

## Transport Committee – Tuesday, 10 October 2017

### Transcript of Agenda Item 6 – Future Transport

**Keith Prince AM (Chairman):** Can I welcome Lauren first of all, Lauren Sager Weinstein, who is the Chief Data Officer for Transport for London (TfL), welcome, and of course Michael Hurwitz, Director of Transport Innovation, TfL. We were talking about you earlier, you may have heard, and there are going to be a number of challenges for TfL when it comes to autonomous and semi-autonomous vehicles. We would like to explore that with you.

I would just like to start first of all. Could you explain how TfL monitors technological trends and plans its response to potential disruption?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Thank you for inviting me along; it is an important set of topics and an interesting one, and I am pleased to contribute to the inquiry.

There are two key principles that have to be adopted in looking for trends, and I wonder if it might be worth elucidating some of these principles with how we dealt with the emergence of dockless cycle hire recently. The first one is very active engagement and engagement fundamentally before implementation. For us, one of our key roles is partly as a regulator, but it is also as the strategic transport authority, so there is a responsibility for us to look out to the market and to understand what might be happening and to see how any new developments in the market can be shaped to be consistent with the goals set out in the draft Mayor's Transport Strategy. It goes both ways. We have to look out to the market; we have to find ways to encourage any potential entrants or those people interested in London to engage with us.

On the dockless cycle hire example, we were talking to the main players in that area, we had been reaching out, we had already started to develop a set of principles that we wanted to communicate to the market. We have already started working with the boroughs. Another key feature of being in London is that engagement is not just us in TfL; we have to be very sensitive to the needs of the various constituents within London. The key thing is to understand, essentially, if you have the private market or the innovators on the one hand, they will have a set of interests. On the other, we have to represent the interests of Londoners to try and make sure that we essentially assert the rights of the public.

The aim of the engagement is to find those areas in the middle where there is a common ground where we get the benefits of the innovative ideas in the market but we also ensure that we can uphold the interests of inclusion, openness for all, accessible services, etc. The first one is engagement and we did do that and, to the credit of some of the operators, some of the operators had already started to engage in some of the boroughs, Mobike with their trials in Ealing, Hackney with Ofo, and Urbo also expected this month with Waltham Forest. The first principle is engagement before implementation.

The second principle is to progress in a way that allows you capacity to learn and trial before you go to scale as the operator, but also as the regulator, before you set regulations in stone. Therefore, you need to have a way that you can trial and learn because, with all of these new technologies, it is very hard to predict, beyond a feasibility study, what will happen when a new service actually makes contact with

consumers, what will happen on the network, beyond what you find if you are doing it as a desk study. A key feature is to have the engagement, to do the trialling, and for a regulator you have to do pre-regulation or anticipatory regulatory steps. With dockless cycle hire, we worked with the London boroughs to produce a code of practice and we have explicitly said it has to be iterative, that document: it has to learn from what we see in the trials. If you are too quick to set things in concrete you can create other unwanted consequences.

Therefore, the key things are those two, engagement before activity; and to progress in a way that allows you capacity to learn before you set the regulatory environment in stone.

**Keith Prince AM (Chairman):** A comment on that?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** That really covers it. This is where being mindful as things go ahead and thinking about this from, not only the technology side, but what the implications are. A lot of this comes down to that, because technology is important and technology is changing, but it is really what is going to make the changes to the business practices and commercial practices.

**Tom Copley AM:** With the oBike example, there were issues there, were there not, particularly in Tower Hamlets where it seemed that oBike had just left a load of bikes around the place and then they ended up all over the place. Clearly there have been some issues. What have you learned from that experience?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Yes, there were issues with oBike. They did not tell anyone they were coming; they launched without a helpline, without a proven operating model, without an understanding of the complexity of boroughs and the powers of the transport authority, and therefore there were issues and it caused a number of boroughs, and us as well, significant concerns. We ended up asking them to remove the bikes and they did. We did not crack down immediately because we want to try to welcome innovation, and the fact is this is potentially something that could really increase access to cycling. There are opportunities here. You have to give somebody a chance, however, you cannot put the public at risk, and it got to the point where we felt we had to ask them to cease operations. Now they have done that; they are now in much more active engagement with the boroughs, trying to mirror some of the approaches taken by some of the more collaborative operators. We will see what comes of it.

The work that we have done in an advance about what the principles are, understanding what our highways powers are, us as the transport authority and the boroughs as a transport authority, the Highways Act was written in 1980, but it is our responsibility to assert the rights of the public on the highway and we are able to act if we think there is a risk of obstruction and danger. We were able to do that and use that and I do not think oBike had understood that regime in London. We were able to respond pretty quickly because we had already started the work with the boroughs on what 'good' looks like, what a 'responsible operator' looks like, and it was clear to us that was not the case with oBike.

**Tom Copley AM:** We had Will Norman [Walking and Cycling Commissioner] in and he sat where you are now saying, "Please talk to TfL". That basically was his message.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** We have written a code of practice. Exactly the first thing we say in that is you have to engage first; you have to engage with

us and I have to say the boroughs are particularly important, there are differences in the different boroughs and different requirements, but that is exactly the reason.

**Tom Copley AM:** What about Uber? Uber has been a massively disruptive force in London. What lessons have you learned from the emergence of Uber as a company?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** As you would expect me to say at the moment, I have some standard lines on Uber and we have to let that process run, so if I could just talk more generally rather than that specific case, because we have to let that regulatory process run?

**Tom Copley AM:** Yes.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Again, I am going to re-emphasise the points I made before, and I will add one more. On engagement, I have heard the analogy before about permission versus forgiveness that Henry [Harris-Burland] from Starship mentioned in the previous session, you need to have a grown-up and open conversation in advance. It is in everybody's interests if you try to find that common ground where there is an environment created where innovation is possible but also protects the interests of people working, living, visiting a city. You have to try to find that common ground and the most important thing is to do it up front.

