



**Assessing the value
of TfL's open data and
digital partnerships**

July 2017

Contents

Foreword	01
Executive summary	03
Main report	08
Appendices	16
Methodological approach and assumptions	17
Calculation ranges	20
Stakeholders consulted	21
TfL open data	22



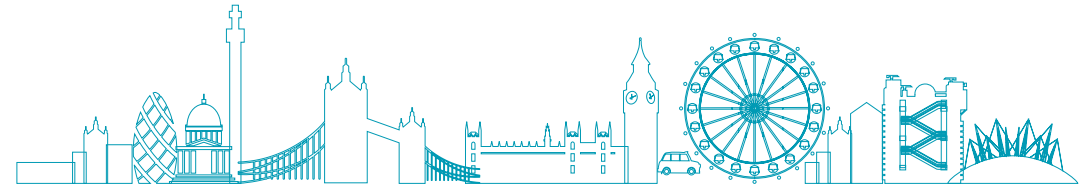


Foreword





Foreword



With over 31 million journeys made in London every day, it is vital that people have the right travel information readily available to help them.

Almost a decade ago, we decided to release a significant amount of our data – timetables, service status and disruption – in an open format for anyone to use, free of charge. Our hope was that partners would then produce new products and services and bring them to market quickly, thereby extending the reach of our own information channels. Our guiding principle ever since has been to make non-personal data openly available unless there is a commercial, technical or legal reason why we should not do so.

We have worked with numerous partners and supported a growing community of professional and amateur developers to deliver new products in the form our customers want. There are now over 600 apps powered by our data, used by 42 per cent of Londoners.

What is less well understood is the economic value and social benefits of this approach, which is why we asked Deloitte to undertake an independent review. This report sets out their findings, including the positive outcomes delivered to customers, road users, businesses and TfL itself. It estimates the size of these benefits and identifies further wider benefits that are not yet measurable.

This is only the beginning. We will make further data openly available on a regular basis and will continue to work with our partners to improve transport for all Londoners. You can follow our progress at blog.tfl.gov.uk.

