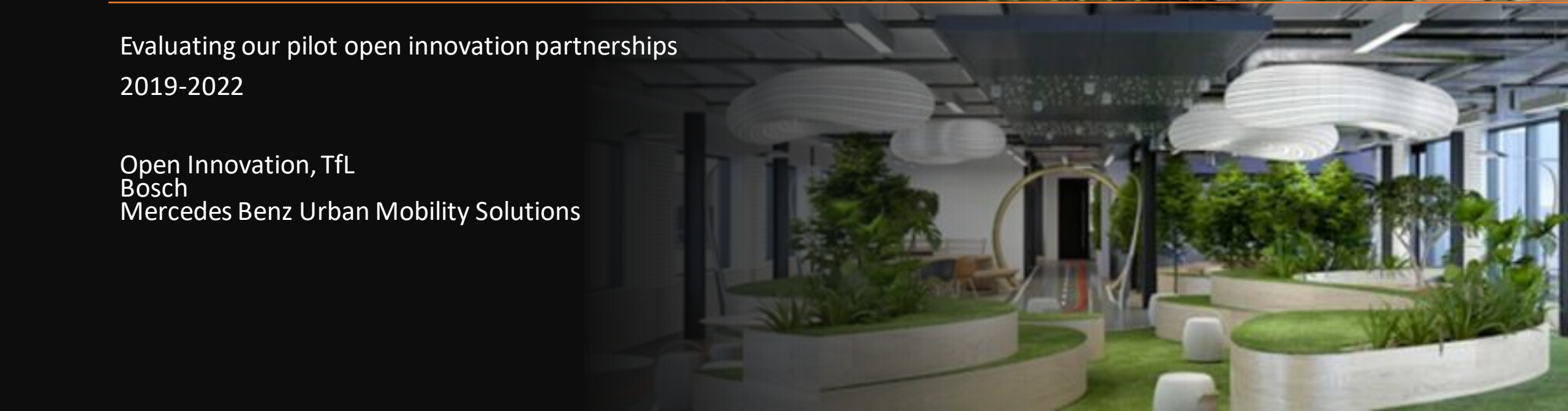


A woman in a dark green dress stands at the front of a large, modern office space, addressing a large audience of people seated at desks. The room is filled with green plants and has a high ceiling with exposed ductwork and modern lighting. The audience is diverse and appears to be listening attentively.

Corporate Innovation Partnerships

Evaluating our pilot open innovation partnerships
2019-2022

Open Innovation, TfL
Bosch
Mercedes Benz Urban Mobility Solutions

A modern office interior featuring several large, circular, white planters filled with green plants. The space is bright and open, with white chairs and a high ceiling with modern lighting fixtures. The overall atmosphere is clean, professional, and eco-friendly.

Our corporate innovation partnership trials

- Policy 23 of the [Mayor's Transport Strategy \(MTS\)](#) commits us to engaging with market innovators, guiding them to develop products consistent with the goals of the MTS.
- By collaborating with the market, we are harnessing this opportunity to develop new products to solve our toughest challenges. The TfL x Bosch Corporate Innovation Pilot was set up to test if innovation partnerships could be a viable way of TfL doing this. This was followed by a further pilot partnership specifically to co-create a Road safety data tool with Mercedes Benz.
- These partnership trials were unique and ground breaking for TfL. We wanted to find out if they could deliver the critical success factors we hoped they would. If so, the learnings would inform the design of a framework of corporate innovation partners.

Critical success factors for the trials

	TfL	Bosch, Mercedes Benz
Internal	<ul style="list-style-type: none">• Introduce staff to new ways of working• Gain useful information on urban mobility technology that can aid implementation/policy formation• Use insights to inform a framework for undertaking partnerships with other commercial entities in the future	<ul style="list-style-type: none">• Learn and gain experience on urban mobility in a complex environment• Find new routes to market• Engage multiple internal divisions in urban mobility• Invest, acquire and partner with new organisations in London
External	<ul style="list-style-type: none">• Demonstrate inclusiveness to organisations that want to co-develop solutions with TfL• Demonstrate progress on Mayor's Transport Strategy• Support procurement on current challenges where relevant	<ul style="list-style-type: none">• Demonstrate commitment to city stakeholders• Be proactive in the acceleration of urban mobility markets• Grow the London Connector community (Bosch specific)• Demonstrate technology innovation

TfL's critical success factors



Introduce staff to new ways of working

- TfL subject matter experts from our Network Performance, Air Quality and Safety, Health and the Environment teams attended a number of co-creation workshops at The Connector with Bosch experts to define the problem statements, design the trials, agree measures of success and develop prototypes. Mercedes Benz also held a series of face to face product definition workshops at TfL's offices.
- TfL's relationship with suppliers tends to be transactional rather than collaborative so our internal teams had not previously experienced working with a supplier to co-create new products.
- The colleagues learned a great deal from these cross team sessions not only from being exposed to new technologies and products but also from working in a more agile way to quickly address key decisions. As a result, they are now more open to using these techniques in other projects and in their day to day work.
- Members of the TfL leadership team and the Deputy Mayor visited the Bosch/Nitrous innovation hub, The Connector, on several occasions so see at first hand how it nurtured a thriving mobility eco system. Being exposed to innovative start ups, different ways of working and a more flexible workspace has influenced changes to TfL and GLA organisational culture.