Also, there is a lesson again both ways, you have to trial and learn and test concepts before you go to full-blown implementation. It is not always possible to do that and you do not always have the regulatory environment to do that. But the more you can have that conversation about what the issue is, for me it is never a productive conversation if somebody comes to us as a strategic authority to say, "We have some really exciting technology to test", what we try to do is say, "Can we talk to you about the problems that we and the boroughs have in providing transport", which can focus the innovation on the problems that we face as a city. It is never the perfect system, but that leads you to better potential outcomes if somebody new wants to come to market.

**Tom Copley AM:** I will not press you on Uber because I know why you cannot say too much, but it seems the problem comes where a company comes in that does not really engage or particularly want to necessarily play by the rules and that can leave you in a difficult situation, if a company just is not willing to engage in a sort of constructive way from the beginning.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Yes, it presents additional challenges, but one of the things that I do, and I deliberately sit separately from the regulatory teams. Once you have pressed the regulatory button you have to follow the process, you have to make sure everybody plays by the rules. It is a much more constructive space if you can talk before that. I cannot stop people in instances doing things.

The other thing I would say though, from that area, is that we operate according to the rules that we are given and the national frameworks in this area are set often by the Department for Transport (DfT), essentially for the old world. The regulations were set in the 1970s and the 1990s, and the world of transport in those days was crudely speaking as follows: you had a car or you took a private hire vehicle or you took a bike, taxi, or you took a bus. Those silos were the fundamentals upon which regulation is based.

If you are thinking about the future of transport by contrast you will now have different categories of transport: shared ownership, peer-to-peer car sharing, regular private hire vehicles and taxis, but shared taxis, the space between buses and taxis, which could be demand responsive transport, and then buses. All of that can also be changed in the longer term with the autonomous vehicles. One of the key things is we have already asked the DfT if we can have certain additional powers in some areas, about the ability to cap or control cross-border licensing on Private Hire Vehicles.

However, there is an interesting question for the DfT about what is the more fundamental review of that overall regulatory structure that they own to be a better fit for the future for the way the mobility landscape is changing.

**Shaun Bailey AM:** To what extent do drones and droids have the potential to take some of the freight traffic off London's roads, considering the conversation we have had earlier in the first session?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** There were some very good points made before about how much is switchable and, if I could maybe add, some of the London data, because some of the issues about how many drones or droids would you need to replace a van that might be doing 80 packages a day, it is probably quite a lot. Just in terms of potential congestion impact, there is one study that was done by the Royal Automobile Club (RAC) Foundation, it was published back in May by Professor Alan Braithwaite [LCP Consulting]. That put a figure of only about 10% of traffic in London, according to his calculations, is grocery and parcel delivery. Therefore about 1.5% of London's traffic is taken up by parcel and drone delivery. There may be some opportunities, however I think the case is as yet unproven about whether significant expansion of drone or droids would take that many vans off the road.

There are genuine opportunities. You have asked specifically about freight, however, we are already using drones in some other areas. We have already, on London Underground (LU), started to use drones for looking at asset maintenance, we have already saved money by not having to put up expensive scaffolding and putting staff at risk in dangerous situations by using that. The Metropolitan Police Service are already doing a trial with drones for surveillance, including out of line of sight. They are about halfway through that trial right now. Therefore, we do see opportunities; there may well be certain use cases where this could be attractive.

One thing that was not mentioned earlier was the idea of a follower drone. If somebody is not capable of carrying their own luggage or carrying their own shopping, you could have essentially your own mobile way of getting your goods to --

**Shaun Bailey AM:** To what extent are these things being looked at, because most of the conversation about drones feels like people saying, "Let us port them into our reality now"? How far into the future are TfL looking? Tom [Copley AM] made a comment about deliveries from your supermarket. That is a hub situation. That would be quite easy to do that. You would stop hundreds of journeys surely, hundreds of journeys. Why are these droids so small? If they were larger, if TfL looked into the future, there will be at some point a droid will effectively be the size of a van. We need to plan for that now because that needs charging infrastructure, etc.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Yes, we are very actively looking at it. The key thing is, does it need to be a drone or a droid to do that? We have mentioned before about using technology where it can help, but is there a simpler way of consolidating

deliveries? Does it need to be a drone or a person? From your comments earlier, you may already have looked at some of the models on freight where you can have a van that goes to a certain area with a number of packages, it could be a droid that takes those further, it could also be an individual. Therefore, they could be part of the mix, we do very actively look at it and our planning horizon is out to 2041. We are very actively engaging - genuinely nothing to do with this Committee meeting happening today - my team was talking to Henry's [Harris-Burland, Vice-President of Marketing, Starship Technologies] team yesterday to understand what the potential could be. We have to try to find a way of making it consistent.

The one thing that I would add though is that, where we want to shape these technologies, we want it to be consistent with the principles that we are setting out in the Mayor's Transport Strategy (MTS). It could be very convenient to do so, but we would raise questions: "does this stop people walking more? Are we going to create people who are sedentary and just wait at home for everything just to come to them? We set very explicit and ambitious targets on active travel in the draft Transport Strategy.

**Shaun Bailey AM:** It seems that the technology and its development is being looked at as a threat. Are we investigating opportunities enough? How far does TfL get to decide if I want to sit at home and wait for my parcel? That might be the way my universe works.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** It is absolutely about balance. You have to look at the opportunities in the same way as the risks, and if --

**Shaun Bailey AM:** Sorry to interrupt you, but are you having a look at the full social impact? My colleague Caroline [Russell AM] here made one comment about people who are disabled who may appreciate the help, and then at the other end of it you have Tom [Copley AM]'s comment about how you could just increase the convenience of the world and cut down some of the emissions because we are integrating these things properly. Then the speaker beforehand talked about the impact on jobs. Could this be providing jobs, a reduction in emissions to London, support people. Are we looking at the whole thing, because if we build it piecemeal then we will only get some of the uplift, will we not, and all of the problems.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Yes, absolutely, that is why we are here. You have to look at it in the round. I think actually we are agreeing.

