



Take Advantage of Change

# Best in Class: How These 7 European Cities are Leading Smart Transit

White Paper

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## Learning From the Best

“We are all about the optimization of vehicle movement; we’re the best scheduling engine in the market from the perspective of optimizing on-demand transport.”

- Mark Williams, VP Sales and Global Marketing, DDS Wireless

At DDS, we are in the business of moving people around.

As a leader in the smart transit industry for the past 30 years, DDS has transferred on-the-ground knowledge and industry insights into mobility and integrated transit systems. And we’re seeing this trend worldwide. Leading European smart cities are harnessing the power of data and the sharing economy to offer successful integrated transit solutions. Here, we highlight the top European models revolutionizing the transit landscape, and outline recommendations for cities and transit providers looking to optimize their transportation systems. Taking cues from Europe, today’s transit providers can adapt to the rapid pace of change in the transportation space.



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## What is Smart Transit?

**Smart transit is transit that makes use of data, sensors, automation and the internet to run and improve transportation offerings.** Smart transit might advise you that your usual route is blocked due to traffic, or your bus is running ten minutes late. It similarly might notify city planners that a particular train line is at max capacity, or an intersection is being inefficiently signalled. Smart transit is on the rise<sup>1</sup> due to an increase in access to real-time data that is enabling municipalities to improve mobility access and efficiency for its residents, businesses and visitors.

The future of smart transit can be broken down into four main components.

- **Big Data.** Big data constitutes all of the digital information captured from the world we live in. We generate data by going online, travelling with GPS-enabled phones, making purchases, sending photos or taking flights: big data is made up of countless digital fingerprints left by everyone everywhere. By comparing relevant data points, smart cities can begin to draw new conclusions about how transit is being used by riders, and how existing systems might be improved.

<sup>1</sup> <https://ddswireless.com/blog/how-smart-cities-tackle-public-transit/>

- **User Experience.** Many industries have made the leap to providing tech-based solutions to common user frustrations. Food delivery, doctor’s appointments and hotel stays can be scheduled with the click of a button, and countless apps exist to make life easier for citizens on the go. Smart cities are recognizing that this kind of convenience is called for in the transit space, and are making moves to provide improved user experiences across varied transportation systems.
- **Internet of Things.** As more and more everyday objects are equipped with internet connectivity, the result is the Internet of Things: a network of devices able to collect and transmit data. These devices can “talk” to each other, increasing the efficiency and responsiveness of machinery and processes. In terms of transportation, the Internet of Things might include a traffic sensor queuing up more red lights or an autonomous bus making a detour to pick up new passengers. Leading smart cities leverage the Internet of Things to create smarter transit systems.
- **Access and Sharing.** The dawn of ridesharing and owner-hosted rentals signalled a shift in how traditional services are offered. In large cities, travellers can access cars, bikes, cabs and public transit via apps, meaning that transportation solutions are more readily available than ever before—and personal car ownership is no longer a necessity. Smart cities are anticipating and encouraging this trend, working to expand sharing opportunities while limiting the congestion, pollution and parking headaches caused by individually-owned vehicles.

As urban centres continue to expand, integrated transit systems are becoming more and more essential to city life. Luckily, the expansion of open and big data, combined with advancements in technology, are making transit systems that reduce costs, emissions and pain points for travellers an increasing reality in smart cities around the world.

In Europe, we’re seeing a number of cities emerge as leaders in smart transit, as they create opportunities for the public sector, businesses, transit companies and the

public to collaborate and test out new, data-backed and technologically-enabled transit solutions. The emergence of smart transit innovations is facilitating a shift towards integrated mobility solutions and increased access to transportation services across the board.

## 7 European Cities Leading the Way

As smart cities turn their attention towards optimizing their transit systems by tackling the most complex of urban mobility challenges, a number of European frontrunners have emerged. As evidenced by these smart city leaders, we are seeing a sectoral focus on the idea of mobility: the opportunity to transform transit systems from stand-alone concepts into an integrated service that residents, businesses and visitors can access on demand. Below, we highlight seven European cities that are making waves in the transit sector and highlight examples of how they are influencing the smart transit evolution.



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## 1. Helsinki, Finland

As a leader in transparent and open data<sup>2</sup>, Helsinki has made a big commitment to digital technology and its integration in recent years. Between user-friendly mobility apps and on-demand transit initiatives, Helsinki has made great strides towards truly effective shared transportation services.

