

SMART LONDON PLAN



**Using the creative power of new technologies to
serve London and improve Londoners' lives**

“We need to harness London’s technical prowess to help the capital work even better as a city”



From 2011 to 2021 London’s population will grow by a million - the fastest rate of acceleration ever. We are going to hit nine million before New York, and approach ten million by 2030. With these demographic projections, we will have at least another 641,000 jobs, another 800,000 homes, and more than 600,000 extra passengers will need to travel by public transport at peak times by 2031. There will be the challenge of dealing with increasing waste and meeting extra pressure on healthcare and energy supplies.

I stand firmly behind London’s future growth. London is a formidable generator of new enterprise, jobs and inward investment, but the

fact is we need to think about how this great capital city can support it.

We need to harness London’s technical prowess to help the capital work even better as a city, support its growth and help our infrastructure and services to be more responsive to Londoners and business needs. We need London’s top of the class researchers and talented entrepreneurs to innovate with new approaches to the capital’s growth challenges. And as this plan shows, they already are, and, in many ways City Hall itself is leading the way.

Boris Johnson
Mayor of London



The 'smart city' agenda is gathering momentum. The drivers are clear, fuelled by increasing constraints on urban resources, such as transport, energy and healthcare and our desire to provide attractive and enjoyable places to live and work. London also has to plan for population growth and avoid peak-load and congestion on its infrastructure.

But nothing stands still. We are entering a 'perfect storm' of technological innovation. Rapid growth of mobile internet applications, the internet-of-things, cloud computing and insights from big data, offer new business opportunities and can enhance quality of life. Data is the new infrastructure and London is ideally placed to lead its development and use. Missing these opportunities could leave us in second place for years to come.

Home to world-leading academic institutions and the 'Tech City' cluster, London has access to some of the best specialist talent in the world. It has capabilities to develop next generation data science infrastructure and the services that will flow from it. It has ideal test-bed markets too. London's citizens are early adopters of technology, engaged and prepared to move to a new era, already using intelligent products, technologies and services swiftly, and at scale.

Now, for the first time London is leading with a coherent, holistic and highly ambitious plan that will put London in pole position. We are ready to harness the benefits of digital technologies, to maintain our position as a world-class city into the future.

The concept is simple. A smarter London must be a place in which people want to live, work and play. It will foster talent, support and accommodate population growth and sustainable prosperity. A smarter London recognises and employs data as a service. It will enable informed decision making and the design of new activities. It will allow 'business as usual', with greater efficiency: easier, faster, cheaper. A smarter London is not a single, definitive solution, but a series of evolving interventions in response to our changing needs.

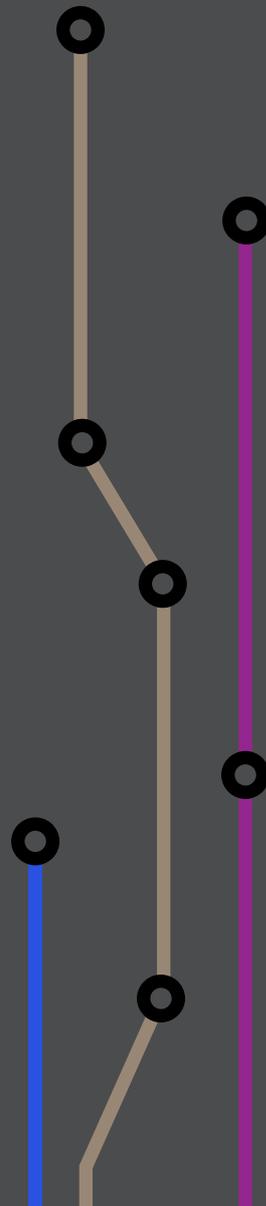
Since its formation in March 2013, the Smart London Board has been advising the Greater London Authority. It is defining a vision for a smarter London and a tangible path to integrate opportunities from new digital technologies into the fabric of London. This Smart London Plan is the initial output from our efforts. It is the starting point for London to engage and shape our future collectively. My thanks particularly to Catherine Glossop and to all involved in reaching this milestone.

Professor David Gann CBE

Vice President, Development and Innovation, Imperial College London
Chairman, Smart London Board

EXECUTIVE SUMMARY

The Mayor's view is clear. To support London's future growth, we must look to what new approaches innovation in digital technology can bring. This Smart London Plan is for Londoners, businesses, researchers, investors and everyone who has an interest in the capital's future. The Plan sits within the overarching framework of the Mayor's Vision 2020. It focuses on what City Hall will be doing between now and the end of the Mayoral term - to which all of London are asked to contribute to and support. We welcome your feedback, your ideas and your collaboration.



1. LONDONERS AT THE CORE

To succeed, 'Smart London' must put people and businesses at its heart - so that Londoners can propel the innovation that will make London an even greater city.

Technology and innovation are changing our lives; the Mayor's vision is to ensure that they both help the city as a whole to function better, and are used to better meet the needs of Londoners' and businesses, mobilising them to be part of that change.

WE WILL

- Ask Londoners, businesses and other stakeholders what 'Smart London' should look like and deliver, and mobilise them to be a part of the solution - through the use of new digital tools, social media and online platforms, such as **Talk London**, the Mayor's online research community.
- Position 'Smart London' as a vehicle for inclusion, using digital technology to meet diverse needs - challenge London's technology community to innovate with new approaches to health, training and social care.
- Tackle skills gaps so that everyone can take part - we will develop a pan-London approach to tackling digital exclusion; promote the creation of digital technologies (such as coding), not just their consumption; increase

the uptake of computer science in London's schools; double the number of businesses taking on technology apprenticeships; and work with partners to address higher level skills gaps.



MEASURES OF SUCCESS

- Increase the number of Londoners who use digital technology to engage in London's policy making¹.
- Host hackathons to involve Londoners and businesses in solving the city's growth challenges.
- Deliver a pan-London digital inclusion strategy by end 2014.
- Double the number of technology apprenticeships by end 2016.
- 1,000 people per borough engaged through City Hall's online research community by 2016 [33,000 in total].

2. WITH ACCESS TO OPEN DATA

Open access to London's data is already being used to plan and operate the city. The **London Datastore**, one of the first platforms to make public data open and accessible, has engaged London's developer community and resulted in numerous apps that help the city to function better. We will build on this work to identify and publish data that addresses specific growth challenges, with an emphasis on working with companies and communities to create, maintain, and use this data. We will increase transparency and accountability around how the capital is performing, and what City Hall and London's boroughs are doing about it.

WE WILL

- Identify and prioritise which data are needed to address London's growth challenges in the Mayor's Long Term Infrastructure Investment Plan.
- Work with public and private sector organisations to create, maintain and utilise it, enabling common data standards.
- Work with other EU cities to create a common platform that will increase the market for developers - create a 'next generation' London Datastore that will aggregate disparate data sets and increase the co-creation of services to meet Londoners' needs.
- Establish a Smart London Borough Partnership to encourage boroughs to free up London's local level data - this will involve identifying and showcasing how open data can save London boroughs money, and deliver better services.
- Use London's dashboard and other digital tools to engage Londoners in how the city is performing, and what City Hall and London boroughs are doing about it.



MEASURES OF SUCCESS

- Creation and wide dissemination of compelling evidence-based stories to demonstrate the power of open data for Londoners and businesses.
- Increase the number of Londoners who use digital technology to access information about the city².
- Publication of the Mayor's Long Term Infrastructure Investment Plan, which includes plans for open data release, conforming to open standards by 2015.
- Evolve the **London Datastore** into a global exemplar platform by 2016.
- Double the number of users on the **Datastore and Dashboard** by 2018.

3.

LEVERAGING LONDON'S RESEARCH, TECHNOLOGY & CREATIVE TALENT

London is home to one of the most significant centres of creativity and culture globally³, has more technology companies than any European city⁴, and more top ranking universities than anywhere in the world⁵. We need to catalyse London's energy, talent and world class research base to solve London's future challenges, create new market opportunities and export our innovations across the world.

WE WILL

- Launch a Smart London Innovation Challenge, to mobilise entrepreneurs, researchers, businesses and citizens to develop solutions that will help solve the capital's growth challenges.
- Showcase London's emerging innovation to attract the global investment that will enable our solutions to be more rapidly commercialised.
- Export London's solutions to the world - run a Smart London Export Programme focusing on high growth global cities.

- Ensure London provides the underpinning conditions that will enable the digital economy to continue to grow - help SMEs to gain access to affordable ultrafast broadband; and lobby for a new London visa to make it easier for talented global technologists to work here.



MEASURES OF SUCCESS

- Invest up to £24 million in the provision of affordable ultrafast broadband to SMEs, and help up to 22,000 SMEs to gain access by 2016.
- Support at least 100 SMEs through a Smart London Export Programme by 2016.
- Support an employment increase to 200,000 technology employees by 2020.
- Support a continued increase in the number of businesses who are 'innovation active' (at least by 10% up to 2020)⁶.

4. BROUGHT TOGETHER THROUGH NETWORKS

London presents a highly sophisticated innovation ecosystem, partly due to its scale, the number and types of organisations involved. The Mayor has a critical leadership role to play – both globally, and in harnessing London’s vast amount of existing activity. A more transformative impact will be brought about from realising these opportunities at scale through strategic collaboration, and of course significant investment to create real efficiencies across London.

- Collaborate with the **Future Cities Catapult** and the **Connected Digital Economy Catapult**, to bring together experts from all over the world to work on how London and other cities can take a more integrated approach to the way they plan and function.



MEASURES OF SUCCESS

- Establish a Smart London Innovation Network by 2014.
- £200 million levered into London to demonstrate smart city approaches by 2018.

WE WILL

- Establish a Smart London Innovation Network, to identify and bring together the huge amount of existing and emerging smart city activity across the capital. The Network will support SMEs and London’s innovation community to seize market opportunities and scale them up.
- Leverage London’s global city role, working with other EU and global cities to share experience, and develop ‘lighthouse’ projects that will demonstrate new approaches at scale.

5. TO ENABLE LONDON TO ADAPT AND GROW

London has more cranes across its skyline than the rest of the country put together. But continued growth is placing increasing strain on the city's infrastructure. London will need to adopt new approaches to cope with the projected growth to almost ten million people by 2030.

WE WILL

- Demonstrate how technology can reduce traffic collision, such as using CCTV to detect incidents and provide queuing alerts; and trial new technologies that can reduce the risk of collisions with cyclists and other vulnerable road users.
 - Experiment with new ways of reducing light freight traffic, using open data, technology, incentives and collaborative business models to tackle the increase in white van deliveries associated with e-commerce.
 - Investigate London's longer term infrastructure needs up to 2050 - and the role of data and digital technology in both informing and helping to meet those needs - through the Mayor's Long Term Infrastructure Investment Plan.
- Promote the use of smart grid technologies to better manage demand and supply of energy and water.
 - Stimulate the use of data and technology to inform the development of new markets for London's waste that brings efficiencies and scale to the segregation and utilisation of waste as a resource.
 - Develop 3D visualisations of London's infrastructure to map underground assets, reducing unnecessary road works, where excavations are repeatedly dug in the same location by different utility firms.



MEASURES OF SUCCESS

- Make available the city's performance, consumption, and environmental data as open data (energy, water, waste, pollution).
- By 2016, develop a robust quantitative understanding of the contributions that smart technical solutions and associated services can make to the management of London's transport and environmental infrastructures.
- By 2020, stimulate smart grid services in London to restrict growth in peak electricity demand and associated infrastructure costs, with 10,000 MWh/annum of contracted supply and demand response.
- By 2020 showcase a robust 3-D map of all London's underground assets, accessible and updatable in real-time by all asset owners and works planners.
- By 2020 ensure London has the best air quality of any major world city, which will require significant (c. 50%) reduction in emissions from London's transport sector.
- Work towards a reduction of greenhouse gas emissions to reach 40% below 1990 levels by 2020.

6. AND CITY HALL TO BETTER SERVE LONDONERS' NEEDS

City Hall also has to work in a more integrated way if it is to better meet the complex needs of London's population. This means joint working across different policy areas which traditionally sit in 'silos', across the GLA (Greater London Authority) Group⁷, boroughs and wider service providers. Using digital technology will create efficiencies, including cost savings, across different service areas.

WE WILL

- Work across the GLA Group to increase data sharing and analytics.
- Work with London boroughs to explore ways of scaling up innovation, across administrative boundaries, to address shared challenges (e.g. parking, or waste collection).

- Promote 'smart' approaches through London's planning system - maximise the use of data to guide the planning and design of London, including in London's opportunity areas, and encourage developers to adopt a more consistent approach to deploying digital infrastructure to future proof new developments.
- We want London's innovative technology entrepreneurs to help City Hall develop new approaches to service delivery, so we will use digital technology to raise awareness of City Hall's spending priorities, and continue to open up GLA contracts and supply chain opportunities to SMEs.



MEASURES OF SUCCESS

- Increase data sharing between London government (City Hall and boroughs) and stakeholders.
- Conduct research to monetise the efficiencies that can be generated, and how service delivery can be improved.
- Support the continued increase in the number of SMEs winning public sector contracts or supply chain opportunities.

7. OFFERING A 'SMARTER' LONDON EXPERIENCE FOR ALL

Digital technology is making massive changes to the way we experience the city - from traffic lights changing as CCTV logs congestion, to knowing exactly what time your bus will arrive, and paying for it with the touch of your credit card. 'Smart London' is about harnessing new technology and data so that businesses, Londoners and visitors experience the city in a better way, and have time free from bureaucratic hassle and congestion.

WE WILL

- Establish a Smart London platform to enable Londoners to feedback, rate and shape the type of experience they want to have.
- Help position the Queen Elizabeth Olympic Park as an interactive smart experience, a test bed and demonstrator by end 2016.
- Ensure London has one of the fastest wireless networks globally, invest in free Wi-Fi in London's art galleries and museums.