Vernon Everitt

Managing Director, Customers, Communication and Technology
Transport for London



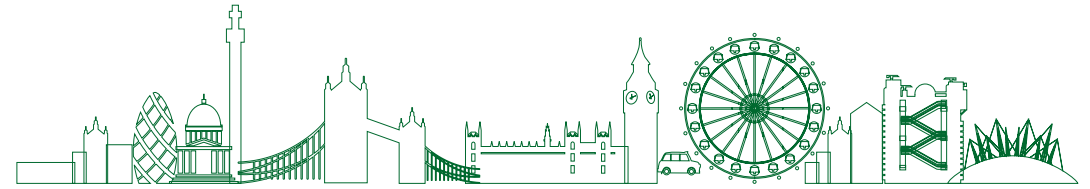


Executive summary



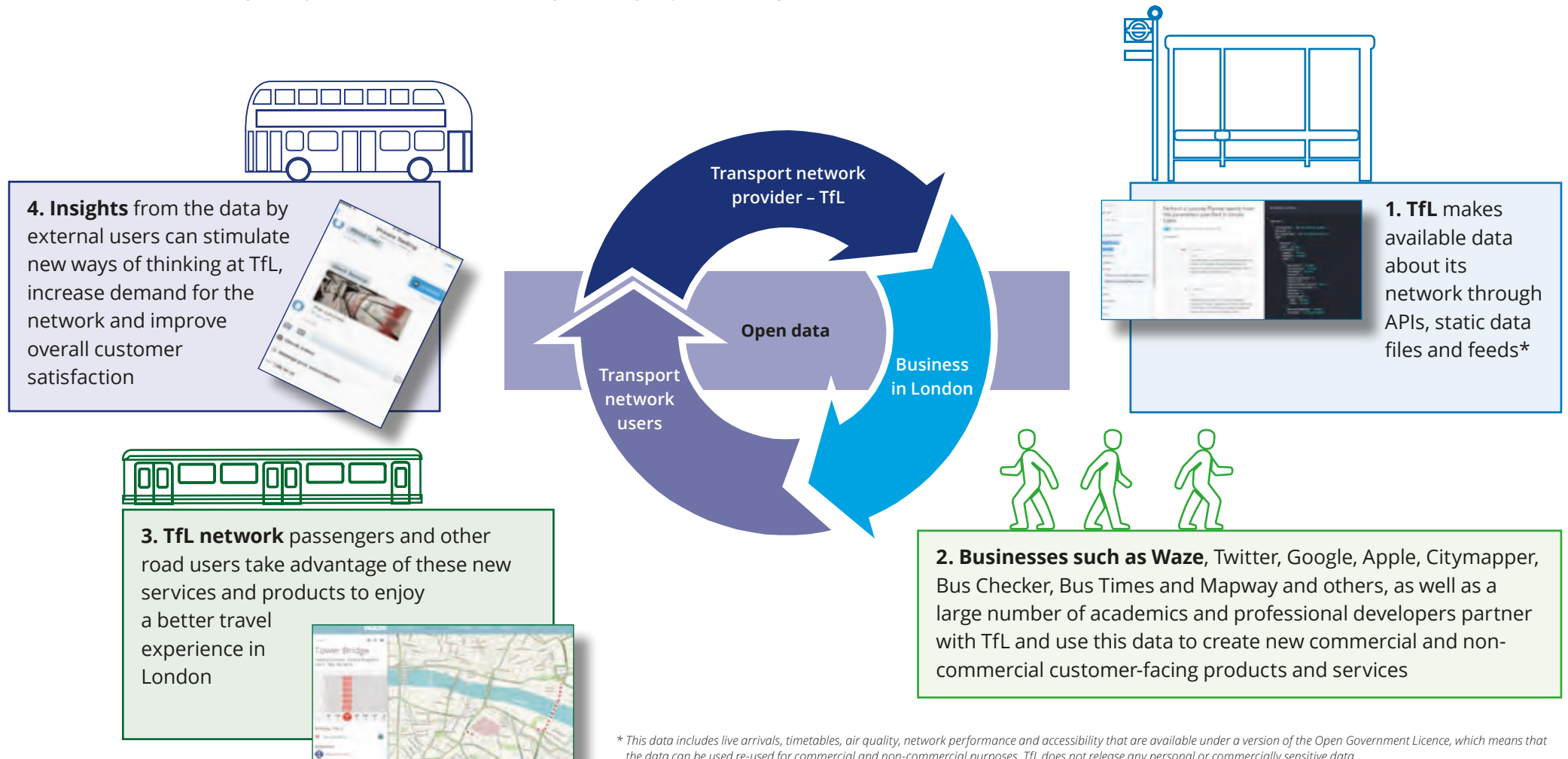


Executive summary



Publishing open data creates a virtuous circle that benefits those using and delivering transport networks in the Capital

Transport Open data that can be freely used, re-used and redistributed by anyone can support operational service improvements, the development of new customer facing products and services, increase transparency and innovation and challenge existing ways of working.





Executive summary

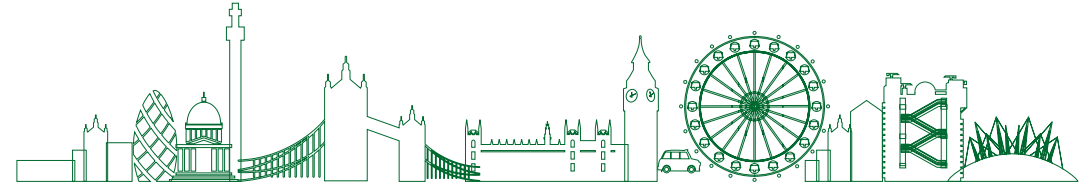


The release of open data by TfL is generating annual economic benefits and savings of up to £130m for travellers, London and TfL itself
42% of Londoners use an app powered by TfL data and 83% use its website with similar data: this benefits all transport users in the Capital, TfL itself, and supports London's economic agenda

TfL Passengers and Other Road Users	London	Transport for London
<p> Saved time for network passengers</p> <ul style="list-style-type: none"> Passengers are able to <i>plan their journeys better with apps</i> that use TfL's open data to provide them real-time information and advice on how to adjust their routes. This provide <i>greater certainty</i> on when the next bus/tube will arrive <i>and saves time</i> – estimated at between £70m and £90m pa. 	<p> Gross Value Added</p> <ul style="list-style-type: none"> A number of companies use and re-use <i>TfL data commercially, generating revenue</i>, many of whom are based in London. We estimate that the total <i>Gross Value Add</i> from using TfL data by these companies directly and across the supply chain and wider economy is between £12m and £15m GVA pa. 	<p> Savings from not having to produce apps in-house</p> <ul style="list-style-type: none"> With over 13,000 registered developers currently, TfL is allowing the market to develop innovative new transport apps and services. This creates potential cost savings for TfL of not having to build apps itself or through co-developing with third party developers.
<p> Saved time for other road users</p> <ul style="list-style-type: none"> The availability of data on road works and traffic incidents can feed into Sat Navs, driving software and apps that can allow private and commercial drivers to adjust their routes to avoid congestion. This saves time and can reduce emissions as less time is spent waiting in traffic queues and journeys are shorter. 	<p> High value Job creation</p> <ul style="list-style-type: none"> TfL open data is estimated to <i>directly support around 500 jobs</i> that would not have existed otherwise. Many of these jobs are in sectors associated with <i>high productivity</i>. 	<p> Savings from not having to invest in campaigns and systems</p> <ul style="list-style-type: none"> The publication of open data gives passengers information directly, <i>reducing the pressure on the Contact Centre.</i> Undertaking an equivalent campaign to make available this information could cost £1m – open data allows TfL to make available the same data at a much reduced cost, <i>expanding customer reach and improving transparency.</i> The cost for TfL of publishing open data is estimated at around £1m annually, suggesting a <i>significant return on investment.</i>
<p> Savings made from moving from SMS alerts</p> <ul style="list-style-type: none"> Passengers are able to switch to using free apps or free web services for real-time data that use TfL's open data. This creates a cost saving for those who previously subscribed to fee-based SMS alerts, estimated to worth up to £2m pa. The <i>use value of new real time alert services</i> is estimated to be up to £3m pa. 	<p> Wider job creation in the supply chain</p> <ul style="list-style-type: none"> A further 230 indirect jobs in the supply chain and wider economy have also been created. 	<p> Leveraging value and savings from partnerships</p> <ul style="list-style-type: none"> Through partnerships with major data and software organisations, TfL <i>receives back significant data on areas it does not itself collect data</i> (e.g. crowdsourced traffic data). This allows TfL to undertake <i>new analyses and improve its operations.</i>
<p> Better information to plan journeys, travel more easily and take more journeys</p> <ul style="list-style-type: none"> Passengers are now able to better plan journeys, enabling them to use TfL services more regularly and access other services. This can result in more journeys on the network. Conservatively the <i>value of these journeys</i> is estimated at up to £20m pa. 		
<p>Plus improved customer satisfaction from having accurate and reliable information available instantly</p>	<p>Plus supporting the wider UK Digital Economy in London and other cities</p>	<p>Plus new commercial opportunities arising from open data</p>







