SUMMER 2021

#7

PULSE

EXPLORE

COVID-19: WHAT IMPACT ON MOBILITY?

ENLIGHTEN

BOOM TIME FOR BIKES!

ACCOMPLISH

3 CITIES, 3 TRANSFORMATIONS

ARE WE GOING THROUGH A MOBILITY REVOLUTION?

Pulse is intended for all stakeholders, decision-makers and opinion leaders involved in everyday mobility. A Keolis-led initiative, this biannual magazine aims to fuel debate and generate discussion about the trends and challenges that are shaping our industry.

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First came the train, then the car and later high-speed mobility. All these major evolutions in transport have been intrinsically linked to industrial, economic and social change. Over the last 15 years, as adressing the climate emergency has become a top priority, and more recently with the coronavirus pandemic, people everywhere have readjusted their mobility expectations and today want to shift to safer, more connected and above all more sustainable modes of transport. So does this mean we're heading for another transport revolution?

One thing we do know is that we're living through a time of major transformation and that shared mobility will inevitably speed up the energy transition. The role of the private car is being challenged and transport habits are changing as citizens around the globe actively aspire to a world that is both fairer and more breathable. For the sake of the common good, everyone involved in transport must now step up to the plate to transform the sector and win back passengers.

At Keolis, we've taken this step by formulating our corporate purpose: ***"Enhance everyday life in cities and communities by imagining and operating safe, smart and sustainable mobility solutions accessible to each and everyone".*** Developed through a collaborative initiative with all our stakeholders, this new corporate purpose reflects our commitment to tackling the social and environmental challenges facing the world today and provides a framework for effectively addressing the expectations of public transport authorities, passengers, employees and the public.

In this issue of *Pulse,* which I hope will prove more thought-provoking than ever, we bring you the insights of a wide range of experts on these topics which we at Keolis believe are not only crucial but also mark a profound transition.

MARIE-ANGE DEBON
Keolis Group CEO

CONTRIBUTORS

Peter D. Norton

Technology historian

Peter D. Norton is associate professor of history in the Department of Engineering and Society at the University of Virginia, where his specialities include the evolving nature of urban mobility and infrastructure. He has written a book on the dawn of the motor age in the United States between 1910 and 1930, which he describes as the "first transport revolution". For *Pulse,* he takes a critical look at the power of technology — and those promoting it — to change social norms and set the new standard. He explains why the current period should be considered a counter-revolution. ●

Mathieu Flonneau

Historian of mobility and motoring

Mathieu Flonneau is a lecturer in contemporary history at the Paris I Panthéon-Sorbonne University. He has widely documented the history of the car as an object of freedom, desire and democratised mobility. Long before the Yellow Vests movement in France, he warned of the social danger of opposing solo driving and responsible mobility, due to people's reliance on cars in outlying and rural areas. For *Pulse,* he explains how the challenges of mobility have been exacerbated by Covid-19, including the urgent need to think about the best way to achieve mobility for everyone's benefit. ●

Yves Crozet

Transport economist

Yves Crozet is an emeritus professor at Sciences Po Lyon and a member of the Transport, Urban Planning and Economics Laboratory (LAET) research unit, which he directed from 1997 to 2007. He also contributes regularly to research by the Brussels-based Centre on Regulation in Europe (CERRE), a European think tank, and by the International Transport Forum at the OECD. *Pulse* invited him to review the impacts of the pandemic on public transport business models and the potential solutions for restoring long-term funding. ●

Dominique Dhumeaux

Vice president of the Association of Rural Mayors of France (AMRF)

Mayor of a French village of 630 people (Fercé-sur-Sarthe, near Le Mans) and a professional firefighter, Dominique Dhumeaux represents the local authorities of towns and villages with populations of less than 3,500 via the Association des Maires Ruraux de France. Two years ago, the Yellow Vests movement underlined that many people in rural areas felt 'invisible' and that public policies were failing to recognise how dependent they are on private cars. For *Pulse,* Dominique Dhumeaux reflects on what has changed since then and describes how rural France is embracing innovative new forms of mobility. ●

Youenn Dupuis

Deputy general director France in charge of the Greater Paris region

Since 2017, Youenn Dupuis has headed Keolis' Greater Paris branch, which operates and maintains mobility services in and around Paris, and supports local government and transport authorities on issues including the deployment of alternative energy bus fleets and on-demand services. Four years from the planned opening of the Grand Paris Express, he talks to *Pulse* about the challenges involved in a 21st-century metro system. A vision informed by Keolis' expertise as the operator of fully automated metros in London, Hyderabad and Shanghai. ●

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COVID-19: WHAT IMPACT ON MOBILITY?

WUHAN
China

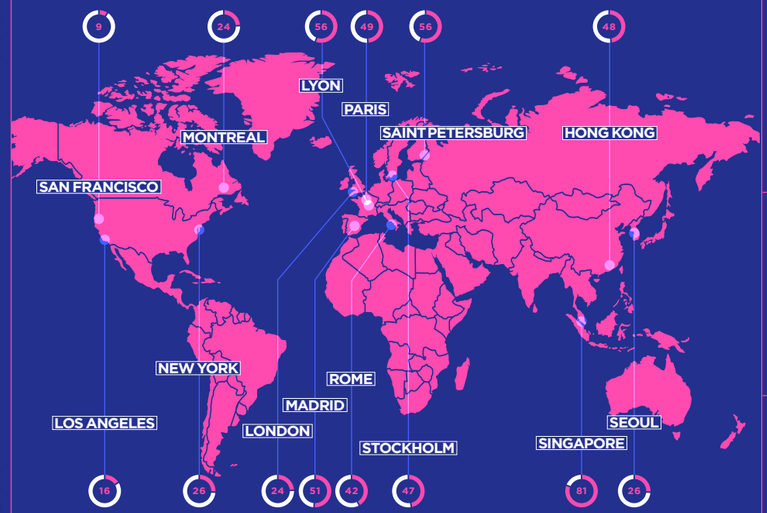
Aerial view of a motorway junction taken 3 February 2020, just as the Covid crisis struck.

A dramatic drop in routine journeys, fear of exposure to the virus on public transport, new aspirations and a longing for a change in lifestyle – the coronavirus pandemic has shifted priorities, compelling transport operators to reinvent their businesses.

By Valérie Lachenaud

DRAMATIC DROP IN DAILY TRAVEL

HUGE VARIATIONS IN RIDERSHIP LEVELS



Source: Citymapper. Data at 8 February 2021 compared with 8 February 2020.

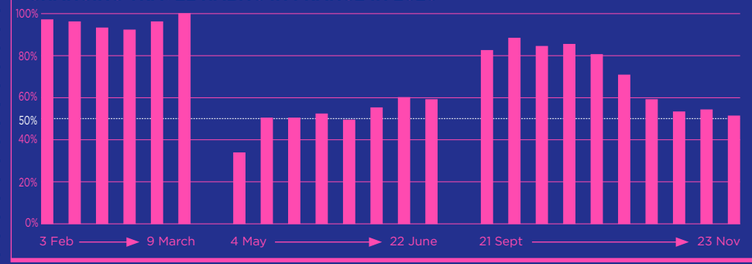
FRANCE: A TEXTBOOK CASE?

Routine travel in France has yet to return to pre-Covid (February 2020) levels, even after the easing of lockdowns. During the first lockdown in March 2020, travel volumes fell 40%, climbing back up to 80-90% of normal levels once restrictions were lifted. Similar figures were reported after the lifting of the second lockdown in December.

The recovery elsewhere has been weaker. Travel in London, for example, has never got above 60% of pre-pandemic levels. Even greater variations have been seen in North America. In Montreal, travel didn't get above 35% of normal, perhaps because fewer people worked from home in Canada. In France, 20% of people worked remotely during the first week of the second lockdown, compared with 40% in the UK.

Source: Happydemics-Le Point survey.

CHANGING TRAVEL HABITS IN FRANCE IN 2020



4 billion

People worldwide subject to travel restrictions

Source: Deloitte, September 2020.

RIDERSHIP

€40BN

Fall in revenue for public transport operators worldwide in 2020.

Source: UITP, 2020.

2% to 5%

Increase in business reported by shared mobility platforms like Blablacar.

Source: Deloitte, April 2020.

90%

Drop in ridership during the first lockdown in France's 10 main cities.

Source: Transition et Energies, 2020.

REMOTE WORKING

74%

Of employees with a higher education qualification in Europe worked from home.

Source: Eurofound report, 28 September 2020.

34%

Of those without a higher education qualification worked from home.

Source: Eurofound report, 28 September 2020.

STRONG DESIRE FOR CHANGE

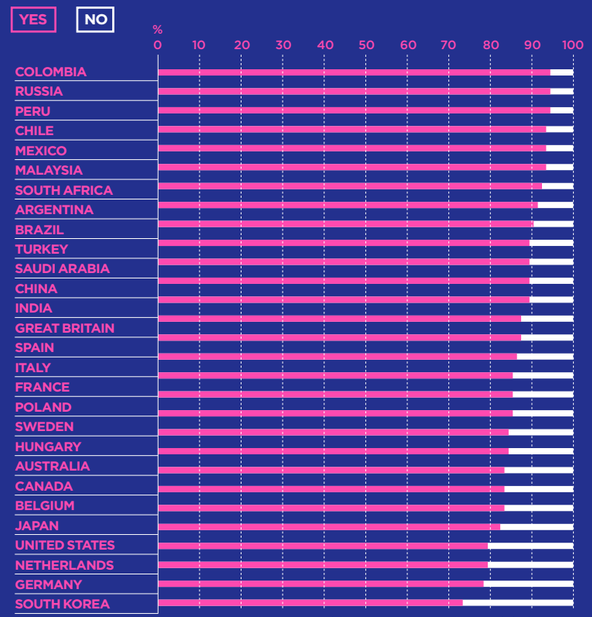
72%

Of people want their personal lives to change significantly, rather than returning to pre-Covid-19.

86%

Say they want the world to change significantly and become more sustainable and equitable, rather than returning to how it was before the pandemic.

RESPONSES BY COUNTRY TO THE QUESTION ABOUT A MORE EQUITABLE AND SUSTAINABLE FUTURE



Source: World Economic Forum/Ipsos global survey of 21,000 adults in 27 countries, September 2020.

PANDEMIC CHANGES THE MEANING OF WORK

14%

More French people would be willing to take a pay cut if they could work less.

Source: Obsoco, June 2020.

49%

Of people in France aspire to a better work/life balance.

Source: Keoscopie, 2020.

DESIRE FOR NEW PASTURES

1 in 3

French people wish they lived somewhere else.

Source: Obsoco, June 2020.

1 in 4

French people dream of living in a less densely populated area.

Source: Keoscopie, 2020.

GREEN ASPIRATIONS

49%

Of French people say the pandemic has changed how they view the environment.

Source: Keoscopie, 2020.

50%

Say their relationship with nature will change.

Source: Keoscopie, 2020.

TAPPING INTO PEOPLE'S ENVIRONMENTAL ASPIRATIONS

13%

Of people say they'll use public transport more than before coronavirus.

Source: 2020 mobility survey, UTP (French rail and public transport union).

2nd

The environment ranks second in the list of reasons why French people use public transport, ahead of convenience — meaning green criteria are more important than economic factors.

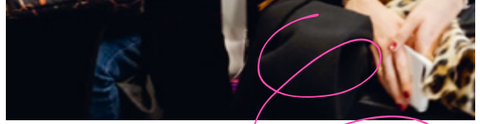
Source: Keoscopie, 2020.

Heightened environmental concerns are an opportunity for public transport. Going forward, this could influence how people choose to travel and impact the modal mix. For operators, this game-changing shift in priorities is a chance to communicate more on the environmental benefits of public transport, such as the fact that public transport emits between 2 and 60 times less CO_2 per passenger mile than private cars, depending on the mode.

Source: Keoscopie, 2020.

TRINQUEMALAY
Sri Lanka

31 March 2020: a wild deer roams through the deserted streets of Trincomalee, Sri Lanka, during a nationwide lockdown to curb the spread of the coronavirus.



RAPHAËL DE BENGY
Avancer ensemble *(Moving forward together)*

"I come from a rural community where people tend to be wary of others who seem different. So I'm fascinated by the ambience in the metro, where people from very varied backgrounds forget what separates them and move forward together. They don't know each other; only the journey brings them together. My aim with these photos is to show how fortunate we are to live alongside each other."

All pictures and captions in the series can be seen here:
instagram.com/avancerensembleparis

And here:
instagram.com/raphaeldebengy

REBUILDING TRUST IN PUBLIC TRANSPORT – A MAJOR CHALLENGE

38%

Percentage of French people who realised during the first lockdown that walking and cycling is actually easier for local journeys.

Source: Forum Vies Mobilités, 2020.