- Help Londoners and visitors seamlessly navigate the city, including improved data for journey planning tools, expanding the use of digital technologies as part of Legible London, and accelerating the innovation and adoption of digital money - establish a digital money demonstrator by end 2015.



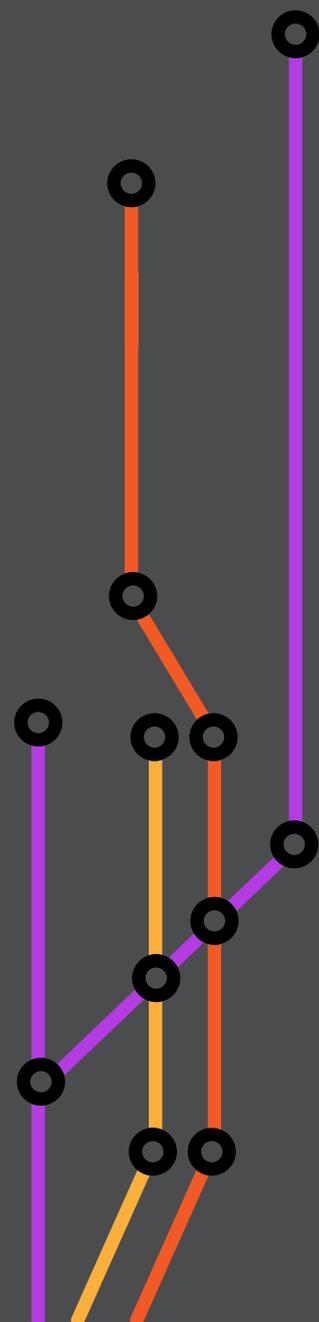
MEASURES OF SUCCESS

- Develop an index to benchmark global progress on digital money (at the city level), and establish a digital money demonstrator by end 2015.
- Ensure London has one of the fastest wireless networks globally by 2016.
- Increase in the number of Londoners who think the use of digital technology has improved London as a city to live in⁸.

1 INTRODUCTION

Using the creative power of new technologies
to serve London and improve Londoners' lives

Smart London Board Vision 2013



A GLOBAL CITY

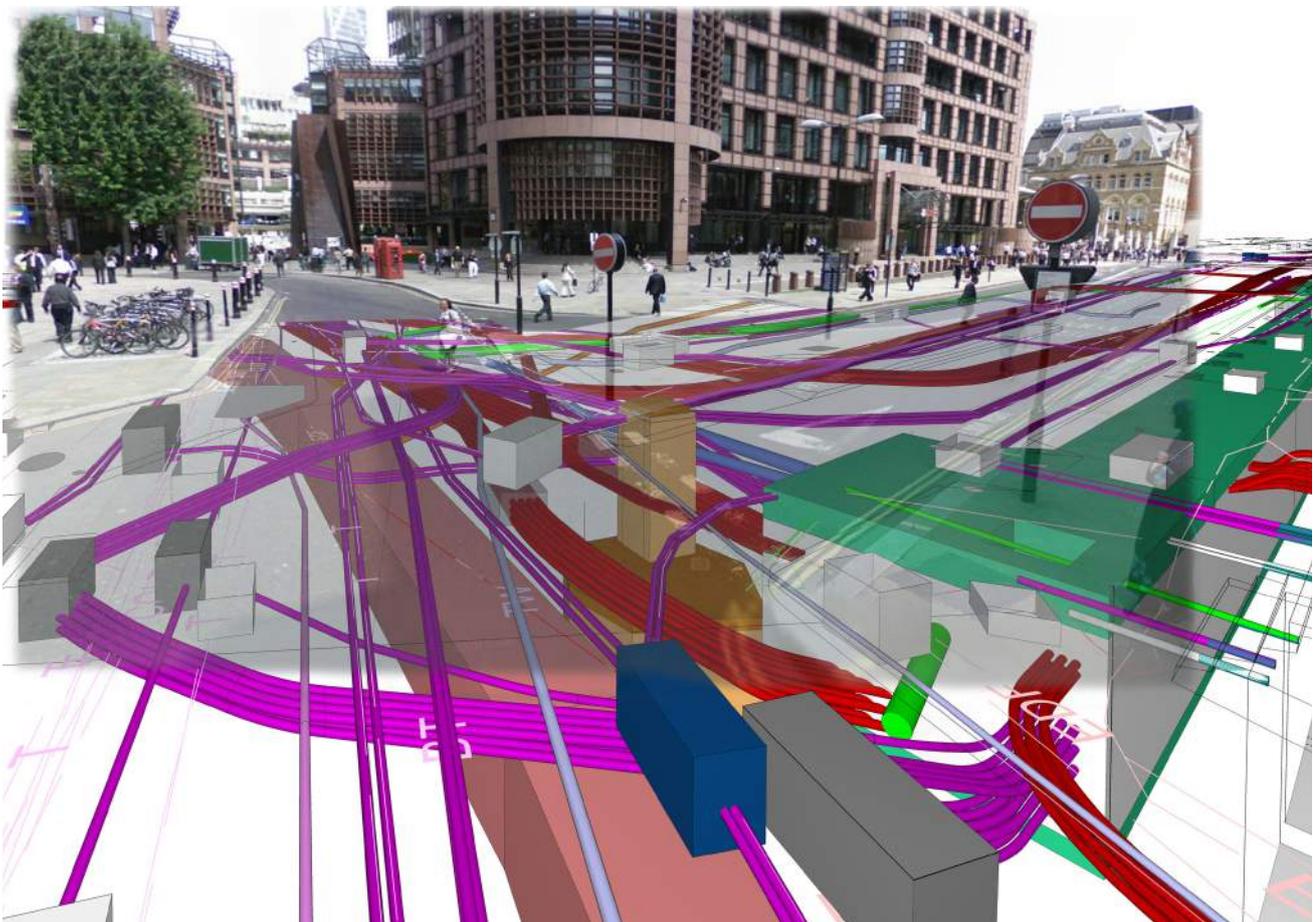
London is one of the greatest cities on earth. A world centre of commerce and a global cultural hot spot, London is diverse, connected, international and cosmopolitan. Its dynamic economy - with renowned strengths in creativity and design, science and technology, banking and finance - offers the most competitive and productive business environment in Europe. London is a centre of knowledge production, invention and entrepreneurship, with more technology companies than any other European city⁹. London is a world leader in healthcare delivery for its citizens, and in diagnosing, discovering and providing treatments to tackle the pressing needs of global cities.



FACING GROWTH CHALLENGES

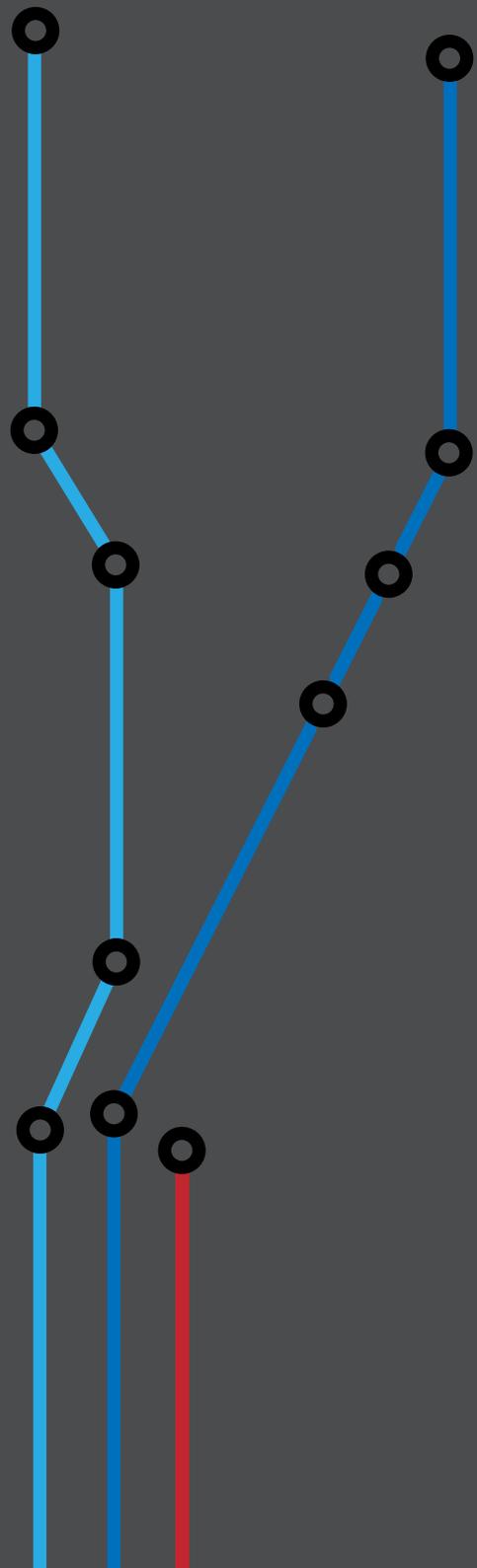
London is in constant flux. Its population is set to grow by one million people over the next decade¹⁰, and the city's infrastructure is struggling to cope with the increasing demands placed on it. Congestion on London's roads cost the economy an estimated £2 billion¹¹, with Londoners spending 70 hours on average in traffic jams annually¹². An ageing population is changing the capital's health, social care and educational needs. There is a pressing demand to create new jobs alongside skills so that Londoners can access the new opportunities that advances in technology bring. A (projected) population of almost ten million by 2030 will increase stress not only on healthcare and transport, but the management of energy and utilities - such as water, electricity and heat, and the need to deal with growing waste and pollution.

Without new approaches, including new business models and new ways of investing in new approaches, London will not be able to grow whilst maintaining and improving its lead as the greatest city on earth, and as a liveable city, offering a good quality of life.



Top - Crossrail underground construction
Bottom - Crossrail underground modelling, Liverpool Street

If it is to adapt to meet these growth challenges, London must harness new technologies, its creative strengths and the vast amount of data that the capital generates each second of every day. This effort will require new forms of collaboration between Londoners, government, businesses and academia to approach London's challenges in an ever more integrated way.



HARNESSING EXPERTISE

The Mayor of London formed the **Smart London Board** in March 2013 to shape and implement London's strategy to ensure digital technology makes London an even better experience for all. The board is comprised of a group of experts, including academics, business leaders and entrepreneurs.

The board will advise the Mayor and the London Enterprise Panel¹³, on how London can best use technology and data to enable more integrated solutions to addressing London's challenges to ensure it remains one of the world's most competitive and liveable cities. The board will put Londoners and London's businesses at the heart of this process.

BUILDING ON LONDON'S INNOVATION LEAD

We are not starting from scratch. London is already recognised as a leader in digital innovation, and a pioneer in open data.

The London Datastore was one of the first platforms to make public data open and accessible, spurring citizen engagement, innovation and the development of new applications. London's dashboard visualises the 'pulse' of the capital - displaying data on anything from Tube delays, to house prices and crime rates. The Centre for Advanced Spatial Analysis at University College London has linked London's data to an iPad wall at City Hall. Built around the concept of a control room, the Mayor can visualise the capital's performance in real time.

The management of London's passenger and road transport systems is amongst the most advanced in the world. Innovations include: Congestion Charging using number plate recognition (which has reduced vehicle numbers in the central

business district by over 70,000 a day¹⁴), the intelligent road network management systems trialled during the Olympics, the Barclays Cycle Hire Scheme and Wi-Fi on the Tube. London's move towards digital money is bringing efficiency savings - from Transport for London's contactless Oyster card to using credit and debit cards to instantly pay for travel.

Technology companies are establishing London as a global showcase, and are collaborating with London's world class research institutions. Examples include Siemens' £30 million investment in the Crystal to explore how technology can create a better future for our cities, and Intel's investment in a Connected Cities' institute with Imperial College and UCL, which will engage Londoners in the development and design of new technology to ensure it meets the needs of people, not just systems. Earlier this year Google announced its £1 billion investment plan to establish a new UK headquarters at Kings Cross. London also now hosts the newly formed UK node of the European Institute of Innovation and Technology's €100m/yr Knowledge and Innovation Community on ICT, known as 'ICTLabs', working with Imperial College, UCL, BT, Intel, Vodafone, IBM, and others. Over the next two years ICTLabs will develop demonstration projects that focus on London's requirements to create 'smart' infrastructure.