Executive summary



TfL's open data can also contribute to improving societal outcomes, encourage innovation and the wider environment.

The use of open data can also change behaviours and position London and the UK to take advantage of new commercial opportunities

Society	Growth and productivity	Environment
<p> People are more likely to walk or cycle and lead healthier lifestyles</p> <ul style="list-style-type: none"> Open data can help <i>integrate the first- and last-mile</i> encouraging alternative transport modes including cycling and walking, which has <i>health benefits</i>. This can support ambitions around <i>healthier streets</i>: since 2007, the number of people walking as their main mode of transport has increased by 13%. 	<p> Taking advantage of new opportunities</p> <ul style="list-style-type: none"> The UK and London have already earned a <i>reputation</i> as a leader in open data and the digital economy. Recent research by Tech City noted London's digital economy was worth £30bn in GVA and supported over 300,000 jobs. The provision of transport open data will be an <i>important foundational block for further development of new transport products</i>. 	<p> Contributing to improving air quality and reducing emissions</p> <ul style="list-style-type: none"> As open data is used to develop new customer facing products that support modal shift from private and public vehicles, there will be greater numbers of pedestrians and cyclists. They will contribute to a lower carbon footprint in London and emit lower particulates being emitted, which can improve air quality.
	<p> Encourages and facilitates increased innovation</p> <ul style="list-style-type: none"> As TfL releases more data, it is able to encourage an increasing number of developers to innovate to create a range of new customer-facing services that can tackle social and economic issues (as demonstrated by the recent cyclist app challenge). 	





Executive summary



TfL now has an opportunity to use its lead in open data to explore new commercial avenues and use data in more innovative ways to improve the customer experience and support wider Mayoral objectives.

TfL can continue to release more open data and work with partners for mutual gain to better exploit it and stimulate the development of future services to improve the customer

Future opportunities for TfL and its partners using open data experience

	Release more open data (e.g. on roads) and continue to support a culture shift internally to become an Insight Driven Organisation.
	Commercialising its expertise around open data, e.g. making its API platform commercially available.
	Working with developers to identify market gaps and opportunities for new customer-facing services that improve the customer experience, especially around network accessibility. This can be through hackathons, accelerators, blogs and formal partnerships .
	Using the data received back from partners on areas where data coverage has traditionally been poor to drive new insights and improve operations (e.g. on real-time traffic).
	Improving the quality and coverage of the existing open data , e.g. through linking and merging with other datasets.