70%

Percentage of city dwellers who say they opted for private motor vehicles (cars or motorbikes/scooters) to avoid the risk of contamination in 2020. This figure rose to 88% in rural areas. What's more, 74% of French people say they still prefer their car to any other means of transport.

Source: Opinion Way survey at the end of the first lockdown.

0%

The level of risk of coronavirus transmission in a metro train, over a period of up to 70 minutes, or 80 minutes on a bus. The level of transmission risk is 1% over longer periods.

Source: University of Colorado, 2020.

0.32%

The chance of contracting Covid-19 on a train. The figure is 0.075% if you sit on a seat immediately after an infected person.

Source: Oxford Academic, March 2020.

35%

of French public transport users say they regularly get off a few stops early and walk the last part of the journey.

Source: Keoscopie, 2020.

64%

of passengers say they trust their public transport network to ensure safety in the future.

Source: 2020 mobility survey, UTP (French rail and public transport union).

MORE EXPECTED OF OPERATORS

Will safety measures be maintained once the pandemic is behind us? No one can tell, but one thing is certain: passengers have high expectations when it comes to safety. So it's likely some precautions will stay in place, such as mandatory face masks for people who are ill or at risk.

In addition, transport operators will probably have to ramp up their strategies for reducing network saturation (such as higher frequencies and apps that allow passengers to avoid crowded trains and buses). Physical distancing and better ventilation are other key issues that need addressing.

Confined spaces	**- Ensure air renewal** **- Ensure air disinfection**
Health & safety	**- Provide hand sanitiser dispensers or wipes at stations and stops** **- Schedule more frequent cleaning** **- Provide proof of cleaning operations**
Crowding	**- Limit the number of passengers at any one time** **- Organise queuing to prevent surging and people crossing paths** **- Block off every other seat** **- Provide live vehicle occupancy information** **- Consider staggered working hours**
Social tension and antisocial behaviour	**- Deploy more onboard staff** **- Deploy more night staff**

Source: Keoscopie, 2020.

Initially, the pandemic caused a big slide in trust among passengers. Over time, however, the panic subsided. Mandatory face coverings, the provision of hand sanitiser and other physical distancing rules helped reassure people there was less risk on transport than they thought.

KEOSCOPIE

The Keoscopie Observatory, key insights into social trends

Overseen by Keolis' Market Research and Strategy department, the Keoscopie Observatory was set up in 2007 to analyse changing lifestyles that could potentially impact mobility trends to help authorities shape the future of mobility.

Since the outbreak of the Covid-19 pandemic, Keoscopie has conducted several online surveys in partnership with Harris Interactive. These were carried out in four waves (June, July, October and December 2020) across a representative sample of more than 4,200 people in France.

OPINION COLUMNS

IS THIS A KEY MOMENT IN THE HISTORY OF MOBILITY?

Ecological and technological transition, new usage trends, public health crisis – mobility is being impacted by many changes, and so far their transformative potential is hard to gauge. To better understand what's at stake today, two historians give us their analysis of developments in their countries: France and the United States. They describe two distinct parallel realities – the urban centre and its outlying areas – and a shared challenge: put an end to private car dependency.

By ***Tiphaine Clotault***
Illustrations: ***Olivier Laude***

Mathieu Flonneau

is a lecturer in contemporary history at the University of Paris I Panthéon-Sorbonne and the Institut d'Études Politiques. He's also President of the International Association for the History of Transport, Traffic and Mobility (T²M).

Always further, faster and for less: the restrictions on movement imposed with the first lockdown pulled the handbrake on a mobility model that was no longer tenable anyway. But, like all crises, Covid-19 has also exacerbated a number of underlying trends that have been at play for a decade. These should prompt us to think about our collective direction of travel, or the "sense of history" we want to give to mobility.

The first trend is private car dependency, made worse by fear during the pandemic. It undermines the scenarios of a mobility deemed more **"virtuous"**, which some had hastily framed as **"going in the direction of history".** Does progress necessarily mean denying people use of our roads? This question was one of the factors that sparked France's Yellow Vests crisis in late 2018, and it needs to be settled, because our outlying suburbs are currently facing a deep mobility crisis. And the necessary ecological transition is only widening the gap between people in city centres, who are well served by public transport or alternatives and those in outlying or rural areas.

"IN FRANCE, LOCKDOWN AND RESTRICTIONS ON MOVEMENT ARE JUXTAPOSED WITH A MOBILITY CRISIS IN OUTLYING SUBURBS..."

If private motoring was the norm throughout the 20th century, it's because it met a need. In France, framework legislation on mobility adopted in December 2019 has brought the issues around routine road travel back into the domain of public policy, at least in part. Central government and local authorities will be better able to take account of the only real-world principle that will matter more than ever after movement restrictions are lifted: the individual and collective cost of mobility and, in turn, the economic sustainability of progressive objectives, which are often left free-floating.

"DOES PROGRESS NECESSARILY MEAN DENYING PEOPLE USE OF OUR ROADS?"

The current economic crisis is also likely to exacerbate changes undermining the notion of the common good, which is the very purpose of progress: the juxtaposition of modes of mobility, more operators and — what's more concerning — the threat of deregulation. Especially since another disruptive issue is emerging: the control of data, which in my view should be held sacred.

"THERE HAS BEEN A DILUTING OF HOW WE MEASURE PROGRESS, WHICH IS NO LONGER RECOGNISED OR SHARED BY MOST PEOPLE."

In the history of public transport in France, the public interest has always been upheld and regulated by an extremely strong state. Today, however, public discourse and decisions are constantly being called into question. Why? Because there has been a diluting of how we measure progress, which is no longer recognised or shared by most people. It's time to rebuild consensus on this issue by fostering a conversation at regional and local level that includes life in outlying areas. Finally, then, we might just allow mobility to lean into a realistic curve that we hope will be virtuous and desirable. ●

Peter D. Norton

is associate professor of history in the Department of Engineering and Society at the University of Virginia, where he teaches history of technology, social dimensions of engineering. He's a member of the University of Virginia's Center for Transportation Studies and has written on transportation history and policy, traffic safety and autonomous vehicles.

We're living a counter-revolution! On 29 January 2020, San Francisco closed off Market Street to private cars and opened it to pedestrians, cyclists, trams and buses. This decision was welcomed by most. Why? Because it has made their daily lives more liveable, safer, cheaper and more eco-responsible. Even in the United States, a country hyper-dependent on the private car, liberation is on the way.

History has rather forgotten it, but the first transport revolution toward the ubiquitous car took place between 1920 and 1950. Led by the carmakers, it transformed social norms and regulations, in parallel with technology. An illustration: 100 years ago, it was **"normal"** to walk anywhere in the public space. This, of course, was a hindrance to the development of the car. So, by calling it **"jaywalking"** and making it **"abnormal"**, the pro-car lobby simply ridiculed pedestrians. The stick-to-the-sidewalk norm was born.

"IN THE UNITED STATES, MAJOR CITIES ARE FREEING THEMSELVES FROM CARS – AND THE SMALLER TOWNS AND CITIES ARE SET TO FOLLOW."

To ensure this counter-revolution succeeds today, we need to appropriate these same effective weapons. The first battle, of course, is communication. In the United States, the bus should no longer convey the negative image of transport **"for those who have no other choice"**. To make this future desirable, we must stop portraying a world without private cars as a negative imposed by climate change. Getting back the freedom to choose how you travel — that's the real revolution!

"GETTING BACK THE FREEDOM TO CHOOSE HOW YOU TRAVEL – THAT'S THE REAL REVOLUTION!"

The second, related battle is semantics. To allow the vocabulary of this counter-revolution to be preempted by those — and there are many of them — who are simply preparing a high-tech version of individual mobility is to lock ourselves into a status quo. No, the **"electric vehicle"** doesn't have to be a battery-powered car, which itself raises a bunch of new issues. The first urban electric vehicle was the tram with overhead wires, which is still the most efficient invention for decarbonising mass transit in cities. For me, **"shared mobility"** isn't these new modes of transport that are rented, sometimes at a high price, but genuinely public transport supported by the public authorities and where the cost is shared.

"THE MOBILITY COUNTERREVOLUTION WILL REQUIRE US TO ACT IN COALITIONS."

The mobility counter-revolution will require us to act in coalitions — between operators, transport authorities and advocacy groups that reject this status quo. But if there's one lesson of hope to be learned from the first mobility revolution, the automobile, it's that changing everything is possible! ●

INTERVIEW

THE RURAL WORLD ON A QUEST FOR EQUALITY

The 'invisible' have become visible.
In 2018, the 'gilets jaunes' or 'yellow-vest' movement aired the grievances of many different sectors of society, including citizens of rural communities who highlighted the inequalities they face – starting with transport. However, whilst general awareness has increased, Dominique Dhumeaux, vice president of the association of rural mayors of France (AMRF), says many lessons are still to be learned.

By Valérie Lachenaud
Photo: Éric Garault

— Is transport inequality between urban and rural communities a real issue?

D. D. Even though it's hard to compare situations, there is blatant inequality. To start with, consider the fact that in France 30% of the transport payroll tax levied on workers via their employers to raise capital for investment in transport infrastructure is generated by people from rural areas. This means that citizens of rural communities indirectly finance public transport, yet to travel to work they have no option but to take their car, because there is no alternative.

— Figures show very high dependency on private vehicles, with 9 in 10 rural citizens required to use their own car to go to work or shop*

D. D. They're doubly impacted. Not only are they forced to travel increasingly longer distances to get to work, receive medical care or access public services, but once they get to the city, they're expected to leave their car on the outskirts and take the tram, or pay the high price for parking in the centre. I'm not criticising the ideas behind these systems, but when you add it all up, people from rural areas feel completely left out.

— Wasn't France's new 'LOM' law on sustainable mobility intended to reduce these inequalities?

D. D. That was its original purpose but, after endless trade-offs, it lost sight of its initial purpose. Of the original 37 proposals to improve rural mobility, only two were retained. Worse still, they're the least effective!

— Do you think rural communities could act as mobility innovation laboratories?

D. D. They already have. Plenty of solutions have been rolled out in our regions. The Le Mans-Sarthe metropolitan tech cluster, for example, developed an electric car-sharing service called Mouv'n Go. The cluster provided engineering expertise for the communities involved, leading to numerous initiatives. Other towns have set up car-sharing schemes and on-demand transport services and built bike paths.

I'm a great believer in park & ride systems. I saw for myself just how effective they can be in Freiburg, Germany, in 2009. I was taken to the top of a hill from where we could see bus after bus converging on the car park of a railway station in the middle of nowhere, ferrying commuters just in time to catch a train that was about to leave. I've tried to develop a similar system in my town, but we've never managed to find an operator. The future also lies in autonomous vehicles, which hold a lot of promise.

— There appears to be a lot more focus on rural issues in public debate than in recent years, especially following the launch of France's "rural agenda" in 2019 outlining a specific action plan. Is this your feeling?

M. M. Things have shifted, there's no denying it. Social media has allowed people in rural areas to connect and become more visible. This was crucial to politicians really paying them any attention — beyond any interest they may claim to have in these issues. It's also true that growing ecological awareness and the ongoing pandemic have changed the way people see rural communities. What's more, the national statistics office INSEE triggered a minor revolution by revamping its mapping model. As a result, the rural population has gone from 4.8 million to 24 million. So something has changed.

But let's not get carried away — it'll be a while before this translates into action on the ground.

— What could make a lasting improvement to rural life?

D. D. Mobility is the crux of the matter, and the source of all the difficulties facing rural dwellers. Determined action is needed so that, a few years from now, people in rural areas have a real alternative to the car. We can't afford to wait; we must tackle this issue right now.

— How should these new mobility solutions be funded?

D. D. The answer is simple: through a system of resource redistribution between local authorities that have ample resources and all the others and between urban and rural communities. Our cities and small rural towns are completely dependent on each other. Rural areas supply people in cities with food, water, clean air and places to get away from it all. Why isn't this contribution acknowledged? Cities would have everything to gain from funding park & ride facilities, as this would enable people from rural areas to come to their high streets, rather than going to out-of-town shopping malls. Redistribution makes sense for the common good and yet, politically, it seems to be a nonstarter! ●

*Source: first survey by the Nicolas Hulot Foundation and Wimoov, in partnership with AMRF (the association of rural mayors of France).

DOMINIQUE DHUMEAUX is vice president of AMRF (the association of rural mayors of France) and, since 2008, mayor of Fercé-sur-Sarthe, a town with a population of 630 in the Pays de la Loire region, west France. He helped draft France's recent "LOM" mobility law and was actively involved in preparing the Rural Agenda in response to the Gilets Jaunes movement. He has developed numerous mobility solutions in his town, including a shared electric vehicle service.