**Shaun Bailey AM:** We are. What I am asking is, how would I see TfL is doing that work? What piece of paper, website, briefing, whatever it is, what could I see that you are looking at it to look at the whole thing so that we get the maximum benefit? London's journey to date has been lots of little villages that have grown together and what we want to do is make London's next step into the future cohesive, it would have all of this planned in as far as possible. Where is that work?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** You have commented that is not mentioned in the MTS. The MTS is in consultation form. I will take that as a good piece of feedback and we can review whether we talk about that, the opportunities of technology. We do talk about that specifically in chapter 6 of the MTS, talking about how we look at how technologies can have an impact, and new business models, how they impact across the full range of our operations. We can talk about whether we emphasise that further or whether we demonstrate that further. However, I can give you an assurance, that is why we are here. Both of us spend a lot of time, Lauren on the technology and data side, me on the new business model side, and it is about making sure it integrates. All of the comments, all of the angles and perspectives you have said, from emissions, from social inclusion, to

reduction in freight miles, to how it fits with the Healthy Streets agenda, that is how we look at all of this. Therefore, I absolutely agree with you; but I am interested if you think we need to be more explicit and demonstrable in some of the activities we do. Hopefully, in the remaining time, I will be able to tell you about quite a lot of the things we are doing in some of these areas.

**Shaun Bailey AM:** I look forward to it because it just seems to me that TfL's position should not be anti-technology. I am not suggesting that it is, that is for you to prove that it is not, however sometimes, reading the MTS, everything that is talked about is a threat. Autonomous cars were talked about as a threat, in my opinion, and I just would like to think that this is an opportunity for London to design the jobs that are coming down the line, get a greener economy, because we thought about it now, because we are going to miss out on these things because we build them all piecemeal. That is enough for me, Chairman.

**Tom Copley AM:** Just to pick up on the point about the MTS, drones and droids are not mentioned in the MTS. Why is that?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Again, I will take that as feedback on the consultation. The current draft of the Strategy essentially was grouping all future mobility developments together and the principle set out there is they all have a role to play, however, some of them present more risk than others, and you have to get that balanced approach. We can review whether we need to have a discussion about it. It is interesting though. We heard from some experts earlier today, a lot of it really is not known. The potential is not known. The evidence base for the Strategy was one of the key things; it needed to be underpinned by confirmed evidence. Therefore, there is a question about how much you have a generic discussion about knowns and how much you base your strategy and deliverables on the best knowledge.

It is absolutely on our horizon, our fundamental role in the strategic authority part of our being has to look for this and it has to understand what the opportunities are, how it could be integrated. However, there is a question for us in the final document about whether we need to have a more explicit discussion of some of these less-known areas that exist on the horizon.

**Tom Copley AM:** Good. In terms of evidence, we have heard evidence today and there is clearly some evidence, particularly on droids, from overseas. I forget what the statistics were, however it seemed in other countries they are being used, not on a huge scale, but certainly on a significant level. Therefore, it might be that there is some evidence there from overseas that could be used to underpin it. However, it sounds like you are taking it all on board.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** We can take it away; we can see how much we want to have that discussion in the final version.

**Tom Copley AM:** Thank you. I will move on to autonomous vehicles then. What are the potential risks and benefits of autonomous vehicles for London?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** The first thing I wanted to say is that I know often the debate in this area jumps straight to fully autonomous. However, what is often called Advanced Driver Assistance Systems (ADAS): there is a very significant potential for that for a number of reasons. The ability to understand what is going on in real time on the network, whether there is a driver in the vehicle or not is extremely valuable, to understand what is going on with air

pollution is extremely valuable, how to optimise traffic flow. A really important one is about the potential for reducing road danger. Just to offer one data point, if you look at the fatality statistics on London streets, every one of those is a tragedy, however it is moving in the right direction. Last year there were 116 fatalities reported and if you compare that to the 2004-2009 average the biggest reduction in the type of fatality between 2004-2009 and last year was people inside a vehicle. That reduced: the previous average was 49.4; last year it was 10.

If you look at fatalities in terms of pedestrians, there has also been a reduction, it was 96 in the 2004-2009; last year it was 61. That is still 37% reduction, but it just shows you essentially it is the combination of passive and active safety that protects the individuals inside the vehicle, it is that technology. Some of those are autonomous systems, autonomous braking, anti-lock braking, if you slam your foot down on the brake in the car you are no longer in control of the brake, the computer system takes over and pumps the brake. There is a whole series of driver assistance technologies that have a genuine potential for reducing road danger. Things like automatic emergency braking or pedestrian alerts or indeed potentially redesign of the outside of vehicles, many of these things we are trying to think about for the new bus safety standard, which will come into effect next year, before you get to the fully autonomous equation. I think there is a significant number of opportunities on incremental levels of both connectivity and autonomy. I can talk about fully autonomous vehicles as well.

**Tom Copley AM:** Just quickly, in terms of this reduction in killed or seriously injured (KSI), how much of that can be put down to the technology and how much is that because either congestion is getting cars to go slower or because boroughs are implementing slower road speeds at 20-mile per hour zones, for example?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** I do not have that breakdown to hand. All road safety is a function of improvements to engineering or enforcement or education, and I do not have the data to hand about what is the assignation of that. I do know that nationally in the United Kingdom (UK) the assessment is that 94% of all road accidents have an element of human error. I do not have that specific breakdown, but we can be quite sure that, particularly if it is considered as an enhancement to capability, there will be benefits to be derived from that.