Gain information on urban mobility technology

- TfL and Bosch, with colleagues from Lambeth Borough Council, created a test bed in Brixton to trial new products in a real world environment.
- **Brixton air quality trial** – proved that advanced data modelling using traffic and emissions data can accurately assess the effect of traffic signalling changes on air quality. Previous TfL trials in other locations lacked the data to prove they had really made a difference.
- **Brixton safety at junctions** – TfL were able to access Artificial Intelligence experts at Bosch to test how, using image analytics, whether you could identify risky road user behaviour - a key use case to inform TfL's image analytics strategy.
- TfL's work with Mercedes Benz demonstrated that telematics data can provide life saving insights to inform road risk modelling and help us achieve our Vision Zero targets. TfL is now looking at how telematics from other modes can supplement data from OEMs.

Demonstrate inclusiveness to organisations of all sizes

- Bosch set up an innovation hub (The Connector) in London to establish a mobility start up eco-system. By the time the COVID pandemic hit the UK, Bosch had already established a vibrant network of start-ups at The Connector.
- These organisations were able to access mentoring from TfL senior staff and take part in events at The Connector where TfL (amongst others) spoke about current and future mobility challenges.
- Up to March 2020, TfL had conversations with a range of start ups at several networking events at The Connector.

Demonstrate progress on the Mayor's Transport Strategy

- **Aligned with Policy 23 of the MTS** - Bosch created an urban mobility innovation hub (The Connectory) to which TfL had access allowing us to influence and manage new transport services in London so that they support the Healthy Streets Approach.
- **Aligned with Policy 6 of the MTS** - The results from the air quality trial in Brixton clearly showed that Network Management's traffic light strategy reduced vehicle emissions in Brixton by around 6%. This trial employed Bosch's innovative granular emissions modelling and data from Bosch air quality sensors to assess the effects of using traffic light phasing to ensure a smoother traffic flow through the main shopping area in Brixton.
- **Aligned with Policy 3 of the MTS** - Road safety and Vision Zero – The knowledge that TfL gained from exploring the use of image analytics and deep learning with Bosch experts will inform our strategy on using these technologies to better understand the causes of risky road user behaviour and design effective interventions to prevent collisions.
- Furthermore, the road safety data from the Mercedes Benz partnership provides insights on road risk that will enable TfL to put in place appropriate interventions to save lives.

Inform specifications for future procurements

- Having access to a wealth of Bosch and Mercedes Benz experts across the globe meant we could gain valuable market knowledge to inform solutions to our key problem statements. A key success factor was regular communication. TfL and Bosch held weekly programme meetings supplemented by weekly project team updates.
- **Tube noise** - Just before the COVID pandemic, Bosch and TfL sound experts discussed ways of identifying ways of reducing noise from Tube trains which was causing discomfort for drivers. Together, the teams developed a plan to use Bosch equipment and expertise to identify which parts of the train were transmitting the sound that was causing these problems as a first step in finding a solution to this problem. Unfortunately, the pandemic meant the testing was cancelled but this topic remains of interest to TfL.
- The successful trial of using Mercedes Benz's OEM data to gain critical road risk insights has led to TfL exploring the benefits of using telematics data from other modes, eg freight, e-scooters, bicycles, in a similar way.
- A key learning from the two partnerships was that taking successful products from R&D to scaling and co-commercialising requires additional lengthy procurements. The need for a more agile process for scaling and implementing co-created products has informed the specification for the Innovation Collaboration Framework due to be tendered in summer 2022.

Establish a framework for partnerships with other commercial entities

- The pilot partnerships delivered against all the critical success factors set at the outset, providing strong evidence that TfL should be working in this way with multiple partners to deliver innovative solutions to its most complex and difficult problems.
- TfL issued an Expression of Interest in December 2020 to ask the market for their help in designing an innovation collaboration framework and to gauge the appetite of suppliers for working with us in this way.
- The plan is to tender for framework partners in Summer 2022.

Evaluation of corporate partners' critical success factors



Learn and gain experience on urban mobility in a complex environment

- The Bosch x TfL partnership provided opportunities for real interaction on the ground in London. Access to the urban environment and relevant data sources informed the appropriate installation of technology and ensured that trials were more focussed and effective.
- Combining the experience and data from TfL with technology and methodology from Bosch and its partners delivered valuable insights for both parties. Gaining knowledge of the processes for implementing hardware on city streets and working with local contractors and Boroughs to install technology was extremely valuable.
- Mercedes Benz also gained valuable knowledge from TfL road safety experts on how their telematics data can be used by cities to improve road safety and save lives.