Main report

Context

Open Data in London

Benefits of TfL Open Data

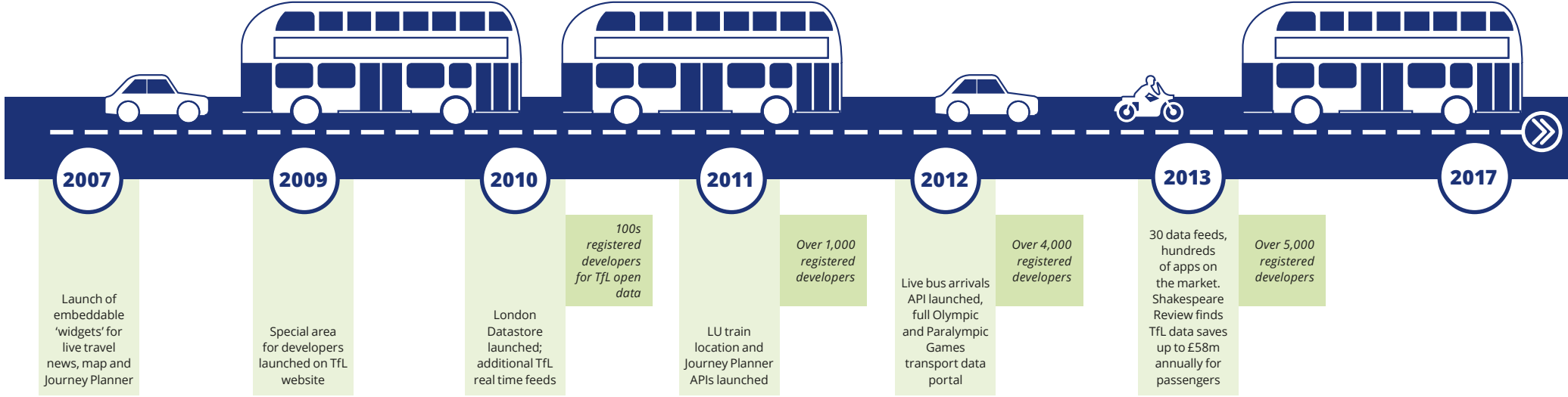


Main report

Context

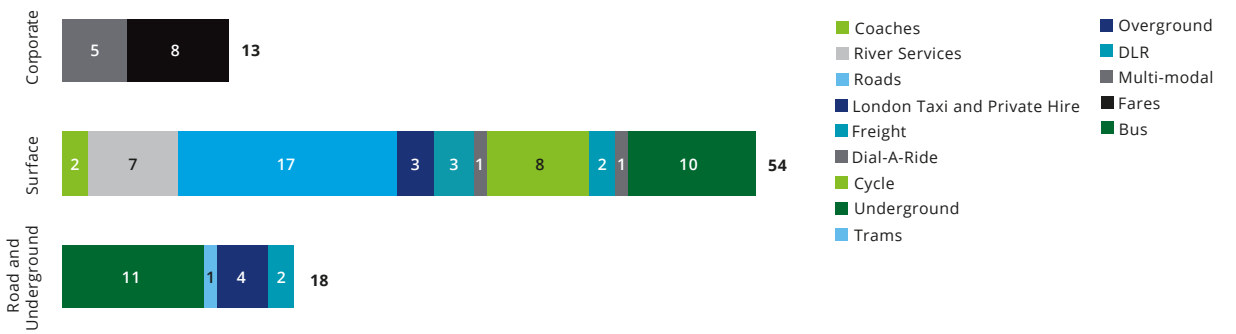
Over the last ten years, TfL has become a recognised leader in publishing Open Data through APIs, the Cloud, the web and across its physical network

TfL's journey in publishing Open Data



- Currently there are over 80 TfL data feeds covering operational and corporate information across all modes of transport.
- Around 75% of the data is available via APIs.
- 42% of Londoners use an app powered by TfL data and 83% use its website.
- TfL has significant data partnerships with major app developers and digital partners where it makes available its data and receives back data.
- There are now over 12,000 registered developers.
- Data is also made via the GLA and data.gov.uk.
- A number of hackathons have been held to engage with the community and receive feedback.

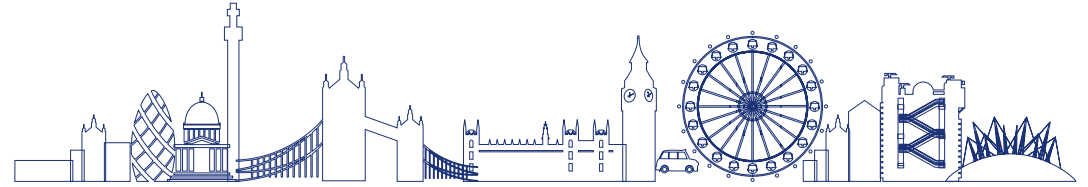
TfL Datafeeds, December 2016





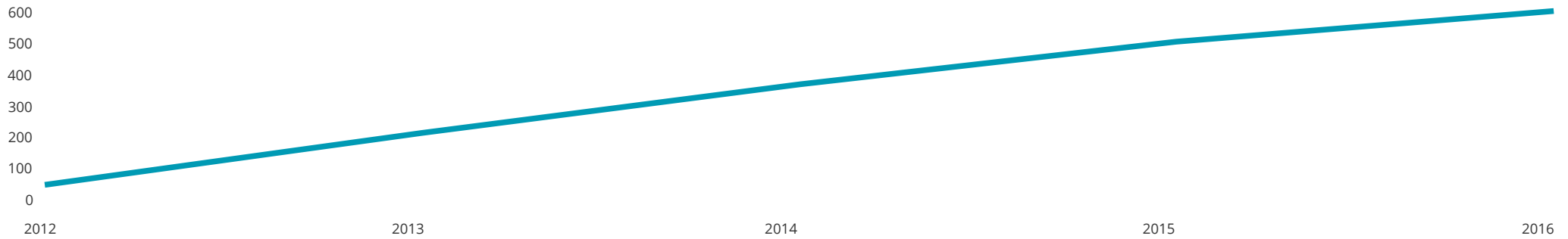
Main report

Context



TfL open data is now being used in over 600 apps which are changing the way people use the TfL and wider London transport network

Number of apps using TfL data 2012-2016*



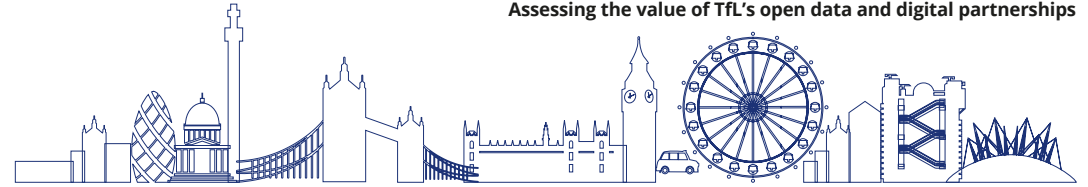
Apps using TfL include journey planners, mapping tools, booking and scheduling tools and analytics engines.





