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Designing with data:
Shaping our future cities

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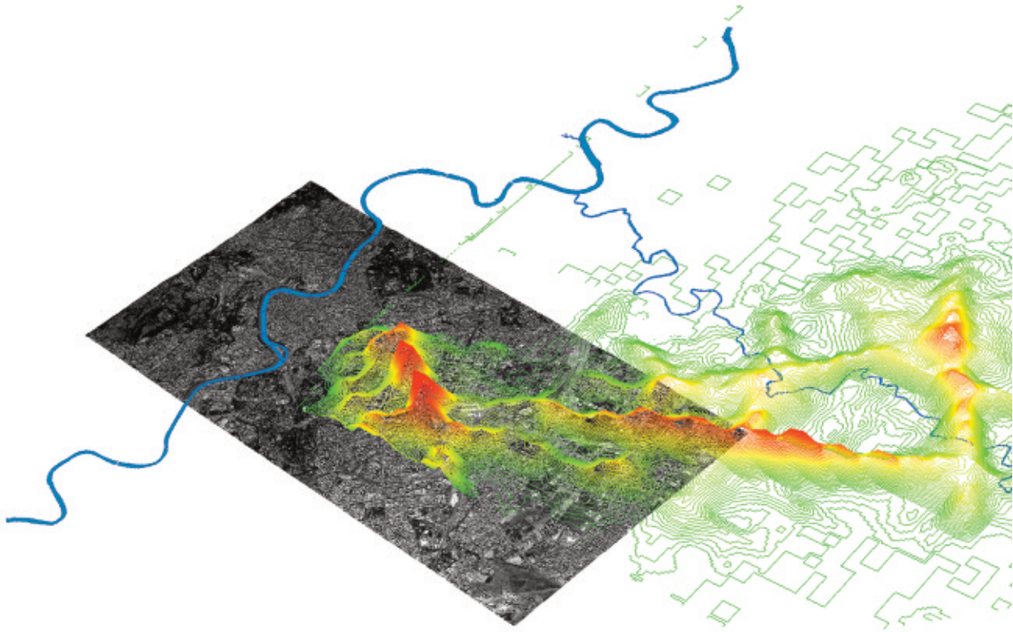
Contents



Realtime Rome project MIT SENSEable City Lab
http://senseable.mit.edu/realtimerome/

Executive summary

The 21st century has seen unprecedented technological advances and an explosion of data available about our built environment and the people that inhabit it. Some industries have already begun reaping the benefits of mining datasets to develop innovative ways of saving money and improving products. Beyond the commercial sector, city authorities are beginning to realise the potential of doing the same to improve city management operations, to become 'smart' cities. However, little has been done to explore the merits of using such data and new technology for planning and design processes. This is to ensure that we do not say that architects aren't already using some form data to inform design.

This paper identifies four main approaches to working with data for architects, urban designers and planners:

- using data to help designers meet user needs;
- experimentation and modelling using data;
- analysing data to improve local and national policy making and implementation;
- and using data to improve transparency to speed up development processes.

Better data, and the volume and speed with which it is now becoming available, affords practitioners new possibilities to understand people and places more deeply to inform their design. Data also offers the opportunity to speed up and improve the design process itself. These benefits must be captured to deliver urban areas that develop more sustainably and operate more efficiently.

Government action is needed to enable and enhance design data collection and analysis to provide architects, urban designers and planners the information they need to create and manage the types of places people will want to live in and thrive.

This report makes the following recommendations to the Government to pave the way to designing with data:

1 **There should be better coordination between government departments to work together to realise a smart future. This will prevent data duplication and help identify gaps in data provision to enable the government to develop a more holistic framework for data capture and analysis.**

2 **As part of its Open Data initiative, the government should model and explore the potential benefits of a digital planning process. Digitising all information submitted for planning and making this data available to the public could unleash economic growth and help local authorities better inform their local planning strategies.**

3 **A joint Government, industry and academic Working Group should oversee the digitisation of planning. The Group should include built environment professionals and academics and should be facilitated by the Department for Communities and Local Government and Cabinet Office, along with organisations such as the Open Data Institute and the Future Cities Catapult.**

Introduction

Fifty years ago, it took a computer the size of a room to perform basic arithmetic calculations. Now a $600 device can store the entire world's music.[1] We are in a new age of data. Online, we generate phenomenal amounts of data; on Twitter alone, 340 million tweets are produced each day. In the physical world, huge quantities of new data about physical space and the social behaviour of people in urban spaces is being generated through technologies such as sensors, smart meters, social media, and mobile phones.

The amount of data available about urban areas is increasing. There are already 30 million networked sensor nodes in transportation, automotive, industrial, utilities and retail sectors globally and this is set to increase by 30% per annum.[2] Transport for London collects data on passenger movements through its payment system, the Oyster card, covering 80% of the journeys made on public transport in London. Our mobile phones relay our locations as we move around the city. We generate data all the time through our movements around our cities.