### User Experience: Integrated Mobility Solutions

As smart transit initiatives work towards alleviating pain points for riders, including cost, travel time, congestion and pollution, the integration of multiple systems is key. On the ground, this strategy looks like a robust and efficient technologically-enabled tool that synthesizes multiple transit touchpoints into one end-to-end experience for the user. Often supported by big data, integrated mobility solutions combine various transit options—including rail, taxi services, bike sharing and buses—into a single service.

An excellent example of this trend is Whim<sup>3</sup>, a cutting-edge transport app that combines public transport, car hires, bike sharing and taxi services into one go-to

<sup>2</sup> <https://www.fastcompany.com/3038765/the-smartest-cities-in-the-world>

<sup>3</sup> <https://whimapp.com>

portal. Created by Helsinki company Maas Global, Whim allows users to pay a base fare to access multiple services, or access the app free on a pay-per-ride basis. Whim has already expanded to the United Kingdom, the Netherlands and Belgium.

User experience is at the centre of building effective smart transit solutions. As we've seen from these European leaders, solutions must be integrated and easy to use. At the end of the day, there's no point in building a complicated system if no one can use it: people don't stick with platforms that don't meet their needs.

### Access and Sharing: On-Demand Bus Service

Helsinki's experimental on-demand bus service Kutsuplus<sup>4</sup> was a first effort at digitally expanding residents' access to public transit. The technology that enabled this service optimized routes based on demand and gave passengers the ability to load their payment online, choose a nearby pick-up point and schedule the service with as little as a few minutes' notice. The idea behind Kutsuplus was to expand access to public transit at a lower cost in order to give residents the option to move away from car ownership. Although this pilot program ultimately concluded<sup>5</sup>, it demonstrated that with some tweaks, sharing models have the potential for success<sup>6</sup>. The city is at work on developing the concept further, with an increased service scope planned for the future.

4 <https://www.fastcompany.com/3033125/helsinkis-new-plan-to-eliminate-car-ownership>

5 <http://sharedusemobilitycenter.org/news/killed-kutsuplus-3-takeaways-cities-pursing-mobility-demand/>

6 [https://www.hsl.fi/sites/default/files/uploads/8\\_2016\\_kutsuplus\\_finalreport\\_english.pdf](https://www.hsl.fi/sites/default/files/uploads/8_2016_kutsuplus_finalreport_english.pdf)



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## 2. Copenhagen, Denmark

There's no disputing that Copenhagen is a smart city leader, with its impressive goal to become the first carbon neutral capital by 2025<sup>7</sup>. Also notable is the city's living laboratory initiative<sup>8</sup>, where public and private sector partnerships and accessible open data create space "for testing smart technologies to handle the challenges of urbanisation and climate change".

Known for its progressive biking infrastructure that has reduced emissions, traffic congestion and the number of motorized vehicles on the road, Copenhagen has also invested in an automated Metro line and is looking to convert its bus fleet to hybrid models for better fuel efficiency.

<sup>7</sup> <https://www.theguardian.com/environment/2013/apr/12/copenhagen-push-carbon-neutral-2025>

<sup>8</sup> <http://www.copcap.com/set-up-a-business/key-sectors/smart-city>

## Internet of Things: Making Light Work

In an effort to make travel by bus and bike more appealing than commuting by car, Copenhagen is implementing an Intelligent Transport Systems Action Plan: a system of smart traffic lights that prioritize bus and bicycle lanes when adjusting traffic flow<sup>9</sup>. The project aims to cut bus travel times by up to 20% and bicycle commute times by up to 10%, encouraging citizens to leave behind their personal vehicles in favour of shared and two-wheeled transportation. By making existing transit options more efficient through the Internet of Things, smart cities stand to speed up the movement towards shared transit solutions.

<sup>9</sup> <https://www.digitaltrends.com/cool-tech/copenhagen-smart-traffic-lights-prioritize-buses-bikes/>



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### 3. Vienna, Austria

With an excellent transit system and a number of up-and-coming technology- and data-enabled innovations, Vienna is a frontrunner in smart mobility. 39% of all journeys in Vienna are made via public transit, and the city has made effective use of car-free housing and is testing out smart transport with a fleet of zero-emissions electric buses<sup>10</sup>.

