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

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

CHECK OUT THE ONLINE VERSION: pulse-mag.com AND ADD THE WIDGET ON YOUR SMARTPHONE
To have a pioneering spirit is akin to cultivating your capacity for wonder. And thus, by questioning preconceived ideas, being open to their ecosystem and being part of the daily life of their regions, the men and women of Keolis have an insightful perspective on the world and today’s major mobility issues.

This pioneering spirit is the philosophy behind our Keoscopie Observatory of Mobility Trends, for which we have just conducted a new large-scale survey on the mobility use of citizens in 37 metropolitan areas across the world. It is also the raison d’être behind Pulse, our twice-yearly magazine, now in its third issue.

In this edition you’ll get to read exciting and in-depth articles on time offices, women’s safety in public transport, and cybersecurity; as well as the views of renowned mobility experts such as Seleta Reynolds, General Manager of the Los Angeles Department of Transportation and Robin Chase, an influential mobility entrepreneur.

Enjoy.

BERNARD TABARY
Keolis International CEO
A n expert in political science, geo­architecture and urban design, Pascale Lapalud co­founded Genre et Ville in 2012. This French urban innovation platform revisits cities through a multidisciplinary approach, aiming to make them more inclusive. Pascale Lapalud also works as a consultant for 9A+ Explore, a socio­ethnographic research agency. Her main areas of interest include mobility, urbanism and “living together”. She shares her perspective on inequalities in public transport and her vision for a more adapted and inclusive city with Pulse.

A n American entrepreneur in the mobility field, Robin Chase co­founded Zipcar, the world’s largest car­sharing service, in 2000. She also created Buzzcar, a peer­to­peer car­sharing service and Veniam, a vehicle­to­vehicle communication network. Robin is also a consultant to the OECD and US Department of Commerce and Transportation. She is recognised as one of the world’s most influential opinion leaders on mobility. For Pulse, she looks back on the introduction of the “Shared Mobility Principles for Livable Cities”, which boasts more than 170 participating organisations.

Seleta Reynolds heads the Los Angeles Department of Transportation and is president of the National Association for City Transportation Officials. In Los Angeles, she has implemented the “Great Streets” plan, aimed at reducing accidents, facilitating bicycle traffic and promoting access to public transport, and this was only a start. She discusses her goal of making Los Angeles a pioneering city in terms of mobility and redefining the role of transport coordinating authorities in her Pulse opinion column.
I have spent the last four years developing a plan to overcome my city’s car dependency. New transportation innovations have opened up the possibilities for Los Angeles. And a better mobility future is within our reach, certainly sooner than most might expect.

My aim is that, by the time we host the 2028 Olympics, Los Angeles will be a model for the autonomous and shared mobility movement that is equitable and sustainable.

By 2028, driverless cars and air taxis will form part of a coordinated transportation network. The City will take a much more proactive role in managing the movement of goods and people. Community-led initiatives will redesign streets to eliminate traffic deaths and reallocate space to public parks and plazas. We will have aggressively converted our buses and city fleets to electric vehicles.

I cannot be sure how mobility will develop in our city. I can be sure that our goal is to express our policies through technology, so that the city remains the guardian of the public realm to ensure that the future serves our goals.

To achieve our transition from car dependency to shared mobility, we need to redefine the role that a city transportation agency has played in the past. And finally, in the past, we’ve approached community engagement as a chore. We created portals to request services that eliminated human interaction. Today, we’re asking better questions of our community partners. Do women feel safe on public transit? How can we improve walking and biking access that helps make people feel more comfortable? Are our buses going where people want them to go? How could micro transit, protected cycle lanes and electric scooters work alongside the bus to provide flexible options that encourage people to drive less?

In the past, transportation agencies have taken an adversarial approach to private product companies and required partners to go through time-consuming and cumbersome contracting processes to share basic data.

In the past, we’ve allowed enticing new technology (like freeways) to completely reshape our urban form with little thought about the long-term social impacts of unfettered expansion. Tomorrow, we expect autonomous systems to be a feature of our streets and air space, integrated with mass transit, and aligned with the city’s sustainability and equity goals.

To achieve our transition from car dependency to shared mobility, we need to redefine the role that a city transportation agency has played in the past.

In the past, we had a static and incomplete picture of how people were traveling; we had no digital data base of where you could or could not park in the city; and we begged for data from private transportation providers. Today, we are offering companies substantial input into the data specification we will use as part of our permit system for electric scooters and ride-sharing. Businesses like Uber and Lyft are now taking a very different posture to when they first arrived on the scene. And we’re creating a dynamic digital database of all of our infrastructure in the city.

In the past, we’ve allowed enticing new technology (like freeways) to completely reshape our urban form with little thought about long-term social impacts of unfettered expansion. Tomorrow, we expect autonomous systems to be a feature of our streets and air space, integrated with mass transit, and aligned with the city’s sustainability and equity goals. Autonomous vehicles have the greatest potential to solve many of our mobility challenges. However, if left to purely commercial forces, autonomy will add to congestion, increase safety challenges, and exacerbate inequality.

This is why today, we are working in close coordination with autonomous vehicle providers to ensure the technology is supported by our infrastructure and aligned with our goals.

In particular, she has implemented “Streets for Los Angeles,” a plan to reduce traffic fatalities, double the number of people riding bikes, and expand access to integrated transportation choices.

In just the last 12 months, we have been able to deliver groundbreaking work to build a Transportation Department that functions more like a platform for services to be built on top of. This digital platform will allow us to guide all users around Los Angeles in the most sustainable way.

Los Angeles was designed around unfettered use of the car. Streets are congested, air quality is poor for one quarter of the year. Traffic deaths are the number one cause of death for kids in Los Angeles. And for every new resident that moves to Los Angeles, they bring one car with them, which now means we have six cars with four times the rate of vehicles than in the 1970s. If these trends continue, how can we keep our city to thrive? As the General Manager of the Los Angeles Department of Transportation, these challenges fall squarely on my shoulders.

I cannot be sure how mobility will develop in our city. I can be sure that our goal is to express our policies through technology, so that the city remains the guardian of the public realm to ensure that the future serves our goals.

To achieve our transition from car dependency to shared mobility, we need to redefine the role that a city transportation agency has played in the past.
Booming computing power, big data and deep-learning technologies facilitate so much the development of Artificial Intelligence that we can expect to see a vastly different transportation landscape.

The transformation will include diverse bases ranging from short-hauling people safely to their destinations and smart, sustainable vehicles performing tasks such as ploughing snow, collecting garbage or delivering food and mail. Here are a few of sustainable vehicles performing tasks such as ploughing snow, technologies facilitate so much the development of the ways in which AI will enrich our daily commuting lives.

**MAKING MOBILITY SMARTER**

AI is about to change that.

California's industrial and public researchers, working on an artificial intelligence project on the Caltrain (the commuter rail line on the San Francisco Peninsula and Santa Clara Valley). The goal is to give passengers with vision, hearing, or other disabilities real-time information in order to help them find the correct platform, board, train, as well as the optimum spot for boarding.

The technology could also find passengers who disembark and confirm that they are on the right train. The Internet of Things system taps into the cloud, smartphones, and data devices called “beacons” at Caltrain’s Diridon Station. The project could be expanded to include BART, the Bay Area Rapid Transit System – and high-speed rail, or used for transit terminals nationwide.

**SMART CHARGING FOR LOWER ENERGY CONSUMPTION**

Until now, recharging the batteries of electric buses has been a challenge for the cities that use them. The system requires putting the buses on charge when they return to the depot and leaving them there until their departure the next day. This may provoke peaks in energy consumption that can wear down the batteries and even result in overcapacity fees. Artificial intelligence can assist in changing this. Smart charging involves smoothing out the consumption so that the peak is never reached again.

Kendal is experimenting with this new method that will ensure the availability of energy for residents when cities fully electrify their bus fleet.