THREE CITIES, THREE TRANSFORMATIONS

Mobility supports a city's growth and development, but it can also bring about genuine transformation. To understand how this dynamic works and continues to evolve, *Pulse* looks at three of the world's major cities or capitals. We take in Vienna, where the city's century-old tram network remains the epicentre of demographic and societal transformations, Tokyo, where the world's densest urban rail network is transcending its physical limits to become an integral part of this smart city, and Strasbourg, a pioneer of low-carbon mobility which is bringing the bicycle back into today's consumption equation.

By Tiphaine Clotault

VIENNA

FASTER INCLUSION THROUGH MOBILITY

With modal share up 9% in 25 years and 45% of people holding an annual travel pass, Vienna's shared mobility performance is a European success story. Trams, metros and buses are used for 38% of trips, ahead of walking at 28%. And in recent years, it's only the growth of 🚲 use — modal share up from 3% to 7% in 25 years — that can compete.

The people of Vienna's attachment to public transport is first and foremost the result of proactive public policies. **For 50 years, the city authorities have methodically curbed 🚗 use, which has seen its modal share fall by 13% since 1993.** But it's above all due to the choice to make inclusion the driving force behind all innovation projects on the network, which has expanded significantly to support the huge demographic boom in the Austrian capital, with 400,000 new people in 20 years.

Travel for a euro a day

In 2012, **Wiener Linien** the Vienna public transport authority, played a masterstroke by cutting the price of an annual pass by 20% from €449 to €365, which it offset by raising parking fines by 60%. The upshot was 500,000 new pass subscribers in eight years. These savings have since enabled travellers to adopt the complementary shared modes (🚶, 🚲, 🛴, 🚗) made available to complete the **'last mile'** without resorting to a private 🚗.

Over a million people have downloaded the WienMobil app, launched in 2017, which lets them combine and book the mobility services offered by 15 Wiener Linien partners.

Adapting to all vulnerabilities...

Vienna has also made accessibility a priority. **All buses and metro trains are now ♿ accessible, as is every second tram. Most stations have tactile walking surface indicators and some also have multisensory information points (audio, touch, sign language).** The city is developing route planners for each category of vulnerable passengers, which also give real-time alerts if accessibility provisions are temporarily unavailable. The next step is to roll out 'light' public transport services, especially for senior travellers, wherever mass transit isn't economically viable. Additionally, since June 2019, **Wiener Linien** has been testing two self-driving shuttles in real-world traffic conditions in the new Seestadt eco-district.

... and all rhythms of life

Just 25 minutes from the city centre by metro, **Seestadt** is a laboratory of equal and inclusive mobility for all rhythms of life. The objective? **Ensure that 80% of routine journeys — school, work, shops, parks, etc. — can be made on 🚶, by 🚲 or by public transport.** This is underpinned by a local urban development plan based on the typical journeys of eight categories of people (working adults with/without children, students, pensioners, etc.). 20 years ago, Vienna was already thinking about gender equality in public spaces, which led to a complete redesign of transport stops, pavements and lighting. Today, it intends to prove it's possible for people of all ages to stay mobile without a private 🚗.

TOKYO
PUSHING THE NETWORK'S LIMITS

Will they be held this summer? With or without the expected millions of visitors? Already postponed for a year due to Covid-19, the Olympic Games are an opportunity to push the limits of a structurally overloaded public transport network, which operates at 150% capacity on average during peak periods. And because of its record density, there's only marginal scope to grow (80% of the city's 37 million population already live and work within a mile of a train or metro station). However, whether or not the Olympics go ahead, the network must adapt to continuous passenger growth and Tokyo's tourism ambitions.

Optimising operations

In summer 2019, one year ahead of the original dates for the Olympics, Tokyo conducted an exercise over several days in near-real conditions, with an extra 660,000 passengers on its trains and metros. Its network may be the world's busiest (30 million people), but its high levels of service frequency, reliability and availability means capacity can still be increased. Operating hours can be extended and frequency of departures — currently every two minutes — can be increased.

In stations, travel management is also in the starting blocks. A champion of contactless ticketing and floor-to-ceiling signage, Tokyo's rail network is testing several ideas: translation devices for information officers, new layouts and upbeat mood music to help speed passenger flows. Posts have also been installed in front of entry gates to quickly split the flows. A delegation for the 2024 Paris Olympics recently visited Tokyo to draw inspiration from its innovations.

Changing behaviours

Tokyo is also testing its travel demand management (TDM) strategy to reduce road traffic in the city centre by 30% and on public transport. Almost 50,000 employees at 2,000 public- and private-sector companies are taking part, with some working from home and others doing staggered hours. **The aim is to spread out commuter numbers over the course of the day.** Tokyo's metro users are also kept informed of ridership statistics to encourage them to change their routines.

MaaS simulation to ease congestion

Beyond the Olympics, **the most decisive step in easing congestion will undoubtedly be MaaS (mobility as a service),** which combines multiple modes of mobility on a single platform. As MaaS is gradually rolled out, with government support, it will allow data to be shared between all operators across a region and solve a major issue in Japan: coordination. In central Tokyo alone, some 40 players share the operation of 121 rail lines. In 2020, to restrict the spread of coronavirus, Tokyo used MaaS to simulate a range of congestion-easing scenarios.

For now, Tokyo's public transport system is taking advantage of the Olympics to improve accessibility: the metro is adding ramps, lifts and floor markings, while all 1,600 buses are now low-floor models.

STRASBOURG
AND CYCLING: SHIFTING UP A GEAR

The Urban Community of Strasbourg, which became a Eurometropolis in 2015, has been promoting 🚲 as a daily mode of transport for 45 years. Critics will say that 49% of local people never use a 🚲 and that restrictions on polluting vehicles don't go far enough. For the more optimistic, 15% of journeys in the city centre are already by 🚲 and in 2018 the French Federation of Bicycle Users (FUB) rated Strasbourg as the most cycle-friendly city in France with over 200,000 inhabitants. What's certain is that, with a 33% modal share for 🚶, Strasbourg is a model of active low-carbon mobility. In the last 10 years, however, the takeup of 🚲 seems to have plateaued. So, how can Strasbourg shift up a gear?

Keeping pace with public transport

As early as its first 🚲 blueprint in 1978, Strasbourg had anticipated the potential of intermodal travel with the future tram system, which entered service in 1993, by setting aside protected sections along its tracks. **Today, the expansion of the rail and bus rapid transit (BRT) networks is being matched by the extension of 🚲 lanes, bike parks and multimodal hubs to support the city's growth.** To make parking more secure, three large fee-paying VéloParks offering 1,790 spaces were opened near stations in 2017. In addition, Pass Mobilité holders benefit from access to 17 park & ride facilities free of charge and a carsharing offer.

A bicycle for everyone

If half of people in Strasbourg don't 🚲, it's simply because most don't actually have a 🚲. The Eurometropolis has launched a vast plan to put this right. The first target beneficiaries are working people for their daily commute. Since 2019, thanks to public funding, 500 electric 🚲 have been available for hire, attracting 1,800 users in two years. Since the start of lockdown, the 6,500 shared 🚲 in this network have been available on a click & collect basis and offered to 1,545 grant-supported students for a token annual fee of €1. Strasbourg is also stepping up initiatives for people on low income. These include a purchase option for €2 a day, a used 🚲 ecosystem and 🚲 marketplaces. It's also supporting community 🚲 schools to get schoolchildren in the saddle.

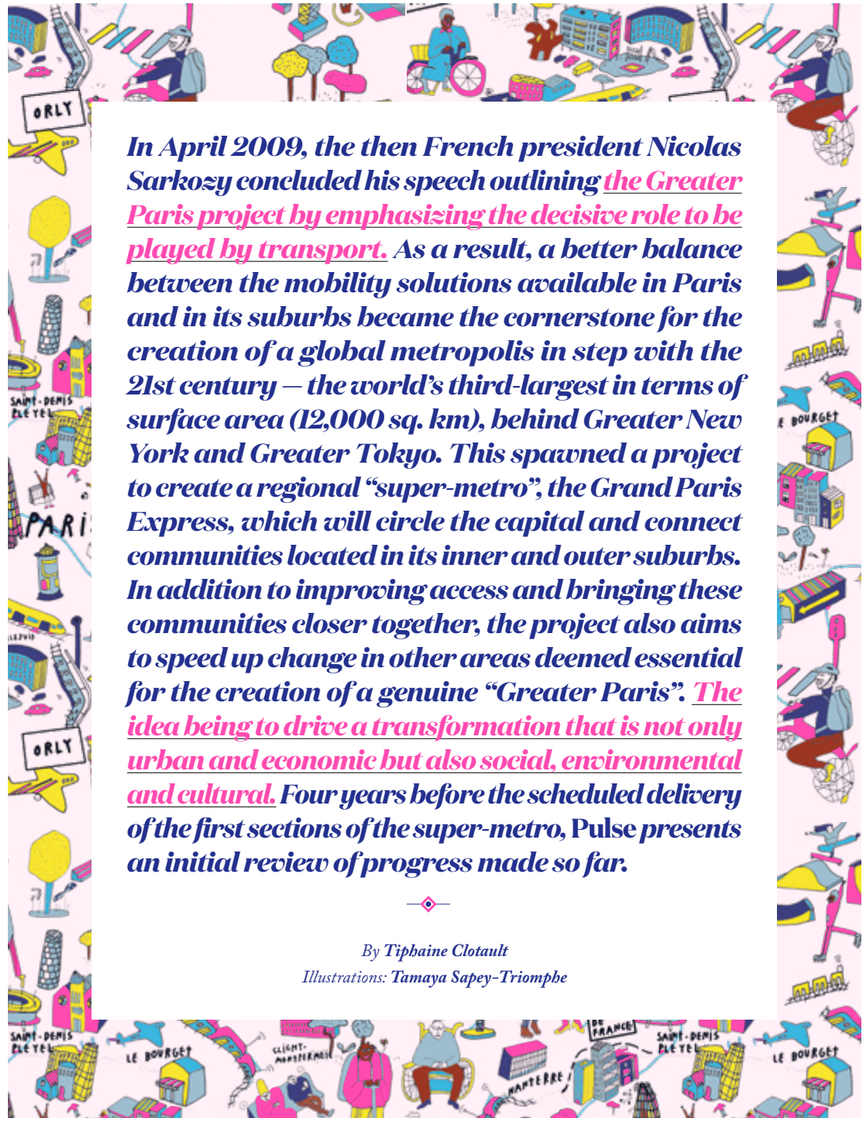
Decarbonising the inner and outer suburbs

The further you go from the city centre, the fewer 🚲 you see. Every day, 500,000 trips of under three miles (5 km) are still made by 🚗.

The 80 mile (130 km) VéloStras express bike network will be completed in 2028, with the aim of converting a third more people to 🚲. Ten radial routes will link Strasbourg's outer suburbs with the centre, while two circular routes will make it easier to cycle between the outlying communities. These routes will benefit from a high level of services, including regular maintenance.

This cyclable 'highway' will supplement the Réseau Express Métropolitain project launched in late 2020 to interconnect 13 existing stations in the towns around Strasbourg by train and bus. **The ultimate goal is to offer a low-carbon mobility solution for everyone living and working in the Eurometropolis.** ●

EN ROUTE TO A GREATER PARIS



In April 2009, the then French president Nicolas Sarkozy concluded his speech outlining the Greater Paris project by emphasizing the decisive role to be played by transport. As a result, a better balance between the mobility solutions available in Paris and in its suburbs became the cornerstone for the creation of a global metropolis in step with the 21st century — the world's third-largest in terms of surface area (12,000 sq. km), behind Greater New York and Greater Tokyo. This spawned a project to create a regional "super-metro", the Grand Paris Express, which will circle the capital and connect communities located in its inner and outer suburbs. In addition to improving access and bringing these communities closer together, the project also aims to speed up change in other areas deemed essential for the creation of a genuine "Greater Paris". The idea being to drive a transformation that is not only urban and economic but also social, environmental and cultural. Four years before the scheduled delivery of the first sections of the super-metro, Pulse presents an initial review of progress made so far.

By ***Tiphaine Clotault***
Illustrations: ***Tamaya Sapey-Triomphe***

Meeting
70%
of suburb-to-suburb travel needs

On 14 December 2020, after 11 years of construction work, the Paris metro's line 14 finally crossed the ring road separating the capital from its northern suburbs with the opening of a 3-mile (5.8-km) extension. It was a major milestone because the extension alleviates congestion on one of the metro's black spots, line 13, which links the northern suburbs to the capital's centre — by as much as 25% according to regional transport authority Île-de-France Mobilités. More importantly, even though line 14 isn't officially part of the Grand Paris Express network, this rollout sets the scene for what's ahead: four lines, including 124 miles (200 km) of track and 68 stations, to be delivered in sections between 2025 and 2030. And line 14 — which will be further extended to reach the Paris 2024 Olympic Village and Paris-Orly airport — will itself play a key role in linking the future regional super-metro to the city centre, thanks to its record frequency of one train every 85 seconds.