#### User Experience: Updates at Your Fingertips

Its 850km public transit network is integrated and accessible via a mobile app, Quando<sup>11</sup>, that provides riders with real-time data on schedules, delays and locations of multiple public transit options including buses, trams and subways. All of this information is provided in one spot, making the transit experience more user-friendly.

#### Access and Sharing: Ditching Traditional Wheels

The introduction of sharing systems gives users a wider range of options than the traditional personal vehicle, while also reducing traffic congestion and increasing the sustainability of a city. Combined solutions, like Vienna's 1,300 km of biking infrastructure, Citybike sharing system, eco-friendly SCO2T electric scooter sharing system and multiple car sharing programs are helping to drive this change.

<sup>10</sup> <https://www.smartcity.press/viennas-smart-city-initiatives/>

<sup>11</sup> <https://www.wien.info/en/travel-info/transport/qando>



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## 4. Barcelona, Spain

Barcelona has taken steps to ensure that the technology it adapts is fully supported by its citizens. This result is a coherent city vision<sup>12</sup> supported by a high volume of open data sets, as well as a willingness from the government, private sector and residents to move towards smart transit solutions.

With this widespread support and openness, Barcelona has introduced bike sharing, electric vehicle adaptation and forward-thinking improvements to public transit. The city is home to a smart cycling system that allows users access to over 400 bicycles through a subscription, presenting further convenience for travellers who forego trips in personally-owned vehicles.

### Big Data: Addressing Traffic Congestion

Barcelona's efforts to introduce smart parking<sup>13</sup> have helped tackle congestion, noise pollution and carbon emissions in its city centre. The installation of sensor technology means that drivers are able to locate available spaces, pay through an app and spend less time on the road overall.

<sup>12</sup> <https://www.smartcity.press/philips-lighting-smartcitiesworld-survey-key-findings/>

<sup>13</sup> <https://www.smartcity.press/barcelona-worlds-leading-smart-city-initiatives/>



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## 5. Amsterdam, The Netherlands

Also on our radar is Amsterdam. This city boasts a high share of non-motorized travel, with 32% of traffic movement comprised of bicycle trips<sup>14</sup>. Moreover, the city is thriving in the urban planning sector, with accessible transit options for its residents and an impressive score in terms of airport connectivity<sup>15</sup>.

### Big Data: Planning for the Future

By facilitating an increase in car sharing and electric vehicle (EV) ownership, and by relying on data and analytics in its planning (the city has employed a CTO since 2004), Amsterdam is a European city to watch in terms of transit optimization.

<sup>14</sup> <https://amsterdamsmartcity.com/themes/mobility>

<sup>15</sup> <https://digitalcityindex.eu/city/1>



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## 6. London, The United Kingdom

A growing population has been a huge challenge for London, but the city has risen to the occasion with cutting-edge mobility systems, smart parking and an investment of over £4 billion into road transportation over 10 years<sup>16</sup>, including £200 million dedicated to the bus network. Some of London's smart transit leadership has included the introduction of the Oyster digitized smart-ticketing system<sup>17</sup> and a new major rail infrastructure project that will reduce commute time for 1.5 million people.

In London, Oyster has made transit easier for users by providing a single-point payment system for multiple transit options, while simultaneously encouraging the use of digital payments. It's also increased revenue and reduced traffic with the introduction of smart pricing, including congestion charging. In addition, London has recently introduced Heathrow pods, a zero-emissions and dynamic rapid transport system connecting terminal 5 with the business car park that has drastically reduced the number of buses needed for airport service.

<sup>16</sup> <https://www.smartcity.press/londons-smart-city-initiatives/>

<sup>17</sup> <http://www.centreforcities.org/reader/smart-cities/case-studies/>

## Access and Sharing: Reducing Personal Vehicles on the Road

A common factor for these seven European cities in their shift towards smart mobility is the goal of reducing individual car usage and ownership. By turning to alternative solutions that de-incentivize personal car use—including improvements to public transit, bicycle infrastructure, ridesharing, smart parking and the integration of multiple systems—smart cities are creating more liveable urban centres.

For example, London's efforts to modernize and update their public transit systems have contributed to an overall reduction in the number of personal vehicles on the road. For London, investing in public transit by renewing bus and metro fleets is decreasing the need for many residents to own cars. This, paired with the city's efforts to implement smart parking and smart traffic technology, has led to a push to reduce car congestion in the city centre. While London still struggles<sup>18</sup> with the amount of vehicles on the road, it is primarily minicabs and private hire vehicles that remain, signalling a shift from individual ownership to ride hailing.