**IMPROVING THE USE OF PUBLIC TRANSPORTATION FOR THE DISABLED**

Researchers have proposed an AI-based system to help make better decisions relating to safety so that riders can enjoy a more comfortable and secure journey. The idea is, first, to let an algorithm monitor all the incoming passenger communication via Twitter, Facebook, and online chats. The information will then help to determine whether they relate to a critical emergency situation, such as fire, crime, or faulty equipment. Once identified as an emergency, the system will detect which department and location are best equipped to handle the situation and automatically push the same alerts to mobile phones of all the relevant stakeholders. It will make for a safer, more enjoyable journey for passengers.

**MAKING PUBLIC TRANSPORTATION SAFER**

Experts have proposed an AI-based system to help make better decisions relating to safety so that riders can enjoy a more comfortable and secure journey. The idea is, first, to let an algorithm monitor all the incoming passenger communication via Twitter, Facebook, and online chats. The information will then help to determine whether they relate to a critical emergency situation, such as fire, crime, or faulty equipment. Once identified as an emergency, the system will detect which department and location are best equipped to handle the situation and automatically push the same alerts to mobile phones of all the relevant stakeholders. It will make for a safer, more enjoyable journey for passengers.

**ANTICIPATING BREAKDOWNS IN ROLLING STOCK**

Experts have proposed an AI-based system to help make better decisions relating to safety so that riders can enjoy a more comfortable and secure journey. The idea is, first, to let an algorithm monitor all the incoming passenger communication via Twitter, Facebook, and online chats. The information will then help to determine whether they relate to a critical emergency situation, such as fire, crime, or faulty equipment. Once identified as an emergency, the system will detect which department and location are best equipped to handle the situation and automatically push the same alerts to mobile phones of all the relevant stakeholders. It will make for a safer, more enjoyable journey for passengers.

**RESOLVING URBAN CONGESTION**

Large-scale artificial intelligence is one of the latest innovations that aims to resolve global urban congestion problems. The software leverages low-power computer vision, machine learning, and predictive analytics to detect and predict passenger movement across various modes of transport. It then processes real-time sensor data from smartphones and wearable devices without the need for any other external hardware. Because the solution leverages fundamental AI techniques to model passenger movements across several modes of transport, it can identify key transition points such as passengers waiting at the platform getting on the train.

So it helps public transport operators to get an end-to-end understanding of journeys.

**PROVIDING MORE EFFICIENT CAMERA SURVEILLANCE**

Camera surveillance has become an integral part of protecting passengers. Analysing videos, however, isn’t easy; it requires time, attention to detail, and discernment by the security personnel. Keolis is experimenting with a way to make security cameras used in public transportation more effective. The solution involves connecting the cameras to a software system that is able to identify an abandoned bag in a precise location in just 10 seconds and retrace it to its owner.

**SIMPLIFYING TRAVEL BY INTEGRATING VOCALBOTS IN PUBLIC TRANSPORT**

Artificial intelligence-powered voice interfaces, or vocalbots, are useful to give passengers quick answers to questions like “Where is the next bus to work?” or “How do I get to the dentist?” Using the transport network information already stored and a journey planner system, the solution is able to provide an answer within a few milliseconds. Today, the idea is to make it easier for customers to choose public transport by integrating a platform with a hands-free speaker you control with your voice. This could be particularly useful for elderly and disabled people who may find it difficult or even impossible to use smartphones, but still need to access all kinds of travel information.
In many Western societies, the notion of time has become an important tool for policy-making. The creation of time offices in Europe has helped cities to unlock real social benefits for their citizens. And this, in turn, has led to the creation of “time offices” and temporal policies, i.e. policies that integrate time-related issues. But how did they come about? What are they exactly? And what do they do?
This means the divergences (school time, working time, leisure time, etc.) are increasingly individualised and diverse.

Since more women were working, they requested that opening hours of public offices be adjusted. This demand led at first at the end of the 1980s to a proposed bill put forward by Luisa Turco, then to the 142/90 law that encouraged cities with over 30,000 inhabitants to reorganise public services schedules. This momentum can be seen as the birth of temporal policies, which are now well integrated into cities like Turin, Genoa, Milan and Bergamo.

Supported by the Italian experience, a French parliamentary report in 2001 recommended the creation of “time offices.” Several cities (including Lille, Lyons, Rennes, Paris, Montpellier and Poitiers) set up several institutional structures to promote temporal policies. Similar initiatives took place in Germany, Spain, Belgium and the Netherlands. In 2009, Barcelona, the first Spanish city to be endowed with a time office, launched a European network of temporal policy advocates. In 2013, the association Tempo Territorial took over the management of this network (see interview with Katja Krüger, page 13).

This new approach to policy-making implies a cultural shift and a certain amount of financial resources. This explains why temporal policies are not yet the norm everywhere.

**Supporting temporal policies**

**Temporal policies can help make better use of facilities.**

In Groningen, in the Netherlands, a temporal analysis of a public school showed that the facilities were under-used outside school hours and could be used to enhance social cohesion. So, the city decided to make the school accessible to neighbouring residents outside school hours in order for them to engage in various programmes.

In Reness, France, together with Kesla, the local office acted in 2012 as an independent and legitimate expert to help alleviate public transit congestion by encouraging university to modify class schedules in order to reduce the number of students travelling simultaneously to and from the university. On a similar note, an experiment is currently being launched to reduce public transit congestion during rush hours in the business district of La Défense, near Paris. Public authorities are working with companies to spread out employees’ arrival and departure times during the morning and evening. The plan also involves encouraging working from home and using third places. The goal is to decrease employees’ rush hour commuting by 5% to 10% within a year.

**Applying temporal policies**

Time offices tackle multiple issues related to mobility. In 2008, for example, policy-makers in the Netherlands and the local cities office explored how to reduce commuting time as well as carbon emissions. This led to the creation of Smart Work Centres in Amsterdam and Antwerp, along the model of what is now called “third place” i.e., a location that is neither home nor the traditional workplace. A year later, results showed that “users had saved an average of 66 minutes per day by using the SWC instead of commuting to their companies’ offices.”

Third places similar to the SWC provide further benefits creating local community centres, acting as a marketplace for urban planning policies. Interestingly, it is the only country with a university programme focused on the subject. Students of the Politecnico Di Milano School learn about chronotropic and chronographic mapmaking, which are tools used to help assess the accessibility of public transit and services in a city; and thus help devise strategies to improve mobility.

Time offices have proved their worth by supporting local authorities when they implement solutions that boost the welfare of city residents. They certainly have the capacity to inspire more decision-makers worldwide.

The issue of time raises questions about equality within the population, as a great number of fragile people still suffer from time-related issues.

On the one hand, low-income families still tend to live further away from city centres and their workplaces, and have no choice but to take jobs, the schedules of which are often constraining: as for women, they often suffer from a double inequality as they tend to work full-time while still doing most of the housework (on average, 75% in France, according to the OECD) or caring for dependent family members, such as children or the elderly.

On the other hand, those who have better qualifications can choose jobs with less demanding schedules, and those who enjoy better incomes can purchase time, by acquiring the services of third parties, such as babysitters for example.

“Despite everything that has been done recently in terms of transit, like introducing more fast trains and building new metro lines, people haven’t really saved time. Instead, areas have simply become more accessible.”

In 2008, for example, policy-makers in the Netherlands and the local cities office explored how to reduce commuting time as well as carbon emissions. This led to the creation of Smart Work Centres in Amsterdam and Antwerp, along the model of what is now called “third place” i.e., a location that is neither home nor the traditional workplace. A year later, results showed that “users had saved an average of 66 minutes per day by using the SWC instead of commuting to their companies’ offices.”

**Case Studies**

1. (3) Source: Kesla.
Transport is a unique vector for opportunity. Whether economic or social, the easier it is to get around, the more locals thrive. But for more than 50% of the world’s population, public transport still comes with serious baggage.