With all this data becoming available, some city governments are starting to use data to help plan and manage their cities more effectively to become 'smart cities'. Chicago and New York are using data to help them tackle a range of city challenges, from identifying food deserts to detecting illegal building conversions. The city of Santander in Spain has deployed 12,000 sensors measuring air quality, availability of parking spaces, and light levels to better manage the city and provide services to citizens.[3]

Meanwhile, social media is making feelings and thoughts about the city explicit. Sentiment analysis of Twitter, Facebook and others, used by companies to find out people's attitudes towards their products and services, can also reveal what people are saying and thinking about places and services.

These new large volumes of data are often termed 'big' data. The story of big data is one of clever analysis of large messy (unstructured) datasets to deduce deeper insights into our world. Big data is predicted to create huge value for industries and government over the next ten years: $300bn in value from data for US healthcare and €100bn savings for European governments in operational efficiencies.[4]

Within the urban realm, big data has so far been mostly used by city government for operational purposes: to save money and improve services. However, it has been used rather less for planning and design to date. Research into big data has concentrated on other industries such as health, retail and transport. What we see from those industries is that big data has great potential to improve design through analytics, better matching of products to people's needs, greater ability to experiment, and transparency.

Urban designers have used data about places and people in their work for a long time. One traditional source of data for development proposals has been census data, which is fairly static, updated only every ten years. But better data can inform better design decisions and there is great potential in the volumes and speed with which data is now becoming available. This paper aims to engage urban designers and planners in the debate about how data is used in our cities, and make recommendations to Government that will bind better design to the smart cities agenda.

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Data and design

How could big data on the urban realm be useful for architects, urban designers and planners? Drawing on experience from architecture and other industries,[5] we have identified four ways for designers and planners to use data to improve their work. The first relates directly to the design process, and the others build upon this process to explore other ways that city data can be generated and used to create better places.

Designing for citizens: using data to better match user needs

New types of realtime data about how people use public spaces and infrastructure could allow a better understanding of user needs and help create spaces that better meet those needs.

Experimentation: enhanced testing and modelling through using data

Data and modelling tools could allow designers and planners to save time and potentially money by testing designs before they enter the construction process. This could also help identify likely objections, and model solutions, saving time in the planning process.

City analytics: analysing big data to improve policy implementation and planning

Cities have the potential to use the vast amounts of data they hold to improve the planning and delivery of services to citizens, by using it to identify and address problems.

Transparency: reducing search and processing time through sharing data

By making more data available, the Government is making it easier for designers and planners to get critical information on development sites faster.

This section explains these areas and illustrates the benefits.

Designing for citizens

Designers have used observational data to research spaces and as input to design for many years. The 2003 redesign of Trafalgar Square by Foster and Partners with Space Syntax involved 170 observation points and surveys of 27,000 drivers to find out where they were coming from and where they were going.[6] Now much of that data could be found in other ways. Mobile phones track our movements through the city. Parking sensors, congestion charge zones, Oyster cards: all yield valuable data about how and when people are moving around the city. Social media records our thoughts and feelings about places and experiences; for example, London School of Economics' mappiness app lets people share and map when and where they feel happiest.[7] We can consult with more people in more ways.

This creates the opportunity for designers and planners to create places that are better attuned to the people who use them, by better understanding their needs through several ways:

- Understanding how spaces and neighbourhoods are used at different times of day, by different types of people, and in response to different events.
- Understanding complex relationships between different variables, such as how people respond to traffic, weather, or public events.
- Understanding who users are and what they want: learning about what people are doing in places and what they are saying about spaces, as well as being able to have conversations with more users about what they want from spaces.
- Help people make sense of spaces, by feeding back information to them while they are in those spaces – for example way-finding information.

Mappiness London School of Economics' app lets people share and map when and where they feel happiest. Image: George MacKerron/London School of Economics. www.mappiness.org.uk