Moreover, the rise in ridesharing—which includes services like Uber and Lyft, but also paratransit, fleet services, buses and even trains—is also reducing the need for car ownership. As transit companies realize how important data can be in predicting and accommodating user needs, ridesharing is becoming a powerful driver towards smart transit.

<sup>18</sup> <http://theconversation.com/london-congestion-charge-why-its-time-to-reconsider-one-of-the-citys-great-successes-92478>



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## 7. Berlin, Germany

In addition to their efforts to reduce personal vehicle usage, Berlin's effective transport system connects 3.7 million residents across the city<sup>19</sup>. Berlin has introduced an electric vehicle (EV) sharing system with over 2,000 cars on the road, supported by charging stations and policy that gives permission for EVs to drive in designated bus lanes.

The German government is also introducing innovative transit policy to help combat air pollution, reduce car usage and increase incentives for EVs. For example, policy makers are considering making public transit free<sup>20</sup> in certain areas of the country. As well, the forward-thinking regulations surrounding the development of self-driving cars in Germany is allowing for innovation in the industry, with the potential for Germany to lead in autonomous vehicle solutions.

<sup>19</sup> <https://www.smartcity.press/smart-city-strategies-berlin/>

<sup>20</sup> <https://www.reuters.com/article/us-germany-environment/germany-considers-plan-for-free-public-transport-in-polluted-cities-idUSKCN1FX270>



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## Adopting Best Practices

There are a number of takeaways that can be gleaned from the European smart transit market. We've seen that by introducing integrated mobility solutions, prioritizing access and shifting away from personal vehicle ownership, cities like Helsinki, Copenhagen, Amsterdam, Barcelona, Vienna, London and Berlin are leading the way in smart transit. At the core of this shift is the ability to improve efficiency and optimize transit systems that take the whole picture into account. At the same time, the commitment to adapt and stay open to change, to prioritize the user experience and to integrate multiple systems is key.

In terms of optimization, the ability to evaluate system effectiveness is paramount. Reporting and analyzing whether or not something could have been done more effectively before, after or during a trip is an essential component of smart transit. The astute transit provider is invested in being as responsive as possible: the companies and cities that moves people successfully can expect to see a positive impact to their bottom lines.

In learning from smart city leaders, the transit sector must recognize the importance of data management to truly make its system efficient.

“The challenge for many transit companies in the fleet services, taxi and ridesharing industries is that they don’t fundamentally believe in focusing their time on the collection and analysis of data. This market needs to recognize that effective data management is the only way to make a system truly efficient.”

- Mark Williams, VP Sales and Global Marketing, DDS Wireless

As transit companies begin to understand the power of data, we will see a transition to optimized systems that are better serving the needs of all riders, while simultaneously driving down vehicle ownership.

Being adaptable, flexible and ready to integrate change is critical for smart transit. For developers in the smart transit industry, the whole core of the business is enabling change. The system that is best today might not be best tomorrow, so empowering urban transit companies to adapt becomes of (incredibly prime) importance. While individual initiatives might fail or an app become outdated, transit providers who can remain agile will continue to serve customers for the long haul.

Finally, it’s vital for transit providers to collaborate—with their cities and with their customers. Smart cities aren’t trying to solve problems by themselves; the leaders in smart solutions are collaborating with the public, technology innovators and service providers to help solve challenges and promote change. Smart transit takes the entire mobility ecosystem into account; these smart cities didn’t become smart by going at it alone. Instead they became world leaders by asking residents, transit companies, public servants, businesses and operators to solve problems alongside them.

The cities of the future are those looking to combine their transit options into centralized solutions, learn from sharing programs to increase access to on-demand services and ultimately reduce the number of personal vehicles on the road. Many European cities have started off on the right foot—it's up to the rest of the world to follow their lead.

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## About DDS Wireless

DDS Wireless Inc. is number one in real-time scheduling and dispatch software. As the only fleet management solutions provider in the world that also provides hardware, we're the industry experts in on-demand people movement. DDS has years of experience in operating on a global scale. We are headquartered in Richmond, Canada and have regional offices in Seattle, Sweden, Finland and the UK. We also have sales, support and technical personnel employed across the globe in Canada, the U.S. and Europe.

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