MIND THE GENDER GAP: MOVING TOWARDS EQUALITY IN PUBLIC TRANSPORT

by Libby Wilson
Illustration: Xaviera Altena
Ensuring women have access to inclusive and secure public transport is a growing priority for economists, policy makers, urban and transport planners alike. Institutions such as the World Bank and UN Women actively research and make recommendations on the relationship between gender and transportation. That’s because the consequences reach far beyond transport use: this isn’t simply about getting around with ease; it’s about equality and advancement.

### Different Travel Patterns

The jury is still out on whether men and women are from different planets, but one thing is certain: they do have different travel habits.

For example, women in Africa, Asia and Latin America are more likely to combine transport use with ease; it’s about equality and transportation.

### Daily Risks

From stalking and unwanted comments or gestures, to groping and assault, women are at higher risk of experiencing violence. And it’s a global problem.

A 2015 French report from France’s National Observatory of Crime and Criminal Justice found that 220,000 women had been sexually harassed on public transport in what was termed “a conservative estimate.” In the Ile-de-France region, for example, a study from FNAUT on gender harassment in public road transport and multimodal hubs shows that public transport (including rail stations) is the primary location for sexual assault against women, with 39% of attacks reported occurring there.

### In an effort to reduce risk, many initiatives focus on improving the quality of transport infrastructure and operations: redesigning waiting areas, creating better lighting on access routes or improving schedules and punctuality at stops. For many women, getting around is a bit like a puzzle, and timing is critical to fit together their various daily trips. On-time transport minimises wait time and reduces insecurity. In other words, it makes a real difference in people’s lives. For example, a report from the Inter-American Development Bank (IDB) in Latin America found that cutting down on tardiness and congestion also reduces the likelihood that a woman will be a victim of crime. Adapting off-peak offers, such as expanding evening and weekend services to avoid extended wait times in deserted or poorly lit spots, is also crucial.

In Quito, Ecuador, as part of UN Women’s Safe Cities Programme, officials found that 84% of women cited public transport as unsafe due to sexual violence. The city created a response plan to address the issue on every front: remodelling 41 of 44 trolley stops in line with new safety criteria, training 600 staff members to assist and respond to victims, a mobile app for reporting sexual harassment via text message, expansion of crime and violence monitoring, a communications campaign, school-based prevention initiatives, and more. In 2016, Quito declared the programme an “emblematic, special category project,” and committed to continuing it in the future.

Women-only compartments on buses and trains have even been introduced in countries like Japan, India, Brazil, Egypt and Mexico as well. But for some, it is only addressing the symptoms and not the problem, and perpetuates perceptions of female vulnerability. Speaking about women-only buses in Papua New Guinea, Lisette Suía, UN Women’s Safe Public Transport Programme, said, “This is just a short-term strategy, because our long-term goal is to make public transport safer for everyone.”

### Technology Solutions

In India, the Safetipin app allows women to easily consult safety scores for public spaces. And in Cairo, HarassMap creates crowd-sourced maps of harassment incidents. Citizens can report an incident or intervention – whether someone acted to stop the incident or supported the victim – via a dedicated website. The result functions much like Google Maps: each dot represents one report and additional details are available upon clicking. This easy-to-use overview helps users determine the safest routes. Once using public transport, geotracking and alert apps kick in. For example, Singapore’s “justJiahekt” lets users simply shake their cell phone to send alerts to the police, family members, and their doctor. Under-reporting of harassment exists, and an epidemic and technology is proving its force in this arena too. The root cause of under-reporting is difficulty identifying perpetrators and a lack of information on how to file a complaint. In 2012, London conducted a survey and found only one in ten passengers said they would report sexual harassment. So transport authorities launched “Report it to Stop it” to give women more ways to report incidents: in person, by phone and even by text. Since this programme launched in 2014, British Transport Police in London has received 65,000 reports by text.

### Incorporating women’s needs and perspectives is an important first step. In Toronto, Canada, active consultation and joint projects with women’s groups have proven effective. Thanks to a fruitful collaboration between transport authorities, police and community groups, comprehensive safety audits of the city’s transport systems were conducted and various safety-related improvements delivered, from design changes in transit areas to request-stop programmes on transport networks. Other organisations (see “Gender sensitisation training in Delhi” and “Australia: a more gender-balanced workforce,” page 19) have introduced gender-sensitive training for drivers and increased the number of women in transport-related roles.

Improving public transport works better when the public is aware of the issues and transport personnel properly trained to combat them. Authorities and campaigning groups are getting the “stop harassment” message across using traditional means like posters, advertising and staff at safety kiosks, as well as via digital tools like Hyderabad police’s Hawk Eye app, which allows citizens to report sexual assaults. But social media plays a big role too. After all, one of the best ways to spark a reaction is to go viral. A campaign by UN Women and Las Vegas City government to raise awareness of sexual harassment on subways grabbed this city’s attention by bringing it to light. A digital tool called “SpaS” created an online safety campaign that, in India, was a short-term strategy, because our long-term goal is to make public transport safer for everyone.”

There’s good news: technology can intervene at various stages. For example, Singapore’s “justJiahekt” lets users simply shake

### The most effective strategies look at issues holistically.

That’s why policy makers are taking action to tackle harassment and improve women’s transport safety as part of a wider gender-equality framework. “It’s a combination of factors that we need to bring: technology can play an important role, as well as infrastructure, service system design, and it is also key to engage women and girls, involve the community in providing safe space,” said Isabel Granada, UN Women’s Safe Public Transport Programme, said, “It’s a combination of factors that we need to bring: technology can play an important role, as well as infrastructure, service system design, and design systems that will also lead to a change in culture, behaviour because that’s part of the issue,” said Pierre Guiraud, a Frenchバルのある地域を踏まえ、公共交通機関の安全性が向上する方法を模索している。これには、交通インフラの改善、運賃の透明性向上、ジェンダーセンシティブな運転手の訓練などがある。GAIAは、この問題を解決するために、政策者、研究機関、NGO、地域住民との協力強化を求めており、日本、インド、ブラジル、イランなどで実施されている。その結果として、公共交通機関の安全性が向上しており、UN Womenは、その取り組みを評価し、実施した。これにより、公共交通機関の安全性が向上しており、UN Womenは、その取り組みを評価し、実施した。
ACCOMPLISH

PULSE

New Ideas to Challenge Daily Mobility

London: Joint action against sexual offences on public transport
Project Guardian, a partnership between Transport for London (TfL) and the police, created a team of officers dedicated to dealing with unwanted sexual behaviour crimes and support victims. To encourage more passengers to report incidents, TfL created a “Report it to stop it” campaign in 2015, and a film, which has been viewed over 13 million times. In parallel, police officers engaged with the public, giving advice to commuters, measuring women that reports would be taken seriously and distributing leaflets explaining the reporting process. Over the past three years, the number of incidents reported has doubled, with a 36% increase in arrests for unwanted sexual offences on London’s transport network.

France: Women-led exploratory walks
“In France women are the main passengers on public transport and the primary victims of sexual harassment and violence. We began exploratory walks on buses in 2015 with the aim of actively involving women in identifying safety risks and potential solutions with us. This led to concrete improvements such as newer, more comfortable buses, better lighting and redesigned bus waiting areas, as well as awareness building initiatives such as educating drivers on women’s safety issues and highlighting the 7,500 video surveillance cameras across policewomen in stations to assist with complaints has led to an increase in female-user participation.

Securing Women’s journeys in Mexico City
The Viajemos Seguras (Travelling Safely) programme began in 2008 aims to prevent and penalise violence against women and girls in public transport. Following the introduction and enforcement of women-only cars on Metro lines and buses, the deployment of personnel on bus networks and policewomen in stations to assist with complaints has led to an increase in female-user participation.