PRIORITY TO THE EAST IN 2025

Société du Grand Paris, the company appointed by the French government to design and execute the project, has prioritized the work being carried out. The first communities to benefit from the network's first two lines (15 South and 16) in 2025 will be those in the eastern suburbs, currently the least well connected in terms of suburb-to-suburb transport. The anticipated time savings are significant: 20 minutes between Saint-Denis and Clichy-Montfermeil and 38 minutes between Pont-de-Sèvres and Noisy-Champs (a 24-mile/39-km journey) versus an hour today.

Because the most important thing about this long-awaited super-metro is that it's going to make life easier for millions of people living in and around the French capital. The current regional network, which has connected the suburbs to Paris since the 19th century, is no longer aligned with residents' transport needs. Today, suburb-to-suburb travel accounts for 70% of the daily journeys made in the Paris region — up 50% in 30 years), 80% of the journeys are made by car to avoid having to cross the capital. As a result, people spend, on average, 90 minutes on the daily commute. Since the last major network extension in the Paris metropolitan area (the RER suburban rail network in 1977), the population has increased by 2.2 million and the economic and demographic dynamics have completely changed. Today, 58% of the region's jobs are located outside Paris and its La Défense business district and the capital loses 11,000 residents each year while outlying areas gain 65,000 more. The aim is therefore to create a Greater Paris transport system as practical as the one within the city itself.

AN INNOVATIVE PASSENGER EXPERIENCE

To meet today's passenger expectations, the super-metro will also be much more efficient and comfortable, with air-conditioned carriages, increased frequency (every 2 to 3 minutes), faster speeds (34 to 40 mph/55 to 65 kph), greater connectivity and improved connections. As an automated network, it will also adjust the frequency of departures depending on the day of the week and any specific events. But more importantly, it will excel in a realm where the Paris metro struggles: accessibility. With some platforms as far as 164 feet (50 metres) below ground, accessibility will be achieved thanks to lifts. Since late 2020, details have

THIS MUCH-AWAITED SUPER-METRO WILL MAKE LIFE EASIER FOR MILLIONS OF PEOPLE

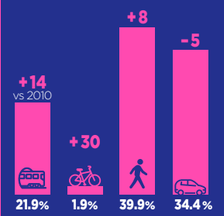
ILE-DE-FRANCE AT A GLANCE

12.17 million residents *(up 0.5% per year)*, representing **19%** of the population of mainland France, comprised of
- **18%** in Paris itself
- **38%** in the inner suburbs
- **44%** in the outer suburbs

1,013 people per sq. kilometre

28% of France's GDP (5.8 million salaried jobs)

43 million journeys daily, of which:



(Source EGT 2020 – figures for 2018)

THE GREATER PARIS PROJECT IS EXPECTED TO DRIVE SWEEPING URBAN DEVELOPMENT

GRAND PARIS EXPRESS

124-mile (200-km) automated metro with **68** new stations

1.45 million residents in station catchment areas

More than **10 million** people living less than 1.2 miles (2 km) from a station (all networks combined)

2 to 3 million passengers per day

€35 billion construction budget out of a total investment of €110 billion for Greater Paris projects (urban development, CDG Express line, etc.)

Ultimately:

27.6 tonnes of CO_2 emissions avoided between now and 2050 (in total)

Between **250,000** and **400,000** homes built

115,000 jobs created

€10 to **€20 billion** per year in additional GDP for Ile-de-France

Persuade
45%
of the Paris region population to stay there

All the surveys point to the same thing: people in the Paris region would love to leave — and the recent lockdowns have only strengthened this trend. While few actually make the move — the region accounts for one-quarter of all jobs in France — this shows that people really do aspire to a better quality of life. Stress, pollution, housing prices and lack of space are among the main complaints. However, there is a huge disparity in quality of life across the region, which is home to both France's wealthiest communities — Paris city centre and the western suburbs — and the poorest — Seine-Saint-Denis to the north of the city. The northern suburbs have nevertheless created more new jobs than anywhere else in the past decade. By serving 53 designated "priority neighbourhoods", the Grand Paris Express will help improve things by providing better access to employment, learning and amenities (such as healthcare, leisure and culture) for the entire metropolitan area. But it's expected to do more than just this. The aim is to drive sweeping urban development to create a cityscape that is at once inclusive, environmentally-sound and beautiful. And projects are now in full swing to achieve just that.

also been revealed about the innovations we can expect to see in stations. Information about occupancy rate and passenger distribution will be displayed on the platform as each train approaches. The furniture will take into account passengers' physical and behavioural diversity during waiting times (active, anxious, relaxed, etc.), by including low seating, perch seating and spaces for and . Stations will also be designed to make passengers feel welcome and safe. Fresh air and natural light will filter down to the platforms to offset the feeling of being underground. And the lighting will reflect the time of day and the season, thanks to technology that reproduces the sun's natural cycle.

MULTIPLE PROJECTS TO IMPROVE OTHER TRANSPORT SERVICES

On the cost side, the initial budget was estimated at €35 billion, financed partly through very long-term loans. But this was also meant to cover the cost of improving other transport infrastructure in the region, including extensions to line 14 and the 14 Eole, as well as the building of the CDG Express line to link Paris-Charles de Gaulle airport directly with Paris-Gare de l'Est train station. It's been clear since 2018 that this initial budget will only cover the construction of the Grand Paris Express network. Nevertheless, all these other projects are still in the pipeline, and the super-metro has spurred the launch of many other projects benefiting suburban communities. No fewer than three Paris metro lines, four tram lines and one RER line are being extended in 2021. And four new tram networks are also going to be built. Residents in the suburb have also seen their transport conditions improve in recent years through the gradual renewal of rolling stock on local and regional train lines.

NEW ROLE FOR STATIONS AS URBAN HUBS

Metro stations barely visible from the street, where people just pass through, are poised to become a thing of the past. While the idea of an overhead network has been ditched (80% will run underground), the new super-metro will "occupy" urban space, thanks to the sometimes monumental architecture of its 68 stations, each one different to blend into its surroundings. But the aim is also to create new urban hubs. On station forecourts, designed to common specifications, the emphasis will be on planted spaces to provide a cooling effect, offering modular uses. Overground facilities will be open to the city and include shops, services and collab-

orative spaces. More surprisingly, stations will also be cultural venues accessible to everyone. Around 30 artists and architects have been creating artworks that will be incorporated in the architecture, including sculptures, videos and illuminated and digitally-enabled features.

STEPPING UP HOUSING DEVELOPMENT PROJECTS

For the time being, however, Greater Paris is starting to take shape mainly around stations (within a radius of 800 metres). Everywhere, urban redesignation projects and new developments are underway or about to kick off, representing a surface area roughly one and a half times the size of the city of Paris. In a region where the housing stock renewal rate is low (1%/yr.), the goal is densification and greater social diversity. The average asking price per square metre of a house or apartment in the city centre has doubled in the last ten years (to €10,750), accelerating the gentrification of the inner suburbs and pushing out even more young and vulnerable residents. A report published in 2019 on progress in this area showed mixed results: among the 186 development projects underway, densification missed its targets and there were too few public and green spaces and not enough cycle ways. What's more, projects are forging ahead faster in the west of the city than in the east. Between 250,000 and 400,000 homes are scheduled to be delivered by 2030 and later, so there is still time to get back on course, especially as outcomes are better regarding other objectives. For example, current development projects include 30% social housing, which in addition is well suited to the region's changing household sizes and structures (smaller, intergenerational, designed for students). Furthermore, these new developments provide an almost even split between housing and commercial real estate (offices, shops and services), compared with a ratio of 60-40% at present. This is good news on the jobs front.

MORE ECO-FRIENDLY PLACE TO LIVE

Although modal shift targets have not been announced yet, the new super-metro should help reduce road traffic, which is responsible for 32% of greenhouse gas emissions in the Paris area. Air quality is also expected to improve. Currently, 1.4 million people in the region are exposed to pollution levels that exceed regulations. In addition, the urban development projects now taking shape are helping to step up the energy transition in the region, notably by deploying solar energy and electricity storage solutions. Nevertheless, given the metro's significant energy requirements — equivalent to the needs of a city of 225,000 people — the Grand Paris Express aims to be exemplary. Circular economy-inspired innovations are in the pipeline, including waste heat recovery and re-use. What's more, the stations themselves will provide energy for surrounding neighbourhoods. Geothermal energy, heat stored underground and heat loss from the metro infrastructure may be used to heat — or cool — nearby buildings. This solution has already been approved for three stations on line 15 Sud (south).

Convincing
60 million
passengers

The third tier in the master plan is to make Greater Paris as attractive as possible. The goal ultimately is for the super-metro to connect the city's three airports, its research hubs, universities and business clusters, putting Paris on a par with other global cities. But four years before rollout of the first sections, several challenges have yet to be addressed. The first one being of course to make it popular with commuters and businesses. This implies convincing a significant proportion of the 10 million-plus citizens who, by that time, will live less than 1.2 miles (2 km) from a public transport hub (all modes combined). But it also means persuading the 50 million people who visit the Paris region every year either for business or pleasure to venture beyond Disneyland-Paris, La Défense, Versailles and the main city-centre attractions.

IMPROVING TRANSPORT LINKS WITH PARIS' 68 STATIONS

Anyone who's ever lived in the inner or outer suburbs of Paris knows that getting to a train or RER station other than by private car is neither quick nor easy. Buses sometimes don't run often enough and safe bike lanes are too disjointed. Regional transport authority Île-de-France Mobilités and the municipal authorities concerned have therefore got their work cut out for them in revamping public space around public transport and active modes of transport. This is especially true in the outer suburbs, home to 5.3 million people, where car are used in 20% of cases for getting to local stations. Express bus services using dedicated motorway lanes will be ramped up. As for the stations on the new super-metro network, the aim is to turn them into **"sustainable mobility hubs"**, featuring an ecosystem of services for bike (parking, rental and repairs) and shared transport modes (ride-sharing, car-pooling and autonomous shuttles).

ALTHOUGH MODAL SHIFT TARGETS HAVE NOT BEEN ANNOUNCED YET, THE NEW SUPER-METRO SHOULD HELP REDUCE ROAD TRAFFIC, WHICH IS RESPONSIBLE FOR 32% OF GREENHOUSE GAS EMISSIONS IN THE PARIS AREA

Avenues to ensure the new **"greater"** Paris becomes a prime tourist and cultural destination also need to be explored. Since the governance model for the metropolis has yet to be decided, the multi-layered administrations who currently oversee its future — sometimes with overlapping powers — need to learn to work better together. Furthermore, it is essential that the economic benefits of all these developments be redistributed more harmoniously to ensure social cohesion. One thing's for sure, however: the new Greater Paris will be a tremendous driver for rebooting the economy after the COVID-19 pandemic. Launched 12 years ago in the midst of the subprime crisis, the project is as relevant today as it was then. ●

INTERVIEW

"An automated metro doesn't imply dehumanising mobility — quite the opposite!"

Leaving aside the planned route, how will the Grand Paris Express revolutionise transport for people in the Paris region? What are their expectations? And what are the key drivers of the new network's performance? *Pulse* spoke to YOUENN DUPUIS, Deputy general director France in charge of the Greater Paris region.

HOW WILL THE SUPER-METRO TRANSFORM PARIS INTO A 21ST-CENTURY GLOBAL METROPOLIS? AND WHAT ARE THE STAKES FOR AN OPERATOR LIKE KEOLIS?

Y. D. The construction of the Grand Paris Express entails investments of €35 billion, the burden of which ultimately falls on taxpayers, with annual operating costs estimated at €1 billion. So, what we collectively owe to the people of the region is the world's most modern metro, delivering a quality of service in line with the highest international standards. At Keolis, we believe we can achieve this goal by developing human-centric mobility. In other words, tailoring the system to each and every possible need and deploying well-trained, visible staff on the ground to engage directly with passengers.

YOUENN DUPUIS
head of Keolis' Greater Paris branch since 2017. The branch has 4,000 employees and 25 subsidiaries and carries 165 million passengers annually for Île-de-France Mobilités.

HOW WILL "HUMAN-CENTRED MOBILITY" SHAPE UP?