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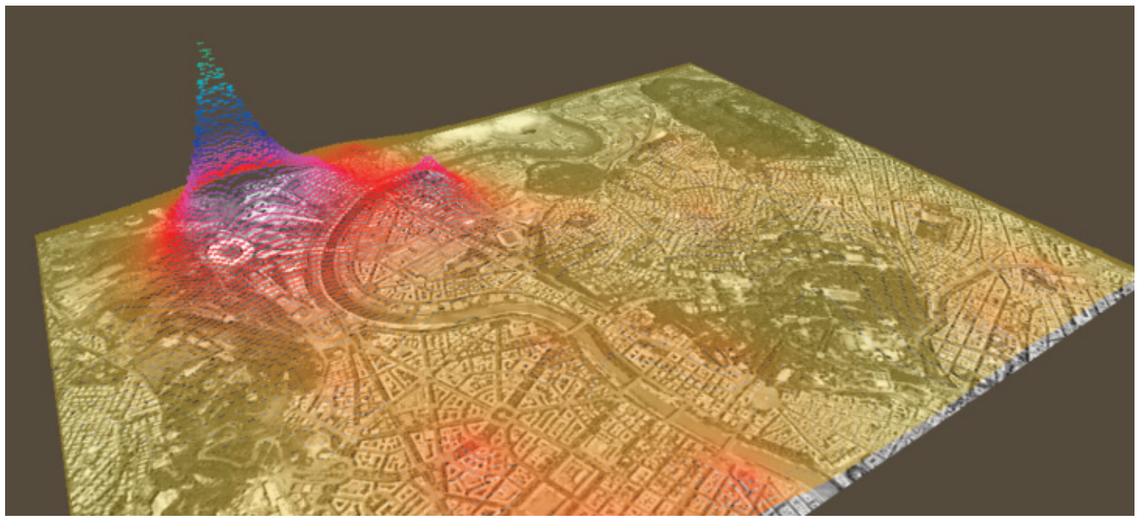
How people use space and how that changes
Realtime flows of data about people's movements are increasingly common, and formatted correctly, could be inputted into design. For example, TomTom, a leading supplier of navigation products, uses the locational data of 16.7 million anonymous mobile phone users in order to provide live information about traffic congestion to their customers.

The Massachusetts Institute of Technology (MIT) Realtime Rome[8] project used existing infrastructure from Telecom Italia to capture information from the mobile operator's network to create realtime visualisations to reveal the relationship between city events, mobile phone use and people's movements. Realtime maps like these can improve our understanding of how neighbourhoods are used in the course of a day, how the distribution of buses and taxis correlates with densities of people, how goods and services are distributed in the city, or how different social groups, such as tourists and residents, inhabit the city.

More recently MIT has begun to explore further how information can lead to better design for public spaces. For example, their Dynamic Public Spaces project[9] experimented with public spaces by using cameras and mobile sensors to capture activity in those public spaces as it happened, while collecting social media traces in realtime. They also changed the design of the square using moveable elements. The digital observations helped them understand how people moved through and behaved in the public square, and how they might react to particular design elements – allowing for analysis and testing of design.

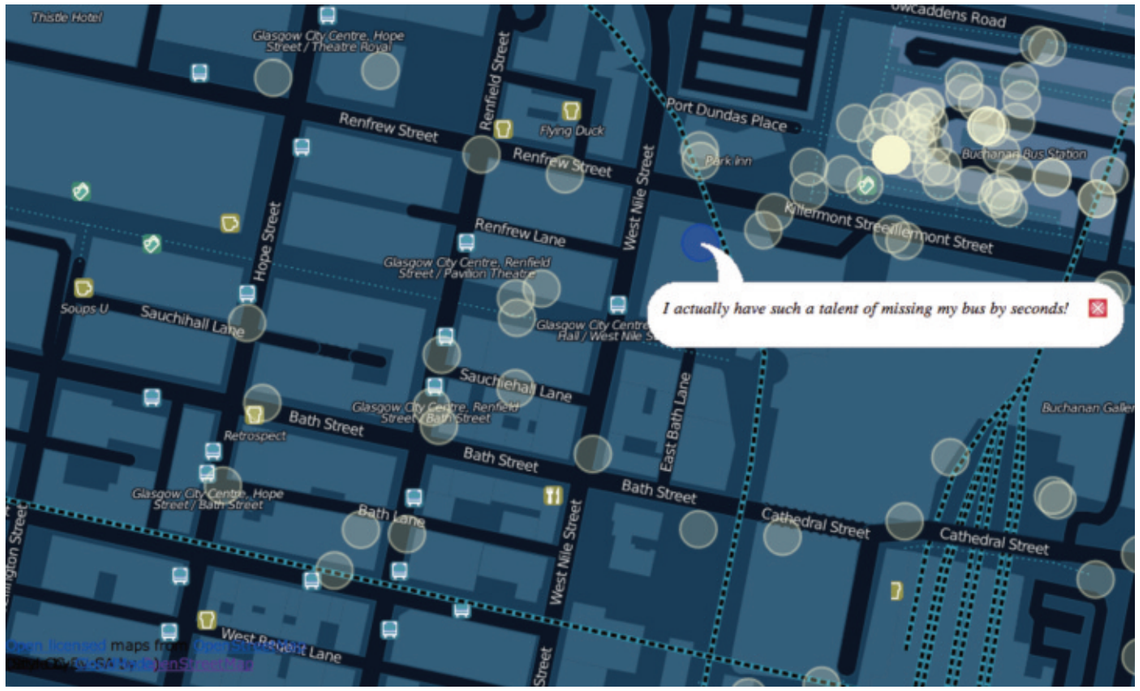
It has become much easier to use tools for observation and for designers to collect project data. The MIT project used low cost cameras and sensors on temporary mounts. Designers at Arup have been using apps like the Nike+ pedometer to calculate distances and speed as part of analysing pedestrian movements and waiting times in Australian city centres. As wearable computing devices like the Nike Fuelband, an activity tracker that is worn on the wrist, and other devices become more prevalent, there will be further opportunities to exploit technology and data.