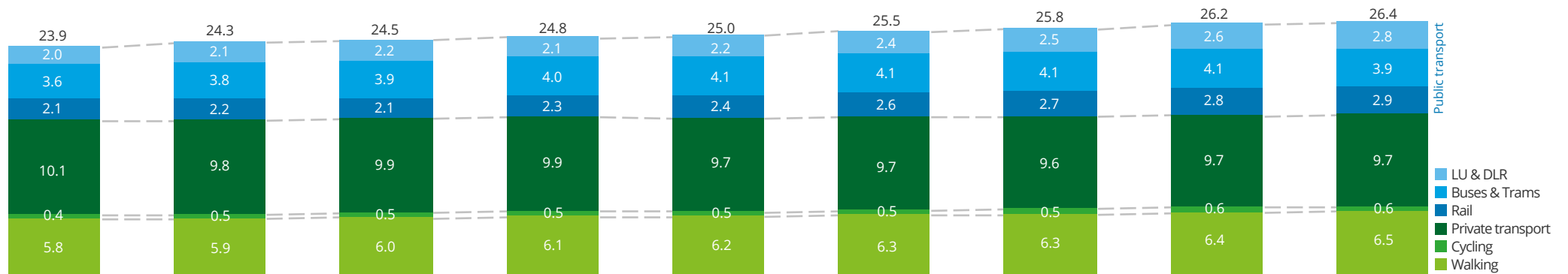
Main report

Context



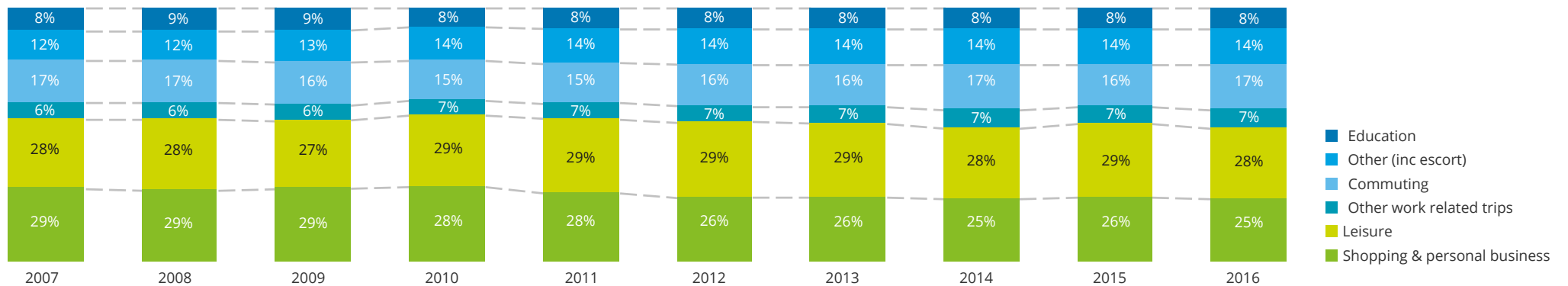
The increasing availability of open data has coincided with increased demand for public transport in London, which in turn creates demand for improved information services

Daily average number of trips made in London, split by main mode of transport, 2007-2015 (Millions)



- Private Transport decreased by almost half a million trips, while public transport saw an increase of over 4 million trips during the years 2007-16

The purpose of travel in London across all modes, 2007-2016 (% split)

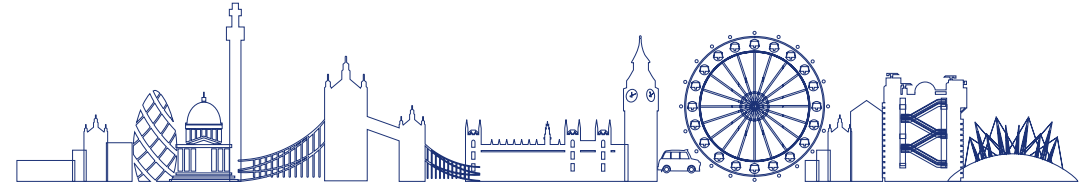


- Demand for real-time information on the network is likely to be high for commuters, for whom the value of lost time is highest
- In 2016, 53% of passengers travelled for recreational reasons. These passengers are more likely to be unfamiliar with the services provided in and around London and their demand will also be high



Main report

Benefits of TfL Open Data



In order to estimate the benefits of TfL's data, we have considered the cost savings and incremental value to three core segments – Passengers, London and TfL itself

Segments

<p>One</p>	<p>Two</p>	<p>Three</p>
<p>Passengers (all network users)</p> <ul style="list-style-type: none"> • Customers range from commuters, occasional users, leisure users and visitors who use London's transport network • Open data has enabled passengers to save time due to increasing knowledge of live times and routes available • Passengers help us understand the key impact open data has had on transport and London 	<p>London</p> <ul style="list-style-type: none"> • The city has benefitted greatly from TfL's open data, through GVA and increased employment • TfL's open data has also encouraged and kick-started innovation in the city - London saw a 13% increase in employment in the Digital sector in 2016 	<p>TfL</p> <ul style="list-style-type: none"> • TfL now have 600 apps using their open data with the potential for even more to be developed • This creates potential cost savings for TfL of not having to build apps itself or through co-developing with third party developers • TfL has also experienced the reputational benefits of being seen as a leader in the space of open and transparent data globally