13 - The London Enterprise Panel is the local enterprise partnership for London. Chaired by Mayor of London Boris Johnson
14 - Jonathan Leape (2006) The London Congestion Charge

DRIVING CHANGE

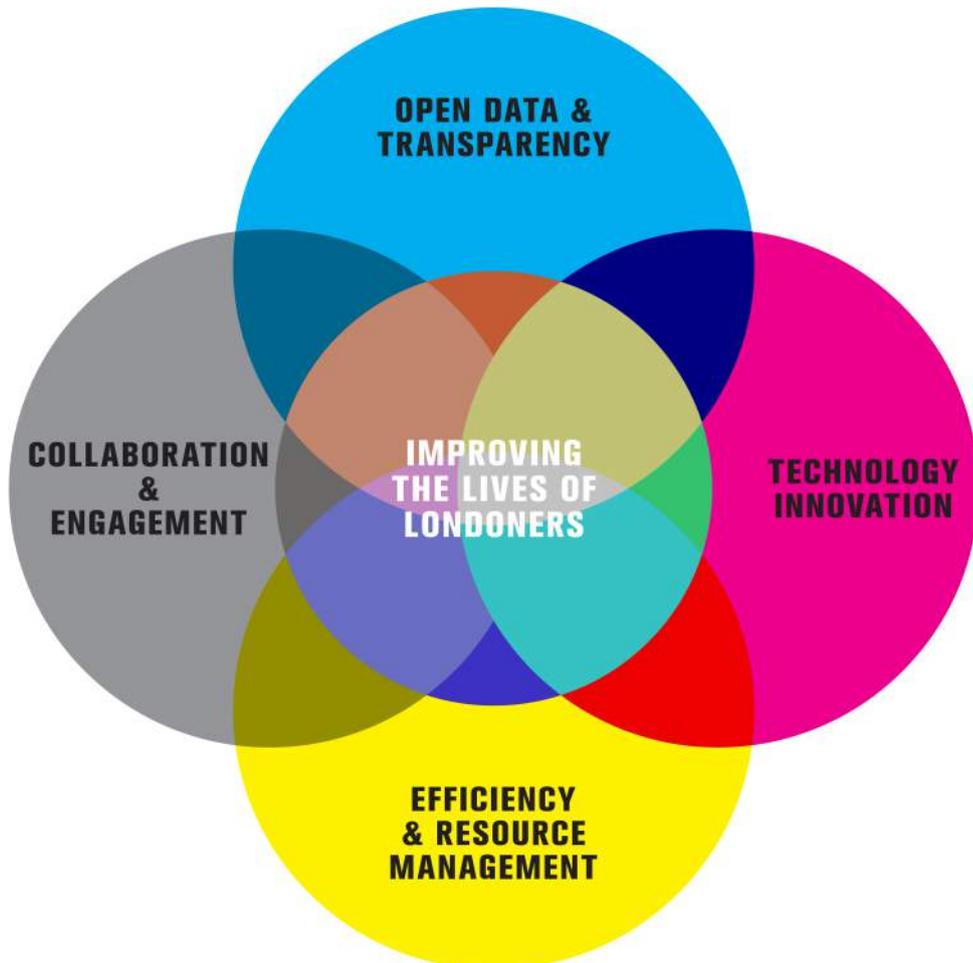
If we build on this lead, further investment in technology and data will bring Londoners better services, create efficiency savings, and lead to improvements in:

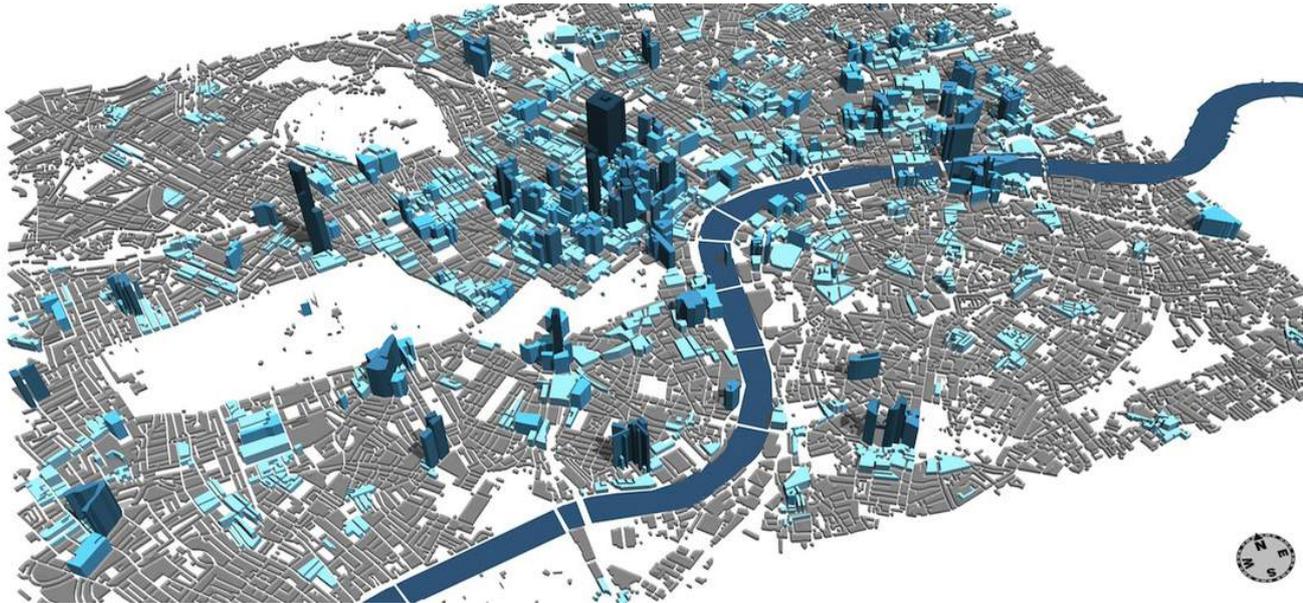
- Enterprise - spurring innovation, creating new markets, creating new jobs.
- Skills and training - access to knowledge and the information that will enable everyone to take part.
- Infrastructure and the environment - absorbing additional pressure, reducing environmental impact.

- Health and well being - new and better ways of responding to Londoners' diverse needs.
- Transport - planning and managing journeys, reducing congestion.

Adopting new approaches, through bringing people, technology and data together, will enable more integrated solutions to addressing London's challenges. The Smart London Venn diagram below illustrates the starting approach that puts Londoners at the heart - driven by the principles of openness, collaboration, innovation and engagement.

SMART LONDON APPROACH





WHAT DOES THE TERM 'SMART' REALLY MEAN?

The term 'smart city' means different things to different people. Smart London is about how the capital as a whole functions as a result of the interplay between its 'systems' - from local labour markets to financial markets, from local government to education, healthcare, transportation and utilities. Smart London is where the linkages between these different systems are better understood, where digital technology is used to better integrate these different systems, and London as a whole works more efficiently as a result - for the benefit of its inhabitants and visitors.



MEASURES OF SUCCESS

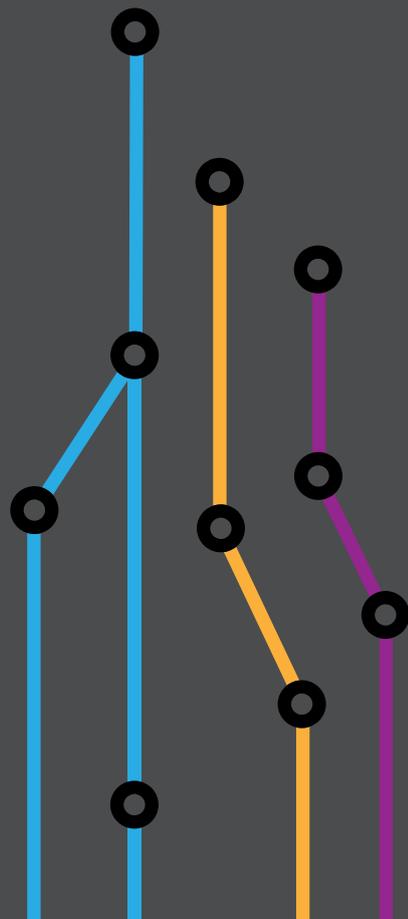
Set within the overarching framework of the **Mayor's 2020 vision**, this plan focuses on actions that will be undertaken between now and the end of this Mayoral term. It therefore prioritises effort and resource, rather than seeking to be all encompassing.

The success of Smart London will be judged by a set of milestones. Some indicators will be measured at the end of 2016. Others will take longer to affect, where measuring performance will be more challenging. To ensure transparency, a progress report will be published in 2016.

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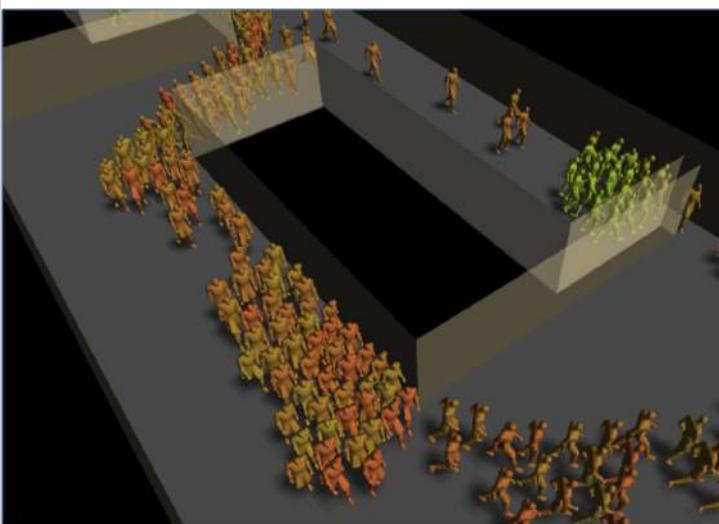
IMPLEMENTING CHANGE

To succeed, 'Smart London' must put people at the core - where Londoners drive innovation as much as technologists, investors or policy agendas to make London an even greater city.



1. LONDONERS AT THE CORE

To succeed, 'Smart London' must put people at the core - where Londoners drive innovation as much as technologists, investors or policy agendas to make London an even greater city. The capital presents a particularly challenging environment - reflecting its scale, diversity and complexity, including high levels of inequality. Innovations in technology and the use of data are presenting new ways of meeting peoples' needs, but not all Londoners have access to the technology, or the skills to use it. Engaging London's diverse communities and enabling digital inclusion must be a priority. But, we also need to create the mechanisms and opportunities through which Londoners can get more involved.



WHAT WILL WE DO?

1. Ask Londoners what a 'Smart London' should look like, and deliver:

we will mobilise London's communities to help City Hall experiment with different ways of engaging Londoners, businesses and other stakeholders in the value of 'smart' approaches. We will ask what challenges they would like to see addressed and how they can be part of the solution - through the use of new digital tools, social media and online platforms, such as Talk London, the Mayor's online research community. We will use offline platforms to engage different audiences.

2. Position 'Smart London' as a vehicle for inclusion:

encourage innovation in digital technology to meet diverse needs, for example challenge entrepreneurs to innovate with new approaches to health and social care. As part of this the GLA will pilot an online marketplace for flexible volunteering and working, to increase the employability of young people (aged 16-24 years).

3. Tackle digital exclusion and skills gaps:

there are a number of existing initiatives to address digital exclusion, both locally and nationally, but this effort is not well co-ordinated for London. We will seek to identify these and develop a pan-London approach that will enable a more coordinated response to tackling digital skills gaps, and related barriers such as access to computer equipment or broadband. We will use **London Schools Excellence Funding** to increase the uptake of computer science in schools, through enhancing teacher subject knowledge, which is expected to reach up to 450 London schools, and involve 1,500 teachers.

The digital hub based around London's Old Street is one of London's fastest growing industries, but it imports

talent rather than developing local talent. Supported by the **Mayor's Fund for London**, 'Tech City Stars' will equip local young people with a digital apprenticeship and route to employment. Through London's 'Tech City Institute', we will promote the creation of digital products and applications (such as coding)', rather than just their consumption, and work with a range of local businesses, London's top tier universities, and other skills providers to address higher level skills gaps.

CASE STUDY

LONDONERS USING TECHNOLOGY TO SHAPE THE CAPITAL'S FUTURE

The Greater London Authority (GLA) created the **Talk London** community, to bring Londoners into the policy making process. Talk London hosts online discussions, polls, live Q&A events, surveys and focus groups - discussing a wide range of topics from improving standards in the private rented sector to cyclist safety around HGVs (heavy goods vehicles). Through the community, Londoners are taking part in policy conversations to generate new ideas. We can also consult Londoners on our ideas to make sure that policies are responsive, effective and resonate with communities.

When people register to join the community we collect key demographic data and ask people about their areas of interest - enabling us to target certain groups of people for particular conversations and ensure we are engaging a broad range of Londoners.

In conjunction with other efforts such as the **London Datastore**, which makes public over 500 sets of London data, and the **London Dashboard**, which visualises this clearly for the public, the GLA is leading the drive to harness technology and data to increase transparency and citizen



engagement. We also use technology to listen to what Londoners are saying about the city and track responses to our policy initiatives through City Hall's 'Listen London' platform¹⁵.

CASE STUDY

TECH CITY INSTITUTE - ENGAGING LONDONERS IN 'SMART' TECHNOLOGY

Engagement starts with education and public debate. Every citizen needs to understand the basics of privacy, technology and interpretation of data. Schools and universities will play an important role, but new public institutes can also further the debate around the role that technology can, and should, play. The 'Tech City Institute' will provide a unique space for citizens to come together and discuss, learn and understand not just the role of the new technologies but also how they impact different parts of society. We will use this space to engage London's entrepreneurs,



the research community, as well as Londoners themselves, to help us find ways of getting the community involved to help us solve some of London's core challenges.

CASE STUDY

TECH CITY STARS - DEVELOPING LOCAL TALENT

The Mayor's Fund for London has announced its support of 'Tech City Stars', a new programme to connect young Londoners from the local boroughs of Hackney, Islington and Tower Hamlets with the burgeoning digital technology industry cluster around London's Old Street.

Tech City Stars is led by employers and will equip local youngsters, who live in an area where some 40% of 16-24 year olds are out of work or not in formal education, with a digital apprenticeship at NVQ 3 and a route to employment.

Ultimately, the aim of Tech City Stars is to be a launch pad for the technology leaders of the future and the chosen talent pool for growing technology companies. Recruiting young Londoners and providing them with fast-track education and in-work technology training will help to drive the competitive advantage of firms in Tech City.

CASE STUDY

USING DIGITAL TECHNOLOGY TO TACKLE YOUTH UNEMPLOYMENT

Young people, more than ever before, are coming out of education with little or no work experience and finding themselves in a position where they can't find work because they lack experience and, equally, can't gain experience because they can't find work.

Almost one million young people are now out of work in the UK. In London, 24.7% of all 16 to 24 year olds (including students) are not employed¹⁶. So how can technology reduce this number?

Team London is developing a pilot micro-volunteering and work platform to enhance the employment prospects of young Londoners (supported by Technology Strategy Board funding). The pilot is intended to encourage volunteering involving organisations and employers to release opportunities that would enable young people to build their CVs through a combination of volunteering, work experience and paid work.

The portal supports the Mayor's vision for 'Smart London' - one that puts technological innovation at the heart of efforts to address global city challenges.



