NLGN
NEW LOCAL GOVERNMENT NETWORK

DEMYSTIFYING DATA

THE DATA REVOLUTION AND WHAT IT MEANS FOR LOCAL GOVERNMENT

AN NLGN WHITE PAPER

Maia Beresford

New Local Government Network (NLGN) is an independent think tank that seeks to transform public services, revitalise local political leadership and empower local communities. NLGN is publishing this report as part of its programme of research and innovative policy projects, which we hope will be of use to policy makers and practitioners. The views expressed are however those of the authors and not necessarily those of NLGN.

© NLGN April 2015
All rights reserved
Published by NLGN
Hub Westminster, 80 Haymarket
1st Floor, New Zealand House
London, SW1Y 4TE
Tel 020 7148 4601 . Email info@nlgn.org.uk . www.nlgn.org.uk

CONTENTS

FOREWORD 4

1 INTRODUCTION 6

2 DATA DIVIDEND 10

3 VULNERABILITIES 20

4 NEXT STEPS TO HARNESS LOCAL DATA 35

5 RECOMMENDATIONS 45

6 CONCLUSION 48

APPENDIX 1: DATA GLOSSARY AND DIAGRAMS 50

APPENDIX 2: DIGITAL GLOSSARY 55

APPENDIX 3: USEFUL RESOURCES AND PUBLICATIONS 58

ABOUT THE PARTNER 62

FOREWORD

21ST CENTURY DIGITAL GOVERNMENT LEADERSHIP

Government organisations on just about every continent are straining to keep up with the fast-paced, innovative progress that society is making. As a result, they are losing relevance and finding their legitimacy increasingly threatened.

Fortunately, there are many elected officials and government IT executives around the world who are determined to reverse this negative course and perception. These public sector leaders are seeking greater connection with citizens by increasing the transparency, effectiveness, efficiency, and responsiveness of their governments. They are harnessing a new generation of affordable and easy-to-use technology solutions to bring government closer to the people, and to make government work better for the people.

This is the essence of the data-driven government revolution. Data-driven government refers to the myriad of government-to-constituent, government-to-employee, and even government-to-government processes, workflows, transactions and user experiences that are positively impacted by a new appreciation for both open and protected data.

Deploying data-driven solutions in order to tackle pressing public sector problems has resulted in the spread of mission-critical digital government leadership (DGL), which will ultimately transform cities, states, regions, and nations into innovative leaders for the new economy of the 21st century. At its heart, DGL is based on the very real and powerful idea that data is an invaluable strategic asset and a critical new resource for government.

If it is implemented and sustained effectively, it has been shown that DGL can achieve measurable and profound performance impact for governments when it comes to everything from citizen participation to transparency and accountability, data-driven and evidence-based decision-making to service and programme innovation.

Beyond just focusing on reducing costs, public sector leaders are also seeking new ways to expand prosperity in their communities today. And data-driven government is increasingly appealing, because it has proven that it can fuel private sector ecosystem creation as well as economic growth.

The aggregate economic impact from applications based on open data across 27 of the European Union countries, for example, is estimated to be €140 billion ($160 billion) annually. Spain is a good case in point. Its infomediary sector, which is comprised solely of companies that sell services on top of open data, generates €330-€550 million ($370-$520 million) a year.

Just as the right low-cost, high-touch and high-performance technologies have transformed the enterprise and consumer marketplaces in recent years, these cutting-edge solutions can now help governments around the world confront and mitigate a portfolio of problems that have long blunted their effectiveness and tarnished their reputations.

Given the scope, sweep and severity of these problems, there is precious little time to waste and huge opportunities to be grasped.

Kevin Merritt
Founder and CEO, Socrata

1 INTRODUCTION

There is a buzz about data – terms such as big data, open data, and linked data are increasingly talked about and data has been described as 'the new oil'.[1] This paper from NLGN is intended to demystify this 'data revolution' – to set out in clear language what it is all about, and how local governments can harness its value for their areas.