This has led to us creating the following benefits metrics

Benefits metrics

<ul style="list-style-type: none"> • Saved time from using open data apps, Sat Navs and other devices to better plan journeys and reduce time lost due to congestion and delays • Reduced uncertainty on public transport from using open data to plan journeys and the resulting time saved • Savings made from moving SMS alerts to using open data • Value of real time alerts • Value of more journeys taken by people on buses after using open data journey planners 	<ul style="list-style-type: none"> • GVA from the Travel App Industry in London • Direct, indirect and induced jobs created by app companies • Encourages and facilitates increased innovation • Reduced congestion • A reduction in pollution • A reputation as a leader in open data • Business Costs 	<ul style="list-style-type: none"> • Savings from not having to run transparency marketing campaigns • Increased partnerships and new insights • New revenue opportunities
---	--	---



Plus other non-quantified benefits



Main report

Benefits of TfL Open Data



TfL open data that supports 42% of travel apps and real-time alerts used by Londoners is saving £70m-£95m pa in saved time, reduced uncertainty and lower information costs

One



Passengers

Passengers

- Passengers range from daily commuters to recreational visitors and tourists who use London public and private transport
- TfL's open data provides passengers with greater, more accurate and real-time information that can be embedded in apps, websites and other devices to help plan journeys.

Estimated economic benefits to passengers directly and indirectly using TfL Open Data

Saved time

- Passengers are able to plan their journeys better with apps that allow them to adjust their routes in light of new information and provide more certainty when the next journey mode arrives
- This can help avoid congestion and save time
- Across the Underground and Buses, this time saving is estimated at between £70m and £90m pa
- Similarly for other road users (private and commercial), there will be a time saving from using apps to avoid road closures, road works and congestion

Savings made from moving from SMS alerts

- Passengers are able to switch to using free apps or free web services for real-time data
- This creates a cost saving for those saving who previously subscribed to SMS alerts
- This saving is estimated to worth £2m pa to the relevant passengers and the value of new real time alert services worth over £3m pa

Estimated social and environmental benefits to passengers directly and indirectly using TfL Open Data

Greater satisfaction with journeys

- TfL's customer satisfaction scores have, on average, increased y-o-y by c.1%
- One contributing reason for this has been argued to be customers increasingly satisfied with the availability of better information to make their journeys faster

Better information to plan journeys, travel more easily and take more journeys

- Passengers are now able to better plan their journeys, enabling them to use TfL services more often
- By improving information provision, this can result in more journeys on the network from people who have accessibility needs
- Conservatively the value of these journeys is estimated at £5.1m pa (not included in figures above)

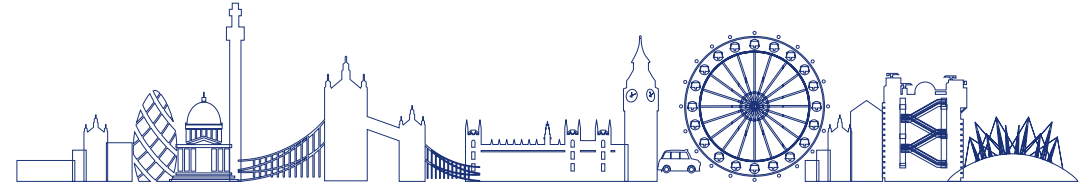
People more likely to walk or cycle and lead healthier lifestyles

- Open data can help integrate the first- and last-mile encouraging alternative transport modes including cycling and walking
- This can support ambitions around healthier streets: since 2007, the number of people walking as their main mode of transport has increased by 13%



Main report

Benefits of TfL Open Data



The release of open data by TfL has supported the growth of London's Tech economy to the value of £14m pa in GVA and over 700 jobs

Two



London



London

- London saw a 13% increase in employment in the Digital sector in 2016
- A number of new businesses have been established that use and re-use TfL open data to bring a range of new apps and services to market

Estimated economic benefits to London directly and indirectly using TfL Open Data



Gross Value Added

- A number of companies use and re-use TfL data commercially, generating revenue
- A large number of these are based in London
- Using publicly available revenue and conservative estimates of how much of this revenue is directly due to TfL open data, the wider supply chain and consumer spending Gross Value Add from these companies is estimated at £14m pa



Job creation

- TfL open data is estimated to directly support around 500 jobs that would not have existed otherwise
- A further 230 indirect jobs in the supply chain and wider economy have also been created

Wider economic benefits to London attributable to TfL Open Data



Taking advantage of new opportunities

- The UK and London have already earned itself a reputation as a leader in open data
- The provision of transport open data will be an important foundational block for further development of new transport products
- Transport open data in London can help secure it as a global leader



Encourages and facilitates increased innovation

- As both Data Provider and Transport Operator, TfL is a key stakeholder in the future and development of MaaS.
- The concept of Mobility as a Service (MaaS) offers the opportunity for service providers to offer a tailored service that targets the pain points of travellers. As TfL releases more data they are able to encourage an increasing number of developers to innovate (as demonstrated by the recent cyclist app challenge)



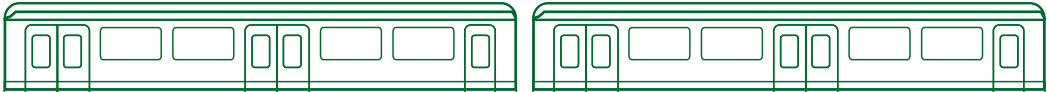
Main report

Benefits of TfL Open Data




Open data also unlocks new revenue and savings opportunities and new ways of working for TfL