MEASURES OF SUCCESS

- Increase the number of Londoners who use digital technology to engage in London's policy making¹⁷.
- Host hackathons to involve Londoners and businesses in solving London's problems.
- Deliver a pan-London digital inclusion strategy by end 2014.
- Double the number of technology apprenticeships by end 2016.
- 1,000 people per borough engaged with City Hall's online research community by 2016 [33,000 in total].

2. WITH ACCESS TO OPEN DATA

Data is the backbone to planning and operating cities. It is used for everything from better managing energy supplies, to putting more trains on at peak hours - ultimately enabling London to cut costs, save energy, improve services, and create efficiencies across the capital.

Opening up data around demand, consumption, services, and operations that enable London to function will create transparency, improve efficiency, and open up the potential for innovation. Improving evidence-based decision making, and engaging both businesses and Londoners, will help us to develop the tools that will improve our city, and at scale.

The London Datastore was one of the first platforms worldwide to make public data open and accessible. Access to public data has created new markets, encouraging the development of products and services for Londoners. The Datastore receives over 30,000 visits a month, with over 450 transport apps alone having been created. City Hall will continue to work with London boroughs and others to free up more data, and will identify and showcase the value that is generated from its use - supporting the development of new business models and the creation of better, and more cost effective, services for Londoners.



We also want to make sure this data is accessible and meaningful to citizens, not just the developer community - so Londoners can compare and challenge public sector performance. We will work to open data standards, simplify and customise datasets, with smart phone and tablet friendly interfaces, engaging content and tools to enable increased interaction between Londoners, policy makers and service providers.

If private data sets (which are, by definition, not open data) are brought onto the Datastore, we want to ensure privacy is protected and there is transparent use of data - to ensure data use is managed in the best interests of the public rather than private enterprise. We will develop and adopt a set of standards which we will use to engage the public in how the data may be used, and how this is of benefit to them.

WHAT WILL WE DO?

1. Identify and prioritise: which data are needed to address London's challenges in the Mayor's Long Term Infrastructure Investment Plan, including plans for open data release, the creation of open data guidelines and the adoption of common data standards.

2. Work with London boroughs, and other stakeholders, to free up more of London's data: the Mayor will continue to encourage public and private sector organisations to open up their data. We will establish a Smart London Borough Partnership to identify and showcase how open data can save London boroughs money, and deliver better services.

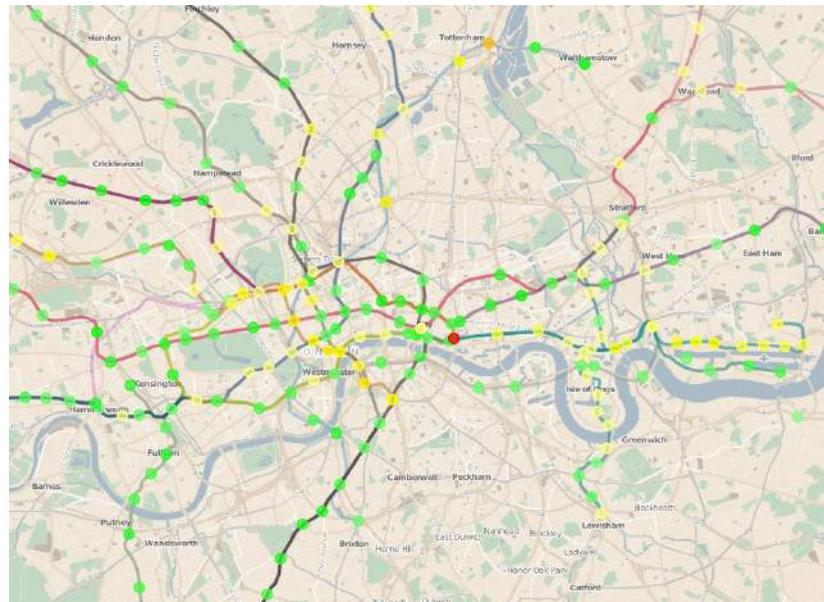
3. Create a new London 'Urban Platform': aggregate disparate data sets and connect sensor networks across London (it is estimated that there are over 20 million sensors in the city) into a developer friendly platform, to help shape a second generation London Datastore. We will work with other global cities, through initiatives such as the **iCity programme** (see following case study), to move towards a common platform that will increase the market for developers and enable the co-creation of services to meet Londoners' needs.

4. Engaging all Londoners: use London's dashboard and other digital tools to encourage the public as well as developers to engage with London's data. We want to experiment with new ways of linking how London performs on different indicators with what City Hall, or London boroughs, are doing about it.

CASE STUDY OPEN DATA IS THE NEW INFRASTRUCTURE

Data is the main building block for the planning, design, and operation of cities. London is working with Bologna, Genoa, and Barcelona as part of the **€5.2million EU iCity programme** to develop an 'urban platform' that will test the sourcing, capture, and storage of different types of public and private data from millions of sensor devices across the capital. iCity will demonstrate the practicalities of analysing the mass, and mess, of 'big data' generated in the city, and the commercial realities of 'apps' using this data.

Knowledge and expertise from this bottom up approach will be incorporated into the next generation London Datastore, which will be used as an exemplar for other UK cities.



CASE STUDY

SMART LONDON BOROUGH PARTNERSHIP - WORKING TOGETHER TO FREE LONDON'S DATA

We will explore how the Mayor can best work with London's 33 local authorities to create common standards for data exchange, and free up local level data. City Hall will explore how the London Datastore can centrally hold London's open data, while enabling each London borough to have its own bespoke 'virtual datastore'. London boroughs would have control over data feeds, systems administration, and local partnering arrangements, but the main data store site and support services would be run centrally. A central programme run out of City Hall would enable shared costs, and shared developments such as CKAN based platform, Open Data Certificates, management dashboards, and personalised dashboards/interfaces. As well as shared technology and costs this would help City Hall and the boroughs work as a team on topics such as open data guidelines and best practice, security, privacy protection, transparency of use, and private sector co-operation. City Hall will work with London Councils to identify the needs and benefits from a joined up London.

CASE STUDY

LONDON'S ONLINE SCHOOL ATLAS - PREDICTING FUTURE DEMAND

The **London Schools Atlas** is an innovative interactive online map that offers a uniquely detailed and comprehensive picture of London schools, current patterns of attendance and potential future demand for school places.

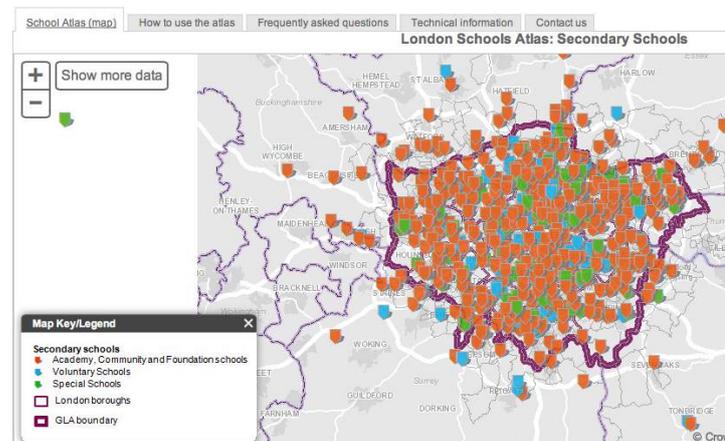
The Atlas is part of the Mayor's programme of initiatives aimed at driving

up standards in education and ensuring there are enough places for all children in the city.

Covering primary and secondary provision, including academies and free schools, the Atlas uses data to illustrate current patterns of demand for school places at a pan-London level for the first time, rather than within boroughs alone. It also gives projected changes in demand from 2012/13 to 2017/18, helping provide an indicative picture of where pressure on places might be in the future.

The Atlas is an open and accessible tool for anyone engaged in meeting the challenge of providing good school places, including local authorities, free school groups, academy chains, and policy makers. For parents and children it offers the most vivid insight yet into the educational options for their family, in their locality and wherever else they may consider living in London.

LONDON.GOV.UK





MEASURES OF SUCCESS

- Creation and wide dissemination of compelling evidence-based stories to demonstrate the power of open data for Londoners and businesses.
- Increase the number of Londoners who use digital technology to access information about the city¹⁸.
- Publication of the Mayor's Long Term Infrastructure Investment Plan, which includes plans for open data release, conforming to open standards by 2015.
- Evolve the London Datastore into a global exemplar platform by 2016.
- Double the number of users on the Datastore and Dashboard by 2018.

3. LEVERAGING LONDON'S RESEARCH, TECHNOLOGY & CREATIVE TALENT

London is home to one of the most significant centres of creativity and culture globally¹⁹, has more technology companies than any European city²⁰, and more top ranking universities than anywhere in the world²¹. We need to catalyse London's energy, talent and world class research base to solve London's future challenges, create new market opportunities, businesses and jobs (the 'smart city' market is estimated by Arup to be worth \$400bn globally by 2020²²), and export our innovation across the world. As a microcosm of the planet the



capital offers the perfect experimental platform. But, London must also provide the supportive ecosystem London's technology community needs to respond and innovate.

WHAT WILL WE DO?

1. Launch a Smart London Innovation

Challenge: mobilise Londoners, entrepreneurs and London's research base to solve the capital's growth challenges.

2. Showcase London's emerging

investment opportunities: London is a global finance centre, home to the **London Green Fund**²³ and initiatives such as Level 39 in Canary Wharf - Europe's largest accelerator space for finance, retail and future cities start-ups - which is examining funding options for smart cities. We will build on this and host Smart London Investor Days to attract the global finance that will help emerging solutions to be more rapidly commercialised.

3. Export London's solutions to

the world: run a Smart London Export Programme for London SMEs with UKTI and London & Partners, focusing on high growth global cities.

4. Ensure London provides the

underpinning growth conditions: invest up to £24 million in the provision of affordable ultrafast broadband to SMEs, through London's Super Connected Cities programme; lobby for a new visa to make it easier for talented global technologists to work here, and create a London visa support scheme to allow start-ups and growing businesses to access the talent they need.

19 - Mayor of London (2010) *Cultural Metropolis*, p.17; 20 - Dun & Bradstreet (2011) *IDI Intelligence*, from the Financial Times Ltd (Sic 737)

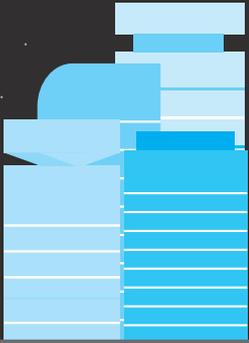
21 - Times Higher Education (2013) *Times Higher Education rankings*; 22 - BIS (2013) "The Smart City Market: Opportunities for the UK", Research Paper No. 136, p.2

23 - The London Green Fund (LGF) is a £100 million fund set up to invest in schemes that will cut London's carbon emission.

LONDON

LEADER IN DIGITAL TECHNOLOGY

28,000
TECHNOLOGY
FIRMS



48
TECHNOLOGY
BUSINESSES
PER KM²

INNER LONDON
HAS THE HIGHEST
DENSITY OF
TECHNOLOGY
BUSINESSES
IN EUROPE



LONDON HAS
25%
OF ALL THE
TECHNOLOGY JOBS
IN BRITAIN

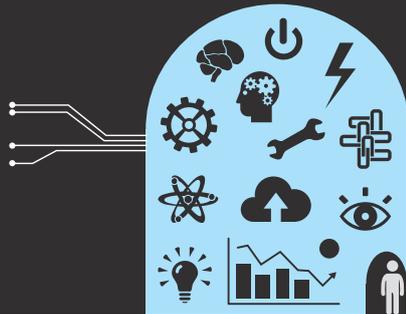
LONDON
HAS MORE
TOP RANKING
UNIVERSITIES
THAN ANYWHERE
IN THE WORLD




63%
LONDON ADULTS
OWN A SMARTPHONE


91%
USE THE INTERNET AT
LEAST ONCE A WEEK

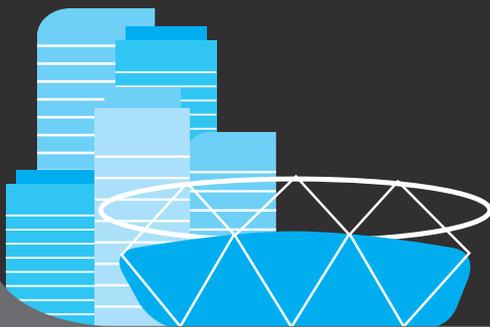
OVER
450
TRANSPORT APPS
HAVE ALREADY
BEEN CREATED
USING OPEN DATA



DATASTORE
RECEIVES OVER
30,000
VISITS
A MONTH



THE NEW DIGITAL HUB DUE TO OPEN IN
2015 ON THE OLYMPIC SITE WILL



CREATE
7,500
JOBS

£460 million
IN GDP TO THE
UK ECONOMY

WI-FI
AT 150
TUBE
STATIONS
BY 2014

£1 million
FREE WI-FI
FOR LONDON
GALLERIES
& MUSEUMS

£24 million
IN AFFORDABLE
FIBRE BROADBAND
FOR SMES

MAYOR OF
LONDON HAS
CREATED A
£22 million
FUND FOR
TECHNOLOGY
GROWTH
COMPANIES



CASE STUDY

SUSTAINABLE CONNECTED CITIES: COLLABORATION BETWEEN LONDON'S RESEARCH BASE, FIRMS, AND COMMUNITIES

Intel, in partnership with two of the world's leading universities, Imperial College London and University College London, launched the Collaborative Research Institute for Sustainable Connected Cities in 2012. The institute will explore how technology can support and sustain the development of cities. It will collaborate with the 'Tech City' cluster in Shoreditch, using the social media expertise of start-ups there to identify and analyse emerging trends within cities. It will also engage local communities to understand how they want to live, and involve them in designing technological innovations. These innovations will include making cities such as London more 'aware and adaptive' by harnessing data gathered through sensor technologies embedded in city infrastructure and data shared by communities. The institute will use this data to develop models for more sustainable behaviour, including community energy management and water conservation. The institute will explore how fixed and mobile sensors across the city, and intelligent connected vehicles, can be used in the collection of weather, emission and traffic flow data, for use by city planners in the development of more sustainable future cities.