Our key argument is that advances in our ability to collect, store, analyse and exchange data digitally have profound implications for society which local government cannot ignore, but that at present a lack of knowledge and understanding is preventing councils from realising its full potential. With concerted individual and collective effort from all of us, we can maximise the value of data locally.

We argue that there are two main ways in which the data revolution can benefit local places:

■ POWERING LOCAL ECONOMIC DEVELOPMENT

Big data' and 'open data' products and analytic services are set to mushroom as drivers of global economic growth, with a recent McKinsey report estimating that improved use of open data across just seven industries could generate $3 trillion in additional global economic value each year.[2] Local businesses that are supported by councils to ride this data wave by using and producing data-driven products and services can raise their productivity and develop useful products that customers love to use. This can generate tax revenues and power local economic growth.

1 'Is Data Really the New Oil?' MetaMetrics Blog (11 November 2013) http://www.metametrics.co.uk/data-really-new-oil/

2 The seven industries are education, transportation, consumer products, electricity, oil and gas, health care, and consumer finance. See, J. Manyika et al., (2013), "Open Data: Unlocking Innovation and Performance with Liquid Information". Available at: http://www.mckinsey.com/insights/business_technology/open_data_unlocking_innovation_and_performance_with_liquid_information, p.6

TRANSFORMING LOCAL PUBLIC AND SOCIAL SERVICES

For local public services, open and big data-driven products and services such as predictive software, data visualisations, and interrogation of open and joined-up data pools offer the opportunity to dramatically improve decision-making; enable councils to target resources more effectively; revolutionise accountability and performance management; integrate and join up care; empower citizens through new data-driven products and services; and open up the way in which local government operates and relates to citizens.

There are numerous exciting initiatives discussed in the paper showcasing how councils are starting to reap these rewards. Compared to where we were just a year ago we believe the tide has now turned and councils are recognising the value of data to their services and their economies.

Yet across the piece there is scope for councils to play a much bigger role supporting and shaping the data revolution in their areas and nationally, and acting to combat some of the vulnerabilities threatening the sector. The simplest way for councils to do this is to broker relationships and create local economic and skills strategies with data economies in mind; to use more data themselves; to release more public sector data openly in a way which generates demand for it across the sector; and to further their roles as thought leaders and stakeholders in this area to ensure important issues such as privacy, data ownership and data sharing are addressed by national legislation.

'Culture' is often cited as a barrier to this agenda within local government, and it does emerge as a barrier in our research. Fear and a lack of confidence, which is generally born from deficiencies in knowledge, skills, and supportive governance structures, are holding places back. These are the core areas requiring local and central government attention. In order for councils and local businesses to realise the rewards of the data revolution, improving public and private sector data manipulation and analytic skills is particularly important.

RECOMMENDATIONS

- Local government should **release more non-personal public sector data in open data formats** via accessible platforms for use by businesses, social enterprises, the voluntary sector, and other local groups.
- Senior **council directors should come together, with input from frontline staff, managers and other public sector partners, to scrutinise their current approach to data** and **create local data strategies.**
- Local authorities should collaborate with each other and with local further education institutions and employers to **foster digital skills and demand for public sector open data amongst existing businesses and SMEs in particular**, learning from a number of Digital Business Academies established around the country.
- Councils should develop skills in their existing workforce by forming exchanges and **placement partnerships with local consultancies, universities and further education institutions with strong data capabilities to learn from their practice.**
- Local economic development leads should identify whether they have the foundations for **embryonic data and technology business clusters** and use their place shaping powers and relationship with LEPs to develop these.
- We recommend the establishment of a **Local Government Digital Programme** including a cross sector **skills development programme**, as argued in a previous NLGN report.[3]
- Independently or as part of this programme, we recommend the creation of a **network of regional Public Data Analytics Hubs** to pool public sector staff, university students and volunteers to solve local problems using data.
- We recommend the development of a **Local Government Open**

3 M. Beresford, (2014) 'Smart People, Smart Places: Realising Digital Local Government' http://www.nlgn.org.uk/public/wp-content/uploads/Smart-People-Smart-Places.pdf

Data Index and **Open Data Top 30** to allow councils to benchmark their open data maturity, and to celebrate the most open data mature organisations in the sector.