**Tom Copley AM:** What about the potential for fully autonomous vehicles?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Fully autonomous, fundamentally it really depends on three key parameters. That is what is the vehicle that is fully autonomous, what is the business model or the use case under which it is used, and in what policy environment? If autonomous vehicles are just individual cars, like the one you have today but just driving themselves around, privately owned and privately used with absolutely no constraint whatsoever, that may have safety benefits but it is almost certainly going to be bad for congestion. It is a crude analogy, but you want to avoid a situation where you can go shopping and, because it is cheaper than parking, you press a button and you say, "Just drive around until I come back". That would not be good for the network.

By contrast, if you have, for example, a shared car or even a minivan that is operating under a service model, which is deliberately trying to funnel people who normally commute by car into a transport hub, and with somehow a targeted set of operation that could be through pricing or through funding measures, then that gives you a whole load of opportunities. Not only do you get the safety benefits, you could

provide an alternative to people with private car in use, potential congestion benefits, but also there is the opportunity of communicating with the vehicles to collectively optimise the way things flow.

The other thing I would say is that this is a really important kind of capability. Further opportunities are that London is great in the tech world and these are a really key high-value set of skills and the more you can get intelligent traffic management, vehicle design, user interface, applying some of the great skills we have now in fin tech or the gaming area to this, there is also an opportunity for building capabilities.

The short answer is, it does depend, and you can see situations where, through some versions, it would present real challenges, but on others it gives great opportunity to make the network flow more efficiently.

**Tom Copley AM:** How do we end up with autonomous vehicles, the situation where they are benefitting us by not putting extra cars on the road, there is more of a shared ownership model, what practical steps can be done to encourage that?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** I will take it in two steps. I will go back to the principles we were talking about earlier, about engagement and trialling, and then working out in the longer term. In the short term, we have quite a lot of activity to understand what the service models are, what the technical requirements are, what the potential impacts on the network are going to be. Some of it is just desk-based modelling; we are doing some of that already working with Massachusetts Institute of Technology on some of the conceptual modelling on the impacts of AVs. There are a number of central Government-funded projects that are allowing us to learn more about what the potential is. One of the projects is called Driven, which is run by a company that spun out of Oxford University called Oxbotica. There is also a major insurer involved in this. I think their aim is that by 2019 they will have half a dozen vehicles that will be able to drive from Oxford to London.

However, the really interesting thing about that for us, first and foremost we have to make sure it runs in a safe way, any trials at the moment, the requirement in the UK is to have a safety driver there ready to take over, you cannot have fully driverless vehicles right now. However, that gives us a fascinating insight into what is happening on the network in real time. XL Catlin, a major international insurer, is also involved in that because they want to know what are the situations on the road that lead to crashes being more likely and incidents being more likely. That is extremely important for us given our congestion and network management responsibilities.

Another trial that is happening is a project called StreetWise with a company called FiveAI. They are exploring, and we are exploring with them, what could the service models be. They came to us, it is a good example of engagement, to say, "What problems do you want to solve?" We said, "Could we shape this to provide alternatives to commuting by car?" and they are seeing whether you could have a demand-responsive autonomous-capable service that would funnel people into transport hubs.

There are a lot more, and I am happy to provide more information about that, about how we are trying to look at what the requirements are on the infrastructure side as well, what we are going to need.

In the longer term, there are a number of key policy requirements that we are going to have to think about. In the MTS draft we talk about the future of road pricing. I think for me it is a really interesting question about how we disincentivise an inefficient use of road space and empty vehicles being around there, so an interesting question for us. Are we going to be able to know when vehicles are empty or not? How would we get to find that out? As I say, what you do not really want to have is vehicles going around



empty on spec. Similarly, you do not want to have mobile products doing the rounds just in case somebody wants to have them delivered at a certain time. Therefore, we need to have a really serious discussion about the future of pricing and how autonomous vehicles fit in that. We want to get the benefits of it, but we cannot let them go unfettered.

**Tom Copley AM:** Do you think then that basically road pricing is going to be key? Is that the main lever by which TfL could essentially regulate this and ensure that you do not have loads of autonomous vehicles just driving around empty? Is road pricing going to be the key to that?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** It is one of the keys, as is planning, as is how you design the future streets, how you design the use of the kerb. It is certainly one of the very important ones, yes.

**Tom Copley AM:** What legal powers do you have over autonomous vehicles at the moment and what powers would you like to have in an ideal world?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Some we have quite strong and extensive powers already, so those that allow us to do the congestion charge give us quite a lot of potential. Some things are outwith our control. Currently, it is with the DfT who in turn have to use international regulations that will approve or not a vehicle for use on the roads. That is dealt with internationally right now and the UK currently applies European Union (EU) law to say what type of vehicle is allowed on the road.

We need to have that discussion with DfT. We have a pretty constructive relationship with them. Currently testing of these vehicles in the UK is dealt with by a code of practice. We are in a very active discussion with them to talk about the next version of that code of practice because we need to make sure that we have that city perspective. For me, I would say that a lot of that sits with DfT; also, as I mentioned before, we need to have that overall review of the future service models, think about the future mobility, not just taxis, buses, etc.

I think there will be a strong argument for devolution or to have local powers and control for some of those because we need to be able to create a vibrant market that gives a good outcome to consumers, but we also need to be able to manage things in the city's interest.

**Tom Copley AM:** Finally from me, this might be one for Lauren, what are your projections of the scale of autonomous vehicles over the years?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Do you want me to?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** Yes, why do you not take that one?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** You see it in two phases. I know that previous Committee meetings talked about the different levels of automation, one and two are here now, which is anti-lock brakes, level three is where the car can take over for certain periods of time, and then the more extreme one is levels four and five where either the vehicle is mostly in control or for level five it is completely in control.