CASE STUDY

SMART LONDON INNOVATION CHALLENGE

City Hall and London boroughs will convene Londoners, developers and the research base to run problem-themed hackathons to help solve London's future growth challenges. The challenges will be identified through working with London boroughs, London residents and London businesses. Following the competition we will work with partners to provide longer term support, bringing in mentors and experts, to help develop these ideas into firms, jobs growth and world exports.



MEASURES OF SUCCESS

- Invest up to £24 million in the provision of affordable ultrafast broadband to SMEs (small and medium sized enterprises), and help up to 22,000 SMEs to gain access by 2016.
- Support at least 100 SMEs through a Smart London Export Programme by 2016.
- Support an employment increase to 200,000 technology employees by 2020.
- Support a continued increase in the number of businesses who are 'innovation active' (at least by 10% up to 2020)²⁴.

4. BROUGHT TOGETHER THROUGH NETWORKS

London presents a highly sophisticated innovation ecosystem, partly due to its scale, the number and different type of organisations involved - from university-led activity (such as Imperial's Digital Economy Lab) to corporate led activity (such as the Siemens Crystal), and accelerator spaces (such as Level 39), to activity led by London boroughs (such as Greenwich's Digital Peninsular). There is activity led by charities (such as the Institute for Sustainability), not for profit organisations (such as the Open Data Institute), created by public bodies (such as Transport for London as a key supplier of data to the ecosystem, but also a commissioner of digital infrastructure) and national government (such as the Catapult centres). London's networks are global as much as they are local, reflected in the capital's lead role in establishing and governing the C40 network, a network of the world's megacities taking action to tackle climate change.

The Mayor has a critical leadership role to play - both globally, and in harnessing London's vast amount of existing activity. A more transformative impact will be brought about from realising these opportunities at scale through strategic collaboration, and of course significant investment to create real efficiencies across London.

WHAT WILL WE DO?

1. Establish a Smart London Innovation Network:

to identify and link up the huge amount of existing and emerging smart city activity. The Network will bring together entrepreneurs, infrastructure providers, IT and software providers, property developers, corporates, London boroughs, universities, investors, and experts to examine 'Smart London' challenges and market opportunities. The Network will support SMEs and the wider ecosystem to seize these market opportunities and scale them up.

2. Leverage London's global city role:

working with other EU (such as Barcelona, Gothenburg, Copenhagen, and Amsterdam) and global cities (such as New York, Singapore and Tokyo) to share experience, and develop 'lighthouse' projects that will demonstrate new approaches at scale

3. Collaborate with the Future Cities Catapult and the Digital Economy Catapult:

to bring together experts from all over the world to work on how London and other cities can take a more integrated approach to the way they plan and function.



CASE STUDY
SMART LONDON INNOVATION NETWORK
- LEVERAGING INNOVATION ACROSS THE CAPITAL

We will establish a Smart London Innovation Network to link London’s entrepreneurs and innovators with the organisations already delivering and financing London’s new infrastructure and services.

The purpose of the Network is to:

- Identify and link up the huge amount of existing and emerging smart city activity and investments.
- Help clarify and shape market opportunities arising from London’s emergence as a smart city.
- Support SMEs and the wider innovation community to seize these market opportunities and scale them up.
- Provide a pipeline of targeted solutions to partners investing in London’s smart infrastructure and services.

The network will build on, incorporate, and support the ever expanding range of London organisations delivering and investing in smart approaches. The network will be collaborative, inclusive, and open - supporting cross-organisation momentum, increased coordination and investment to scale up solutions and create greater efficiencies across the city.

CASE STUDY
FUTURE CITIES CATAPULT

We will collaborate closely with the **Future Cities Catapult**, a new centre for urban innovation. The Catapult focuses particularly on the challenge of urban integration: how cities can take a more joined-up approach to the way they plan and operate. It will be based in a central London Urban Innovation Centre, a space in which business, academia, investors, innovators and cities can collaborate. The Catapult will also host a Cities Lab, aiming to be a world-leading facility where live data feeds, advanced modelling, simulation, analysis and visualisation can be brought together to support new, commercialisable solutions to city challenges.

The Catapult will run a number of large scale ‘smart city’ innovation programmes across London. It will support small businesses. It will develop exportable innovation. And it will work with London’s financial experts to devise innovative new financial mechanisms for funding smart cities.



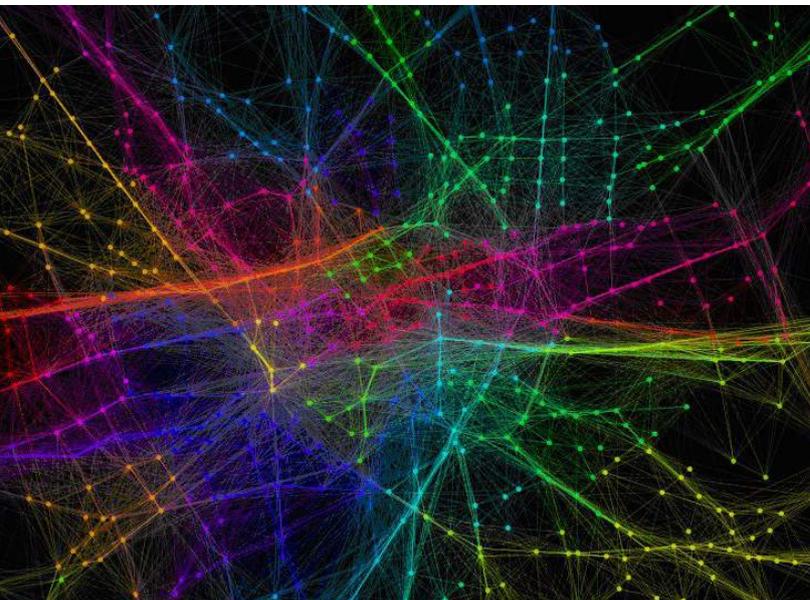
Left - Journey segments between two Oyster card ‘taps’ by Michael Batty

CASE STUDY**ICT LABS - KNOWLEDGE AND INNOVATION**

London is home to the newly formed UK node of the European Institute of Innovation and Technology's €100m/yr Knowledge and Innovation Community on ICT, known as ICTLabs. Core partners are BT, Intel, Vodafone, IBM, Imperial College, UCL, University of Edinburgh and Institute for Sustainability. The aim is to foster and build upon networks of digital technology providers, supporting trials and implementation in new markets, linking large and small firms with top quality research in the UK and with similar nodes in Berlin, Paris, Stockholm, Helsinki, Eindhoven and Trento. An ecosystem of partners working in research, business, and education are able to draw on additional resources to enhance their ability to carry out innovation projects. This provides particular opportunities for new projects in London in areas such as cyber-physical systems, health and wellbeing, smart energy systems, smart spaces, and urban life and mobility. Over the next two years, we will work with ICTLabs to develop demonstration projects that focus on London's needs to create smart infrastructure.

**MEASURES OF SUCCESS**

- Establish a Smart London Innovation Network by 2014
- £200 million levered into London to demonstrate smart city approaches by 2018



5. TO ENABLE LONDON TO ADAPT AND GROW

London has more cranes across the skyline than in the rest of the country put together. Most recent figures show London now boasts 28,000 technology firms, where employment growth has outpaced most other sectors²⁵. The recovery is underway, but continued growth is placing increasing strain on the city's infrastructure - increasing stress not only on transport, but the management of energy and utilities, such as water, electricity and heat, and the need to deal with growing waste and pollution. City Hall is preparing London's first long term infrastructure investment plan to 2050 in response to the challenges and opportunities of growth. If London is to continue to grow, including attracting inward investment and international talent, and maintain its position as one of the greatest cities on earth - new approaches will be a prerequisite. The Mayor's

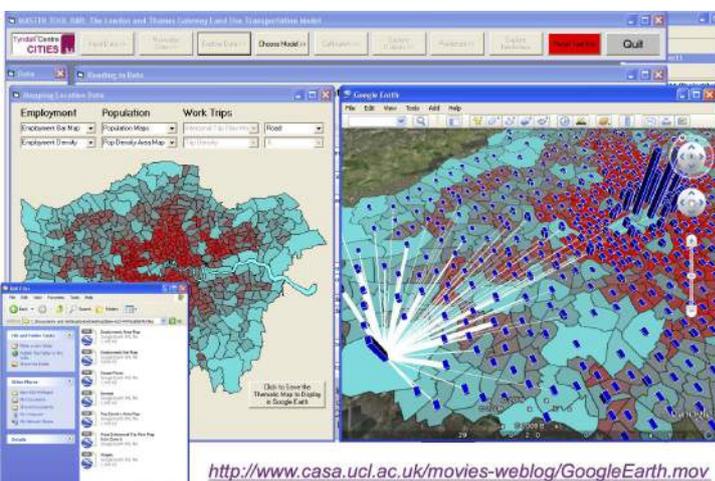
'**opportunity areas**', such as Elephant & Castle, Nine Elms, the Greenwich Peninsular and the Queen Elizabeth Olympic Park, present opportunities to use regeneration funds and private sector investment to test out more integrated approaches to building and planning new communities.

WHAT WILL WE DO?

1. Promote the use of smart grid technologies: such as through Low Carbon London, which is looking at how smart grid technologies can be used to help meet the increased demand for electricity, including the use of spare generating capacity and turning down consumption at times of high use. We will build on this approach to support the use of smart water metering to better manage consumption and leakage.

2. Develop new markets for London's waste: we will stimulate the use of data and technology to inform the development of new markets for London's waste to bring efficiencies and scale to the segregation and use of waste as a resource.

3. Visualise the city's infrastructure: we will develop 3D visualisations of the city's infrastructure through bringing together data from different utility companies to map underground assets. Sharing this data should reduce unnecessary road works, where excavations are repeatedly dug in the same location by different utility firms.



4. Demonstrate how technology can reduce traffic collisions, and improve traffic flow: such as trialling Light-Emitting Diode studs to manage lane allocations in real time; using CCTV to detect incidents and provide queuing alerts; and exploring how technology can reduce the risk of collisions with cyclists and other vulnerable road users.

5. Experiment with new ways of reducing light freight: we will trial different ways of using IT, incentives and collaborative business models to tackle the rise in congestion and pollution caused through the increase in e-commerce.

6. Plan for London's long term infrastructure needs: we will investigate London's long term infrastructure needs - and how data and digital technology can both inform and help meet those needs - through the Mayor's Long Term Infrastructure Investment Plan, which will guide future investment in the capital up to 2050.



Above - Image by David Curran

CASE STUDY DEMONSTRATING NEW APPROACHES - INTELLIGENT ENERGY MANAGEMENT

Since 2011 London has been working with Gothenburg, Cologne, Genoa and Rotterdam on the CELSIUS project, funded through the European Commission's Framework Programme.

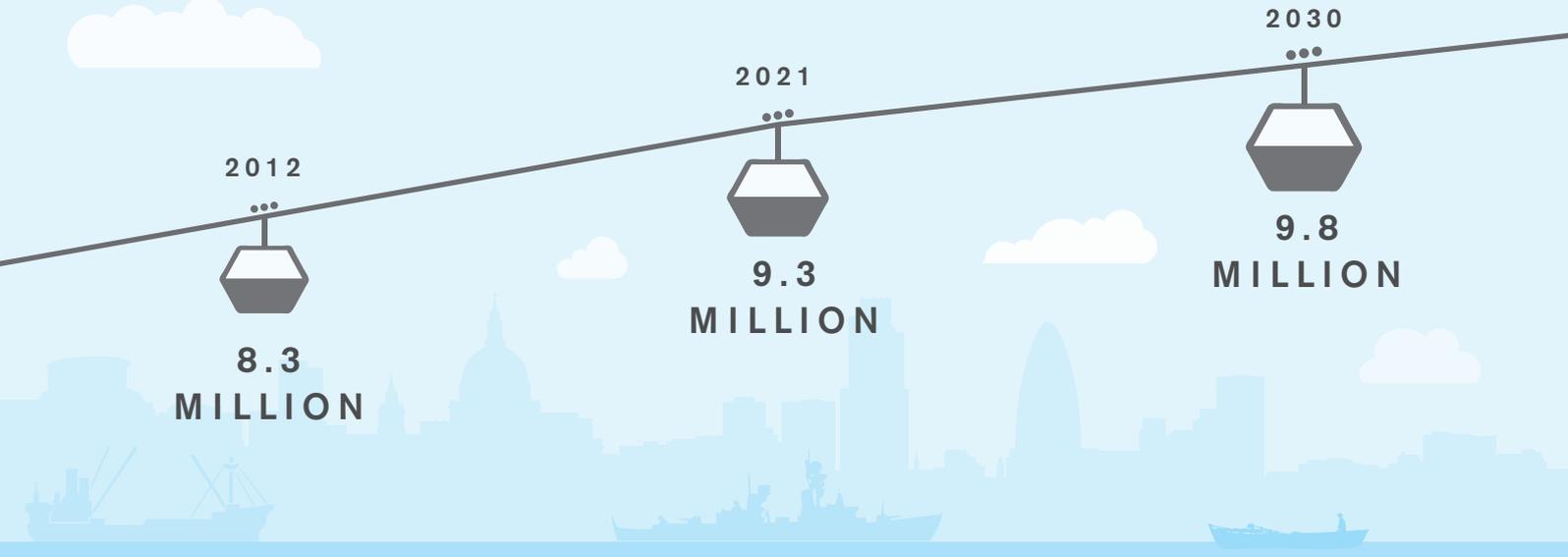
This project is playing a key role in London's smart city evolution and its development as a low carbon, resource efficient city that uses the available waste heat generated through its day-to-day operation. It will inform London's medium to long-term strategic approach to energy system and network development to ensure London has the resilient, low carbon and cost effective energy infrastructure required to support a highly competitive, and growing, global city.