Y. D. Take cleanliness, for example, which is often cited as a problem by passengers in the Paris region. Technical solutions will of course help improve things, but what will really make a difference is ensuring teams apply a "zero defects" policy. This also goes for passenger information during service disruptions, and we intend to pay particular attention to the 40% of people in France who experience mobility-related vulnerabilities. This topic has been extensively researched by Keoscopie, our observatory of lifestyles and mobility trends. To be able to offer an alternative route to all passengers, staff must be trained to identify those who either have a visible disability or suffer from an invisible vulnerability, such as anxiety, language issues or difficulties in using digital technology. Keolis has applied this thinking to the Docklands Light Railway network in London, where it's providing specialized training for staff. Another key aspect that requires a tailored response is spreading out peak rush-hour traffic. In Rennes, we worked with the city's university to adjust timetables for staff and students to minimise the need to travel during rush-hour traffic. What's more, because operators will also be responsible for managing the future stations on the Grand Paris Express network, they'll have a crucial role to play in making them fully-fledged urban hubs

48% OF PEOPLE IN THE PARIS REGION ALMOST ALWAYS OR OCCASIONALLY USE A DIFFERENT MEANS OF TRANSPORT FOR THEIR OUTWARD AND RETURN TRIP

that contribute to the vibrancy of surrounding neighbourhoods.

LAST-MILE MOBILITY WILL BE A KEY SUCCESS FACTOR FOR THE GRAND PARIS EXPRESS. WHAT'S NEEDED IN YOUR OPINION?

Y. D. In the Paris region 48% of people almost always or sometimes use a different means of transport for their outward and return trip. The challenge therefore will be to offer a range of integrated and interchangeable solutions that people can choose between depending on the circumstances. The micro-mobility solutions we're seeing emerge today like self-service electric bicycles are part of what should be on offer. And this should also include walking, which must be made safer, for example, with "walking bus" schemes, whereby staff accompany pedestrians. In the medium term, autonomous shuttles will offer a solution to passengers' needs in the evening and during off-peak periods. Buses will, of course, remain the main way of getting people to stations, but with more flexible systems. On the networks we operate for Île-de-France Mobilités, we're steadily introducing more on-demand schemes in the evening, for example, with buses waiting for passengers and allowing them to get off where it's most convenient. We're also developing continuity with train services, meaning that if a train is delayed a few minutes, the bus driver will wait for passengers.

THESE NETWORK UPGRADES WILL PUT PRESSURE ON PUBLIC FUNDING — ESPECIALLY WITH THE CURRENT CRISIS. WHAT FINANCIAL LEEWAY IS AVAILABLE?

Y. D. As public transport in the Paris region is opened up to competition, I see huge potential for cost savings, as operating costs across the region will be challenged. As well as financial benefits for the transport authority, competitive bidding will also drive quality of service and innovation as providers will undoubtedly seek to outdo each other in offering the best solutions for passengers in Europe's most populated region.

WHAT IF WE REGULATED CAR USE?

The decline in ridership and loss of revenues due to the coronavirus crisis have dealt a blow to public transport networks. According to transport economist Yves Crozet, this new threat accentuates the need to rethink funding and regulation models for urban and suburban mobility solutions.

By ***Valérie Lachenaud***
Photos: ***Denis Allard***

Economist **YVES CROZET** is an emeritus professor at Sciences Po Lyon and a member of the Transport, Urban Planning and Economics Laboratory (LAET) research unit, which he directed from 1997 to 2007. He also contributes regularly to research by the Brussels-based Centre on Regulation in Europe (CERRE), a European think tank, and by the International Transport Forum at the OECD. His most recent work includes reports on new forms of mobility, Mobility-as-a-Service (Maas) and the role of the cars in urban mobility.

INTERVIEW

— WHAT IMPACT HAS THE HEALTH CRISIS HAD ON PUBLIC TRANSPORT?

Y. C. The first and second lockdowns in France resulted in a sharp, long-lasting decline in public transport ridership, which has picked up slightly since but still hasn't returned to 2019 levels. The reasons behind this decline include the uptick in home working and the economic slowdown, as well as a switch to other modes of transport, such as walking and cycling, but also private cars.

— HAS THE SAME TREND BEEN OBSERVED IN OTHER COUNTRIES?

Y. C. Absolutely. Researchers at ETH Zurich have been following a sample group of passengers and their daily movements for over a year. The data collected clearly shows a decline in passenger traffic during lockdown periods but also a shift in mode choice. Cycling has been one of the most popular modes during the pandemic, at least until autumn, when temperatures started to drop. Road traffic fairly quickly returned to the same level as the previous year, while public transport ridership remains 20% to 30% lower than pre-lockdown levels. Similar trends have been observed around the world, including in the United States and other parts of Europe.

— ISN'T THERE A RISK THAT THE PANDEMIC WILL UNDERMINE EFFORTS MADE IN RECENT YEARS TO DEVELOP PUBLIC TRANSPORT AND REDUCE CAR USE?

Y. C. There certainly is. The decline in ridership and commercial revenues is going to create serious problems for transport authorities. In France, transport authority association GART estimated back in May 2020 that nearly €4 billion in financing was needed as a result of the decline in commercial revenues and mobility tax proceeds.

Another trend has been accentuated by the pandemic. The desire among certain city dwellers to live in a different environment was heightened by their experience during lockdown, as illustrated by the demand for real estate in suburban areas or even farther afield. If it becomes a reality, this urban "thinning" would diminish the relevance of public transport and increase car use.

> "THE DESIRE AMONG CERTAIN CITY DWELLERS TO LIVE IN A DIFFERENT ENVIRONMENT WAS HEIGHTENED BY THEIR EXPERIENCE DURING LOCKDOWN."

— HOW MIGHT THAT AFFECT PUBLIC TRANSPORT FUNDING MODELS?

Y. C. In terms of funding, France is different to other countries because of its mobility tax system: companies with more than 11 employees pay a percentage of their payroll to help finance the public transport network. Introduced nearly 40 years ago by France's LOTI law on inland transport, this system has ensured a steady stream of resources for many years and enabled significant improvements in the public transport offer. But the economic situation is now calling this system into question. Businesses closures and lay-offs are reducing this source of funding, which often represents more than 50% of operating revenues, or nearly twice as much as commercial revenues.

In other countries, commercial revenues play a larger role and cover at least half of the public transport network's operating costs. But with ridership declining, that model is also under threat. With the challenging economic environment making it difficult to increase ticket and subscription prices, countries around the world must rethink their funding models.

— WHAT ARE THE POTENTIAL SOLUTIONS AND WHICH ONES WOULD YOU RECOMMEND?

Y. C. Although it's counter-intuitive, the current crisis will probably speed up France's shift to free public transport. Fifty years ago, commercial revenues

accounted for 70% of the public transport network's total revenues. Today, they represent just 30% on average and 15%-20%, or even less, in many small towns. If revenues decline, the percentage will become insignificant.

In these circumstances, more and more cities will wonder whether it's worth having ticket machines, turnstiles and ticket inspectors. And they may well be tempted to make public transport free. Niort and Dunkirk already have. Montpellier introduced free public transport on weekends for residents last September. And Audrey Pulvar (an elected official at Paris City Hall) is talking about it for the Greater Paris region. It's seen by many as a way of converting people to public transport.

— What's your opinion of this solution?

Y. C. It all depends on the scale involved. In a small town, where public transport costs relatively little and accounts for only a very small share of all travel, it's easier but it doesn't change the modal mix. However, in a large city like Montpellier, it jeopardises future investments, including those designed to extend the network outside the city centre. SYTRAL, the public transport authority in Lyon, was able to extend the city's metro lines and create new tram lines over the past two decades precisely because it took the opposite approach. To develop a high-quality transport network, commercial revenues need to account for a significant portion of the budget. Lyon is the exception to the rule in France 🇫🇷: in 2019, commercial revenues covered 60% of its operating costs, compared with less than 30% in the Greater Paris region.

— Isn't free public transport nevertheless a good way to get people out of their cars?

Y. C. No, it doesn't work. Free public transport may be a good campaign slogan, but any resulting modal shift is negligible. People don't use public transport because it's free, but because it offers a fast, regular and reliable service that takes them where they actually need to go. Passengers will use it for more journeys, over shorter distances, rather than walking or cycling. At best, it's a way to attract people back to the city centre. But it doesn't change the fact that the vast majority of motorised journeys are made by car. It's interesting to note that very few cities around the world have adopted this solution, except for Tallinn in Estonia 🇪🇪 (for residents only) and Luxembourg 🇱🇺. Other cities that had introduced free public transport, such as Portland and Atlanta in the United States 🇺🇸, have since backtracked.

"WITH THE CHALLENGING ECONOMIC ENVIRONMENT, COUNTRIES MUST RETHINK THEIR FUNDING MODELS"

— What new model do you see emerging?

Y. C. The aspect of the French model we need to hold on to is the principle of an earmarked source of revenue. But basing that source of revenue on a payroll tax is problematic. First of all, there's the threshold effect. Since the mobility tax is only payable by companies with 11 or more employees, some businesses may avoid growing. There's also the issue of geographical equity. Large businesses are often located in outlying areas, while the public transport they're helping to fund is mainly concentrated in city centres. Firms are relieved of their responsibilities and their employees have no choice but to drive to work.

— So, where should public transport funding come from?

Y. C. Funding could come from other types of taxes, like the one on office real restate in Paris to help fund the Grand Paris Express (GPE) network. But the best solution is a fee for using transport infrastructure, particularly roads, which accounts for most travel. In France 🇫🇷, for example, from 1982 to 2000, vehicle tax discs provided funds to the local authorities that managed roads but also coach transport. The tax disc was a very progressive levy, paid primarily by owners of "gas-guzzlers".

In accordance with the European Union's 🇪🇺 recommendations, we need to imagine a more elaborate system where payment would depend — for all vehicles, not just trucks — on the number of miles travelled and the type of roads used. A few years from now, all cars will be connected. The digital revolution must facilitate the widespread application of a basic principle: motorised mobility must pay for motorised mobility. And the modes that take up the most public space must compensate by helping to fund public transport networks, which uses less public space. That's the idea behind the urban toll system used in London 🇬🇧, Stockholm, Gothenborg and Oslo 🇸🇪, where tolls generate 20% of public transport operating revenues.

— Is a toll a good idea from a social perspective? Wouldn't the cost be more dissuasive for those with fewest resources?

Y. C. No, because it's perfectly compatible with a solidarity-based pricing system. The toll can be adapted according to income level, the size of the vehicle or even the amount of pollution it generates. And don't forget that people with the lowest incomes already use public transport.

— Why charge for using the road network?

Y. C. Because the vast majority of journeys are carried out by road and because public transport authorities have become multimodal mobility authorities. They can no longer focus solely on public transport, which — excluding in the Greater Paris region — accounts for less than 20% and often less than 10% of all journeys. Given that cars still dominate, and in light of urban sprawl will continue to do so for some time, their use must be regulated because they generate costs, notably in terms of road safety, noise, pollution and use of public space. Yet, today, with the exception of certain motorways, road use is free of charge, especially for electric vehicles. Paradoxically, the transition to electric vehicles is going to require the introduction of a distance-based "pay-as-you-go" pricing system.

"THE TRANSITION FROM PUBLIC TRANSPORT AUTHORITY TO MULTIMODAL MOBILITY AUTHORITY INVOLVES A CHANGE OF SCALE THAT REQUIRES THE USE OF NEW TOOLS."

Legislation has already imposed the user-pays principle for water, waste and electricity, but the question hasn't even been raised for mobility.

— Would it be politically sustainable? The yellow vests movement has shown how sensitive this topic is....

Y. C. The issue is a tricky one and the "solutions" devised by economists tend to be problematic for public decision-makers. But those same decision-makers are setting very ambitious environmental objectives: greenhouse gas emissions reduction, zero net artificial land development, preservation of biodiversity, and more. And protecting those community assets requires increased regulation of motorised transport. At the European level, this observation has resulted in a de facto alliance between economists and ecologists, who agree that charging is a good way to change behaviours. Realising that the transition will be difficult is not enough; the groundwork needs to be laid. If transport authorities continue to focus solely on city-centre mobility solutions — whether it's with gimmicks like free public transport or "low-emission zones" — they will completely miss their target. And the climate commitments made 55% less greenhouse gas emissions by 2030 will not be achieved. To ensure that mobility regulation is aligned with those commitments, ambitious measures must be taken.

— What kind of measures?

Y. C. Introducing charges for all motorised mobility solutions, but also revolutionising the way roads are used. Because better mobility regulation also requires the reorganisation of road space. Solo driving needs to be curtailed by setting aside more space for green modes of transport, including for long distances in suburban areas, but also for collective mobility solutions, such as carpooling and express coaches on motorways.

These measures need to be implemented on the access roads to urban areas in order to avoid the rebound effect that electric vehicles are going to have on the car market by reducing the cost of using a private car. The transition from public transport authority to multimodal mobility authority involves a change of scale that requires the use of new tools. ●

1. Crozet Y., 2020, Mobility as a Service: a New Ambition for Public Transport, paper prepared for the Roundtable on MaaS and Public Transport? Paris ITF-OECD, 23 pages, **www.itf-oecd.org/sites/default/files/docs/maas-ambitions-public-transport-authorities.pdf**

Crozet Y., 2019, Car and Space Consumption: Rethinking the Regulation of Urban Mobility, ITF-OECD, 28 pages. www.itf-oecd.org/car-and-space-consumption-re-thinking-regulation-urban-mobility.