Around the turn of the decade is when you are going to start to see level two and three becoming more prevalent. Thereafter, the more ambitious of the providers, some of the automotive companies are talking about their trial deployments from 2021; that kind of timescale onwards, and that is trial, relatively limited, they call them certain operational design domains. They make certain use cases. From the mid-2020s, much of it depends on the pace of regulation; it is hard to put a number on it. What I would say is that the incremental autonomy and connectivity is going to become pretty much ubiquitous, however, that is before you get to full levels of autonomy, I think you will see from the turn of the decade certain use cases where it will become apparent and that is the stuff that we are really interested in, is what could they be in London. Again, we want to avoid the situation we were talking about where somebody just comes and does something that is disruptive. We are very actively engaging, trying to work out what those best use cases for London could be.

**Tom Copley AM:** Thank you.

**Caroline Russell AM:** Just before I move on to apps and data, which will be for Lauren, I just wanted to pick up on one thing about the autonomous vehicles, just on these timescales. You said by the mid-2020s increasing autonomy is going to be pretty ubiquitous. We have seen with Uber the negative on our city of increased congestion, unexpected levels of vehicles being registered, dropping in bus ridership, which is bad for our city. I am just wondering, are you actively pursuing the risks to the Mayor's Transport Strategy and the vision that he has for more walking and cycling and less traffic on the roads so that we use our space for the things that are important to the city rather than just for moving traffic and hopefully cut down on the rising number of serious injuries that are happening to pedestrians and cyclists on our streets? Is there a sort of an active anticipatory programme that is going on to second-guess the bad stuff or the risks?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** You second-guess the bad stuff and you try to make the most of the good stuff. But, yes, absolutely, some of that horizon-scanning is what we do. You mentioned specifically about autonomous, just to clarify, it is the lower levels of autonomy that is going to be ubiquitous and the higher levels of autonomy are less certain. However, to give you a practical example, I have given quotes of some of the trials that we are now involved in, they are not being led by us, we will be a party to some of those because we need to make sure they happen in a safe way, however we also think we can learn from them.

The conversations for that is that when, for example, the Department for Transport and the Department for Business Innovation and Skills<sup>1</sup> put out their funding calls, we always go to say, "Look, if you are thinking of trialling stuff in London you need to talk to us because we need to take it to the question where it is not just a question of coming to test the technology for technology's sake". There are benefits to that because you get the skills and the capability, which are of potentially very high value, but we shape the projects that are going to be here to make sure it is addressing some of our problems as well. Therefore, the kind of debate I will have with a number of organisations that come to us is to say, look, a solution where you have an autonomous vehicle that allows people to be more mobile where they are previously less mobile, either through disability or age, or if you are providing people a route to a station that is hard to access, we will talk about demand-responsive transport soon I think and we can talk more about that then, those are good outcomes. If you are providing something that is probably going to drag people off a bus and spread them out into more vehicles that is not the kind of service model we are

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<sup>1</sup> Now the Department for Business, Energy and Industrial Strategy.

looking at. If you are going to provide somebody an alternative to walking where walking or cycling is a really good option that is where we have to try and shape those business models.

Therefore, at the moment, the beauty of this market right now is it is malleable. The business model is not yet set and if we take that active role to reach out to the people thinking of markets, the fact is London is iconic globally, if we can demonstrate how this can be integrated with the transport it could be a winner for both of us. Shaun [Bailey AM] and Caroline [Russell AM], I hear both sides of the coin, we have to get both of them, we need to look for the opportunities, but we have to balance that with ensuring a consistency with the objectives. However, I do not see an inherent tension, there is a natural need to find a balance, and we have to find the mid path --

**Caroline Russell AM:** I certainly would not want anyone to think I am against technology because I think it can be used for good in a really positive way and for the good of the city. However, it is making sure that we anticipate the risks that were not anticipated with those earlier examples of tech coming into the city.

Anyway, moving on properly to apps and data, and, Lauren, for you, just to start off, how does TfL support smartphone app developers to provide innovative transport services?"

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** Can I just start perhaps by putting a little bit of context about the way we think of data, because if we think about data, it is not data in and of itself and it is not necessarily only for the sake of data. We are using data to solve problems. We are using it within our own sort of sphere within the work that I do in terms of co-ordinating data work within TfL. Then we are also using it externally and this is where we are using data to power these smartphone apps to help people move around the city.

If we think about this then, we have to stop and say, right, what is the fundamental question that we are trying to solve? It really goes back to some of the discussions we had earlier, which is about how can the information we are providing be an enabler to better transport outcomes? Therefore, when we look at the open data that we are providing, the aim of this is to get a better and efficient use, and a better customer experience for Londoners moving around the city. This is where we work in partnership with the developer community to provide the information and that is seen in various feeds that we have through our unified application programming interface (API) so that the developers can take the data and turn it into products that will be useful for customers. We have seen a huge benefit in this and we have been a champion of open data and making this data open and freely available and encouraging our developers to use this.

In doing so, we get benefits; our customers get a benefit that we see. We also learn. A lot of the discussion today has been about how can we learn quickly from technologies and this is where we see the way that developers are using information and providing it to customers and in terms of the ways of presenting information to our customers that they can find useful. We can take that information back so that we can understand how data can be useful and new data feeds that we can provide. It really comes down to why do we do this; it is to provide solutions for problems, and it can either be externally for customers to get better information and then also internally for how we run a more efficient system with data.

**Caroline Russell AM:** Certainly, I am sure everyone has things like Citymapper which have completely transformed travelling around the city because it just makes it possible to plan journeys because it is all in one place and you can move from tube to bus. All of us have to travel to all sorts of places all over

London, and that kind of service is incredibly useful. The app developers, with this open data, they have an absolute gift there, they are able to produce products and power businesses. To what extent are they giving that data back to you? I am thinking in particular things like, I know DriveNow have a lot of data that shows the journeys that are made with those one-way car hires, and that presumably maps out places where there is not enough public transport at the moment. How much are you taking that data and using it for planning new services?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** This is a journey and we are starting, so if you were to look back on where we were, initially it was really very one-sided, we pushed out everything we got, not much back. However, we then, in our partnership discussions with the communities, and all the developers who have been able to say, “OK, we are trying to solve problems, you are trying to build businesses and solve problems, and there is a real win-win here in terms of how we can work together on this”. Therefore, what we have been working towards is a model where we are getting some information back and that can range, in terms of the information that you could get back, from one extreme it is helpful just to know statistics about how many people are downloading particular apps, to the other extreme it is getting the aggregated information about usage patterns and that sort of work we are beginning to explore how do we do this with two-way partnerships with some of the developer community on that. That is where you would see benefits in terms of getting this aggregated data back, in terms of patterns. However, what is important to keep in mind is that what we take back is aggregated information rather than individual personal information because what we have to do is keep a very hard line between what is shared, so what is shared back to us is patterns.