The London demonstrator project, in Islington's Bunhill Ward - working with the Greater London Authority, Islington Council, UK Power Networks, London School of Economics and Imperial College - will illustrate how the deployment of smart technologies and systems can create a smart grid that optimises the financial and carbon efficiency of the infrastructure, and the contribution it makes to a city's energy systems. The findings of the project will be used by other European cities to maximise the reuse of waste heat generated.



LONDON'S GROWTH

POPULATION PROJECTION



LONDON
WILL HAVE
641,000
MORE JOBS
BY 2031



LONDON WILL NEED AT LEAST
800,000
MORE HOMES

PUBLIC TRANSPORT WILL
NEED TO ACCOMMODATE
MORE THAN

600,000

EXTRA PASSENGERS
AT PEAK TIMES

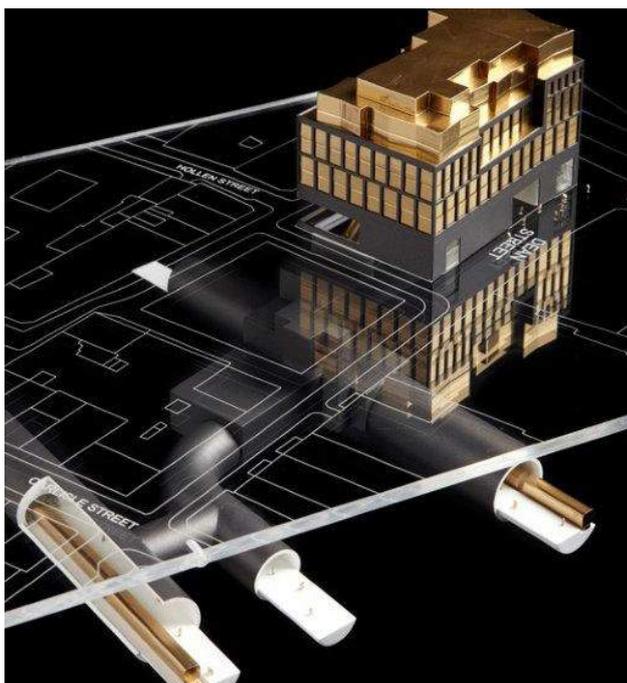


CONGESTION ON
LONDON'S ROADS
COSTS THE ECONOMY
OF £2 BILLION A YEAR

CASE STUDY

USING TECHNOLOGY TO REDUCE VEHICLE COLLISIONS WITH CYCLISTS

We will build on the experience of the 2012 Games, where we substantially reduced the number of peak-hour lorry movements, to work out how we can get HGVs out of traffic at the busiest times of day, when they are most likely to come into conflict with cyclists. TfL will be holding an event with technologists in 2014 to increase engagement in potential solutions. We aim to trial new technologies that will reduce the likelihood of collisions with cyclists and other vulnerable road users, such as proximity sensors.



CASE STUDY

REDUCING WHITE VAN DELIVERIES ASSOCIATED WITH INCREASED E-COMMERCE

Light freight journeys are responsible for 80% of freight miles on London's roads. TfL estimates that by 2030 this will grow by 43%²⁶. The growth in e-commerce and

personal deliveries is a major contributor.

Congestion costs the economy an estimated £2 billion a year. Stalled traffic in London has been found to lead to 8% more CO₂, 6% more PM₁₀ and up to 9% more NO_x emissions than free-flowing traffic²⁷.

This project will trial the use of information technologies, incentives and collaborative business models for local consolidation, load sharing and customer communication. It will link to related low emission freight demonstration projects, in the context of plans for the Ultra-Low Emission Zone.

In practice, this will involve working with delivery companies and domestic and commercial customers to:

- Reduce the number of journeys they make by helping them share loads (so vans are fuller), deliver to local 'consolidation points' in bulk rather than to individual premises and reduce the number of failed deliveries (reducing repeat journeys).
- Move deliveries out of central London and off-peak.
- Consider the adoption of low emission vehicle options (buying, leasing).
- Change routes to avoid congestion.
- Promote white labelling and encourage collaboration amongst companies.

CASE STUDY

MAPPING LONDON'S UNDERGROUND INFRASTRUCTURE ASSETS

Roadworks in London account for 36% of road disruption costs, equating to an indirect annual cost of around £720 million per year to the London economy. Data sharing is currently slow and is often

Above - Modelling for Crossrail Infrastructure

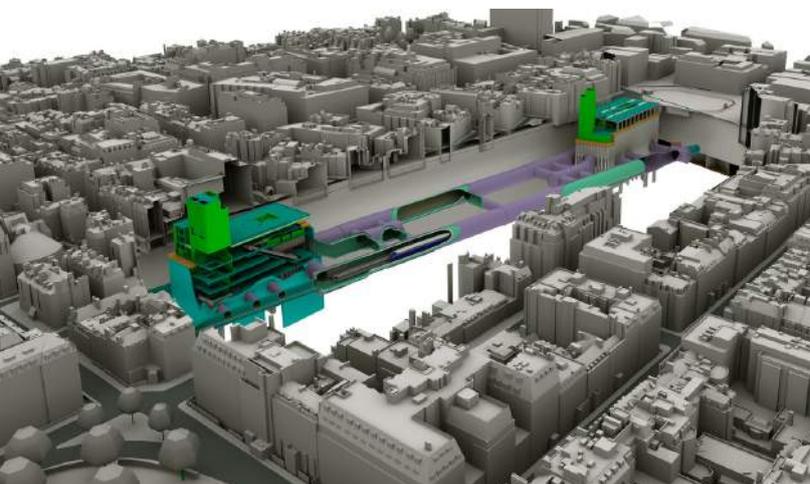
26 - Transport for London (2012) [Correspondence]

27 - Transport for London (2009) SCOOT Simulation Study. [Correspondence]

repeated for new works programmes. Data quality is variable and usually describes three-dimensional worlds in only two dimensions. Excavations are repeatedly dug in the same location by different utility companies. Damage to underground assets costs £150 million per year across the UK, including 20 strikes per year on London Underground's assets. Shallow, unregistered installations of business-critical broadband cabling may augment this problem several hundred-fold in the future.

A complete view of infrastructure would improve both how existing assets are renewed and how new assets are delivered. This project aims to develop new collaborative models and digitisation of London's underground infrastructure. This will provide an invaluable asset to urban planners and infrastructure owners, enabling efficient investment decision-making.

This project will build on existing work to bring together data from utilities on the location and condition of underground assets and to automate the inquiry system for new data requests. It will also explore the most cost-effective means of improving data on those assets. The project will look to develop 3-D visualisations of utilities in key parts of London and 'real-time' updates of data on underground assets.



Above - Building Information Diagram showing underground structures at Bond Street Station



MEASURES OF SUCCESS

- Make available the city's performance, consumption, and environmental data as open data (energy, water, waste, pollution).
- By 2016, develop a robust quantitative understanding of the contributions that smart technical solutions and associated services can make to the management of London's transport and environmental infrastructures.
- By 2020, stimulate smart grid services in London to restrict growth in peak electricity demand and associated infrastructure costs, with 10,000MWh/annum of contracted supply and demand response.
- By 2020 showcase a robust 3-D map of all London's underground assets, accessible and updatable in real-time by all asset owners and works planners.
- By 2020 ensure London has the best air quality of any major world city, which will require significant (c. 50%) reduction in emissions from London's transport sector.
- Work towards a reduction of greenhouse gas emissions to reach 40% below 1990 levels by 2020.

6. AND CITY HALL TO BETTER SERVE LONDONERS' NEEDS

City Hall also has to work in a more integrated way if it is to better meet the complex needs of London's population. This means joint working across different policy areas which traditionally sit in 'silos', including sharing data and objectives; and more joint working across London boroughs, and wider service providers. This will help to create efficiencies, including cost savings, across different service areas.

The Mayor has powers over, and budgets for, transport, policing, economic development, fire, culture, health, the environment, planning and development. The functional bodies — Greater London Authority, Transport for London, the Mayor's Office for Policing and Crime, London Fire and Emergency Planning Authority, and the London Legacy Development Corporation — are responsible for the delivery of services in these areas²⁸. We need to open up City Hall budgets to more transparent and innovative ways of delivering these services.

London is already experimenting with different ways of sharing and analysing data and objectives across these functional bodies, including predictive analysis. For example, the Metropolitan Police Service (MPS) and Transport for London (TfL) are proposing integrating automatic number plate recognition

systems with the MPS's existing system to develop a 'ring of steel' around London and identify unregistered, uninsured and stolen vehicles. The London Fire Brigade (LFB) and TfL are exploiting sophisticated computer-based optimisation and modelling techniques. For example, LFB have used modelling to ensure their fire stations are in the right place so that fire engines can get to emergencies as quickly as possible.



WHAT WILL WE DO?

- 1. Work across the Greater London Authority Group:** to increase data sharing and analytics, such as the use of predictive analysis.
- 2. Scale up innovation, working across borough boundaries:** work with London boroughs and service providers to identify strategic opportunities for applying data and technology to London's challenges, and examine ways in which innovations can be rolled out at scale, across administrative boundaries (in applications such as parking, waste collection, or healthcare).

3. Promote ‘smart’ approaches through London’s planning system: maximise the use of data to guide the planning and design of London, including in London’s opportunity areas. We will also encourage developers to adopt a more consistent approach to deploying digital infrastructure to future proof new developments. City Hall will proactively share planning and development data, such as sharing data with utility firms to improve demand forecasting and the strategic planning of infrastructure.

4. Open up City Hall budgets: we want technology entrepreneurs to help City Hall develop more innovative approaches to service delivery, so we will use digital technology to raise awareness of City Hall’s spending priorities, and continue to open up GLA contracts and supply chain opportunities to SMEs.



CASE STUDY

LONDON BOROUGHS - BUILDING A SMARTER LONDON

City Hall is working with Croydon Council to support the borough’s future development as a ‘smart borough’. Together we are addressing the core

challenges that face the borough, and identifying priorities that leverage Croydon’s £3bn of development funding to deliver smart city projects locally. Sectors under consideration include transport, health, and building automation. Projects will include parking and traffic congestion management, telehealth, and unlocking Croydon’s skills and software development to form a technology information hub. Once tested and proven, this is an approach City Hall could take forward with the other London boroughs using the Opportunity Areas as a catalyst to build, from the ‘bottom up’, a smarter London.

CASE STUDY

TRANSPORT FOR LONDON AT THE FOREFRONT OF DATA SHARING AND ANALYTICS

Cycle Hire

Since launching in the summer of 2010, **Barclays Cycle Hire** has seen in excess of 25 million bicycle journeys completed throughout central London and has become a mode of transport synonymous with the city. Throughout the relatively short life span of Cycle Hire, technology has changed enormously and with it the demand for real time information. The number of bikes and number of spaces is vital information as it helps inform users where they can get a bike and more importantly, where they can drop one off. Cycle Hire created a data feed and syndicated it on the TfL website. The release of this data has led to the development of numerous smart phone apps, providing up to the minute station information and mapping to users of the Cycle Hire scheme. As well as a syndicated feed, Cycle Hire provide real time information, journey planning and mapping through the TfL website.



London Buses

The demand for real time information from TfL has never been higher and TfL has responded across all service operations. For example, London Buses have created the “Countdown” service, which provides live bus arrival information for all 19,000 bus stops in London’s network via fixed & mobile web, SMS (Text Message) and via 2,500 roadside signs. As with Cycle Hire, the real-time data is syndicated to smart phone developers, who have created over 60 transport apps, all providing real time information to TfL’s passengers. It has been determined that 13% of daily journeys use these digital services (apps, web and text), which account for more than 650,000 passenger journeys.

Oyster data

TfL has been at the forefront of smart ticketing since launching the Oyster card a decade ago. Today over 85% of all Tube and bus travel in London is paid for using an Oyster card. In December 2012, TfL began offering customers the option of using their contactless debit, credit or charge card to pay the single Oyster fare on any of London’s 8,500 buses. This widespread acceptance of contactless payment cards is a leading-edge

development and will be a world first once it is integrated on all modes of transport in London in 2014.

Data from the Oyster system, used in accordance with data protection standards, provides TfL with a breadth and depth of information about how customers travel across the network. This data also provides information back to TfL on how its rail and bus services have operated and for operational planning. TfL has an active programme of working with a number of research institutions to explore how Oyster data and other data sets can be used for future data analytics to support Smart London initiatives.



Above left - Barclays Cycle Hire scheme, London on View
 Right - Barclay's Bike Scheme Dock Checker, London Datastore

CASE STUDY

SOCIAL MEDIA ENABLED TRAFFIC MANAGEMENT

Traditionally, traffic management has depended on fixed sensors to understand what is happening on the road network. Although useful, they are limited by their ability to only give intelligence at their specific location, with single function capability and specific installation requirements - resulting in high installation costs, and limited geographical coverage. A Cooperative system, CoSy for short, looks to examine the potential for using digital technology, such as mobile phones, GPS, satnav, bluetooth, twitter, Cloud computing etc, to help develop an understanding of the network in real time. CoSy also aims to create a way for the traffic manager and the public to engage in real time and look at a number of options, including personalised journey choices.

TfL recently undertook a number of demonstrators to experiment with using digital technology - including mobile phone, twitter and SatNav data. Over 30 billion data points related to journeys and their impact on the road network were captured. CoSy demonstrates the capability of using social media for traffic management, and the Cloud as a mechanism for handling big data, enabling real time traffic management at a fraction of the cost of traditional systems.