Three




TfL


 **TfL**

- TfL now has 600 apps using their open data with a number of them reporting over 1m downloads


Estimated economic benefits to TfL from publishing open data

 **Savings from not having to produce apps in-house**

- With over 13,000 registered developers, TfL is able to allow the market to develop innovative new transport apps and services
- This creates cost savings for TfL in terms of not having to build apps or provide ongoing support

 **Increased partnerships and new opportunities**

- TfL has also benefitted from increased partnerships with companies such as Waze, Google, Apple, Citymapper, Bus Checker, Bus Times, Mapway and others; some of whom reciprocally supply TfL with their own
- Through partnerships TfL receives back significant data on areas it does not itself collect data (e.g. crowdsourced traffic data)
- This allows TfL to undertake new analyses and improve its operations

 **Savings from not having to invest in campaigns and systems**

- The publication of open data gives passengers information directly, reducing the pressure on the Contact Centre and allowing it to focus on other priorities
- Undertaking an equivalent campaign to make available this information could cost in the order of £1m – open data allows TfL to make available the same data at a much reduced cost
- The cost for TfL of publishing open data is estimated at around £1m annually, suggesting a significant return on investment



Appendices



Methodological Assumptions

Stakeholders Consulted

TfL open data



Appendices

Methodology Assumptions

Our approach covered the following steps to build an empirical benefits framework quantifying the value of TfL's open data

Methodology

Outputs

1. TfL Data Collection & Study framework	
	<ul style="list-style-type: none"> Conduct a thorough literature review TfL Data collection Identify the relevant open data inputs, the types of data sets TfL makes available, APIs, metadata etc Mapping open data feed inputs to outputs such as apps and other products and services reliant on open data Creating a Benefits/Value framework by tracing the societal and economic impacts of these services
2. Wider data collection	
	<ul style="list-style-type: none"> Looking further into the Proxy prices Conducting data triangulation Identify different stakeholders or user archetypes reaping the benefits of open data Build the model, creating metrics and associated calculation sheets to measure these impacts taking account of geographies, additionality and longevity
3. Quantification	
	<ul style="list-style-type: none"> Test, run and refine model Review strategy
4. Synthesis	
	<ul style="list-style-type: none"> Report to show insights and results from the model created





Appendices

Methodology Assumptions



Calculation assumptions (underlying spreadsheet supplied separately)

Passengers



Benefit	Key assumptions	Range of values used
Saved time from using open data to better plan journeys and reduce time lost due to congestion and delays	<ul style="list-style-type: none"> Usage of open data apps by travellers that affects behaviour 	<ul style="list-style-type: none"> Proportion of passengers using apps to plan journeys averaging 27% between 2011 and 2016 Proportion of passengers using web services to plan journeys averaging 9% between 2011 and 2016
Reduced uncertainty on public transport from using open data to plan journeys and the resulting time saved	<ul style="list-style-type: none"> % of buses that are low frequency Usage of open data apps to plan bus journeys 	<ul style="list-style-type: none"> 4 low frequency buses an hour
Savings made from moving SMS alerts to using open data	<ul style="list-style-type: none"> Cost of SMS Substitution between SMS and apps Usage of open data apps 	<ul style="list-style-type: none"> Average cost of SMS message is 12p Full substitution assumed in all instances
Value of real time alerts	<ul style="list-style-type: none"> Willingness to pay for real time alert (1p) Usage of social media services 	<ul style="list-style-type: none"> WTP for real time alerts is 1p
Value of more journeys taken by people on buses after using open data journey planners	<ul style="list-style-type: none"> % concessionary bus pass users % of increase attributable to open data Usage of open data apps 	<ul style="list-style-type: none"> Additional journeys due to open data between 0% and 0.2% of all bus journeys





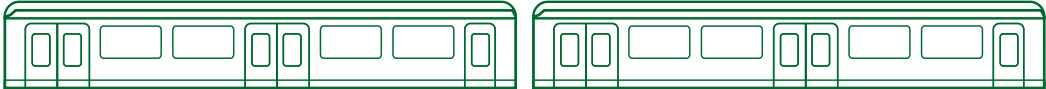
Appendices

Methodology Assumptions



Calculation assumptions (underlying spreadsheet supplied separately)

TfL



Benefit	Key assumptions	Range of values used
Savings from not having to develop own apps and maintain them	<ul style="list-style-type: none"> • Cost of developing app • Cost of maintaining app 	<ul style="list-style-type: none"> • Total apps using TfL data = 600 • # apps with over 1 million downloads = 19 • Average cost of development = £100k - £150k • Average annual cost of support = £50k - £75k
Savings from not delivering own campaigns	<ul style="list-style-type: none"> • Cost of equivalent marketing campaign 	<ul style="list-style-type: none"> • Between £0.75m and £1.5m based on TfL discussions

London



Benefit	Key assumptions	Range of values used
GVA in London	<ul style="list-style-type: none"> • Revenue generated by app developers based in London using TfL data 	<ul style="list-style-type: none"> • App revenue attributable to TfL open data = £120m - £160m
Jobs supported by TfL open data	<ul style="list-style-type: none"> • Direct jobs supported by app developers based in London using TfL data 	<ul style="list-style-type: none"> • Direct employees attributable to TfL open data = £500



