

THE QUICK GUIDE TO

Smart mobility solutions

FOR CITY OFFICIALS & URBAN PLANNERS

PTV GROUP

the mind of movement



"The era of ownership is ending;
the age of access has begun."

Jeremy Rifkin

Economist

INTRODUCTION

As technology revolutionises the way people reach their destination and how cities are being managed, we investigate state-of-the-art solutions that shape communities and transport systems. The question is: What are the realistic solutions that can be adopted by decision-makers?

OUR EXPERTS

This guide includes information from numerous studies, reports, field work by PTV Group and interviews with the following experts:



Sabrina Meyer

creates innovative mobility concepts for rural areas. As Head of Customer Success at tech company door2door, she advises cities and municipalities on how to integrate new technologies into their mobility planning.



Prof. Dr.-Ing. Johannes Schlaich

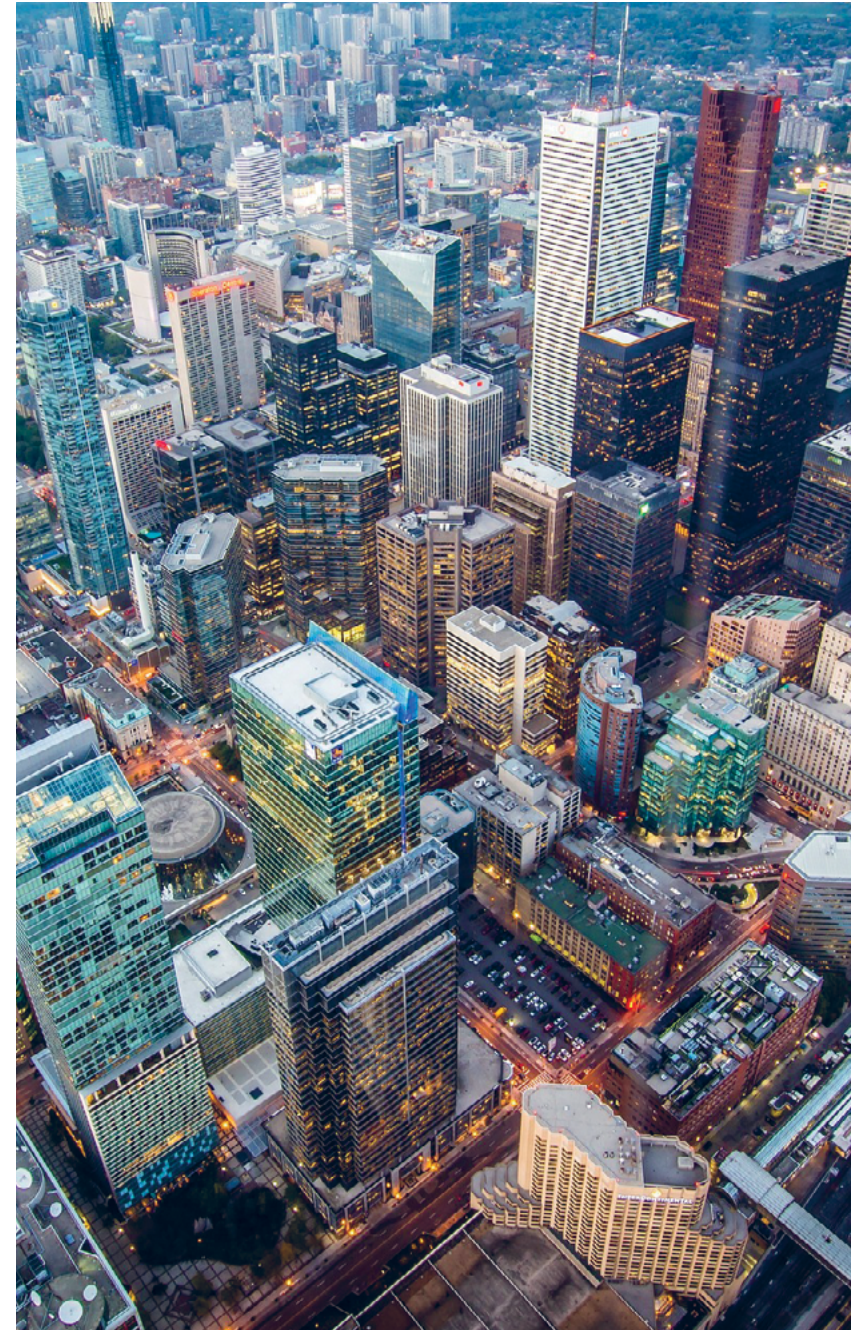
specialises in mobility and transport at Beuth University of Applied Sciences in Berlin. He develops and implements technology-oriented strategies for optimising urban mobility together with cities and transport companies.