- An **overhaul and rationalisation of data sharing legislation**, taking on board the recommendations made by the recent Open Policy Making group investigating this issue.[4]

These recommendations are laid out in more detail at the end of this report.

METHODOLOGY

This paper is the result of a short independent research project by NLGN which was supported by Socrata, involving a literature review and two roundtables with local government staff and stakeholders. It builds on NLGN's previous report 'Smart People, Smart Places: Realising Digital Local Government'.[5]

4 See conclusions of civil society and public sector policy discussions on data use in government http://datasharing.org.uk/conclusions/

5 M. Beresford, (2014) 'Smart People, Smart Places: Realising Digital Local Government' http://www.nlgn.org.uk/public/wp-content/uploads/Smart-People-Smart-Places.pdf

2 DATA DIVIDEND

Collecting and using data to communicate and make better decisions is nothing new, in industry or government. However, recent advances in computer power mean that now we can and do collect and store so much data digitally.

Indeed it has been reported that 90 per cent of the world's digital data has been created in the last two years alone.[6] Smartphones and new computer applications encourage and enable us to frequently record personal data such as our weight or the duration of our exercise sessions; social media and the internet have borne numerous new forms of digital data such as our 'likes', 'page views', online purchases and number of 'friends'. The advent of smart sensor technologies and the 'Internet of Things' mean that everything from human heartbeats to the movements of trees, the density of clouds in public spaces, and the pressure on floorboards can be sensed, measured, and stored digitally.

We can now collect new forms of data and much more of it, but in addition new technologies and software systems mean that we can now analyse it on a much greater scale and with far greater speed, sophistication and automation.

This revolution in our ability to record, share, analyse and respond to data digitally has substantial consequences for society and is hugely relevant to business and government. In this section we outline the main opportunities for local economies and for the public and third sector.

For local economies

- Private sector products and productivity
- Jobs and tax revenue

6 See L. Bradshaw, (2014), "Big Data and What it Means". Available at: http://www.uschamberfoundation.org/bhq/big-data-and-what-it-means; IBM "What is Big Data?" Available at: http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html

For the public and third sector

- Better public sector data-driven decision-making
- An increase in government transparency, accountability and performance management
- Citizen empowerment and self-help
- The better care possible owing to digital data sharing

FOR LOCAL ECONOMIES

Globally the 'data-driven economy' is set to mushroom in coming years. According to a study conducted by IDC, big data technology and services are expected to grow worldwide at a compound annual growth rate of 40% – about seven times that of the ICT market overall.[7] UK and local businesses that can harness data effectively can fuel productivity and develop new products that improve consumers' lives, provide new jobs in their area, and ultimately increase tax revenues for governments.

PRODUCTS AND PRODUCTIVITY

The benefits of the 'data economy' for businesses are wide ranging (Box 1).[8] Many of the productivity benefits come from the collection and analysis of data to understand processes or customer behaviour, often in real-time, and use of programmes and human intelligence to tailor responses, marketing or products as a result. Companies forging ahead are those which are constantly updating their customer experience through real-time data, with products and services constantly improved by patches. Amazon are well known for using data to tailor their customer offer and improve back-office functionality. Similarly the video game industry is now constantly improving games though their ability to collect insight about the game-play, gamers, and bugs they encounter. For example, live content can be created to help gamers move through the game if they are facing problems, tailoring the experience

7 European Commission, (2015), "Towards a Thriving Data-Driven Economy". Available at: http://ec.europa.eu/digital-agenda/en/towards-thriving-data-driven-economy

8 Organization for Economic Cooperation and Development, (2013), "Exploring Data-Driven Innovation as a Source of Growth," OECD Digital Economy Papers, No. 222.