**Caroline Russell AM:** However that aggregated data is allowing you to make more intelligent planning decisions.

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** Yes, so what you would want to do is you want to start, particularly on the road network where this is where there are some opportunities, where we really would benefit from more information. Therefore, we have done some work with Waze, for example, where we have been able to take information patterns back so we can understand disruptions on our network. If that gives our controllers better information on how to run our network more efficiently it is a win for everybody. However, this is really where we need to go back to the fundamental questions and if the fundamental question we are trying to solve is, “How do we unlock mobility?” on the road side there is certainly an opportunity for getting information that would help us.

**Caroline Russell AM:** You mean connecting up then with Scoot and the traffic light systems?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** Yes, so, again, it is understanding very precisely where you might change and how you might change, because if you are not going to take an action on it, and it is really interesting in terms of pattern analysis, however you are not going to spend as much time as if you were going to be able to change the way you are running your traffic system. Therefore, if we can identify where we would change signal timings, for example, that does provide us with a way we are going to run the road network.

**Caroline Russell AM:** It is interesting, because Waze is one of the red-flag companies to anyone who is interested in trying to get more people walking and cycling because they tend to direct people down side roads and streets that should be quiet and not full of lots of through traffic. It is a kind of rat-runners app and it allows people to drive through back streets as if they knew the area really well, therefore it can have disadvantages for communities living there who experience more traffic, more difficulty crossing the road

when they are taking their kids to school or just to get to the local shop. That has negative outcomes in terms of people making those daily journeys on foot and by bike, which is one of the things the Mayor says he wants to achieve. You are suggesting that there could be some good that comes out of that Waze data?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** This is where we have to go back to the engagement question and say, “OK, we really want to use technology to unlock the outcomes. How do we have conversations with the developer communities and talk about this in terms of, not starting from data per se, but starting from the outcomes?” We have begun to have some of these discussions and if we think about the way we communicate, there is a tech side and a very sort of specific techy data discussion to be had. However, before you get there, it is really about the shared objectives and thinking about the MTS and trying to get that alignment.

**Caroline Russell AM:** Do you think that maybe TfL should encourage the app developers to have public purpose, good transport outcomes, at the heart of their business model and then they get your data sharing options? Do you have any limits? For instance, Waze I would see as a company whose app is not particularly helpful for the transport network for public transport, so should they have the same access to data, TfL data, public data, that belongs to Londoners, as a company who is doing something that has more public purpose to it, like Citymapper, which is enabling people to use public transport more effectively?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** That is a good question. What we started from is saying that we are just going to push this data out and we are going to provide some standards in terms of explaining how you present the data, that you are accurate about it, however, we have not so far got into vetting particular companies.

**Caroline Russell AM:** It is not about vetting the companies, but it is about vetting the outcomes so that there is public purpose and good for London’s transport system that comes out of the use that people make of TfL’s data. Because TfL’s data is hugely valuable and so I am just wondering if you are yet asking those questions about the outcomes that are coming from your giving that data to companies.

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** We certainly have been encouraging thinking about the mobility outcomes, however, the way that we have presented the data, it has been as a sign-up to the feeds and we encourage you to use them. Certainly, we want to make sure that we are promoting sustainable transport, promoting public transport, and that is certainly something that is important.

**Caroline Russell AM:** Then just finally, in London, because we have an Oyster card that is pretty much mobility as a service anyway, but I just wondered if you have any thoughts about where Oyster might go or whether mobility as a service as a concept has any bearing on what is happening in London?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** Maybe if I start and talk about the data side and then I will have Michael in terms of how we have been thinking about taking that forward.

You are right, what we find with Oyster as a payment platform for public transport, it has transformed the way that Londoners have travelled, so when you think about the fact that we have customers being able to travel across London, across public transport modes, that has been hugely helpful in terms of promoting

public transport. From a selfish data point of view, it also allows us to understand patterns in a much more granular level of detail than we could before. Again, going back to my own interest in terms of data, that means that I can provide that to those of us who are planning the network better and running the network better so that we can get a more efficient outcome. That has really been where we have started thinking about what is the payment platform and how you then get the data out of it to make it useful as we go forward.

Going ahead, this is where, when we work together, Michael and I have discussed about how then you could think about it in the broader sense and where do you take it forward.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Yes, you put your finger right on the button there. We already provide a form of mobility as a service. The three pillars that constitute mobility as a service when people talk about it, firstly there is a set of transport services, then there is an information payment platform, and then there is a subscription by which you pay, and people often talk about paying for mobility like you pay for a mobile phone rather than buying a particular mode. There is a version of that already in London because we have a set of services under our integrated remit, we have Oyster, and the information that we provide, and then we have a subscription, which is either your travel card or your cap, which is daily or weekly.

The question is not whether we do it, because we will do it, and it makes absolute sense for the strategic transport authority to be involved again, because a really important role for us is upholding the service evolved in a way that is inclusive, open to all, that does not create digital exclusion, all of those functions are ours.

The questions left on mobility as a service are how do we improve the existing platform, and we do that, so these are probably your examples, Lauren, however last year we put contactless into black cabs, and we have just got the TfL app, and therefore we will continue to evolve the platform. The really interesting question, which is both a policy one and a commercial one, is at what point and under what circumstances would you extend the range of services that could be included. That raises some really interesting questions about, OK, to get access to the roundel or to the TfL brand, to provide that level of consumer trust that would justify someone being part of that service, what would you demand of an additional service to be part of the overall family?