CASE STUDY

TRANSFORMING THE RELATIONSHIP BETWEEN LONDONERS AND THE NHS

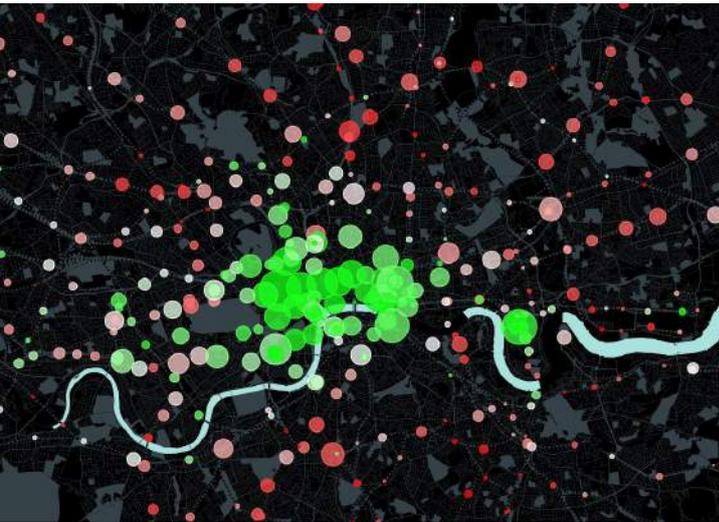
Contacting the NHS can be confusing. Set against the recent Stafford hospital report, the Berwick Review of patient safety and the Clwyd review of complaints in the NHS, we must make it easier for the public to talk to the NHS, for feedback to be listened to, and acted upon.

Care Connect is an NHS England innovation modelled on the highly successful 311 in the USA which has transformed the relationship between citizens and their public services and the similar approach used by the UK Police (who have adopted 101 for triaging all non emergency call). Launched in August 2013 with pilots across 16 London boroughs, Care Connect offers a simple point of access through a range of channels (online, phone, text and social media) for the non-clinical aspects of a comprehensive customer service (general enquiries, complaints triage and feedback), routing in real-time to the right part of the NHS for resolution. Interactive maps and dashboards enable the public to track progress and openly see how NHS providers are responding. Care Connect speaks directly to NHS England's commitment to transparency and participation.

Built by a company specialising in '311 style' democracy sites this early prototype of Care Connect can be accessed as an 'app' via **NHS Choices** and **myhealthlondon** websites with a Customer Relationship Management system to ensure effective management and tracking of multichannel and multi-functional requests, supported by a moderation and case handling service.

From increasing engagement and transparency in NHS services, to personalised medicine and healthcare

delivery - digital technology is transforming healthcare, and London is well poised to lead. In July 2013 the Mayor announced his intention to create 'MedCity' a body that will capitalise on the NHS's purchasing power, patient base and London's world leading research in life sciences, to drive increased investment, unlock the sector's massive economic potential and improve London's health outcomes.



MEASURES OF SUCCESS

- Increase in data sharing between London government (City Hall and boroughs) and stakeholders²⁹.
- Conduct research to monetise the efficiencies that can be generated, and how service delivery can be improved.
- Support the continued increase in the number of SMEs winning public sector contracts or supply chain opportunities.

CASE STUDY

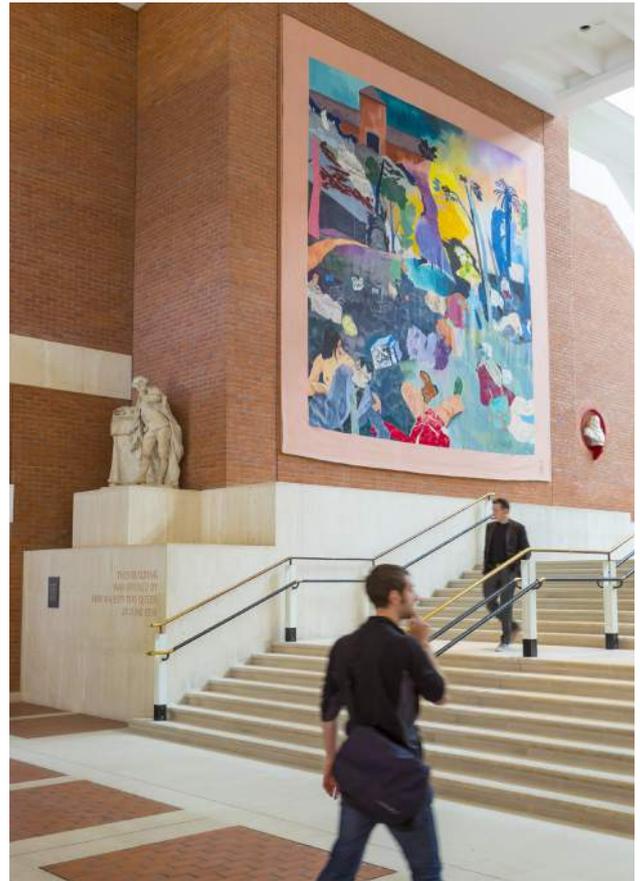
TECHNOLOGY INNOVATION PORTAL

TfL's innovation portal encourages users to submit innovative technological ideas and solutions to help address London's core transport challenges, and deliver the Mayor's vision of a world-class transport system. Entrepreneurs often put forward good ideas, but putting these ideas into practice can be much harder. The innovation portal tries to break down some of the barriers by focusing ideas on the technological solutions to the challenges TfL face, and helps to get the ideas directly in front of TfL's domain experts and accountable managers.

7. OFFERING A 'SMARTER' LONDON EXPERIENCE FOR ALL

Digital technology is making massive changes to the way we experience the city - from traffic lights changing as CCTV logs congestion, to knowing exactly what time your bus will arrive, and paying it with the touch of your credit card. Smart London is about harnessing digital technology so that Londoners, visitors and businesses can experience London in a better way, and have more time free from bureaucratic hassle and congestion.

Londoners are early adopters of new technology. We need to encourage them to interact more with the city and its performance, and be a part of the solution. London has already experimented with the city 'talking back'. The City of London, for example, established 'smart' recycling bins, which were used as Wi-Fi hotspots with digital screens providing information on the city. The recent surge of public opinion against the tracking of Wi-Fi signals to gather anonymous data on peoples' movement reiterates the critical importance of involving Londoners in any plans to make the city 'smarter'.



WHAT WILL WE DO?

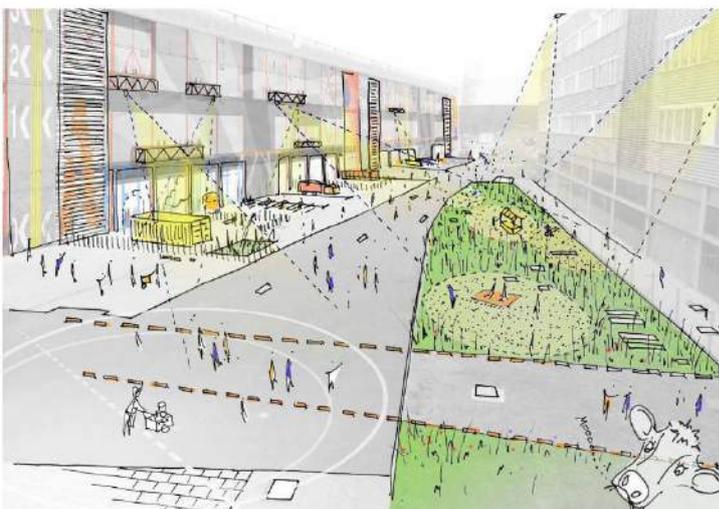
- 1. Establish a Smart London platform:** to enable Londoners to feedback, rate and shape the type of experience they want to have.
- 2. Help position the Queen Elizabeth Olympic Park as an interactive smart experience:** a test bed and demonstrator by 2016.
- 3. Invest in wireless networks in public spaces:** we have already invested in Wi-Fi on the London Underground, and were the first UK city to launch 4G. In 2014 we will invest over £1 million in free Wi-Fi in London's art galleries and museums, to ensure London has one of the fastest Wi-Fi networks globally.

4. Help Londoners and visitors to seamlessly navigate the city: including improved data for journey planning tools, expanding the use of digital technologies as part of Legible London, and accelerating the innovation and adoption of digital money to lubricate the functioning of the city - including establishing a digital money demonstrator by end 2015.

CASE STUDY

HARNESSING THE POWER OF LONDONERS TO CLEAN UP LONDON

The Love Clean London initiative uses mobile phone and 'apps' technology to enable members of the public to report environmental quality issues such as graffiti, poor waste storage and fly-tipping to their local council. Users can send a text, upload photographs online or use a free mobile phone application to submit reports. Reports are shown on an online interactive map, which means councils can prioritise clean-up operations where most needed, helping to maintain a clean and pleasant public realm environment for the community. It also enables photographs to be displayed to show where clean-ups have taken place and the results of the action taken.



CASE STUDY

THE QUEEN ELIZABETH OLYMPIC PARK AS A GLOBAL SHOWCASE FOR SMART TECHNOLOGY

The London Legacy Development Corporation (LLDC) is the Mayor's body in charge of developing and regenerating the Queen Elizabeth Olympic Park and its surrounds, building on the 2012 Olympic and Paralympic Games legacy.

As part of its overall plans, LLDC's ambition is to harness technology to create a world class experience for visitors, residents and workers on the Park, to increase visitor numbers, attract inward investment, and facilitate the regeneration of the wider area of east London.



The Park presents a unique opportunity to showcase London as a global leader in technology led innovation across the park's diverse offerings.

Most recently the Park has secured the presence of **iCITY** - a 1 million square foot digital quarter for London that will support the growth of London's technology sector, provide space for start-ups, education and post graduate research. iCITY is underpinned by the most advanced digital infrastructure in Europe - almost unlimited bandwidth connectivity, the highest capacity power, and London's highest capacity data centre delivered by Infinity.

Over the next two years LLDC want to focus on three areas to enhance the experience on the Park, to realise this ambition LLDC will be seeking advice and investment input from the wider community and the private sector:

- **Transport and navigation:** a showcase and testing ground for a more integrated approach to transport planning and use. For example, the Park could be a testing ground for extending the Oyster to other modes of transport - allowing Oyster travel from central London onto the park by tube, bike hire across the park, and perhaps returning home using an electric car hire scheme.
- **Sustainability:** a showcase and testing ground for a more integrated understanding of resource consumption to encourage more sustainable behaviour. The Park could be the first location in Europe where all assets are managed in real time and consumers understand comprehensively how their behaviour impacts on energy, carbon, water and waste.
- **Connectivity:** if given the correct support, the Park could offer free Wi-Fi, or be the first 5G site in the country.

CASE STUDY

FINDING YOUR WAY AROUND THE CITY - DIGITAL LITH

London is packed with tourist attractions, shopping areas and cultural offers that draw huge numbers into the city. As a world financial centre, it also attracts thousands of workers and business travellers every day.

Legible London is the integrated wayfinding system that's helping people move around the Capital more easily

and quickly, with over 1,250 signs now installed. Legible London is integrated with other London public transport options so when people are leaving the Underground, or getting off a bus for example, they can quickly identify the walking route to their destination.

Getting people to walk more has real economic benefits to London, as it supports the health of Londoners and London's high streets. The prototype digital lith is a new type of Legible London sign developed in partnership between TfL and Canary Wharf Estate. It is designed to meet pedestrian wayfinding needs in a dense, multi-level urban centre.

The new design features an interactive touchscreen panel displaying electronic mapping on one side, with a standard printed map on the reverse side. The touchscreen allows pedestrians to search for destinations such as restaurants, shops and businesses, with the electronic maps showing the quickest walking routes to destinations. The digital display also allows users to access additional information such as text directions to destinations, opening hours, retailer offers, and more.

TfL and Canary Wharf are continuing to test the digital lith. TfL is undertaking research to understand user perceptions of the sign, the features they like, and to explore what other content might be useful. Two more digital liths are currently being manufactured for Canary Wharf. These further units will expand wayfinding coverage for pedestrians and allow TfL and Canary Wharf to expand the digital offer of Legible London.

CASE STUDY**DIGITAL INNOVATION - THE FUTURE OF DIGITAL MONEY IN LONDON**

London is both a global technology hub, and the world's financial capital. Converge the two, alongside a large population and the need to facilitate high volume, low value transactions, and you have the ideal experimental platform for digital money innovation.



London is already at the forefront of financial innovation. Level 39, based in Canary Wharf, is Europe's largest 'fin tech' accelerator - already working with many companies creating new ways of payment and collection in electronic form. For example ZipZap enables users to buy online, and complete the transaction at a local payment station, improving access to online price benefits for those not currently able to pay online. Yoyo has created a mobile payment system that builds in an automatic loyalty point collection system. Companies like Transferwise, operating out of their headquarters in East London, have been able to revolutionise the way money is transferred abroad, with significant savings for consumers.

Digital money innovation is also taking place within the GLA Group. The use of the

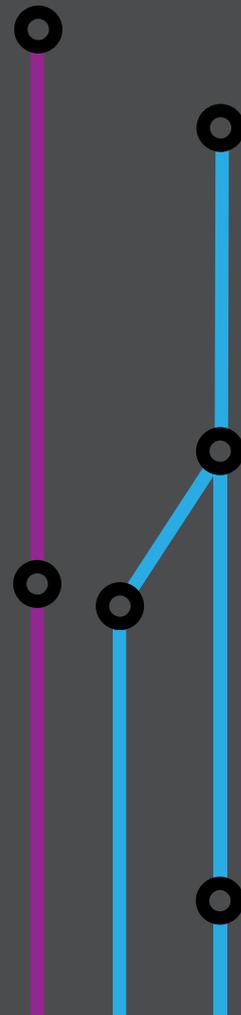
Oyster scheme across Transport for London, and the introduction of micropayments for contactless debit card payment for fares on London buses, has provided many opportunities for the advancement and study of digital money adoption.

Imperial College London and Citigroup are undertaking a significant study into digital money to debate and benchmark global progress, and will be hosting a Digital Money Symposium in London in 2014. The Smart London Board will work with Citigroup to establish a digital money demonstrator in London by end 2015, and will work to develop indicators that will measure London's progress against other global cities.