Security of women’s journeys in Mexico City
The Viajemos Seguras (Travelling Safely) programme began in 2008 to prevent and penalise violence against women and girls in public transport. Following the introduction and enforcement of women-only cars on Metro lines and buses, the deployment of personnel on bus networks and policewomen in stations to assist with complaints has led to an increase in female-user participation.

Actions to address women’s safety from across the world
Explore our selection of initiatives linked to different aspects of public transport management that are helping to make transport networks safer for women.

France: Women-led exploratory walks
“In France women are the main passengers on public transport and the primary victims of sexual harassment and violence. We began exploratory walks on buses in 2015 with the aim of actively involving women in identifying safety risks and potential solutions with us. This led to concrete improvements such as newer, more comfortable buses, better lighting and redesigned bus waiting areas, as well as awareness building initiatives such as educating drivers on women’s safety issues and highlighting the 7,500 video surveillance cameras across our transport network. Last year we began a campaign to mobilise passengers against sexual harassment, reminding how to report incidents and reminding perpetrators of the sanctions.”
Claire Brousse, Senior Analyst and Prevention Policy Manager, Fédic Lyon

Seoul: Women-friendly city project (WFCP)
 Authorities in Seoul have set out to implement women-friendly policies that address safety and convenience since 2007. To incorporate women’s perspectives, WFCP created a framework that involves women’s civic groups, government officials and experts in fields such as transportation, architecture and environment to guide policy-making from planning to implementation.

New Delhi: Beyond a more gender-balanced workforce
Delhi Transport Corporation worked with Japan, a women’s advocacy group, to run gender sensitisation sessions for drivers and conductors. Drivers were made to sit on the bus and watch role-plays about women’s journey experiences in order to understand gender issue and sexual harassment and become stakeholders in making transport safer for women. Women-only cars have been introduced in the New Delhi Metro.

Australia: A more gender-balanced workforce
In 2013, only 12% of employees of Melbourne operator Yarra Trams were women. If launched a Driven Women recruitment campaign to address the barriers that prevented women from applying for tram driver roles, including misconceptions about safety issues, earning potential and working conditions. The campaign quickly yielded results: in the first two years after its launch, the number of job applications from women increased nine-fold. Today, women account for more than 22% of Yarra Trams’ workforce and driver recruitment is now 50:50.
Craig Ypinazar, Director, People and Development at Yarra Trams said, “It’s important that our workforce reflects the diversity of the community we serve. A diverse and inclusive workplace makes good business sense, and we continue to work on new ways to attract and retain diverse talent across Yarra Trams.”

No to manspreading in Madrid
Transport authorities in Madrid launched a campaign in June 2017 against manspreading with signs placed on all city buses. The initiative was driven by EM, the City Council’s equality department and women’s group Movimientos Feministas. A similar campaign is planned for the city’s Metro system.
Clara Serra, politician and member of the Madrid Assembly: “We believe that putting a name to and making visible those kinds of daily sexist behaviours is the way ahead to become more aware and leaving inequality and machismo behind.”
Historically, cities have been designed by and for men.

We are assigned roles and identities from birth that are shaped by social traditions, political institutions and assumptions.

By questioning what is at work, we observe that the urban and societal model is built on the basis of a gendered, hierarchical duality that imposes on all individuals the normative power of a hegemonic masculinity.

Sociologists and geographers Connell and Messerschmidt define this model as the embodiment of what most revered form of what a man should be, it imposes on all others to position themselves in relation to it and ideologically legitimizes the total subordination of women to men.

Equality for women is not a new subject and has been gaining ground since the feminist movement of the 1960s. Legislation is helping put gender-sensitive thinking more firmly into the design and provision of public services. For example, many cities have adopted the 2006 European charter for equality between women and men. In 2014, France passed a law to promote substantive equality between women and men: “the State and local authorities, as well as their public institutions, must implement a policy for equality in an integrated approach”.

Many public sector projects now integrate gender policies – both thanks to top-down pressure from government as well as through the lobbying efforts of local advocacy groups.

These days there are more women in professions like architecture and urban planning. Countries like Canada, UK, US and the Nordics have successfully mainstreamed gender perspectives but it is yet to be integrated into the formal teaching of these disciplines in France, for example.

PASCALE LAPALUD

What explains today’s inequalities?

Equality for women is not a new subject and has been gaining ground since the feminist movement of the 1960s. Legislation is helping put gender-sensitive thinking more firmly into the design and provision of public services. For example, many cities have adopted the 2006 European charter for equality between women and men. In 2014, France passed a law to promote substantive equality between women and men: “the State and local authorities, as well as their public institutions, must implement a policy for equality in an integrated approach”.

Many public sector projects now integrate gender policies – both thanks to top-down pressure from government as well as through the lobbying efforts of local advocacy groups.

These days there are more women in professions like architecture and urban planning. Countries like Canada, UK, US and the Nordics have successfully mainstreamed gender perspectives but it is yet to be integrated into the formal teaching of these disciplines in France, for example.

PASCALE LAPALUD

What explains today’s inequalities?

Equality for women is not a new subject and has been gaining ground since the feminist movement of the 1960s. Legislation is helping put gender-sensitive thinking more firmly into the design and provision of public services. For example, many cities have adopted the 2006 European charter for equality between women and men. In 2014, France passed a law to promote substantive equality between women and men: “the State and local authorities, as well as their public institutions, must implement a policy for equality in an integrated approach”.

Many public sector projects now integrate gender policies – both thanks to top-down pressure from government as well as through the lobbying efforts of local advocacy groups.

These days there are more women in professions like architecture and urban planning. Countries like Canada, UK, US and the Nordics have successfully mainstreamed gender perspectives but it is yet to be integrated into the formal teaching of these disciplines in France, for example.

PASCALE LAPALUD

What explains today’s inequalities?
Travel tickets have taken all forms and shapes over the years. From simple pieces of paper to high-tech devices, it has been quite a journey. Come on board for a quick tour!

### Paper and ink

In the middle of the 15th century, before the invention of printing, public transport was provided by horse-drawn coaches. Passengers were simply given handwritten vouchers as travel tickets.

### Print it out

In 1804, trains carried passengers for the first time in England. With the Industrial Revolution and the emergence of the first train companies, transport tickets functioned like modern contracts. In the form of a printed piece of paper, their terms involved a user and a service provider, a point of departure and a destination, and a date of validity.

### Always quicker

With radio-frequency identification technology (RFID), smart cards became contactless. No more need to dig around in your bag for your transport ticket. This added to an even smoother user experience. The RFID T-Money card was introduced for the very first time in Seoul (South Korea) in 1996. Two years later, Amiens and Nice (France), adopted the system with microprocessor technology, which has become the global standard.

### Multi-service cards, more with less

In a few cities, travel card holders can now enjoy a larger range of services not limited to transport. In Brittany (France) the Scénéc’Go card, launched in 2006, gives access to public transit and public services like local public libraries and swimming pools since 2013. In Rome (Italy) the Roma Pass can be used both to access public transport and to visit cultural sites.

### Open payment

Travellers can use a contactless payment card to take the bus, tram or subway. In mid-2017, Open Payment accounted for 40% of all “pay as you go” payments on the Transport for London (TfL) bus and metro network. In 2018, Keolis successfully implemented this system in Dijon (France), the second European city after London.

### Tailor-made tickets on your wrist

For special events that temporarily generate heavy traffic, ticketing systems can adjust and innovate. For the 2016 UEFA European Championship, Keolis introduced in Lille the NFC travel wristband, a contactless public transport device.

### The smartphone, a traveller’s best friend

The advent of smartphones combined with NFC technology that enable two electronic devices to exchange information but no dematerialised travel tickets. In 2017, smartphones became a traveller’s best friend with the mobile app Plan-Book-Ticket developed by Keolis and its subsidiary Kisio Digital. Since then, not only have travellers been able to access timetables and real-time traffic information, but it has also become possible for them to purchase and validate tickets.