Realtime Rome project Image depicting average cellphone user distribution in Rome during Madonna's controversial 'Live to Tell' concert on August 6 2006. The concert took place in Rome's Olympic Stadium located just three kilometres from the Vatican City, in which Madonna appeared against a mirrored cross wearing scandalous clothing. The peaks in this image represent heightened cellphone use near the Olympic stadium and the Vatican. MIT SENSEable City Lab http://senseable.mit.edu/realtimerome/

What people are thinking and saying about spaces
It is also much easier to find out what people think about spaces, which creates new opportunities to match design to people's needs and to improve on existing designs. For instance, sentiment analysis of twitter feeds could allow designers to see what people currently think and say about places. Transport API, a technology firm, has built a transport sentiment analysis map, which allows people to search for realtime tweets about buses and trains in London.[10] This could allow bus companies to find out in realtime what people are saying about their services, or could allow designers and planners to find out what people are saying about the places they are re-designing.

It is also easier to ask people what they want, and even to collaborate with them on design. There are several new consultation tools[11] which allow for the collection and analysis of feedback online. This allows designers and planners to have a greater understanding of the public given that currently only a particular set of people tend to be able and interested in attending consultation meetings. Of course not everyone participates in social media, and not everyone has access to online tools so a combination of approaches is required.



Transport API
TransportBuzz an interactive transport sentiment analysis map by TransportAPI. http://transportapi.com

Case study
Collaborative Community Map

It is often difficult for planners to gather knowledge and expertise from non-technical experts – those who live, work, or otherwise have an interest in the places being planned for. As a result, end plans tend to be based on a complex set of assumptions about a given place. Collaborative Community Map offers planners a way to engage with more people than just a select few, who either have an abundance of time to meet or a vested interest, by allowing people to participate in consultation activities at a time and place that suits them. Apart from offering the possibility to capture views of the silent majority, the map can also assist project teams in mapping constraints and concerns associated with planning and design proposals, by enabling stakeholder comments and their associated locations to be mapped. These can be drawn into a GIS tool for analysis and visualisation.

A recent example is the Parking Strategy for the City of Subiaco, Perth, Australia. The map was used as an interface through which residents, workers, students and visitors could identify the scale and nature of parking related issues. This, along with local and international best-practice techniques, was used to develop an interactive strategy for delivering a 10 year parking management plan. The mapping survey tool was available online for a month, and it was advertised via the council's website, media, and project materials sent to residents and businesses that explained how to use the online survey. People without access to a computer could request a hardcopy, which had the same format as the online survey. Using the same format meant that the hardcopy could be transferred to the online map by council staff enabling the city to have a single database of information.

Results and benefits
The interactive map helped planners reach a bigger pool of people across a larger geographical scope, including those who did not live directly in the area but still used the facilities in question. It attracted 1,349 visits and received 753 comments. Five traditional community workshops were set up following the online consultation. Planners were able to invite people who used the collaborative map directly, apart from advertising an open invite in the local paper. This contributed to high attendance rates – a total of 57 people. Despite the merits online consultation, the workshops still proved an important participative method to reach people without internet access, or who wished to communicate in person. However, the map enhanced the workshops by enabling planners to follow up on and further develop ideas proposed through the online tool.[12]

Collaborative Maps
Arup Collaborative Community Map City of Subiaco parking consultation.
www.collaborativemap.org

Making sense of space
It is not just about observation, however. Sensors open up new possibilities for practitioners to design experiences in places. Technology offers new ways of interacting with physical and digital worlds. Theme parks like DisneyWorld have long been aware of the importance of designing places that could deliver the kind of experiences customers would want to pay for.[13] Our experience of cities can be aided and augmented by digital technologies, whether it be Google Maps or bus information signs.

It is important for designers and planners to recognise the opportunities for helping people make sense of public space through technology. However, questions still remain on how to make information in public space readable and digestible for the public.[15] Smartphones are currently the main way of delivering information in public space. Touchscreens and large screens have a place, but are not always appropriate. We have not yet found the right interface between place, device and the human body. Google Glass, an augmented reality headset, is a new approach to the human-computer interface. However such devices and interfaces are not yet mature. This is an important area that deserves more attention from designers and planners.

Using public data necessitates addressing privacy and security issues. UK telecoms operators, for example, are legally required to store data for one year, but it is then illegal to for them to keep it for more than two years. We need to identify ethical standards for how public data is used. The public need to be comfortable with how their data is used and should have the right to opt out if they wish.