Appendices

Calculation ranges



Calculation assumptions (underlying spreadsheet supplied separately)

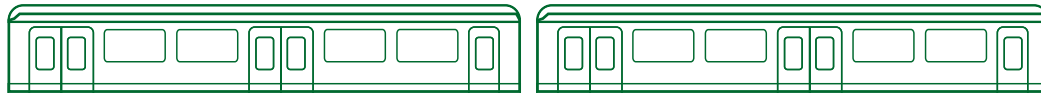
Passengers



Benefit	Key assumptions
Saved time from using open data to better plan journeys and reduce time lost due to congestion and delays	• Between £69m - £89m
Reduced uncertainty on public transport from using open data to plan journeys and the resulting time saved	
Savings made from moving SMS alerts to using open data	• £1.9m (no range)
Value of real time alerts	• £3.5m (no range)
Value of more journeys taken by people on buses after using open data journey planners	• Between £0 and £20.5m

The overall estimated range is between **£90m** and **£130m pa**

TfL



Benefit	Key assumptions
Savings from not delivering own campaigns	• £0.75m - £1.5m

London



Benefit	Key assumptions
GVA in London	• Total GVA = £12m - £15m
Jobs supported by TfL open data	• 730 supported jobs (no range)





Appendices

Stakeholders Consulted during April-May 2017

Vernon Everitt, Managing Director, Customers, Communications and Technology

Shashi Verma, Chief Technology Officer and Director of Customer Experience

Chris Macleod, Marketing Director

Alison Shaw, Research and Insight Manager

Alison Henderson, Head of Customer and Employee Insight

Rob Love, Performance Research Implementation Manager

Rikesh Shah, Lead Digital Partnerships Manager

Theo Chapple, Senior Digital Partnerships Manager

David Tan, Digital Partnerships Manager

Phil Young, Online Lead





Appendices

TfL open data available July 2017



Air quality: London Air API and Atmospheric Emissions Inventory

General: Journey Planner API, Journey Planner Timetables, Station Locations and Station Facilities

Tube: Tube departures, boards, line status and station status, Tube this weekend and Wi-Fi access points

Bus, coach and river: Live arrivals (instant and stream), Bus stop locations and routes, iBus, Coach parking site/location and Pier location

Roads: Busiest times at Blackwell Tunnel; Geographic boundary of GLA road network; CC and LEZ boundaries, Live Traffic Disruptions, Road disruptions, Post code addressed by major road schemes, Live traffic camera images, Live roadside message signs and Licensed private hire operators

Cycling: Cycle Superhighways and Quietway route data; Cycling data API and Cycle Hire data

Walking: Walking times between adjacent stations in Zone 1-3 and Walking times for selected Central London locations

Oyster: Oyster ticket shop locations

Accessibility and Toilets: Step free guide and toilet data and Bus toilet data

Network statistics: Busiest times on trains and stations, Public Transport Access Level, Rolling Origin and Destinations Survey, LU passenger counts, Dial-a-Ride statistics and Oyster card journey information

The latest available data can be found at: <https://tfl.gov.uk/info-for/open-data-users/our-open-data?intcmp=3671>





Notes





Notes





Important notice

This document has been prepared by Deloitte LLP for the sole purpose of enabling the parties to whom it is addressed to evaluate the capabilities of Deloitte LLP to supply the proposed services.

The information contained in this document has been compiled by Deloitte LLP and may include material obtained from various sources which have not been verified or audited. This document also contains material proprietary to Deloitte LLP. Except in the general context of evaluating the capabilities of Deloitte LLP, no reliance may be placed for any purposes whatsoever on the contents of this document. No representation or warranty, express or implied, is given and no responsibility or liability is or will be accepted by or on behalf of Deloitte LLP or by any of its partners, members, employees, agents or any other person as to the accuracy, completeness or correctness of the information contained in this document.

Other than as stated below, this document and its contents are confidential and prepared solely for your information, and may not be reproduced, redistributed or passed on to any other person in whole or in part. If this document contains details of an arrangement that could result in a tax or National Insurance saving, no such conditions of confidentiality apply to the details of that arrangement (for example, for the purpose of discussion with tax authorities). No other party is entitled to rely on this document for any purpose whatsoever and we accept no liability to any other party who is shown or obtains access to this document.

This document is not an offer and is not intended to be contractually binding. Should this proposal be acceptable to you, and following the conclusion of our internal acceptance procedures, we would be pleased to discuss terms and conditions with you prior to our appointment.

Deloitte LLP is a limited liability partnership registered in England and Wales with registered number OC303675 and its registered office at 2 New Street Square, London EC4A 3BZ, United Kingdom.

Deloitte LLP is the United Kingdom affiliate of Deloitte NWE LLP, a member firm of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee ("DTTL"). DTTL and each of its member firms are legally separate and independent entities. DTTL and Deloitte NWE LLP do not provide services to clients. Please see www.deloitte.com/about to learn more about our global network of member firms.

© 2017 Deloitte LLP. All rights reserved.

Designed and produced by The Creative Studio at Deloitte, London. J12733