**Caroline Russell AM:** Do you mean like for Zipcar or DriveNow, those car hire companies, is that the kind of thing you are thinking about there?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** It could be them, it could be demand-responsive service, it could be some kind of last-mile service to take you to a station, there is a range of things. Any one of those things, for the future of mobility as a service, this is a really important lever that we have because essentially people want to be part of the integrated offer and that is a lever for us where we can exert some influence on the services as they evolve. It may or may not be possible for us to integrate that, however, that is one way we can control and shape the future market.

**Caroline Russell AM:** Thank you.

**Caroline Pidgeon MBE AM (Deputy Chair):** Very briefly, also really focusing on passengers, however from the previous session, Professor McKinnon talked about logistics and data around logistics. Are you

sharing that kind of data or would you consider commissioning research to understand that to see how new technology could add benefit for the final mile or so?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** Research, and thinking about how you frame a research question, there is some real value in this. If you look at the efficiency of the network, if we can understand how you can run a freight network and a logistics network more efficiently, that is clearly going to have benefit for congestion. Therefore, there is value in terms of thinking about how do we work with universities, how do we work with logistics companies, to frame a question, do analysis, and again, to the test and learn idea, if there is something that you could identify and try to measure and see what happens, there is real value in terms of doing that as well.

**Caroline Pidgeon MBE AM (Deputy Chair):** Do you have data around logistics already that you are sharing?

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** We have had some discussions with the freight community. There is certainly more opportunity to think about this going forward.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** However it is not part of our data. In the way, for example, we hold information on when the next bus is going to arrive at a given stop, so we do not hold open APIs in the same way on freight.

**Lauren Sager Weinstein (Chief Data Officer, Transport for London):** No, we would not. What we do have of course is we have some information on congestion and jam cams and things like that where we do encourage that use from freight and logistics companies to make use out of that so they can run the network. There are certainly opportunities in terms of saying how might you work with freight companies to identify ways, algorithms and questions that you could ask about the network that would be very interesting to us.

**Caroline Pidgeon MBE AM (Deputy Chair):** OK, and my final question I think really is probably for Michael. Wayfinder, which is an app that helps people with sensory disabilities that we supported as a Committee in the past, had a pilot at Euston and Pimlico and are looking to roll it out to six other stations. Do you know when that is being rolled out? That is where you are working with a provider to provide a really useful service.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** I do not have that to hand, but I can provide that information outside of the session.

**Caroline Pidgeon MBE AM (Deputy Chair):** You have heard of it? You are aware of it?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** Yes, absolutely, and there is a whole range of things also ongoing in this area. There is an extremely rich accelerator/incubator start-up community in London, I think there are over 160 now - or even more - accelerators and incubators in London. There is a huge wealth of talent. We had a sense that they were not spending enough time on accessibility products. It was in June we ran a session to try to engage with the community to say, "Look, this is going to go down extremely well for the city, I think there is a gap". We were very actively involved in that space, however, apologies, I do not have the timeframe for Wayfinder to hand. I am happy to provide that.

**Caroline Pidgeon MBE AM (Deputy Chair):** I really liked that because, as I say, they were something we had worked with before and really supported and it seems to have gone a bit quiet, and so I would like to know, because we would probably like to visit one of these stations when it is up and running.

**Joanne McCartney AM:** I want to ask about demand-responsive bus services if I may, and the MTS states that demand-responsive bus services could potentially cater for gaps in service, and I think particularly in outer London it refers to as well. Could you just tell me a little bit about how those initiatives could complement existing bus services and perhaps also tell me about the dangers that you would see as well in that?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** In terms of talking about the opportunity for that, there are a number of scenarios where the idea of a demand-responsive service, and it may be a bus, it may be a smaller vehicle --

**Joanne McCartney AM:** Yes, a Mercedes or the Daimler Via initiative that is launching later this year, I looked at their vehicles, it looks like a very large minivan.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** There is a private hire vehicle. That is like the Vito; it is that kind of size. If you look at, for example, the service that Arriva did in Sittingbourne in Kent, that was essentially a minibus that operates on a demand-responsive basis rather than on a fixed timetable. There are a number of areas, if you look at again, grounding it in the transport challenges and mobility challenges we have, in situations such as providing transport to an out-of-town employment centre; or to harder-to-reach essential services, such as health care, there is an opportunity there. Given the amount of growth and new development there is going to need to be in London, it is quite well established in terms of transport behaviours that when people move to a new area they are susceptible to being encouraged into more sustainable modes. Therefore, if a new development can provide an opportunity that provides people with a viable alternative to commuting by car, that is an opportunity. Similarly, if you can provide a more flexible service that will take people to a transport hub, all of those are potential areas where the concept of demand-responsive transport might have something to offer.

Again, I want to make clear that we are really committed to working out what it can offer, however, it is not known. Huge leaps have been taken in the capacity for routing algorithms and booking algorithms and the speed with which this can be done, it has opened up a new set of possibilities. Those are some of the examples that we are thinking through. There are a couple of elements that we are doing in practical terms, we are thinking through whether and where a trial would be helpful so we can test the problems. Again, we are going to adopt those principles of do it on a limited basis, understand what the potential is, understand how we could have the integration, and --

**Joanne McCartney AM:** Will it be TfL doing its own trial as opposed to --

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** We could do our own trial. You quoted Citymapper earlier. They are also trialling right now a more flexible bus route. There is a question for us about can we get the learning that we need if you have a commercial entity doing that. We are looking to collaborate with them. We permitted that service; that is their own commercial decision to run that service, however what can we learn from how they have done it?