A DELICATE BALANCING ACT

REDUCING NETWORK CONGESTION THROUGH TDM

What happens when a metro or train system reaches maximum capacity and it's no longer possible to extend the network or add more rolling stock? *Travel Demand Management (TDM) is all about improving the flow of public transport systems by adjusting travel demand. For large cities, this mass transit management solution could be a game-changer.

By ***Julien Thèves***

Illustration:
Simon Bailly

Travel demand management (TDM) is a mobility management concept that emerged in the United States in the wake of the oil crises of 1973 and 1979. To save energy and improve traffic flow on the roads, drivers were encouraged to leave their cars at home via ad campaigns, an adjusted public transport offer and various financial incentives, including tolls and fiscal measures. In recent years, TDM has become a key tool for enhancing the efficiency of existing mass transit systems. It focuses on the four R's: "Reduce" (limit travel), **"Re-time"** (change travel times to avoid peak periods), **"Re-mode"** (choose an alternative mode of transport, such as walking, cycling or the bus), and **"Re-route"** (take a different route to get where you want to go).

Relieving peak-hour congestion

"TDM has gradually become a preferred solution for the world's major cities, as they struggle to deal with recurring network congestion and pressure on their finances," says Agnès Grisoglio, Transformation & Mass Transit Academy Director, SNCF. "With the support of the region, local communities and public transport authorities, the Transilien teams in Greater Paris are implementing TDM initiatives to cope with peak-hour demand, for example, or during maintenance and renovation work. We're focusing on the lines, stations and times with the highest levels of demand, such as those serving the La Défense business district or the Plaine Commune cluster. Based on our knowledge of peak-hour usage, we regulate demand by encouraging passengers to travel earlier or later on weekday mornings and evenings. We also liaise with the businesses and universities that generate passenger traffic to help spread departure and arrival times over a longer period." The TDM initiatives being implemented around the world are many and varied. In New York, suburban train tickets are cheaper during off-peak hours, while in Melbourne, passengers can travel for free before 7:15 am. Other cities are finding more creative ways to get passengers to travel outside peak times. Examples include a points system that offers cash rewards in San Francisco, and free noodles in Tokyo!

Changes driven by Covid-19

When the 2020-2021 health crisis made physical distancing a necessity, TDM played a key role in regulating traffic flows. In New South Wales, Australia, for example, the operator increased the discount offered to passengers travelling during off-peak times, from 30% previously to 50% at the height of the epidemic, between July and September. In Beijing, a trial booking system was introduced right at the start of the pandemic for metro users travelling between 6:30 am and 9:30 am on weekdays. "The health crisis proved that commuters do have the ability to adjust their travel times," says Agnès Grisoglio. "We need to leverage these behavioural changes to enable passengers to travel more comfortably in the future, in trains that are less crowded and consequently more punctual."

Preparing for anticipated surges in demand

In addition to day-to-day challenges and Covid-related imperatives, operators also have to deal with temporary surges in demand caused by major events — a frequent occurrence in large cities and one that needs to be prepared well in advance. Once again, TDM seems to be the most promising solution and is often the only one that's viable. In 2012, with passenger traffic expected to increase by 30% during the Olympic Games, Transport for London (TfL) launched its **"Keep London Moving"** campaign aimed at encouraging passengers to adjust their travel habits. The campaign worked: one in every three passengers changed their habits and overall travel demand decreased by 5%. "Five percent might not seem like much, but it's enough to restore capacity to the network and make it more robust, particularly when employment is highly concentrated in specific areas", explains Agnès Grisoglio.

"WE NEED TO LEVERAGE THESE BEHAVIOURAL CHANGES TO ENABLE PASSENGERS TO TRAVEL MORE COMFORTABLY IN THE FUTURE."

As for France, Île-de-France Mobilités and its partners — SNCF, RATP, the public authorities and the Games committee — are already taking action to make the Paris 2024 Olympics a success. For Agnès Grisoglio, the challenge is a formidable one. "We're accustomed to using TDM for temporary surges in demand related to major events," she says. "But the Olympic Games will be 40 times bigger than a football or rugby World Cup! We need to come up with a TDM solution that will enable the mass transit network to prove its solidity and efficiency, while meeting the travel demand generated by Olympic Games spectators as well as the day-to-day mobility needs of those who live and work in the Greater Paris region."

BOOM TIME FOR BIKES!

In the wake of the pandemic, 2020 saw a surge in cycling as people opted massively for active mobility. Thousands of miles of bike lanes popped up almost overnight in cities everywhere. But will these temporary installations become lasting side-effects of the crisis. In other words, will the bike boom keep rolling when things "return to normal"?

*By **Adeline Tissier***

Seattle, United States.

Seventy fours miles (120 km) of cycleways in London, 90 miles (150 km) in Rome, 72 (117 km) in Bogota — a few weeks after the first phase of lockdowns, authorities around the globe began promising to install temporary cycle lanes, triggering a kind of virtuous knock-on effect among large cities. Some but not all of these promises were kept. While several major cities have succeeded in pushing cycling as a viable means of transport, others have struggled to re-claim the streets, which continue to be dominated by private cars, forcing them to review their strategy.

WIDESPREAD SHIFT IN GEAR

"Cities applied the principle of 'tactical urbanism'," explains Holger Haubold, Director of Intellectual Property and Data Collection at the European Cycling Federation. ***"Using traffic cones, protective bollards and posts, they spontaneously made quick and inexpensive changes to their environment."*** Tactical urbanism is based on immediate interventions that require little outlay to make public spaces more people-friendly or to bring neighbourhoods more in line with residents' aspirations.

"This strategy has allowed cities to embark on, and in some cases, step up the transformation of their mobility plan with relative ease," adds Holger Haubold. ***"We've seen hundreds of initiatives take shape."*** The Brussels-based, European Cycling Federation promotes as a ***"healthy and sustainable means of transport".*** In a recent study, the federation reported that more than 1,400 miles (2,300 km) of temporary infrastructure had been installed across Europe, in the space of a few months. The same trend has been observed in large cities across Europe, as well as further afield, including the Colombian capital Bogotá, and the Brazilian capital São Paulo.

Other reliable and verified indicators support this theory, such as the increase in the number of searches for routes recorded by Google Maps between February and June 2020 (up 69%), and the widespread rise in traffic between 2019 and 2020 across cycling routes worldwide corresponded with data gathered by Eco-Counters. In addition, although 2020 sales figures for new, second-hand, cargo and electric-assist aren't available yet, according to the European Cycling Federation, we can expect to see a hike. ***"A real dynamic is taking hold, and it ties in perfectly with our goal of seeing 240 million daily trips made by bike by 2030, 50% more than in 2017,"*** says Holger Haubold.

CYCLING AND COVID — WHAT'S THE CONNECTION?

While the coronavirus crisis has fuelled the surge in, is it really the major factor behind this renewed enthusiasm? Sociology lecturer at Rennes 2 University Eric Le Breton doesn't think so. ***"Each time the way we live and work undergoes significant change, cities revamp their traffic plans and the streetspace they allocate to each mode of transport. The crisis we went through in 2020 undoubtedly changed our habits, but most of all it amplified and crystallised an existing phenomenon, which was a need for a change in the way people get around."***

Éric Le Breton believes the cycling boom is part of a very progressive shift, propelled mainly by cycling activists themselves. ***"Campaigning collectively through action groups, these people — for the large part also very committed environmentalists — fought for cycling to be gradually accepted in public debate."*** This is what's happened in France over the last 40 years, and more recently in Spain. ***"In Seville, the transformation of the city's traffic plan to include a network of segregated lanes was driven in the 1990s by cycling campaigners, who slowly but surely pushed for change and won the support of successive municipal au-thorities. The boom is a direct result of these long-term efforts."***

HELD UP BY CARS — BUT NOT FOR EVER

These insights are a reminder of how reclaiming the city from the car to allow cycling to thrive remains the biggest hurdle to overcome — but it's not insurmountable. In Copenhagen 🇩🇰 in the 1970s, private cars were predominant and cycling seemed unlikely to catch on. Yet, thanks to a combination of determination, political will and experiments, the Danish capital is now the most bike-friendly city in the world, with five times more 🚲 than cars.

Encouraged by the push for active transport, cities elsewhere are following the Danes' lead. In Poland 🇵🇱, several cities experienced a ***50%*** hike in cycling last year. Out of its 16 regions, 14 have recognised that support for 🚲 infrastructures is crucial in boosting the local economy. The government even went as far as to integrate 🚲 into its economic recovery and resilience plan launched in September 2020.

In Italy 🇮🇹, 2020 also created favourable conditions for the long-term transformation of several other cities including Rome. Prior to the crisis, only 1% of trips were made by bike in the Italian capital, where there are 620 cars for every 1,000 inhabitants and a total of 500,000 motorbikes. The city authorities capitalised on residents' enthusiastic take-up of 🚲 during and after lockdown to make some changes permanent. Rome's cycleways are ***'transitory'***, not temporary - which is more in line with tactical urbanism and implies a transition towards something else. The choice of wording is important. Political will and investments to the tune of €3.2 million did the rest.

INSPIRATION FROM WHAT WORKS FOR LONG-LASTING CHANGE

The challenge now is to sustain the cycling boom. ***"It's really positive that so many genuine pro-cycling initiatives have emerged in Europe. Now we need to build on this momentum,"*** says Holger Haubold, enthusiastically. Among them are the hugely successful mobility plans rolled out in the Netherlands 🇳🇱 and Austria 🇦🇹, which encourage cyclists to opt for the bike/train combo. ***"What's important is offering multimodal solutions, where no single mode is exclusive. Complementary solutions are the key, rather than making people choose between one or the other."***

This is what lies behind the success of the model adopted in Copenhagen 🇩🇰, where most drivers are also regular cyclists.

Other effective approaches include cycle-friendly tax incentives, such as cycle-to-work allowances for people who use their own bike for work, or tax deductions for employers who provide 🚲 for their staff. These government-backed incentive schemes are highly popular and have already been implemented by numerous firms in Belgium 🇧🇪 and Germany 🇩🇪. This type of initiative rounds out public measures, like voucher schemes for the purchase of a new 🚲 or for repairs and maintenance.

SHARING THE ROAD

For cycling to really take off, efforts need to look beyond the city centre. ***"To ensure a long-term adoption of cycling, we need to win over decision-makers and people in outlying dis-tricts and suburban towns — and the middle classes,"*** emphasises Holger Haubold. ***"This calls for a combination of unflinching political will, more connected cycle networks, safe, segregated cycle lines and the right equipment."*** Today, there's a highly effective and increasingly affordable solution for getting around: the electric-assist, or e-🚲. Thanks to progress in technology, users can cover ever greater distances. According to Holger Haubold, ***"it may well be the main driver for boosting cycling in the years ahead."*** If this proves to be true, it will once again raise the issue of how we share public roads — a key issue that's not just about safety but sharing the road in harmony. Whether they're walkers, cyclists, drivers or e-scooter riders, all users demand access to more space. Perhaps the key lies in striking a better balance and building mutual respect and understanding so that all needs can be accommodated. Understandably, drivers who cycle occasionally are invariably more aware of cyclists' behaviour — and vice versa. Seeing things from other people's perspectives. Now there's an idea! ●

Regional train
Deutsche Bahn Saxe.

Top 20 most bikable cities in the world, according to their modal share

1	Copenhagen	90.2%
2	Amsterdam	89.3%
3	Utrecht	88.4%
4	Antwerp	73.2%
5	Strasbourg	70.5%
6	Bordeaux	68.8%
7	Oslo	62.5%
8	Paris	61.6%
9	Vienna	60.7%
10	Helsinki	59.8%
11	Bremen	58.9%
12	Bogotá	58.1%
13	Barcelona	57.4%
14	Ljubljana	57.1%
16	Tokyo	55.4%
17	Taipei	54.5%
18-19	Montreal/Vancouver	53.6%
20	Hambourg	52.7%

INNOVATION: NOT WITHOUT MY "LAB"!

Far from a passing trend, innovation ecosystems are driving a fresh, more open approach to experimentation, ushering in exciting new mobility solutions. Numerous major cities, public transport authorities and operators have already come onboard, creating their own innovation hubs.

*By **Adeline Tissier***
*Illustrations: **Benedikt Rugar***

A long-established core commitment in the private sector, the push for innovation has now been taken up by numerous public stakeholders. Far-reaching change is sweeping through today's cities in terms of spatial occupancy, diversity and the green transition — and transport is no exception. Local authorities, operators, equipment suppliers and all other stakeholders are looking for new solutions to address the challenges facing communities and to meet the needs of ***"the users of cities"***, i.e. the businesses and citizens who live and work there.