### Smart cards, reusable

Building on magnetic ticket technology, Roland Moreno, the inventor of the memory card, had the idea of the smart transport card in 1975. With a chip integrated inside the card, not only was information processing faster, but more detailed data could also be produced to make the transport service smarter.

### Making it magnetic

The first magnetic tickets were introduced in the Paris metro in 1969. More difficult to forge than simple paper tickets, they made it easier to fight fare evasion. And by automating ticket checks, they facilitated the flow of passengers. The ticket system modernized even further with the introduction of ticket-selling machines in the 1980s.

### CURIOSITY CABINET

**1804**

Travel tickets have taken all forms and shapes over the years. From simple pieces of paper to high-tech devices, it has been quite a journey. Come on board for a quick tour!

**1969**

The first magnetic tickets were introduced in the Paris metro in 1969. More difficult to forge than simple paper tickets, they made it easier to fight fare evasion. And by automating ticket checks, they facilitated the flow of passengers. The ticket system modernized even further with the introduction of ticket-selling machines in the 1980s.

**1980s**

Building on magnetic ticket technology, Roland Moreno, the inventor of the memory card, had the idea of the smart transport card in 1975. With a chip integrated inside the card, not only was information processing faster, but more detailed data could also be produced to make the transport service smarter.

**2007**

The advent of smartphones combined with NFC technology that enable two electronic devices to exchange information but no dematerialised travel tickets. In 2017, smartphones became a traveller’s best friend with the mobile app Plan-Book-Ticket developed by Keolis and its subsidiary Kisio Digital. Since then, not only have travellers been able to access timetables and real-time traffic information, but it has also become possible for them to purchase and validate tickets.

**2013**

In a few cities, travel card holders can now enjoy a larger range of services not limited to transport. In Brittany (France) the Scénéc’Go card, launched in 2006, gives access to public transit and public services like local public libraries and swimming pools since 2013. In Rome (Italy) the Roma Pass can be used both to access public transport and to visit cultural sites.

**2018**

Travellers can use a contactless payment card to take the bus, tram or subway. In mid-2017, Open Payment accounted for 40% of all “pay as you go” payments on the Transport for London (TfL) bus and metro network. In 2018, Keolis successfully implemented this system in Dijon (France), the second European city after London.

**2016**

For special events that temporarily generate heavy traffic, ticketing systems can adjust and innovate. For the 2016 UEFA European Championship, Keolis introduced in Lille the NFC travel wristband, a contactless public transport device.
Robin Chase: When I co-founded Zipcar in 2000, I didn’t really know anything about transportation, other than what every one of us knows. After three or four years of doing it, I realized that it is “the centre of the universe”. It is the gateway to every opportunity. But it’s enormously undervalued. People take it for granted and don’t realise its pervasive importance in their lives.

If you care about the quality of people’s lives and if you care about the climate, transportation is really important.

Right now, in the United States, the average person spends about 20% of their household budget on transportation, and if you are poor, as much as 40% of your budget goes to transport. From a climate perspective, worldwide transport produces 23% of emissions (road transport, air, sea, etc.) and in cities it’s 60% of emissions. Given the deep disruptions created by new technologies, the transport sector is currently in flux. From a human perspective and from a climate change perspective, we absolutely positively have to move urban areas to active and shared modes that are zero emission.

We cannot come out in any other place if we want the planet to survive and for cities to be places that are livable. We don’t have 50 years, we have to make this happen absolutely as fast, efficiently and pleasantly as possible.

How did this thinking lead you to create a charter of Shared Mobility Principles for Livable Cities?

It was in the spring of 2017. I felt that there was so much noise around cities about transport and where it was going: so many newspapers, so many podcasts, so many non-profit advisors, so many consulting firms advising. There was a cacophony of advice.

And even among the advisors from non-profit organisations, it felt like there could be a consensus. They weren’t aligned.

I realised that we need to have one uniform set of these Shared Mobility Principles, something that we could all rally behind, and that we advisors actually did have a strong common set of beliefs.

The 10 principles were produced by a working group of nine international NGOs, including C40 Cities Climate Leadership Group, the Institute for Transportation and Development Policy (ITDP), ICLEI - Local Governments for Sustainability and the World Resources Institute.

They were designed to guide urban decision-makers and stakeholders toward the best outcomes for all.

It was challenging, because of the diversity of groups involved, and their different perspectives, but we got to a place where every single word was backed by all of those parties. It’s a very solid piece.

We launched the principles at the EcoMobility World Festival in Kaohsiung, Taiwan, in October 2017. Immediately afterwards, I was completely struck by how these Shared Mobility Principles totally resonated. There clearly has been a real desire for this type of simplicity and clarity.

Which stakeholders did you target?

The convening group of large NGOs were the appropriate people to start with, because they exist to address social and political issues in the realm of cities and transport, independent of any government.

Later on we approached private sector companies, but they had to be in the business of transporting passengers and they had to be a multi-national. In February 2018, we announced that 15 service providers and tech companies had initially signed up to the principles, including Chiyonoppe, Keolis, Mobile and Lyft.

Since then, I haven’t approached any other organisations. All the newcomers have all come to us. Endorsers now number more than 170 entities from around the world.

What did you hope the Shared Mobility Principles would achieve?

The end goal is that cities change from planning and building with private cars as the dominant mode to planning and building with active and shared modes being dominant. Over the last 30 years we have been suffering from mono-modal, car cities. There are too many people sitting alone in private cars on their own in noisy traffic journeys. People must be shared – and emissions free – if we are to make cities better.

I want the Shared Mobility Principles to get policy-makers in cities all around the world thinking about the future of transport, its interrelatedness to how we build cities, build economies, and, importantly, create the right regulatory environment.

New mobility services like Zipcar, Uber and Lyft, and the rise of electric bikes and scooters have all shown that our regulations are broken. Our regulations are based on an outdated framework where...
there were clearly defined transport silos – bus, rail, taxi, private car, etc. – and the new mobility services don’t easily fit into those silos. As the number of cars coming in, it will be the exact same thing – so we need new regulations that help us achieve the outcomes we want.

I also want the Principles to get people thinking about user fees, what people pay to get around. Right now our user fees are very, very broken and around the world. And cities are responding in an even more broken fashion. Without better pricing and allocation of rights of way we are trusting ourselves up for an incredible catastrophe. In my view, we have to do congestion pricing.

Are the Principles already guiding transport policy?

I. We plan our cities and their mobility together.

The way our cities are built determines mobility needs and how they can be met. Development, urban design and public spaces, buildings and zoning regulations, parking requirements, and other land use policies should incentivise compact, accessible, livable, and sustainable cities.

II. We prioritise people over vehicles.

Traffic congestion is a mobility crisis, not a fraction of vehicles, private cars. This plan was pricing that targeted taxis, and a system of congestion policies that was introduced in New York City to introduce

III. We engage with stakeholders.

All transportation services should be integrated and thoughtfully planned as part of an urban transportation ecosystem, and complementary modes. Seamless trips should be supported through connections, interoperable payments, and combined information. Every opportunity should be taken to enhance connectivity of people and vehicles to wireless networks.

IV. We lead the transition towards a zero-emission future and renewable energy.

Transportation and land-use planning, and policies should minimise the street and parking space used per person and maximise the use of each vehicle. We discourage overbuilding and oversized vehicles and infrastructure, as well as the overuse of parking.

V. We aim for public benefits via open data.

Transportation and land-use planning policies should maximise the street and parking space used per person and maximise the use of each vehicle. We discourage overbuilding and oversized vehicles and infrastructure, as well as the overuse of parking.

VI. We work towards integration and seamless connectivity.

The data infrastructure underpinning shared transport services must enable interoperability, competition and innovation, while ensuring privacy, security, and accountability.