Find new routes to market

- Through working with TfL to achieve the goals in the MTS, Bosch were able to show that technology and innovation are key to making step change improvements for citizens.
- Advanced data modelling and smarter ways of using of data can create innovations that can be marketed as viable products. In addition, these products can be shown to be flexible, portable and scalable, meaning the optimisation of solutions for a particular need.
- Mercedes Benz's partnership with TfL proved the value of their road safety data in identifying road risk making it more attractive to other cities globally.

Engage multiple internal divisions in urban mobility

- Bosch is active in many fields of technology and development. The broad scope of Bosch's product and service portfolio enabled diverse teams to be engaged to pool resources and ideas and deliver a range of trials with TfL. This ranged from data modellers, air quality experts, project managers, AI developers and sound engineers.
- A key strategy for Bosch is to develop connected innovative products and services through combining the technology and expertise of a wide portfolio of divisions. The TfL partnership was a catalyst for cross team working across Bosch.

Invest, acquire and partner with new organisations in London

- London provided a strategic base for co-innovation for Bosch and Mercedes Benz. Bosch's London Connectory provided a physical hub for a growing eco system of start ups operating in the mobility space.
- The TfL x Bosch Brixton air quality trial meant Bosch also worked closely with Lambeth Borough Council which introduced their project team to a local government authority.
- Mercedes Benz have connected with road safety community groups and other public authorities through their work with TfL.

Demonstrate commitment to city stakeholders

- Bosch committed to work with TfL and other partners in the city and to offer access to their products and expertise.
- Bosch methodologies, including moderated design sprints, were employed to co-create potential solutions to key challenges in the city. Significant investment and commitment was provided by Bosch in order to achieve this.
- An eminent road safety campaigner has praised the road risk modelling data work and sees it as a vital tool for saving lives on our streets.

Be proactive in the acceleration of urban mobility markets

- The engagement with TfL on the ground in London helped the Bosch team pair up with several organisations and innovation networks to participate in the co-creation of products and services which enhance urban mobility.
- This is a very fast moving market where new technical challenges appear due to the ever changing landscape. Bosch, with the backing of a mature and experienced team and new partners from a growing ecosystem of mobility start ups, were able to be agile and adapt co-created new products to meet market needs.

Grow the London Connectory community

- Bosch invested significant resource in setting up and growing their mobility start up ecosystem, The Connectory, in London.
- This community gained real momentum during the course of the partnership with TfL. Since this was a mobility focussed eco-system, the participation of partners like TfL was designed to focus on those contributing and innovating in the mobility space. As a result, the community was able to collaborate well due to the common goals they shared - to advance the mobility market.

Demonstrate technology innovation

- The corporate innovation partnerships have shown that the innovative solutions trialled bring real value and potential to solve complex city challenges.
- In Brixton, Bosch proved that when traffic flow is closely observed and controlled, it can bring about significant improvements in localised air quality. The adjustments to the traffic flow used existing infrastructure to control traffic emissions in an innovative, localised way.
- Technology has also been trialled to understand the topic of safety. Camera technology and advanced analytics at pedestrian crossings have the potential to offer insights into why 'near misses' or collisions happen.
- Mercedes Benz's partnership with TfL has proved that telematics data from connected vehicles can pinpoint high risk locations on a city's road network and help cities develop appropriate mitigations to save lives.

Next steps for our corporate innovation partnerships strategy



Next steps

- The TfL x Bosch and TfL x Mercedes Benz partnerships met their original aims and generated some excellent insights
- Bosch and Mercedes Benz dedicated significant resources and investment in the partnerships in return for access to TfL's experts, data, opportunities to trial on our network and our brand.
- The results of the trials have been very well received by TfL stakeholders and there is a strong desire to continue to work in this way with suppliers.
- The learnings from this partnership have informed TfL's aspiration to design its first Innovation Collaboration Framework with input from the market and internal stakeholders.
- The framework will have at its heart the key principles of co-creation, collaboration, mutual benefit and co-commercialisation.
- It will allow us to take our corporate innovation partnerships beyond R&D (where appropriate) to scale up and co-commercialise co-created products without lengthy additional procurements.

TfL x Bosch Projects

- Brixton – Evaluating the effects of smart traffic management on air quality using advanced data modelling and localised air quality data
- Brixton – Using digital images and AI to identify “near misses” at a pedestrian crossing
- Reducing noise on London Underground trains
- Road safety event at The Connector
- Exploring options for speakers for electric buses
- Exploring options for advanced braking systems for buses
- Research into particulate matter from electric bus components
- Exploring advanced braking systems for buses

TfL x Bosch Press

- [TfL x Bosch partnership launch press release](#)
- [TfL x Bosch partnership – TfL press release](#)
- [TfL x Bosch air quality project](#)
- [Here Maps press release](#)
- [Bosch London Connectory press release](#)
- [Cities Today article](#)
- [Bosch air quality case study](#)

TfL x Mercedes Benz Press

- [Mercedes Benz press release on road safety partnership](#)
- [Highways News article](#)
- [Mercedes Benz Sustainability Report 2021 – PP65-69\)](#)