“We need to detach ourselves from the idea that public transport always means fixed lines, rigid timetables and increasingly larger transport vehicles,” says Dr. Johannes Schlaich, Professor for Mobility and Transport at Beuth University of Applied Sciences in Berlin.

People no longer want to commit to using a single mode of transport. They have begun to question their mobility routines and now have digital mobility services determine the best route for them. At the same time, they increasingly desire to use different mobility services whenever necessary. “The future lies in demand-responsive systems,” states Schlaich. And they need to be planned and implemented accordingly.

“Concepts such as dial-a-ride services or car sharing have been around for a long time,” says Schlaich. “But currently, they are experiencing a true renaissance. This is





because the Internet, smartphones and apps have transformed consumer behaviour.”

The Internet serves as an ideal platform for buyers and sellers to meet. Smartphones and apps allow for an easy exchange of information anytime and anywhere. Mobility can be accessed and consumed in new ways, which impacts transport systems as we know them today.

MOBILITY ON DEMAND

There are several indicators that point towards a stronger focus on mobility on demand. For example, the registration and usage figures of car sharing services. In recent years, the car sharing community has experienced steady growth. Whereas in 2006, there were 0.35 million registered members worldwide, by 2015, the number increased to 7 million. Studies predict that by 2025, 36 million people will have signed up worldwide.¹

Car sharing services are currently active in almost 50 countries on six continents. Measured by the number of members, Asia leads the car sharing community with 58%, followed by Europe with 29%.²

Despite rising membership numbers, only a fraction of car sharers actually integrates car sharing into their everyday lives: In the United States, about 15% use car sharing services once or several times a week.³ But in Europe, inte-



gration is less developed: In France, the average booking rate accounts to 2.2 rents per user per month.⁴ In Germany, just 6% of car sharing members rent car2go, DriveNow and Co. once or three times a week. Almost every seventh member uses the service less than once a month or never.⁵

In the United Kingdom, car sharing is increasingly used by younger people in their daily routine: While in the 60+ age group only 2% rent a car sharing vehicle in their everyday lives, 17% among the 30 to 59-year-olds do so. About one in four of the 18 to 29-year-olds uses car sharing at least sometimes to satisfy their daily mobility needs.⁶

Driving license holders like the feeling of having the option to use a vehicle whenever they want. That is what makes them register for one or multiple car sharing services. For some, car sharing replaces a second car. For others, it marks the beginning of non-car ownership because it provides an option to life without owning a car.

Moreover, a study in US cities showed that about a third of those who started opting for bike or car sharing and ride-pooling services used their car less often to get to work. About a quarter drove less to take care of errands or engage in leisure activities. Around 15% stated they used public transport more frequently instead. The study also revealed that people who routinely used different shared mobility services had only half

as many cars per household as those who chose public transport as an alternative.⁷

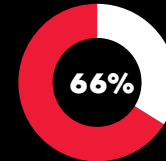
The demand for intelligent, individually tailored mobility services is growing. Future mobility means more than just arriving at a destination states the future study “Mobilität. Erfüllung. System.” (“Mobility. Fulfilment. System.”) carried out by the Munich-based association on digital transformation Münchner Kreis. The study predicts that additional benefits will increasingly influence our choice of transport modes in the future. Individual preferences in transport modalities, comfort and situational and context-related services will gain in importance. At the same time, the spectrum of mobility or how people can get from A to B is becoming more varied.⁸

This trend is already supported by mobility platforms such as moovel, moovit and Whim, offering multiple services in one app. “They provide intermodal travel information that shows the entire range of transport systems, offer real-time forecasts and location searches for bike and car sharing, plus allow for direct booking and payment,” explains Schlaich. “The linking of these services makes it easier to access systems that offer a real alternative to private cars.”

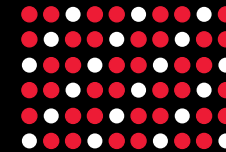
For cities and municipalities, the trick is to find the most suitable transport systems for their demand and deploy them skilfully to meet their urban and traffic planning goals.

THE EUROPEANS AND THEIR CARS

End of a love affair? The ING International Survey⁹ shows that



Europeans can imagine sharing their car with others. This despite most of them saying they feel emotionally attached to their vehicle.



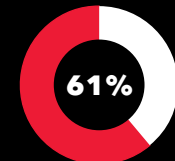
Every third European with a driving licence uses car sharing or is considering using it next year. But car ownership is not the only rival of car sharing: It is also competing with ride-hailing services such as Uber and Lyft.