Selected Signatories:

- **Mobiisen** – long-distance carpooling service available in 21 countries.
- **OTMAPP** – public transport app and mapping service.
- **Eireon** – a global leader in mobility, operates more than 10 transport services in the UK. 
- **TripED** – provides transportation software solutions for transit agencies.
- **Her** – peer-to-peer ridehailing, taxi cab services and more.
- **VLR** – transportation network and real-time ride-sharing company.
- **Zapcar** – car-sharing company.
- **Uber**.
- **Nit more.**

VII. We support the shared and efficient use of vehicles, lanes, curbs, and land.

Businesses, and other stakeholders may feel direct impacts on their lives, their investments and their economic livelihoods by the unfolding transition to shared, zero-emission, and ultimately autonomous vehicles. We commit to actively engage these groups in the decision-making process and support them as we move through this transition.

VIII. We support fair user fees and pricing.

Pricing and financial access to shared transport services are valuable public goods and need thoughtful design to ensure use is possible and affordable by all ages, genders, incomes, and abilities.

IX. We support that autonomous vehicles (AVs) in dense urban areas should be operated only by shared fleets.

Due to the transformative potential of autonomous vehicle technology, it’s critical that all AVs are part of shared fleets, well-regulated, and zero-emission. Shared fleets can provide more affordable access to all, maximise public safety and emissions benefits, ensure that maintenance and software upgrades are managed by professionals, and actualise the promise of reductions in vehicles, parking, and congestion. In line with broader policy trends to reduce the use of personal cars in dense urban areas.

---

I am hoping to develop small case studies associated with different types of cities. They would show, for example, how you might achieve a transition towards shared mobility in a city that has a transportation backbone and a large informal sector, and how you might do it in a city that has high GDP and an existing public transport network. Executing will require the work of partners around the world, each with their own local knowledge and expertise.

We are also deliberately vague about which transport modes should be employed to deliver shared mobility.

Cities need metro, light rail, bus rapid transit – things that have their own right of way and are pushing huge numbers of people in future and peak periods.

In dense metro areas, there is nothing else that can move enough people.

But, ultimately, our customers for the Shared Mobility Principles are cities and the people who live in them. We are not pro any particular technology or vehicle or mode. We are sticking with these principles as laid out and don’t care if it’s self-driving car companies like Waymo or Zoo, or something I’ve never heard of – if it can achieve what we want.

And, shockingly, I also don’t care if public transport retains its glory as it stands today. I am looking to move the most people at the least cost in the most livable way.

---

@rmchase

www.robinchase.org
At major occasions like sporting or cultural events, a whole city suddenly bustles with a huge number of visitors that it needs to host. The city’s routine is shaken up: urban logistics and transport coordination have to be readjusted accordingly. So how do the city’s stakeholders rise to such challenges?

Many preparatory meetings with all stakeholders are held ahead of the event. Seated around the table are councillors, local public administrators, police officers, prefectural officials, sports club directors, UEFA executives, heads of public transport authorities, mobility operators and representatives of resident and retail associations.

The operator draws up a comprehensive offering in mobility (flows, human and material resources to use, communications to be released in advance, real-time passenger information, etc.)

We should consider all ways of getting around the city in our mobility plan, including walking.

And safety remains our priority.

I’m Lea, a Keolis accountant and a volunteer doing on-the-ground work at big events. These volunteers are vital for managing flows, for giving passenger information, for reporting incidents and more.

Here’s Marc with his daughter Édith. They’re both football fans, they’ve come to Lyon for the first time to follow their favourite club and want to go to the stadium by public transport.
The supporters follow directions, as do Lyon’s local population, who were informed of changes made to their public transport network several days ago for this special evening.

To adjust to the growing crowds, we guide passenger flows using barriers and signs.

Hello Safety Headquarters? A one-way passenger flow has been set up at the entrances to Garibaldi Station. The flow is smooth.

Using the “Day Pass” offered on this day, Marc and Édith are free to travel on any mode of transport on the network (underground, bus, tram or shuttle).

Don’t worry, I’ll tell you which connection you’ll need for the direct tram to the stadium.

Maintenance specialists (capable of repairing the overhead cables, which power the trams, for example) are strategically positioned to swiftly carry out work in the event of an incident.

Arrivals are frequent, so the rate of tram turnarounds is increased: one every minute, instead of one every five minutes as usual.

Maintenance specialists - especially in operation for the occasion – it is the peak period for transport to the stadium.

For events at the stadium, a special route is used so you get dropped off right in front of the stadium.

Please move towards the back.

On the evenings of matches, public transport stays running until 1:00AM especially for the occasion...
TO REACH GATE C, TAKE THE STEPS ON THE LEFT, ENJOY THE MATCH!

Like their colleagues on the buses and underground, the drivers quickly get through successive turnarounds. They are vital links in the chain.

During the match, the teams hold discussions, both on the ground and at the headquarters. Counterpoint to the arrival period, the stadium has to be vacated in a very short space of time.

The match is over! Marc and Édith take a free shuttle ride from the stadium to the car park. A friend is going to drive them back to the city centre to celebrate the victory.

Almost half the spectators came to the stadium on public transport, which amounts to around 30,000 people.

The match is over! Marc and Édith take a free shuttle ride from the stadium to the car park. A friend is going to drive them back to the city centre to celebrate the victory.

Almost half the spectators came to the stadium on public transport, which amounts to around 30,000 people.

TOMORROW THE CITY WILL BE BACK TO NORMAL... AND I'LL BE BACK AT WORK.
MAKING SURE CYBERTHREATS DON’T DERAIL PUBLIC TRANSPORT

One weekend in November 2016, riders of San Francisco’s Muni light rail transit system got an early holiday treat. Following a ransomware attack on the computerised fare system, the Muni, which also runs buses and the city’s famed cable cars, decided to turn off the payment machines and open the gates, allowing Muni passengers to ride for free. It lasted two days, while the authorities sought to figure out who had hacked the computer system, reportedly demanding 100 Bitcoin. Muni decided not to pay up, and by Monday they had managed to get the system back to normal. While the cybercrime disrupted Muni’s computer operations, it could have been worse. And that left experts wondering how transit authorities would respond to a much more severe attack from cyberterrorists intent on causing real damage.

ATTRACTIVE TARGETS
Cybersecurity is a concern for all industries, but transportation is a particularly attractive target because of the complexity and age of the IT systems. According to Stan Engelbrecht, Director of Cybersecurity Practice at 3D Security Services, a company specialized in business and personal safety and security, “Supervisory control and data acquisition (SCADA) systems manage the physical automation that coordinates mass transit. Some of these systems have been in operation since the 1970s, and needless to say, they were not designed with modern cybersecurity in mind.” Today, they are well-known as vulnerable targets in hacker communities, and the methods for hacking them are widely shared online. What’s more, as control and management systems become even more dependent on automation and information technology, they are vulnerable to increasingly sophisticated cyberattacks, from sources that range from terrorist groups to individuals bent on quick financial gain. In 2016, there were multiple hacking attempts against the email accounts of employees of railroad workers in South Korea in order to take control of the transport system. And such attacks can do great harm. “Cyberattacks can destroy a transit agency’s physical systems, (ie computers) render them inoperable, hand over control of those systems to an outside entity or jeopardise the privacy of employee or customer data”, the American Public Transportation Association has warned in their Cybersecurity Considerations for Public Transit report (2014).

WHEN SMART MEANS VULNERABLE
At the heart of the problem is the interconnection of systems. Urban transportation infrastructure used to be built around electronic display systems. However, as today’s cities become increasingly smart, they are naturally moving toward connected transportation infrastructure to enjoy the many benefits it provides, such as improved safety, faster response times for emergencies, timelier infrastructure repairs, improved traffic flow and even lower CO₂ emissions.

This leads to a wider potential attack surface of transportation systems, allowing hackers to target not only the information technology, but also the operational technology that runs a city’s signalling and control systems.