© Arup

"We increasingly experience cities mediated by digital technology… we need a discipline that doesn't really exist yet, a merger of urban design and urban planning with urban informatics, with networked public space."[14]
John Tolva, Chicago Chief Technology Officer

Experimentation

Data is enabling experimentation to improve the performance of city systems and places. More tools are available to professionals and the public to experiment with scenarios and smart models of real cities. This enables designers and planners to save time and potentially money by testing designs before they enter the construction process. Visualisations also help the public and professionals to engage with data about their cities and think more deeply about the relationships between place and other variables, such as movement or air quality. Through this, they can help identify likely objections and model solutions, saving time in planning.

The City of Melbourne, Australia, measures pedestrian movements using 18 sensors positioned around the city. This data is used to give the City of Melbourne a better understanding of how people use these precincts so they can manage the way they function and plan for future needs. This project enables the public to access that data through an interactive visualization tool and by downloading the sensor data.[16] The Centre for Advanced Spatial Analytics (CASA) at University College London (UCL) in London has developed a series of city dashboards[17] for cities around the UK, displaying attributes such as happiness, public transport feeds, or air pollution.

Simulation and parametric design tools have been around for a while, but they are getting more powerful and easier to use. For example, tools like ESRI's CityEngine allow designers to create 3D GIS models using city data so new designs can be more easily tested and communicated. These tools, and others, further allow designers to generate building layouts, configurations of public space and infrastructure by defining specific criteria and operational parameters. By using sensor-derived realtime data, different conditions could be quickly tested and simulated allowing more time for traditional design. The quality of analysis behind the parameters is key, as are the test assumptions of the model to ensure they are appropriate to the given situation.[18]

There are more ambitious efforts to produce simulation and predictive models for city regions. The Ecological Sequestration Trust is developing a new open-source urban-rural tool to understand how the flow of resources in a region impacts on its economy, society and ecology. This allows analysis of current conditions, as well as simulation of future conditions, as input to policy making and design.


© Daniel Imade/Arup

City Dashboard
University College London's Centre for Advanced Spatial Analysis (CASA) in London has developed a series of city dashboards for cities around the UK, displaying attributes such as happiness, public transport feeds, or air pollution. http://citydashboard.org/london

Case study
Experimentation-enhanced testing and modelling using data

Prof Peter Head CBE FREng FRSA, Director, Arup

The Ecosequestration Trust is developing a regional-scale interface that will provide a new way to attract and connect regional investment funds, such as public sector bonds, for low-carbon and resilient development. This will help communities and individuals secure funding to create the type of places and lifestyle changes that the fund supports. The platform will assemble a range of social, ecological and economic activity data, which could allow multiple stakeholders – including architects and urban planners – to undertake collaborative integrated design. This could help investments move forward more quickly through the planning process, and the access to capital would help developers and the construction industry create jobs in the region faster. Additionally, the platform will record the social and economic benefits that will result from the public private partnership (PPP) projects, to build an evidence base of the effectiveness of this interface.

Gaming applications continue to influence testing and modelling tools. From early examples such as Civilisation and SimCity – the inspiration for many planners – allow people to think through development of an imaginary city. Betaville uses gaming technology for collaborative planning of real cities. Inspired by open source software development, Betaville is a multiplayer environment based on real cities in which ideas for new works of architecture, urban design and development can be shared and discussed in context[19] by professionals and interested members of the public.

City Analytics

Many cities are starting to use the vast troves of data they already hold to improve planning and delivery of services to the public, driven by the need to serve more people with fewer resources.

Two leading examples are New York City and Chicago in the US. Both cities set up data analytics functions within their city governments to mine data for actionable insights. Their analysts use data from a range of sources across city government.

Betaville
Betaville Gaming technology for collaborative planning of real cities. Gotham Innovation Greenhouse http://betaville.net

Case study
New York

In New York a terabyte of raw information, enough to fill nearly 143 million printed pages, passes through the Mayor's office daily.[20] Drawing on this data, New York has been able to help their front line staff become more effective. They have reduced the amount of time that building inspectors spend remediating dangerous illegal apartment conversions, doubled the hit rate for discovering shops selling bootlegged cigarettes (impacting tax revenues), and began fighting a prescription drug epidemic by identifying pharmacies with unusual levels of sales of certain types of drugs.

New York's '311'[21] service provides the public with hundreds of city datasets, including permitted development, restaurant inspections, annual power use by ZIP code, Wi-Fi hotspots and maps of public parks and sanitation services. Citizens are encouraged to comment on the quality of services to improve service delivery and the overall operation of the city. The data allows the creation of mobile phone apps to solve common urban problems such as congestion and road accidents involving cyclists. Popular city-based apps include 'green-can', which enables users to locate the nearest recycling bin. The bin informs citizens about what type of waste it accepts. This provides valuable feedback to the city about where recycling bins should be placed. 'Bikepool'[22] is also a new way-finding tool that assists cyclists in avoiding roads with high fatalities. The tool suggests alternative park routes, and pinpoints public sanitation facilities and rest-stops to encourage safer cycling. The benefit to the City is a safer greener environment.