TOP REASONS FOR CHOOSING CAR SHARING SERVICES:

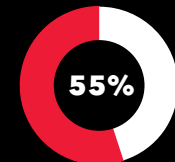
- 1 lower costs
- 2 sustainability
- 3 flexible alternative to car ownership

WHAT MILLENNIALS DEMAND

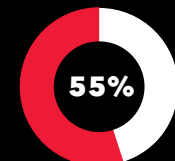
Millennials already use multiple travel options. What they expect from public transport in the next ten years:¹⁰



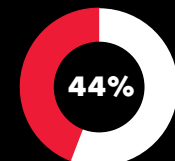
say the systems should be more reliable



state there should be real-time updates



say Wi-Fi or 3G/4G should be available wherever you are



state the travel experience should be more user-friendly and intuitive

“It is difficult to predict with certainty what the future will look like,” says Schlaich. “What is certain, however, is that cities and municipalities will have to work more closely with private technology-driven companies in order to develop further. In addition, they will have to rethink funding and subsidy issues.”

ON-DEMAND SHUTTLE

There are more and more reports about new types of transport partnerships, such as the on-demand service BerlKönig, launched in Berlin in September 2018. The initial deployment of 50 minibuses is intended to supplement Berlin’s public transport services within the city area. It is a cooperation between BVG, Berlin’s transport operator, and ViaVan, a joint venture between Mercedes-Benz Vans and tech company Via. Passengers can request a ride via an app and will get picked up at their location. If there are other passengers heading in the same direction, they are collected along the route and taken to their destinations. According to BVG, BerlKönig is currently the world’s largest on-demand shuttle service offered by a public transport operator.

Latin America’s first on-demand shuttle started in mid-February 2019 in Goiânia, Brazil. HP Transportes Coletivos, one of Brazil’s largest public transport operators, launched CityBus 2.0. The entire project is also rolled out in partnership with Via. This service serves stations in eleven





districts supplements the city's existing public transport system. It employs 30 drivers, handling up to 3,500 trips a day.

Within the first month, 22,000 users registered for CityBus 2.0. Up to 14 persons can be accommodated by a single van. The base rate is the equivalent of 0.64 US\$. It varies depending on the distance and number of passengers. During the first 30 days, the vehicles covered more than 40,000 kilometres; that's a trip around the world.

Since December 2018, Singapore has been testing how public on-demand buses can make life easier for commuters: In the south of the city state, passengers can request a bus ride by app to any stop in the catchment area and be chauffeured to any stop. "We're experimenting with a new form of public transport to see if we can optimise the options for commuters. We need to experiment with a few models of public transport to find out what people need, what people want," says Janil Puthuchery, Singapore's Senior Minister of State for Transport. "A lot will depend on how commuters react."¹¹ During the first seven weeks of the test phase, the Ministry of Transport counted 6,000 trips.

Are on-demand services a concept for metropolises and larger cities only? "Not at all," says Sabrina Meyer, Head of Strategic Projects at door2door. Conventional public transport services with fixed routes and timetables are increasingly unable to meet the citizens' mobility needs, which makes it

more challenging for rural areas to remain attractive as a place to live and work, especially for young people. As a result, these municipalities struggle with depopulation and demographic change.

Cities like Sacramento in the U.S., Freyung in southern Germany, or municipalities like Vimercate near Milan, Italy, are therefore testing how to supplement or replace their public transport system by on-demand ride-pooling services. They decided to work together with local bus and taxi operators. The aim is to offer citizens an enhanced range of mobility services, while also strengthening local mobility providers.

“If cities and municipalities want to follow this path, it is first and foremost important to look at the target groups and the goals they are striving for,” explains Meyer from door2door. “You have to ask yourself: Do we want to optimise our transport services for senior citizens or rather address young people? Do we have to supplement our current public transport services during the entire operating time or only at off-peak times? Do we want to offer door-to-door services or increase the overall service level for our citizens?”

Once the target group and objectives have been defined, cities and municipalities can start designing the ride-pooling concept and putting out transport services



MOBILITY IN 2040

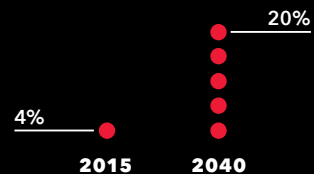
The strategy consulting firm Oliver Wyman has compared the mobility landscape in 2015 with the forecast for 2040¹²

1 People will travel even more in the future. They will prefer personalised, flexible end-to-end solutions.

2 In 2015, private cars accounted for 74%. This share will drop to 55% in 2040.



3 The demand for shared mobility services will rise to 20% in 2040 compared to 4% in 2015.



4 China will play a pioneering role in smart mobility services. 98% of Chinese respondents indicated that smart mobility services were important to them and that they were willing to switch modes for smart mobility offerings.



to tender. One option would be to integrate local transport and taxi operators in order to optimise capacity utilisation and ensure reliable revenues.