Among the technical assets transport operators must protect today are traffic signal pre-emption equipment that can be used to change traffic light timings, wireless fare payment technology interfaces such as Near Field Communication, Bluetooth, barcode scanning, and automatic passenger counting systems.

In addition, “Public transit systems have a great deal of information about passengers,” notes Nicolas Vennersan, Chief Information Security Officer at Keolis. “So there is a risk of passenger data being stolen and either used for blackmail or sold into the black market for a financial gain. In 2016, there were multiple ransomware attacks in the US in 2017 when information display screens at the Washington D.C. Union Station were hacked and started playing a pornographic video during rush hour. While that is a nuisance, it’s nothing compared to the disruption that could be unleashed if hackers took control to broadcast false messages, or worse if they took control at a distance of the steering of a tram or a train.”

Cities and transit operators also have to face a wider range of attacker motivations, including ransomware, which, according to annual Verizon Data Breach Report (2018), rose 50% in 2017 in businesses in general.
Lindsey Mancini is a UITP (International Association of Public Transport) Senior Manager of IT and security whose responsibilities include managing all the activities related to IT in public transport and cyber security.

There is a lot to be done but unfortunately there’s no silver bullet. I think we’ve reached a tipping point where cybersecurity has become a hot topic and public transport systems are starting to take a serious look at how to approach it and find real solutions.

There are standout transport authorities, such as Transport for London, and Singapore’s Land Transport Authority. Both are leaders in the way they have adopted a holistic approach to cybersecurity and have buy-in from the top. This means that they have a real company culture of cybersecurity, only you can do that because you know the environment, the history, and the culture of the organisation. It’s pure fantasy to think someone from outside could do that for you. The big issue is the lack of a cybersecurity culture within the organisation, from the boardroom to the frontline staff. It is important that every person understands the risk and their role in protecting the system.

There are loads of technical solutions, firewalls and such, but they are of no use if you still have employees writing their log-in passwords on a Post-It and leaving them on their computers. That’s really the biggest challenge: getting humans on board, through awareness raising and training and by having cybersecurity policies explained, not just distributed. Another challenge is the fact that public transport systems work with lots of vendors, suppliers, and other outside contractors, and they have no control whatsoever over their IT. So even if you do a great job explaining the risks to your staff, it’s not enough, you have to go even further.

There is a recent problem. If we go back 10 years ago, there weren’t many examples of attacks. One that stands out happened in 2008 in Lodz, Poland, when a teenage boy hacked into the system and derailed a few trains. The first big well-known attack was probably the ransomware attack, two years ago on the Muni system in San Francisco. There is a number of trends on the horizon that mean that these threats won’t go away. One is artificial intelligence, which is being applied in many sectors, including public transport, in order to make sense of all the data being collected. That’s great but it’s also an opportunity for cybercriminals to make even more sophisticated attacks. Another is the Internet of Things, which is growing at an exponential rate. As more and more things are connected to the organisation, the risk and their role in protecting the system is increasing.

Improving security policies

More and more cities such as Singapore are putting into place internal awareness campaigns and training programmes for transportation personnel. Many are also following best practices, including using apps to manipulate transit operators into taking dangerous actions. Security professionals also reported a lack of trained personnel to deal with these issues. This is alarming because as cyber security threats continue to increase, cities will need more experienced security personnel and robust security policies and procedures in place for not only preventing attacks, but also for how to respond after an attack.

Under this principle, public transport operators need to discuss how security is implemented for the whole lifecycle of the product: at the time the system is designed, when the product is integrated into an existing system, right until the end-of-life. This approach is based on an early risk analysis and allows to anticipate security issues from the start.

Staying ahead of the cybercriminals will remain a challenge for cities – the price to pay for becoming increasingly “smart”.

Cybersecurity by design

Public transit operators on both Europe and the US are coming under increasing pressure from governments to implement minimum-security measures, report cyber incidents, and comply with the regulatory framework, such as Europe’s Directive on Security of Network and Information Systems (NIS Directive) that went into effect in August 2016 and aims to create an overall higher level of cybersecurity in the EU, as well as more broadly with the General Data Protection Regulation, adopted in 2016 and applicable since mid-2018. For legacy systems, operators can try to isolate critical functions. For more recent systems, the solution is to employ “security by design”, which means defining the security objectives and the controls from the beginning of the project.

There is a lot to be done but unfortunately there’s no silver bullet. I think we’ve reached a tipping point where cybersecurity has become a hot topic and public transport systems are starting to take a serious look at how to approach it and find real solutions.

There are standout transport authorities, such as Transport for London, and Singapore’s Land Transport Authority. Both are leaders in the way they have adopted a holistic approach to cybersecurity and have buy-in from the top. This means that they have a real company culture of cybersecurity, only you can do that because you know the environment, the history, and the culture of the organisation. It’s pure fantasy to think someone from outside could do that for you. The big issue is the lack of a cybersecurity culture within the organisation, from the boardroom to the frontline staff. It is important that every person understands the risk and their role in protecting the system.

There are loads of technical solutions, firewalls and such, but they are of no use if you still have employees writing their log-in passwords on a Post-It and leaving them on their computers. That’s really the biggest challenge: getting humans on board, through awareness raising and training and by having cybersecurity policies explained, not just distributed. Another challenge is the fact that public transport systems work with lots of vendors, suppliers, and other outside contractors, and they have no control whatsoever over their IT. So even if you do a great job explaining the risks to your staff, it’s not enough, you have to go even further.

There is a recent problem. If we go back 10 years ago, there weren’t many examples of attacks. One that stands out happened in 2008 in Lodz, Poland, when a teenage boy hacked into the system and derailed a few trains. The first big well-known attack was probably the ransomware attack, two years ago on the Muni system in San Francisco. There is a number of trends on the horizon that mean that these threats won’t go away. One is artificial intelligence, which is being applied in many sectors, including public transport, in order to make sense of all the data being collected. That’s great but it’s also an opportunity for cybercriminals to make even more sophisticated attacks. Another is the Internet of Things, which is growing at an exponential rate. As more and more things are connected to the organisation, the risk and their role in protecting the system is increasing.

Improving security policies

More and more cities such as Singapore are putting into place internal awareness campaigns and training programmes for transportation personnel. Many are also following best practices, including using apps to manipulate transit operators into taking dangerous actions. Security professionals also reported a lack of trained personnel to deal with these issues. This is alarming because as cyber security threats continue to increase, cities will need more experienced security personnel and robust security policies and procedures in place for not only preventing attacks, but also for how to respond after an attack.

Under this principle, public transport operators need to discuss how security is implemented for the whole lifecycle of the product: at the time the system is designed, when the product is integrated into an existing system, right until the end-of-life. This approach is based on an early risk analysis and allows to anticipate security issues from the start.
A cities swell, public transport must absorb any growth. To help, city planners often propose laying down new rulers of train track, ordering roomier trains, or expanding cycle lanes. But for cities lucky enough to have access to a waterway, the simpler solution may be to provide a way to commute not across land, but rather by lake, river or sea.

Once a relatively niche form of transport, waterborne commutes are gaining popularity in major cities worldwide. The reasons are straightforward. One, opening up waterways clears congestion from roads and trains. Two, waterways already exist, so there’s no need to construct new, expensive infrastructure such as subway tracks, cycle paths, or dedicated bus lanes. Three, river transport creates far less pollution than land transport. Four, travel time is more or less guaranteed. And finally, lest we forget – taking a boat to work is, well, fun.

In cities where water transport is already being rolled out, the locals have responded with unanimous enthusiasm. It’s not exactly a surprise: someone who previously had to put up with a long, complex commute on land may suddenly find they are able to cut directly across the bay or river, dramatically cutting their travel time. And then there’s the obvious point: water transport is less hectic and more scenic – a cruise more than a commute. The sheer pleasure of ferry rides may serve as an invaluable boon to a city’s collective mental wellbeing.