The City of Chicago is looking at ways to improve policy and decision making through using data. They are using data analytics to make predictions at a neighbourhood and block level for policy interventions in public safety, use of infrastructure, public health and transportation.[23] A good example is the work to identify food deserts in Chicago. Using transport information with other datasets, the city authorities were able to identify places with little or no access to fresh food. Mayor Emanuel of Chicago recently announced a 20% drop in food deserts since 2011.[24]

Chicago and New York are among the leading cities in the use of data to improve city outcomes. Here in the UK, there is also a lot of interest in using data better in city management and planning. For example, the recent Technology Strategy Board's 'Future Cities' competition saw 29 cities put forward plans for how they would tackle the integration of city systems in their cities, looking at how city systems can work together for mutual benefit. All planned for a data platform as a tool to improve economic, environmental and social outcomes.[25] Bristol, Manchester and Birmingham are among the cities looking to take these plans forward.

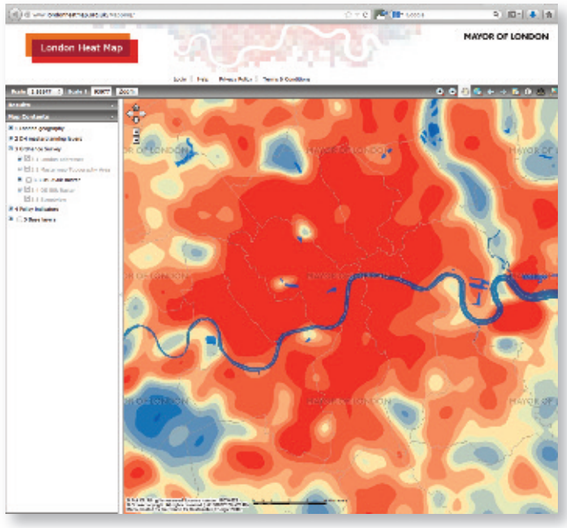
Transparency

One of the key benefits of adopting a smart approach to data is the ability to see lots of datasets in context with each other, and to detect temporal and spatial patterns. This transparency saves time and cost by reducing the time needed to find and process key data. The London Heat Map is a case in point. The interactive tool developed by the Greater London Authority (GLA) allows people to identify opportunities for Decentralised Energy projects in London, such as Combined Heat and Power (CHP) or district heating networks.[26] Public organisations, property developers, social landlords or investors can also use it to view spatial information that can help them identify and develop Distributed Energy opportunities, such as data on: major energy consumers, fuel consumption and carbon emissions, energy supply plants, community heating networks, and heat density. The London Heat Map will evolve over time alongside the Decentralised Energy for London programme and become more useful and sophisticated as boroughs and other stakeholders start inputting more energy data into the map.

Fortunately it is now possible to access increasingly more amounts of public data. Open data is a concept centred on the idea that certain information should be freely available for people to use and reuse without restriction. Whilst the academic world realised the need to open up data back in the late 1950's,[27] governments have only recently recognised the power and benefits of this. The EU expects its 2011 open data strategy to deliver a €40 billion boost to its economy each year.[28] In the last few years, national and municipal governments around the world have been establishing online data portals to catalogue and distribute their own open data, with the UK in the early vanguard establishing data.gov.uk in 2009.

An increasing number of individual government departments and agencies are now publishing their datasets online, such as the Ordnance Survey, the Environment Agency and Transport for London. This has made it easier and faster for designers to obtain critical information about development sites, such as maps, predominant land uses, or flood plain locations. The recently released Shakespeare Review of Open Data (2013)[29] suggests open data has the potential to deliver a £2 billion injection to the UK economy in the short-term, and a further £6-7 billion further down the line.

The UK government has recently made changes to how it licences its data in order to facilitate reuse of public sector information, through its publication of the Open Government Licence v2.0. Public sector agencies and city governments are encouraged to share data at no or marginal cost.[30] Many UK cities have set up open data portals and are looking at how to better share data, but there is little standardisation so far on the spatial data that is collected.



London Heatmap
The interactive tool developed by the Greater London Authority (GLA) allows people to identify opportunities for Decentralised Energy projects in London. www.londonheatmap.org.uk (reproduced with the permission of the GLA)

Implications for current practice

We have demonstrated how data can be used by designers and planners in four ways: to design places that better serve the people that they are designed for, to allow more experimentation and testing before construction, to improve evidence-base building and analytics for policy making, and to improve visibility and information sharing. The examples we have outlined show that there are numerous opportunities for data to be put to use and feed into design. Current practice could benefit from several UK government initiatives happening at the moment in order to achieve this.