**MEASURES OF SUCCESS**

- Develop an index to benchmark global progress on digital money (at the city level), and establish a digital money demonstrator by end 2015.
- Ensure London has one of the fastest wireless networks globally by 2016.
- Increase in the number of Londoners who think the use of digital technology has improved London as a city to live in³⁰.

The Smart London Plan will be a live document that will evolve to reflect London's dynamism and the pace of innovation, and to which all of London are asked to contribute to and support. We welcome your feedback, your ideas and your collaboration - whether you are a business, investor, university, resident or global city. The 2012 Olympics showed what we can do if we focus our energy on the challenges facing our city. This is our opportunity to show the world how we can put our inventiveness back into London. You can contact us on Twitter (@SmarterLondon/#SmartLondon), through our website (<http://www.london.gov.uk/smartlondon>) or by email (smart@london.gov.uk).



ANNEX

SMART LONDON BOARD

In March 2013 the Mayor set up the Smart London Board to advise on London's approach to using digital technology to ensure London maintains its position as the best big city in the world.

The Smart London Board members are:

- Professor David Gann, Vice-President (Development and Innovation) at Imperial College London and holds the Chair in Innovation and Technology Management in Imperial College Business School and the Department of Civil and Environmental Engineering (Chair of the Smart London Board).
 - Professor Ricky Burdett, Director of LSE Cities, Professor of Urban Studies, London School of Economics and Political Science, and Global Distinguished Professor, New York University.
 - Professor Alan Penn, Professor of Architectural and Urban Computing, and Dean of Faculty, University College London.
 - Dr Andy Hudson-Smith, Director and Deputy Chair of the Centre for Advanced Spatial Analysis (CASA) at The Bartlett, University College London.
 - Professor John Polak, Professor of Transport Demand and Head of the Centre for Transport Studies at Imperial College London.
 - Paul Clarke, Independent Technology Strategist sits on the Transparency sector panel for the Ministry of Justice.
- He is the former head of strategy for Directgov, the government's online channel for the public.
- Joanna Shields, Chief Executive of the Tech City Investment Organisation and UK Business Ambassador for Digital Industries.
 - Christophe Williams, Founder and Managing Director, Naked Energy Ltd.
 - Chris Thorpe, Entrepreneur and Technologist.
 - Mike Butcher, Editor of TechCrunch Europe, cofounder of Tech-Hub London.
 - Martin Curley, Vice President of Intel Corporation, Director of Intel Labs Europe.
 - Paul Maher, CEO, Siemens Infrastructure & Cities LMV & Smart Grid Divisions, North West Europe, Siemens.
 - Volker Buscher, Director, Arup.
 - Gavin Starks, CEO, Open Data Institute.
 - Naveed Sultan, CEO, Global Head of Treasury and Trade Solutions, Citi Transaction Services.
 - Ian Short, Chief Executive, Institute for Sustainability.

GLOSSARY

3G - A mobile communications standard that allows mobile phones, computers, and other portable electronic devices to access the internet wirelessly.

4G - A mobile communications standard intended to replace 3G, allowing wireless Internet access at a much higher speed.

Barclay's Cycle Hire - A public bicycle hire scheme in operation from 2010 in London.

Big Data - Big data involves very large datasets, such as billions of tweets or terabytes of sensor data.

BIM - Building Information Modelling uses multi-level data rendered in a 3D common language environment. This allows the interdisciplinary parties in the project - architects, structural engineers, mechanical and electrical engineers, designers and manufacturers - to talk about exactly the same thing and, crucially for so many participants, visualise it in 3D.

Bluetooth - A standard for the short-range wireless interconnection of mobile phones, computers, and other electronic devices.

Care Connect - An NHS England innovation modelled on the highly successful 311 in the USA which has transformed the relationship between citizens and their public services. Interactive maps and dashboards enable the public to track progress and openly see how NHS providers are responding.

CCTV - Closed-circuit television used for security monitoring.

CELSIUS Project - Smart district heating and cooling solutions. This project is playing a key role in London's smart city evolution and its development as a low carbon, resource efficient city that uses the available waste heat generated through its day-to-day operation. It will inform London's medium to long-term strategic approach to energy system and network development to ensure London has the resilient, low carbon and cost effective energy infrastructure required to support a highly competitive, and growing, global city.

Cloud Computing/The Cloud - The practice of using a network of remote servers hosted on the internet to store, manage, and process data, rather than a local server or a personal computer.

Coding - Coding, or programming, commonly refers to computer programming, which is the process of writing software, applications and websites, which are all created using a programming language. There are many different programming languages, and programmers often tend to specialise in one or two. Examples include python, ruby, and java.

Connected Digital Economy Catapult - One of seven 'Catapults' launched by the UK's Technology Strategy Board as a network of world-leading centres designed to transform the UK's capability for innovation in seven specific areas and help drive future economic growth. Connected Digital Economy Catapult focusses on accelerating growth through the Digital Economy.

CoSy - A Cooperative system, looks to examine the potential for using existing types of technologies, such as mobile phones, GPS, satnav, bluetooth, twitter, Cloud computing etc, to help develop an understanding of the transport network in real time.

Crossrail - The new high frequency, high capacity railway for London and the South East. When Crossrail opens in 2018 it will, for the first time, produce a direct connection between all of London's main business centres, linking Heathrow, with Paddington, the West End, the City and Canary Wharf.

E-commerce - Commercial transactions conducted electronically on the Internet.

Future Cities Catapult - One of seven 'Catapults' launched by the UK's Technology Strategy Board as a network of world-leading centres designed to transform the UK's capability for innovation in seven specific areas and help drive future economic growth. The Future Cities Catapult focusses on Urban Innovation: how cities can take a more joined-up approach to the way they plan and operate. To improve quality of life, strengthen their economy and protect the environment.

GPS - Global Positioning System, an accurate worldwide navigational and surveying facility based on the reception of signals from an array of orbiting satellite.

iCITY - A new digital quarter for London that will support the growth of the digital and creative industries. Situated on the Queen Elizabeth Olympic Park and in the heart of East London's creative scene, iCITY will be a world-leading centre of innovation, education and enterprise.

iCity - A European funded programme to build an open data and open infrastructure urban platform that will deliver data and enable remote control to citizens in European cities of London, Barcelona, Genoa and Bologna.

Legible London - A pedestrian way finding system that's helping people walk around the capital.

LFB - London Fire Brigade is the body responsible for London's fire and rescue service. It is the busiest in the country and one of the largest firefighting and rescue organisations in the world.

LLDC - London Legacy Development Corporation is a Mayoral Development Corporation responsible for the regeneration legacy from the London 2012 Games, created in April 2012. Its role is to promote and deliver physical, social, economic and environmental regeneration of the Olympic Park and its surrounding area, in particular by maximising the legacy of the 2012 Olympic and Paralympic Games, by securing high-quality sustainable development and investment, ensuring the long-term success of the facilities and assets within its direct control, and supporting the aim of convergence.

London Dashboard - A 'dashboard' display of data covering a range of topics, updated at regular and frequent intervals which helps put the figure from datasets in context, more detailed analysis sits beyond the headline figures.

London Datastore - Created by the GLA as an innovation towards freeing London's data, the datastore provides free access to a number of data-sets. The GLA is committed to influencing and cajoling other public sector organisations into releasing their data onto the site providing an easily accessible location for multiple data sets.

London Development Database - The London Development Database records selected planning permissions in the Greater London area as part of the process of monitoring the Mayor's London Plan. These are tracked through to implementation, allowing us to produce data on completions and the development pipeline in addition to levels of approvals. The LDD is a collaboration between the GLA, which provides the IT infrastructure and co-ordinates the project, and the London boroughs who are responsible for providing the data for schemes in their area.

London Enterprise Panel - The local enterprise partnership for London. Chaired by Mayor of London Boris Johnson, the LEP is the body through which the Mayorality works with London's boroughs, business and Transport for London to take a strategic view of the regeneration, employment and skills agenda for London.

London Green Fund - A £100 million fund set up to invest in schemes that will cut London's carbon emission. The fund was launched in October 2009 by the Mayor of London and the European Commissioner for Regional Policy - the first JESSICA Holding fund in the UK.

London Schools Excellence Funding - The fund is part of the Mayor's Education Programme and will, alongside the London Schools Gold Club and London

Curriculum boost standards in the capital's schools by helping students achieve better results through expert teaching, improved subject knowledge and subject specific learning methods.

Love Clean London - Love Clean London is a 'call to arms' for Londoners in the run-up to 2012 and beyond, which makes it easier for Londoners to report environmental crimes, receive feedback from London boroughs on progress and save London boroughs money.

Mayor's 2020 Vision - The 2020 Vision sets a broad course that communicates London's readiness and ambition, and our city's ability to meet the connected challenges of rapid population growth and economic success.

Mayor's Long Term Infrastructure Investment Plan - The Infrastructure Investment Plan will be as much a capital investment plan as an infrastructure plan. It will provide a high level assessment of London's infrastructure needs; along with an assessment of the magnitude of costs associated with the required infrastructure. Importantly, it will also consider funding streams, both in a future where the current fiscal arrangements apply and in a more fiscally devolved future. The plan aims to be published in Summer 2014.

Mayor's Opportunity Areas - Opportunity Areas are London's major source of brownfield land with significant capacity for new housing, commercial and other development linked to existing or potential improvements to public transport accessibility. Typically they can accommodate at least 5,000 jobs or 2,500 new homes or a combination of the

two, along with other supporting facilities and infrastructure. 33 were identified as part of the Mayor's draft London plan.

MedCity - 'MedCity' will promote a joined up and globally distinctive life sciences offer for London and the Greater South East (GSE); act as a visible 'go to' point for businesses and investors, whether global or local, to access, invest in or collaborate with London and the GSE's science base; and provide a strong voice for the sector, champion its strengths, but also raise awareness of the factors impeding further growth to catalyse positive change. MedCity will help London and the Greater South East to be the world's greatest life science hub.

MPS - Metropolitan Police Service is police force responsible for the whole of Greater London apart from the City of London which is the responsibility of the City of London Police.

Open Data - Open data is information that is available for anyone to use, for any purpose, at no cost. The Open Definition sets out a number of principles for Open Data.

Open Definition - A piece of data or content is open if anyone is free to use, reuse, and redistribute it - subject only, at most, to the requirement to attribute and/or share-alike.

Oyster - A plastic smartcard that can be used on London's public transport instead of paper tickets. Travelcards, Bus & Tram season tickets and pay as you go credit can be loaded onto it.

Queen Elizabeth Olympic Park - The Queen Elizabeth Olympic Park is the site that hosted the 2012 Olympic Games.

The site and its surrounds are now being developed and regenerated by the London Legacy Development Corporation, building on the 2012 Olympic and Paralympic Games legacy.

SatNav - Navigation dependent on information received from satellites.

SCOOT - Split Cycle Offset Optimisation Technique is the world's leading adaptive traffic control system. It coordinates the operation of all the traffic signals in an area to give good progression to vehicles through the network. Whilst coordinating all the signals, it responds intelligently and continuously as traffic flow changes and fluctuates throughout the day. It removes the dependence of less sophisticated systems on signal plans, which have to be expensively updated.

Smart City - The general term used to discuss how cities across the globe are sharing information and making use of technology to work more efficiently.

Smart Grid Services - A utility supply network that uses digital communications technology to detect and react to local changes in usage.

Smart London - Smart London is about how the capital as a whole functions as a result of the interplay between its 'systems' - from local labour markets to financial markets, from local government to education, healthcare, transportation and utilities. Smart London is where the linkages between these different systems are better understood, where digital technology is used to better integrate these different systems, and London as a whole works more efficiently as a result - for the benefit of its inhabitants and visitors.

SME - Small to medium-sized enterprise, a company with no more than 250 employees.

Super Connected Cities - In 2011, the government set aside £100 million for an Urban Broadband Fund (UBF) to create 'super-connected' cities across the UK. This was followed in 2012 by a further fund of £50 million for a 'second wave' of cities to benefit from this programme. Cities will benefit from faster and better broadband, and large areas of public wireless internet (WiFi) access. London bid for £25 million, and the majority of the funding will be delivered through a SME voucher scheme.

Talk London - Talk London hosts online discussions, polls, live Q&A events, surveys and focus groups - discussing a wide range of topics from improving standards in the private rented sector to cyclist safety around HGVs (heavy goods vehicles). Through the community, Londoners are taking part in policy conversations to generate new ideas. We can also consult Londoners on our ideas to make sure that policies are responsive, effective and resonate with communities.

Team London - The Mayor's volunteering programme for London, Team London makes it quick and easy for Londoners to give their time, find volunteer opportunities and do great things for their city.

Tech City - Also known as Silicon Roundabout. A number of digital and creative small to medium start-up companies have established themselves around the Old Street roundabout and Shoreditch areas. In just three years, the originally small cluster of high-tech firms around the Old Street roundabout has become the capital's leading hub for digital, creative and high-technology companies.

Tech City Institute - The 'Tech City Institute' will provide a unique space for citizens to come together and discuss, learn and understand not just the role of the new technologies but also how they impact different parts of society. We will use this space to engage London's entrepreneurs, the research community, as well as Londoners themselves to help us find ways of getting the community involved to help us solve some of London's core challenges.

Tech City Stars - Supported by the Mayor of London, accredited by City and Guilds and Microsoft and endorsed by City University, Tech City Stars is a high quality, high intensity programme that provides talented young people with a year of work experience and training with tech city firms.

TfL - Transport for London is the local government body responsible for the majority of the transport system in Greater London.

Twitter - Social networking and microblogging service utilising instant messaging, SMS or a web interface.

Ultrafast Broadband - Broadband service with downloading speeds of at least 100Mbps and uploading speeds of at least 50Mbps. This is most often delivered by fibre to the property (FTTP).

Wi-Fi - A facility allowing computers, smartphones, or other devices to connect to the internet or communicate with one another wirelessly within a particular area.

Wi-Fi Hotspot - A public place where a wireless signal is made available so that the internet can be accessed.