The proof is in the ridership rates: when the NYC Ferry began operating in 2017, city officials predicted annual ridership would max out at around 4.5 million passengers. Six months later, the service was carrying 38% more passengers than predicted, spurring them to double their projection to 9 million annual riders. The NYC Ferry owes at least part of its success to its pricing model: at $2.75 a ride, it’s as affordable as the subway. Across the Atlantic in Nantes, France, the Navibus river boat shuttles riders up and down the Loire river for just €1.70, again, the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride. On Hong Kong’s historic Star Ferry, a sail across the bay or river is the same price as a metro ride.

Clearly, keeping ferry fares low keeps the locals happy. But is it economically viable? Ferries are costly to build and maintain, as are the terminals they’ll dock in. Unless they’re electric-powered – as is the Bat³ river fleet in Bordeaux, France – they’ll need fuel. And then there are the safety-related costs – from staff training to equipment. To cover costs, cities with existing river-transport systems can opt to diversify the offer with tourist-oriented routes. Places like Hong Kong, Recife in Brazil, and Dubai are introducing special sightseeing routes and timetables (and in the case of Dubai, private charter options). So far, the strategy seems to be working.

Of course, there are other, more qualitative ways to measure return on investment (ROI). Opening up a city’s waterways can help reduce crowding on trains, decongest roads, and reduce travel time. When the Lagos state government, Nigeria, made a move to overhaul its ferry system in late 2017, it did so with the intent to take pressure off its jam-packed roads. So far, so good: an August 2018 University of Lagos study shows that complementing the city’s bus, taxi and car networks with waterway services has slashed the average journey time by around 46%.

While ferry and riverboat services are enjoying a global rise, if they want to thrive as mainstream modes of transport, public transport operators will need to focus on two areas: optimising vessels, and providing easy connections to land transport. London’s river bus excels in both respects, with services every 20 minutes, docking at 33 points along the Thames, most of which link easily to major Tube stations. Onboard, there’s plenty of space for bikes and scooters, and passengers have access to bathrooms, free newspapers, and even a bar serving coffee by day and cold pints by night. The cost of the river bus – £6.60 vs. £2.90 for the Tube – may have slowed the service’s growth, but has by no means stopped it. In 2018, the service carried its 40 millionth passenger, and operator Thames Clippers will soon be adding an 18th catamaran to the fleet set to accommodate an additional 300,000 riders per year. In London, river transport continues to rise as it has in other ferry-equipped cities worldwide. If the trend continues, in the very near future, commuting by boat may not be so niche after all.
Living in the country can be bliss, but for those inhabiting remote, sparsely populated areas, getting around can prove a real hassle. We look at the complex challenges of rural mobility, as well as the creative, bespoke transport solutions emerging to render residents’ journeys less taxing.

by Marie-Noëlle Bauer
Illustration: Aurore Petit

It’s many a city-dweller’s dream: escaping the urban rat race and moving to the countryside to enjoy a better quality of life. A study published by the French Institute of Public Opinion (IFOP) in October 2018 found that 81% of the French population deems rural living “an ideal lifestyle” (with just 5% of current country residents saying they’d wish to leave)

But of course, fantasy rarely matches up to the reality; just like the city, the country’s many advantages are coupled with distinct challenges. According to the same study, one of the main reasons respondents were dissuaded from making the big move to the countryside was the dearth of transportation (54%) – a real disadvantage particularly affecting young people, the elderly, the mobility impaired and the unemployed.

Shared mobility has become a high-stakes issue in the European Union, 57% of which spans rural regions, holding approximately 24% of its population. It not only bolsters the attractiveness of regions, it also supports carbon-emission objectives and improves the quality of life and public health in general. With the need to be mobile for all sorts of reasons, some of these communities are increasingly open to new and more creative transport solutions.
A new generation of rural mobility initiatives...
For Pulse, Fred Charbaut, a specialist music journalist and co-founder of Paris’s Saint-Germain-des-Prés Jazz Festival, presents a musical selection inspired by the world of public transport. Tracks and stories to [re]discover.

Metros, trains, stations and all those who frequent these busy transit areas are a source of endless inspiration for artists. In the eyes of composers and musicians, trains become allegories, the metro ticket inspector turns into a gentle dreamer, the city’s effervescence is transposed into rhythms...

After all, it’s only natural that music echoes our lives.

“It’s a source of endless inspiration for artists. In the eyes of composers and musicians, trains become allegories, the metro ticket inspector turns into a gentle dreamer, the city’s effervescence is transposed into rhythms. It tells the story of ‘this guy you pass and don’t look at.’ Under the ceramic tiles of the Parisian metro, the ticket inspector is bored with punching travelers’ tickets day after day. And so he reads, dreams of great escapes, to the sea and on wild paths. ‘I’d like to fly away/Leave my cap in the cloakroom’ sings Gainsbourg. This song was one of the composer’s first hits. The town hall of Les Lilas, in the Parisian suburb, recently proposed naming a new metro station, scheduled for 2019, Les Lilas-Serge-Gainsbourg. Proof that this song has been a shamanic journey invites us onboard his...”

Serge Gainsbourg. This song was one of the composer’s first hits. The town hall of Les Lilas, in the Parisian suburb, recently proposed naming a new metro station, scheduled for 2019, Les Lilas-Serge-Gainsbourg. Proof that this song has become a shamanic journey invites us onboard his...”

New ideas to challenge daily mobility.
~ SPECIAL THANKS ~

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

A

Kellie Ashman
Communications Advisor, Keolis Downer

Rohan Astley
Communications Manager, Keolis Downer

Sylvain Aussert
Production Manager, Keolis Lyon

B

Christophe Badesco
Ticketing Project Manager, Keolis

Chris Barker
Vice President New Mobility, Communications and Marketing, Keolis North America

Armelle Billard
Internal Communications Manager, Keolis Rennes

Bertrand Billoud
Head of Communications, Kisio Digital

Antoine Blanchet
Press Officer, Rennes Métropole

Jean-Yves Boulin
Sociologist and research fellow, Paris Dauphine University

Claire Brousse
Statistical Analyses & Prevention Policy Manager, Keolis Lyon

C

Simon Chalumeau
Mobility on Demand Project Manager, Keolis

Robin Chase
Transportation entrepreneur, co-founder of Zipcar, lecturer and author

Ségolène Deeley
Corporate Affairs Director, Keolis Downer

Philippe Grall
Penn Ar Bed shipping company Director, Keolis Brest Maritime

Daniel Hoffman
Former Chief of Station with the Central Intelligence Agency, cybersecurity advisor

Raphaël Jacquemet
Marketing Offer Director, French Regions, Keolis

Arnaud Julien
Innovation and Digital Director, Keolis

D

Katja Krüger
Deputy Mayor of the city of Rennes responsible for “time policy” and President of Tempo Territorial

Pascale Lapalud
Urban Planner and co-founder of the Genre et Ville think tank

Marie Leroy
“Time office” Assistant, Rennes Métropole

Anne Lieure
Public Affairs Director, Keolis France

Kara Livingston
Group Marketing Director, Keolis

Stephanie Luelf
Director, Public Affairs & Sustainability, Keolis Downer

M

Lindsey Mancini
Senior Manager Security and IT in Public Transport, UITP

Elodie Mijieux
Communications and Media Relations Manager, Keolis Lyon

Anne Miller
Director of Corporate Affairs, Keolis North America

N

Schuyler Null
Communications Associate, World Research Institute

Jacky Pacreau
Deputy CEO, French Regions, Keolis

Seleta Reynolds
General Manager of the Los Angeles Department of Transportation

Charlotte Soignon
Innovation and Digital Project Manager, Keolis

Bernard Tabary
Keolis International CEO

Nicolas Vermuseau
Information Systems Security Manager, Keolis

Scheherazade Zekri
Director New Mobility Services, Keolis