COLLECTIVE INTELLIGENCE, A PREREQUISITE

When we talk about innovation, we tend to mean 'open innovation', a term coined by Harvard professor Henry Chesbrough in 2003 to refer to an approach that encourages cooperation between firms within an open, trust-based framework. Later, in 2011, Chesbrough specified that this approach to innovation is ***"based on the observed fact that useful knowledge today is widely distributed, and no company, no matter how capable or how big, can innovate effectively on its own."*** In sum, companies need each other to improve and succeed in the long haul.

This was the model embraced by the first players in the transport sector to start pursuing the idea, driven by a desire to develop high value-added technology solutions. ***"Major cities, most of which have their own transport authority like Tokyo 🇯🇵, New York 🇺🇸 and Paris 🇫🇷, set out on this track around ten years ago,"*** explains Maxime Audouin, head of the Keolis Innovation & Digital Lab. ***"They began by collaborating with startups and then set up their own innovation agencies or labs"***. Tokyo Metro and New York's Transit Tech were among the forerunners.

SAME GOALS, DIFFERENT MODELS

Other cities and communities tapped into the culture and capabilities of private players, such as Montreal 🇨🇦 with its Quartier de l'innovation while others have capitalised on the know-how and experience of their operator. One such example is Transport for Wales Rail 🏴, which launched its own innovation lab in 2019. ***"What makes Lab by Transport for Wales special is the way it came about,"*** says Michael Davies, Insight and Innovation Manager, in the Lab's Customer Experience team. ***"The Lab was***

GLOSSARY

INCUBATOR Business incubators — whether public (university or government led) or private (company or investor funded) — help start-ups and early-stage businesses transform ideas into effective business models. Support involves access to co-working space and other resources and networking opportunities with other businesses and experienced professionals.

ACCELERATOR Similar to a business incubator but focusing on the technical aspects of projects. Lasting between 3 and 6 months, accelerator programmes support development of an innovation or a startup and may also provide seed funding.

HACKATHON An event where programmers and designers get together with startups and project sponsors, usually for 1 or 2 days, to collaboratively develop innovative concepts, ideas and prototypes in response to a specific challenge.

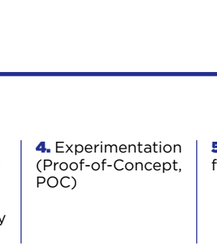
custom created by Transport for Wales Rail to find new solutions to the challenges facing its public transport authority Transport for Wales. It offers an unrivalled wealth of resources for addressing the real needs of passengers. But apart from the way it was set up, we operate just like an outside lab. We identify a need or issue, analyse the passenger experience and then call on startups and R&D firms to pursue their proposed innovation with the support of our 12-week accelerator programme."

The entrepreneurs, startups and scale-ups taking part in the programme receive mentoring from business experts at various partners, including the cities of Cardiff and Newport, Cardiff University, the Welsh Development Bank and Business Wales, the Welsh government's support service for businesses in Wales. At the end of the 12 weeks, participants pitch their 'Minimal Viable Product' (prototype) to decision-makers from the transport authority, who select the projects with the greatest potential. Successful candidates are awarded a contract with Transport for Wales, coupled with the financial backing and access to resources needed to continue development of their product or service for implementation across Transport for Wales. In the two years since its launch, Lab by Transport for Wales has conducted two acceleration programmes and financed around a dozen promising new solutions, allocating between £5,000 and £15,000 to each one.

"THE TERM 'ECOSYSTEM' REINFORCES THE IDEA OF A DIVERSE SPECTRUM OF PLAYERS WITH OVERLAPPING ACTIVITIES, AREAS OF FOCUS AND GOALS."

EVERYTHING TO GAIN

For public transport authorities, launching or engaging in an innovation agency offers a host of benefits. According to Maxime Audouin, the first main advantage is a boost to their image and attractiveness. *"A PTA actively involved in this type of initiative shows that it's flexible, open and committed to continuously improving services for the communities it serves".* Secondly, operating or supporting a lab necessarily delivers results through the development of new solutions — even if they don't work first time. *"Innovation is all about taking risks — especially the risk of getting it wrong,"* remarks Michael Davies. *"In our business, we're not afraid of failing. For us, it's a chance to learn from our mistakes. This is a key aspect of our mindset".* Another immediate benefit is gaining access to local innovation-driven entrepreneurs and companies. Being involved in an innovation lab means contributing to an emerging community with local roots. It allows PTAs to engage with some of the brightest minds, innovative talent that may have seemed out of reach or simply hadn't occurred to them. That's why we tend to talk about 'innovation ecosystems', a term taken from the world of living organisms. *"It's an interesting choice of words,"* says Michaël Knaute, Sustainable City Manager at Paris&Co, the French capital's urban innovation agency. *"It reinforces the idea of a diverse spectrum of players — businesses, startups, local authorities, chambers of commerce, universities, investors, individuals, etc."* With overlapping activities, areas of focus and goals, Paris&Co set up its own Urban Lab to help address the challenges ahead for the French capital. In collaboration with Keolis and 25 other major firms, the Lab acts as an incubator for startups, testing and implementing innovations through its Urban Innovation Districts.



MAIN STEPS IN OPEN INNOVATION

1. Define a need or issue

2. Source startups (incubation or acceleration programme)

3. Integrate users (UX) to assess the experimentation framework, technical feasibility and cost

4. Experimentation (Proof-of-Concept, POC)

5. Experience feedback

6. Product launch (business model)

SOME OF THE STARTUPS INCUBATED BY THE PARIS & CO URBAN LAB

 # Urban Lab de Paris & Co

ECOV: A carpooling service for people who need to make short trips in suburban areas with low traffic density. Meeting a real need for local communities, ECOV makes carpooling as easy as taking the bus!

KAROS: Combining carpooling with public transport to ease the daily commute. Powered by AI technology, the Karos app logs users' day-to-day travel habits and proposes the most suitable carpool offer for their next journey. The dynamic platform matches users automatically to meet even last-minute requests.

WINTICS: Leveraging CCTV images to deliver valuable mobility statistics and drive efforts to cut congestion and reduce pollution. Using AI-powered video analysis software, Wintics helps keep track of what's going on in the city.

WEVER: Putting citizens back at the heart of mobility by meeting their real-world needs. A unique MaaS mobility platform that enables companies to co-build corporate mobility schemes and other mobility solutions in collaboration with the people who use them — their employees.

ACCELERATOR PROGRAMME

#Lab by Transport for Wales accelerator programme
3 experimentations =
3 winning startups

BRITEYELLOW LTD
funding of £5,000 (€5,670)
An application that makes it easier for passengers to navigate stations and delivers real-time crowd information and position tracking. The app offers customers **a virtual tour of facilities for travel planning as well as visual, voice and haptic (touch) guides at stations for enhanced wayfinding. Passengers can also request personal assistance.**

PASSAGE WAY
funding of £10,000 (€11,330)
"My Journey", is a Personal Passenger Information System developed by PassageWay that provides **timely information to customers on disruptions, capacity and journey updates.** Users don't need to sign up for the service or provide any personal data. They simply click on a URL or QR code to get quick and easy access to travel information.

CLEVERCITI
funding of £15,000 (€17,000)
A smart parking solution that guides drivers to the most convenient available space. Cleverciti uses AI technology to gather data via overhead sensors, enabling real-time detection of available parking spaces. This makes life easier for local residents and reduces emissions and congestion.

THE USER EXPERIENCE

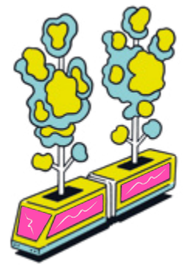
"Innovation is not an end in itself, it must always address a real-world issue," reiterates Michaël Knaute. As far as mobility is concerned, the user experience tends to be the starting point: developing more direct, seamless journeys, more intuitive services that are easy to access, enabling technologies, and so on. For example, the three startups whose solutions have been selected for deployment by the Lab by Transport for Wales all proposed mobile apps to improve the passenger experience or for parking. *"Our 2021 cohort will focus on another key and highly topical passenger experience issue: getting passengers back on our trains, against a backdrop of the ongoing pandemic and following several months of intermittent journeys,"* says Michael Davis.

"LOW TECH IS ALSO DRIVING FRESH THINKING, CHAMPIONING THE IDEA OF A MORE FRUGAL CITY."

At the Paris&Co Urban Lab, which is an urban innovation agency in the broadest sense, mobility issues have accounted for more than a quarter of all successful projects over the past five years. However, as Michaël Knaute points out, siloed thinking is out of the question: *"projects now cut across a range of themes and address overlapping issues, such as mobility and real estate, or technological innovation and social innovation."* Developing solutions to optimise the occupancy of public space, like the startup ZenPark did in Paris with its cheap parking app, implies integrating issues other than just parking itself and collaborating with a host of other players — residents associations, businesses and the city authorities. Likewise, when startup Navilens developed a QR code that facilitates access to metro and bus stations for vision-impaired passengers, it was only natural that it extended the service to other places such as pavements, museums and public buildings This goes to show that inclusive transport leads to more inclusive cities.

GREEN MOBILITY ON THE RISE

Hot on the heels of digital solutions shaping the future of mobility and MaaS (Mobility as a Service), green mobility has emerged as another key focus in recent years. *"In 2016 around 35% of our projects revolved around the green transformation of the French capital,"* says Michaël Knaute. *"In 2020, this was up to 80%".* A deep-seated trend is clearly underway. *"Low tech is also driving fresh thinking, championing the idea of a more frugal city."* This illustrates growing aspirations among citizens for more environmentally-friendly, ethical solutions. The boom in greener transport choices like cycling and walking, as well as in active transport, such as electric scooters, dovetails perfectly with this idea and is a powerful incentive for start-ups to pursue their innovative efforts in this area.

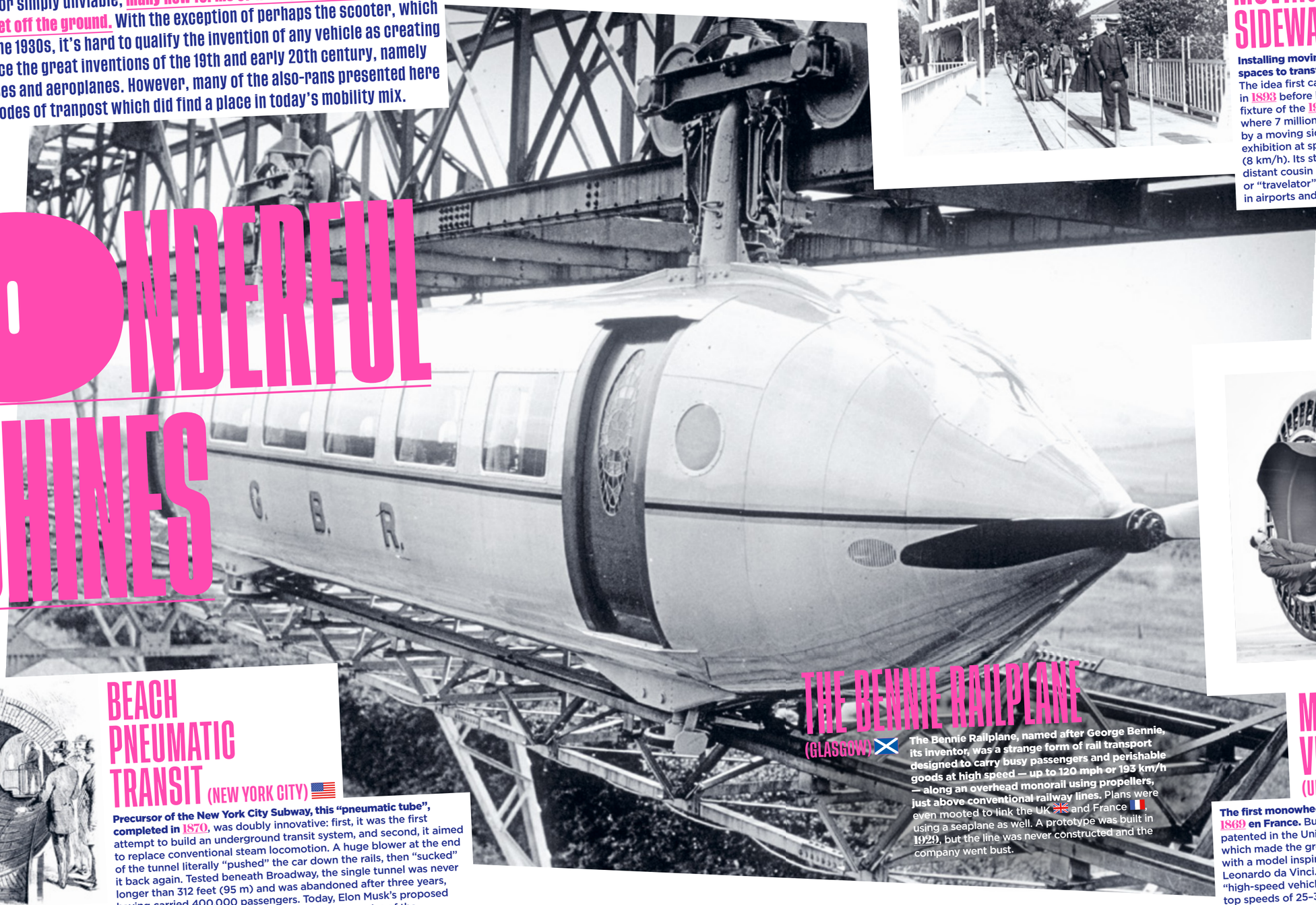


"The aim isn't necessarily to develop innovations, but to ensure that existing solutions can scale up and enable them to reach maturity," says Mickaël Knaute. The challenge is on!