I can give you one further example. What we are learning from this agenda is that the regulatory environment does not quite match. The nearest thing we have for this space at this moment is something called the London Service Permit (LSP), which is designed for tour buses or buses that run outside the London bus network. We are thinking through right now whether we need to put advice to the Mayor with proposals to revise that to make it fit for the emerging technology services. We are working through that right now. There is a lot of opportunity and we need to find it out. I cannot tell you now that, yes, the specific benefits are going to be X and Y. Conceptually, we think there is enough that it warrants looking at. It could solve some problems and we want to take the learn-by-trial approach. You asked about risk.

**Joanne McCartney AM:** Risk, particularly about whether they could undermine existing services.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** We are talking about this right now as a complement to services. Fundamentally, when we want to shape this market, we come back to the principles that we set out in the draft MTS in that we are trying to increase accessibility, we are trying to increase the mode shift towards public transport, cycling and walking. We want to shape the market, therefore, that encourages that.

There are some very good questions. Probably some of things you are hinting at is that, at the moment, these things tend to be app-based and applicable through the app. There is the service that Starship was talking about. It knocks on your door by sending you something to your phone. That might not work for everybody. Similarly, we need to think through how this could work as a genuine increase of service. Those are the kinds of things we want to test. How can you make such a service that it gets the benefits of the on demand, the flexible routing in areas that might not previously have been viable for a big bus or you did not have the flexibility that you need in new development in certain areas? We want to test how that is possible but we are very live to those issues.

This is the point, again, I do not want to say definitively it has to be this way or that. I want to see how it works and understand the economics and fundamentally understand the consumer response, what the consumers want and need from this. If you have that, then I can answer your questions about how we are going to make sure it remains an open, inclusive service.

**Joanne McCartney AM:** You hinted at digital inclusion there, which obviously is an issue, but you also talked about TfL as a regulator of bus services and private licensed taxi services as well in the city. You talked about the regulations perhaps not being fit for this new emerging technology. Would you have the power into existing regulations to refuse to regulate if there was an undermining of existing bus usage on a bus service, for example?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** We are reviewing the LSP guidance, just to bound it at the moment. If you are talking about a service that is launched as a private hire vehicle, that is well known and I have already tried not to talk about that too much today but, at the end of the day, those are well known. As you know, we have been asking the DfT for more powers to be able to regulate that in additional ways that we are not currently able to.

If somebody wants to launch the kind of service that does not fit within the existing London bus network, you are required to have a LSP, which we grant. There is an open question about what goes into the mayoral guidance and that would be a decision for City Hall, but there is a set of guidance that you are allowed to derive from the MTS that sets those parameters. We are working through all of those. What

would we be able to demand or request? There is a question whether you can do it specifically to protect bus services. I do not know the answer because that is something that would require a legal opinion but I would say that, ultimately, it has to be consistent with the goals of the MTS that is leading to better public transport services and better accessibility. We are working that through now. We would need to consult on what that guidance looks like and the timings because we have to have the MTS finished first because we have to derive any guidance from that. Our current aim is to have that discussion with City Hall and if we choose to consult and derive revision to that guidance, it will be as soon as we can after the MTS is published in its final form.

**Joanne McCartney AM:** Thank you. We talk about demand-responsive bus services but, of course, some of the ones that are saying they are, you said car-sharing, in a sense, but it does throw up in the future lots of issues because if there are genuinely demand-responsive bus services operated by a private operator, then they are likely to want to pick their most profitable routes and, therefore, you will be left with those routes which require heavy subsidies. The regulation is going to be extremely important around that.

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** It is. I am going to come back to what I said right at the beginning because we have very explicitly, both through bus operators and anybody in the market, reached out to anybody who is thinking about launching demand responsive technology services in London. We talked about the importance of engaging before you press the regulatory route, and Citymapper came through the LSP route. There are no current LSP applications like that that are in play right now but I expect others to come. You get an awfully long way by having that discussion to say, "Look, you could chase the most profitable routes".

We did turn down the first application which was from Citymapper because it was going to run along London Bridge and around the Bank junction. These are areas where we are trying to reduce traffic, therefore, we said, "No, that is not going to work". We had, I would say, a very productive discussion to say, "Hold on a minute. Is there a common ground here where we can make the most of that technology and solve a problem?" What they have ended up doing is a temporary service but essentially as a primer for the night Overground, and allowing people to start using public transport where previously they might not have done. My experience thus far is that if you say, "Look, this is going to be consistent with mayoral priorities. This is the likelihood that you would get the thumbs up from us as a regulator and also from City Hall but you need to find an area that is sufficiently commercially attractive that is not going to screw up the transport network in another way or screw up the consumer experience in another way". So far, there seems to be quite a lot in that common ground to say, "This is sufficiently interesting but it is also solving the city's problems". We get a sense there is potential.

**Joanne McCartney AM:** As an Assembly Member whose residents are regularly lobbying me for bus services where we currently do not have any, my reaction would be why does TfL not provide that service if there is demand there, particularly if it will make money that allows you to subsidise other bus services?

**Michael Hurwitz (Director of Transport Innovation, Transport for London):** The question is: at what cost would it make money? At the end of the day, if you have a smaller vehicle and the economics are not yet proven whether it would be cheaper, we would not want to end up doing a whole load of new services that make a loss and increase the subsidy requirement. The reason why I want to do the trials is to work through the economics.

**Joanne McCartney AM:** Yes, thank you.

**Keith Prince AM (Chairman):** Thank you very much indeed for your contributions. We are very grateful to you. Can I just say at this moment, though, that I would like to put on record my thanks to you both for coming along this afternoon? It was very kind of you. There are a few issues that we have raised that you do need to take back, especially around the MTS, around drones and droids and hopefully you will be able to. The shame is that as it is only coming to light now, people have not had the opportunity to really make a contribution on those issues. I have to say that you have missed the trick, in a way, with the MTS to open up the debate on drones and droids. We are where we are and, hopefully, we will be able to go forward, but thank you very much for coming along.