The UK government is pushing forward a number of initiatives connected to big data and smart cities. The Department for Business, Innovation and Skills (BIS) is setting up a Smart Cities Forum for policymakers, cities, businesses and researchers to develop and coordinate policy more effectively. BIS has also commissioned the British Standards Institute to identify where standards could help address barriers to implementing smart city concepts including data sharing between agencies.[31]

The Cabinet Office is leading on open data policy and looking at ways to encourage private data sharing. The Technology Strategy Board has sponsored the establishment of the Open Data Institute (ODI) and the Future Cities Catapult. The ODI is an innovative organisation set up to promote and enable the use of open data for economic, environmental and social benefits. The Future Cities Catapult is intended to be a place where cities, businesses and universities come together to develop solutions to the future needs of our cities.

So far, architects and urban planners have been largely absent from these discussions despite being great users and visualisers of data. If the economic, social and environmental benefits of big data are to be extended to the spatial disciplines of planning and design, then they need to be connected to the open data and smart city debate for three reasons.

1 We need to move beyond technology-driven ideas of the city and incorporate more urban theory and practice into the design of solutions for the complex systems that are cities.[32] This extends to city analytics. Whilst big data has the potential to uncover relationships between different variables, theory is needed to provide a framework for understanding its significance. For example, in New York City, the statistical finding that shopkeepers keeping their doors open reduced the incidence of crime could also have been predicted by urban theory (NYC's own Jane Jacobs wrote about the need for 'eyes on the street' many years ago[33]). We need to be aware of what big data can do, when it is needed, and how it should be used – to test hypotheses and provide evidence.

2 We now experience urban spaces mediated through digital tools. We use our mobile phones to navigate, access transport information, or to socialise in public places. There is great potential for designers and planners to use digital tools to help people make sense of urban spaces. However, the tools are not yet well developed, partially because the relationship between smart infrastructure and space is not yet fully understood. Designers and planners need to engage with technologists to understand how these technologies could impact on the design of urban spaces, and how people experience them.

3 The needs of urban designers and planners for data are underrepresented in the current open data discussions. More work needs to be done to define these needs, such as how data should be captured, shared and made accessible. Beyond the realtime data we have discussed, there is also a huge amount of useful data in submitted planning documents that is difficult and time consuming to access. Current practice demands that documents are submitted to planning in formats that are not machine- readable (PDF), so they have to be sifted through by hand. Processes and protocols for sharing data therefore need to be developed, that would respect individuals' intellectual property whilst allowing multiple stakeholders to collaborate. Standards for making data available also need to be agreed. It is not uncommon for adjacent local authorities to use different standards, forms and practices for making data available.

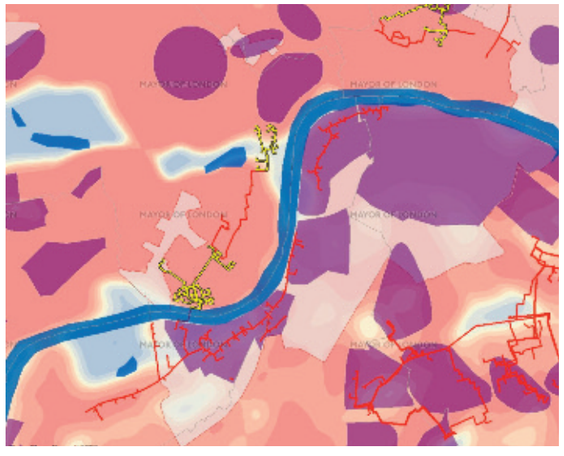
Smart benefits

A smart approach to architectural and urban design could have a profound effect on our cities and communities, on how they are designed and how they look and operate once they are designed. An intelligent use of data could help to design places which respond effortlessly to public need or reduce and reuse excess energy. From an architectural perspective, the clear benefits data could help to realise are better designed places and better design processes.

"A smart approach could help the construction industry realise low carbon, resilient development that is future-proofed and flexible to accommodate climate change and economic growth. A common language and accessible platform that would enable datasets to be evaluated in relation to one another could help designers understand and respond to dynamic change. For example, smart data could help test the impact of likely building fabric improvements through the Government's Green Deal or regeneration schemes, to show how the GLA's Heat Map would adjust to these variables. The data could also be used to model the impact of new renewable energy generation and future development on the map. This would enable the creation of a resilient low carbon transition plan for London that would take into account a range of considerations.

If consistent data could be shared whilst protecting intellectual property, stakeholders would also be able to partner beyond the development boundary. A common data platform would enable opportunities only achievable through economies of scale and collaboration. For instance, where Combined Heat and Power (CHP) is proposed, heat could be more freely shared with neighbouring residential developments, schools, or public buildings with a relatively high heat load. This would enable the optimum amount of electricity to be generated off the CHP for office or commercial uses that typically have a low heat demand."