Too far ahead of their time or simply unviable, many new forms of transport hailed as "revolutionary" failed to get off the ground. With the exception of perhaps the scooter, which was conceived as a toy in the 1930s, it's hard to qualify the invention of any vehicle as creating a revolution in mobility since the great inventions of the 19th and early 20th century, namely trains, motor cars and buses and aeroplanes. However, many of the also-rans presented here provided inspiration for modes of tranpost which did find a place in today's mobility mix.

By Tiphaine Clotault

WONDERFUL MACHINES



MOVING SIDEWALK (CHICAGO) (PARIS)

Installing moving sidewalks in urban spaces to transform journeys on foot? The idea first came to life in Chicago in 1893 before becoming a popular fixture of the 1900 Paris Exposition, where 7 million visitors were carried by a moving sidewalk around the exhibition at speeds of up to 5 mph (8 km/h). Its story ended there, but its distant cousin — the moving walkway or "travelator" — is a common feature in airports and metros today.

BEACH PNEUMATIC TRANSIT (NEW YORK CITY)

Precursor of the New York City Subway, this "pneumatic tube", completed in 1870, was doubly innovative: first, it was the first attempt to build an underground transit system, and second, it aimed to replace conventional steam locomotion. A huge blower at the end of the tunnel literally "pushed" the car down the rails, then "sucked" it back again. Tested beneath Broadway, the single tunnel was never longer than 312 feet (95 m) and was abandoned after three years, having carried 400,000 passengers. Today, Elon Musk's proposed **Hyperloop** draws inspiration from the aerodynamics of the cylindrical pods, but it uses magnetic propulsion instead.

THE BENNIE RAILPLANE (GLASGOW)

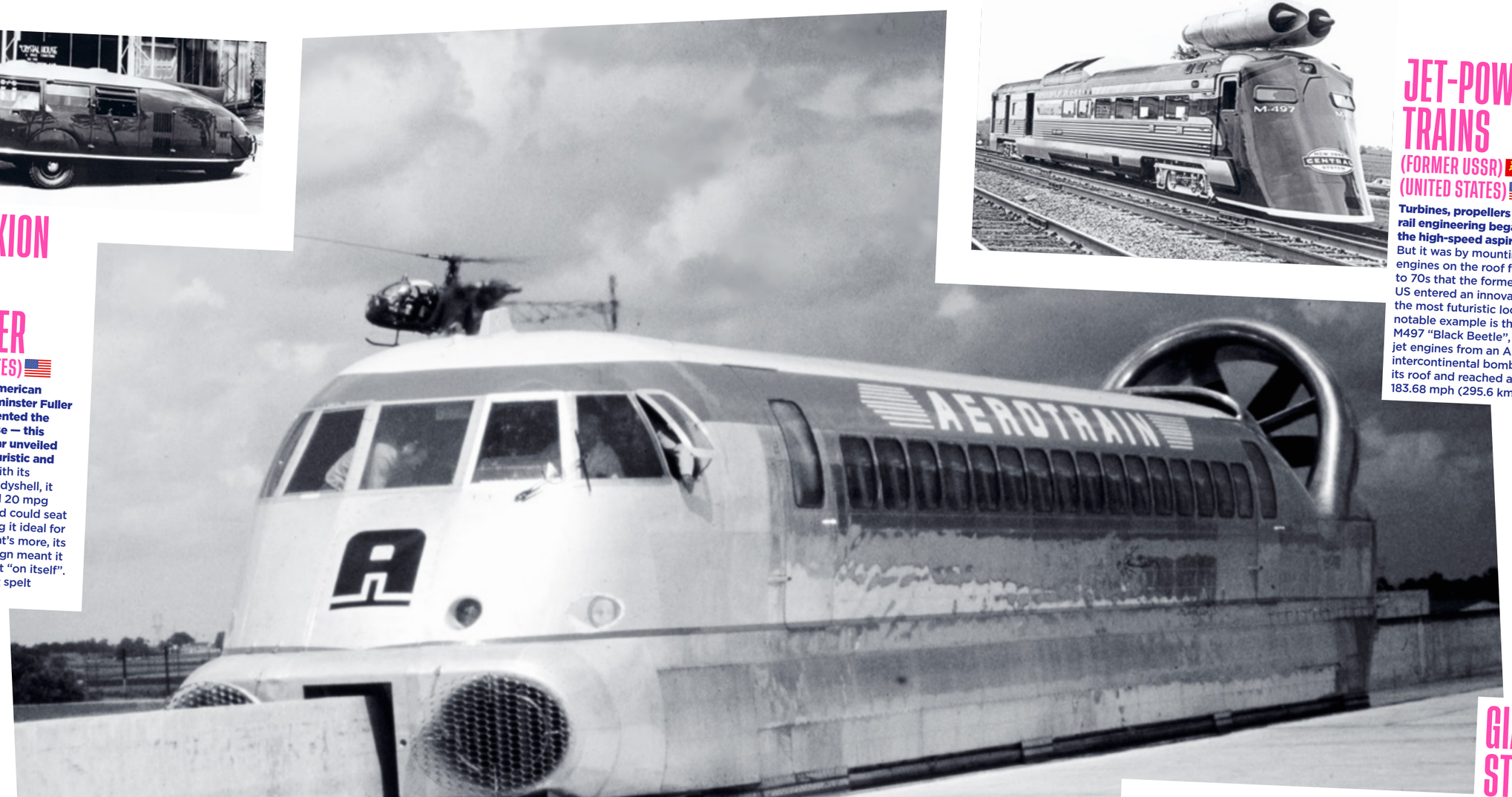
The Bennie Railplane, named after George Bennie, its inventor, was a strange form of rail transport designed to carry busy passengers and perishable goods at high speed — up to 120 mph or 193 km/h — along an overhead monorail using propellers, just above conventional railway lines. Plans were even mooted to link the UK and France using a seaplane as well. A prototype was built in 1929, but the line was never constructed and the company went bust.

MONOWHEEL VEHICLES (UNITED KINGDOM)

The first monowheel was built in France in 1869 en France. But it's the **Dynasphere**, patented in the United Kingdom in 1930, which made the greatest mark on history, with a model inspired by a sketch by Leonardo da Vinci. Described as the "high-speed vehicle of the future", with top speeds of 25–30 mph (40–48 km/h), it ultimately failed to win support due to its unwieldy handling.

DYMAXION THREE WHEELER
(UNITED STATES)

Designed by American architect Buckminster Fuller — who also invented the Dymaxion House — this experimental car unveiled in 1933 was futuristic and eco-friendly. With its aerodynamic bodyshell, it achieved around 20 mpg (12 l/100 km) and could seat 11 people, making it ideal for ridesharing. What's more, its three-wheel design meant it could turn almost "on itself". A tragic accident spelt its demise.



AEROTRAIN
(FRANCE)

The need for speed... This fast TACV (tracked air cushion vehicle, or "hovertrain") ran on a concrete monorail and might have become the new standard in France, if the government hadn't favoured the TGV (high-speed train) instead. From 1965 to 1969, the Aérotrain was successfully tested on intercity and longer routes, achieving a record speed of 262 mph (422 km/h). Its air cushion technology could be about to make a comeback, thanks to a French SME.

JET-POWERED TRAINS
(FORMER USSR) (UNITED STATES)

Turbines, propellers — from 1900, rail engineering began to embrace the high-speed aspirations of flying. But it was by mounting aircraft jet engines on the roof from the 1950s to 70s that the former USSR and the US entered an innovation race to build the most futuristic locomotives. One notable example is the experimental M497 "Black Beetle", which had two jet engines from an American intercontinental bomber bolted to its roof and reached a speed of 183.68 mph (295.6 km/h) in 1966.

GIANT STRADDLE BUS
(CHINA)

An elevated vehicle designed to travel over congested traffic? This enticing idea has been tested in several dense urban areas, most notably in the United States. A prototype running on rails and carrying up to 1,600 people was even trialled in 2016 in Qinhuangdao, northern China. But at 7.3 feet (2.20 m), it was too tall to meet bridge height restrictions and above all tricky to manoeuvre, so the concept was shelved.

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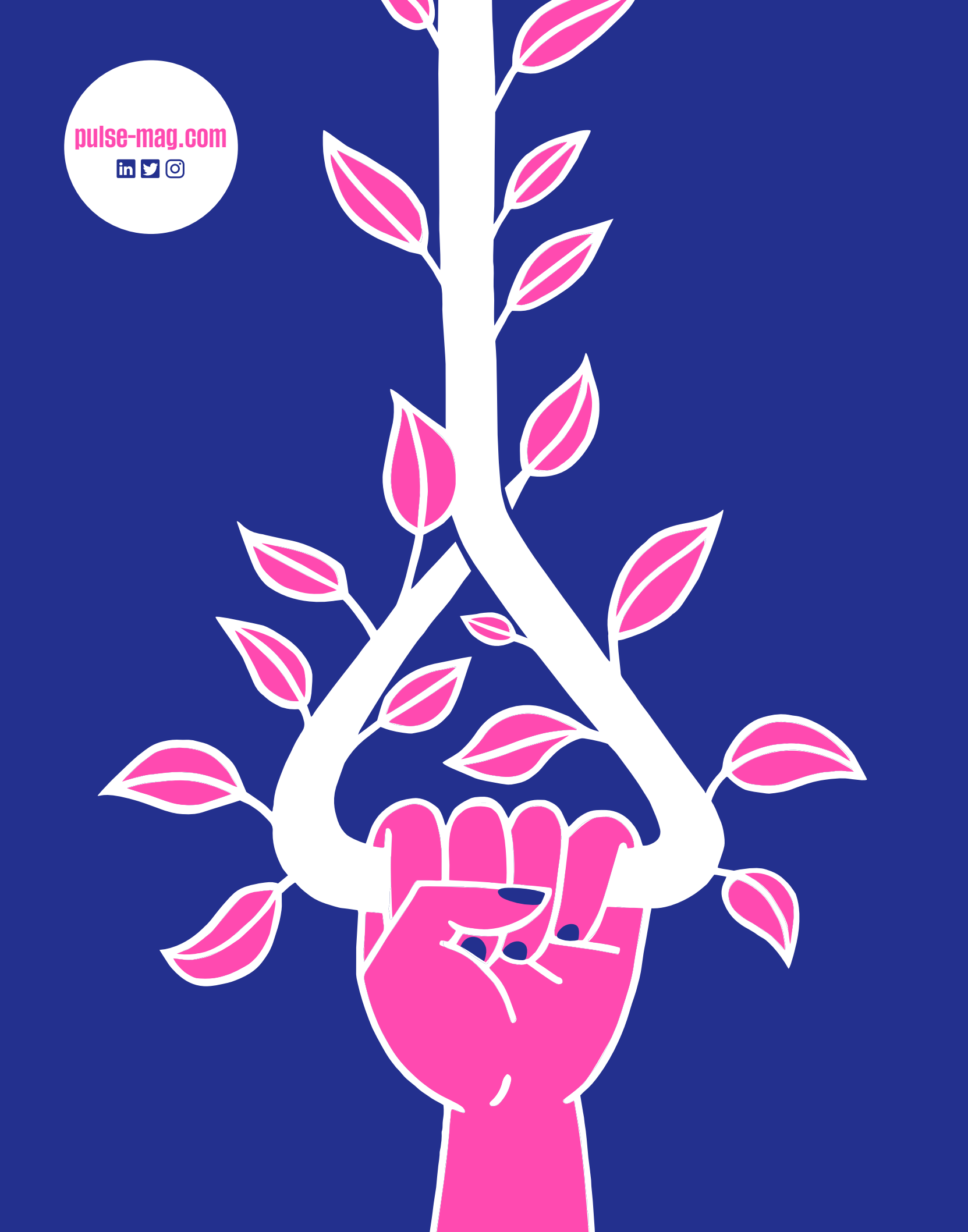
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