And what should cities and municipalities be aware of when taking the first step towards realising their vision? "In general, it is important that they create appropriate resources from the outset and that the project is coordinated by a person who understands the technology and thinks 'out of the box'," states Meyer. "Running such a project is a full-time job, and from experience we know that project-executing agencies who assigned a team member specifically to this task were successful."

SMART INCLUSIVITY

Technology is designed not only to provide the best mobility services fitting individuals' needs in a convenient and practical manner. Smartened up devices and apps bear also enormous potential in being inclusive by providing simplified accessibility to mobility services also to disabled people.

For example, voice control assistants can help the visually impaired to choose the right transport connection; finger scan can be used by persons with limited mobility as a smart payment method via smartphone.

Moovit shows what this could look like in real life. Its app provides barrier-free functions that offer blind and visually impaired people better access to public transport. Thanks to voice-assistant apps, they can use the app to plan their trips, have current delays and departure times read to them and receive information on when to get off.

NEW MOBILITY SERVICES OFFER TRANSPORTATION ALTERNATIVES

	Traditional mobility solutions	New mobility services	
Individual-based mobility	Private car ownership	Car sharing: peer to peer	A peer-to-peer platform where individuals can rent out their private vehicles when they are not in use.
	Taxi	E-hailing	Process of ordering a car or taxi via on demand app. App matches rider with driver and handles payment.
	Rental cars	Car sharing: fleet operator	On demand short-term car rentals with the vehicle owned and managed by a fleet operator.
Group-based mobility	Car pooling	Shared e-hailing	Allows riders going in the same direction to share the car, thereby splitting the fare and lowering the cost.
	Public transit	On-demand private shuttles	App and technology enabled shuttle service. Cheaper than taxi but more convenient than public transit.
		Private busses	Shared and Wi-Fi-enabled commuter busses available to the public or to employees of select companies. Used to free riders from driving to work.

McKinsey & Company



● — REFERENCES

1. Statista: Number of car sharing users worldwide from 2006 to 2025 (in millions).
2. Transportation Sustainability Research Center, University of California, Berkeley: Innovative Mobility: Carsharing Outlook. Spring 2018
3. American Public Transportation Association (APTA): Shared Mobility and the Transformation of Public Transit. 2016
4. 6-t Bureau de recherche: National Survey on Car Sharing, Edition 2016. May 2017
5. Bundesministerium für Verkehr und digitale Infrastruktur: Mobilität in Deutschland 2017 (MiD). November 2018.
6. Statista: Have you ever used a car sharing service for everyday transport? 2017
7. American Public Transportation Association (APTA): Shared Mobility and the Transformation of Public Transit. 2016
8. Münchner Kreis e.V.: Mobilität. Erfüllung. Systeme. Zur Zukunft der Mobilität 2025+. May 2017.
9. ING Bank N.V.: ING International Survey. Car sharing unlocked. October 2018
10. American Public Transportation Association (APTA): Millennials & Mobility. Understanding the Millennials' Mindset. October 2013
11. The Straits Times, Christopher Tan: On-demand buses hit the road from Dec 17. December 2018.
12. Oliver Wyman: Mobility 2040. The Quest for Smart Mobility. 2018.

● — SOFTWARE SOLUTIONS FOR CITIES

Cities around the world are testing how digitisation can support their citizens' mobility needs. However, there is no one-size-fits-all solution as every city is unique. Factors such as a city's infrastructure, existing mobility services and mobility behaviour as well as socio-demographic structure need to be accounted for. Above that, innovation in the field of mobility is ongoing and business models are emerging regularly, making it difficult to know exactly what the movement of people and goods will look like in the future.

Modelling and simulation software gives city officials and urban planners a tool to better understand their different options. They allow them to simulate scenarios in a virtual environment before they are turned into reality in order to analyse and evaluate the potential outcomes. Thereby, they give them the ability to identify the option that truly matches the DNA of their city and thus solves their own problems in the best possible way.

With 40 years of experience in the field of transport logistics and transportation, PTV Group provides market-leading software solutions for making the movement of people and goods more efficient, safe and sustainable. Visit our website and get in touch with our experts to find out how our software solutions could help you introduce smart mobility solutions in your city.

smartmobility.ptvgroup.com



ABOUT PTV GROUP

Recognised as global market leader, PTV Group develops intelligent software solutions for transport logistics, traffic planning and traffic management. Thus cities, companies and people save time and money, enhance road safety and minimise the impact on the environment. PTV plans and optimises everything that moves people and goods in more than 2,500 cities worldwide - it's the central idea which has accompanied PTV since its foundation in 1979.