Alan Shingler, Partner, Head of Sustainability, Sheppard Robson



London Heatmap
The interactive tool developed by the Greater London Authority (GLA) allows people to identify opportunities for Decentralised Energy projects in London. www.londonheatmap.org.uk (reproduced with the permission of the GLA)

"Throughout the design process we assemble huge amounts of data – to inform design decisions and to support planning applications. Sometimes this is site specific, such as density and area calculations, but often it has a wider technical relevance to variables like transport accessibility, air quality, noise or flood risk assessments. Although this information is all available online it tends to be buried in scanned documents and PDFs. This data could be used more intelligently if it was collected and stored in more appropriate formats.

Every planning authority across the country is scrambling to evaluate land supply and make strategic decisions about where housing should be located, but policy makers do not necessarily have sufficient base information to make good decisions about site suitability and housing quality. If essential data for exemplar schemes and for comparison was available and accessible, we could build a much better process for delivering housing quality."

Richard Partington MA (Cantab) DipArch RIBA, Director, Richards Partington Architects

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Policy recommendations

There are great opportunities for designers and planners to use data and digital tools for better design. However, we are only at the beginning of the journey and there is further work to be done to bring built environment professionals, technologists and Government together to work out how best to capture these opportunities- including making data available, and developing tools to use that data in design. We have three recommendations to begin this process.

Recommendation 1:

Better coordination between government departments to work together to realise a smart future

The opportunities made possible through more and better data are starting to be realised by the UK government. But the focus is operational and needs to look beyond the management of cities to their design and development. Government departments therefore need to talk to each other to ensure data duplication is avoided and that gaps in data collection are identified. This would help the government develop a more holistic framework for smart data capture and analysis that incorporates lower level data, particularly that relating to the built environment.

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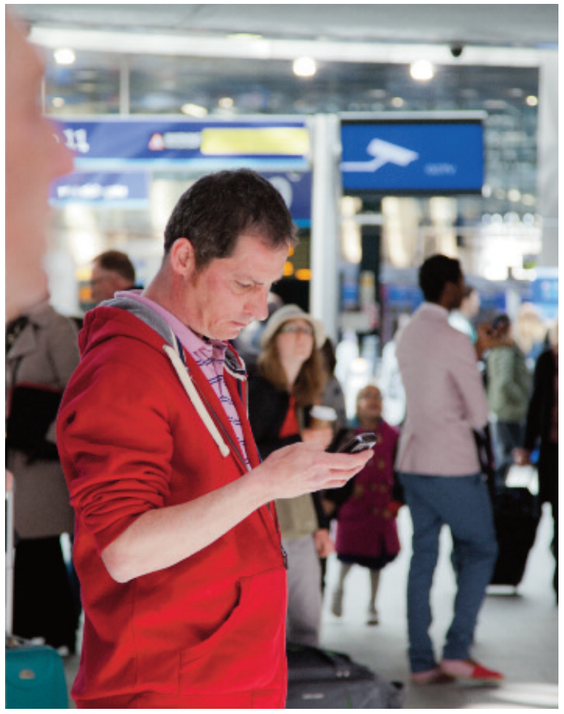
Recommendation 2:

Facilitate the digitisation of the planning process

As part of its Open Data initiative the government should model and explore the potential benefits of a digital planning process. Government should scope how it can standardise the digitisation of all information submitted for planning, and of standardising design data collection across local authorities. This public data should be open to unleash economic growth; and local authorities should be encouraged to use open data to inform local planning strategies.



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Recommendation 3:

The UK Government should commit to work with professionals to incorporate and develop smart design data specific to the built environment

To oversee the digitisation of planning Government needs to work closely with the built environment industry. The Department for Communities and Local Government and Cabinet Office, along with organisations such as the Open Data Institute and the Future Cities Catapult, should jointly set up a working group with built environment professionals and academics.

This working group should:

- Establish what data would be useful to support the design process and identify key design data across scales and stages of design.
- Identify relevant data formats
- Identify and prioritise design data capture methods that can be integral to current data collation practices in order to accelerate market innovation and create diversity.
- Identify the skill and tool gap for realising design data potential and address it.
- Develop a legal framework that would protect intellectual property disclosed on the design data portal to encourage data sharing.
- Collaborate with leading academic institutions to explore the research and development of various toolkits that will help practitioners collect and manipulate big data in a meaningful way (efficiently, creatively, sensitively to local context).
- Communicate the value of smart design data to the government, to ensure its development is incorporated in smart and open data initiatives.

These steps will help the government enable relevant smart data collection, and enhance its analysis to create and manage the types of places people will want to live in and thrive.

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