to the user. Game companies can also trial different features or adverts and see how these affect how users interact with and enjoy the game.[9]

Better use of data technology can benefit a wide array of industries, including those not often considered particularly 'digital'. For example 'precision farming' is taking off in some parts of the USA – where agriculturalists use programmes and smart sensors to enable tractors to drive themselves, whilst farmers analyse crop yield in real-time, and coordinate tasks from their iPads.[10]

BOX 1: BENEFITS OF DATA[11]

- Developing new organisational and management approaches or significantly improving existing practices (data-driven organisation), often by **using data to make better decisions**
- Improving marketing by providing **targeted advertisements and personalised recommendations** (data-driven marketing)
- Developing **new products** (goods and services) by using data either as a product (data products) or as a major component of a product (data-intensive products)
- **Optimising production or delivery processes** and supply chains (data-driven processes) for example through smart grids or smart logistics and technology
- **Enhancing research and development** (data-driven R&D) which shortens the trial and error process of innovation

9 R Taneja (2013), "Video Games: The Biggest Big Data Challenge" at Strata 2013 Conference. View at: https://www.youtube.com/watch?v=ZK_PXlbvOfM

10 For example 'Precision Farming' has taken off in the USA. See http://www.precisionfarmingdealer.com/content/360-yield-center-holds-yield-summit-2015

11 Organization for Economic Cooperation and Development, (2013), "Exploring Data-Driven Innovation as a Source of Growth," OECD Digital Economy Papers, No. 222.

There is a strong link between higher levels of data use and business productivity in terms of value added: companies in the top 16% of data use are 8% more productive than their competitors.[12] In particular, companies like those mentioned that *analyse* (rather than just collect) data and use this for decision-making are more likely to have higher productivity.[13] What is more they also see a boost in their profits: their EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortisation – a measure that captures how good a company is at generating net profits per operations) per employee is £3,180 higher than the average, and their return on equity is 4.3% higher.[14]

More broadly, the 'data economy' is leading to new useful products and services for customers. Data management and analytics are particularly relevant to the development of robotics and smart sensor technologies, and data analytics and technology has horizontal relevance across other tech sectors too.[15] Specific 'data-driven products' are also helping to make businesses and individuals' lives easier. For example Duedil is a database and website which pulls together business data from various sources, including open data from Companies House. By aggregating previously siloed information such as contact information and financial data, and providing analytical and visualisation tools to analyse this, it dramatically revolutionises the way that companies, potential investors and other interested parties conduct due diligence and find out about companies' corporate structures.[16]

12 NESTA, (2014), "Inside the DataVores". Available at: http://www.nesta.org.uk/blog/inside-datavores-how-data-driven-businesses-are-raising-productivity-and-increasing-profits

13 Analytical firms that probe the data they collect with a wider variety of methods (such as controlled experiments on their websites, or data and text mining to discover patterns in their customer data) are 11% more productive. NESTA, (2014), "Inside the DataVores". Available at: http://www.nesta.org.uk/blog/inside-datavores-how-data-driven-businesses-are-raising-productivity-and-increasing-profits

14 Ibid.

15 Tech City UK, (2015), "Powering the Digital Economy". Available at: http://www.techcityuk.com/wp-content/uploads/2015/02/Tech%20Nation%202015.pdf, p.69

16 A. Williams, (2013), "Duedil Raises $5m for Open Data Platform To Conduct the Due Diligence Companies Need". Available at: http://techcrunch.com/2013/04/12/duedi-raises-5m-for-open-data-platform-to-do-the-diligence-companies-need/

JOBS AND TAX REVENUE

As a result of these new products and services, the value of data to the economy is expected to be substantial. Supporting the data-driven economy also promises much wider economic benefits and tax revenue for governments. Understandably both the EU Commission and UK government are keen to strengthen the European and UK position in this growing market with the view to it playing a key role in the economic recovery, and all things going well, the Centre for Economics and Business Research estimated that the big data marketplace could create 58,000 new jobs in the UK between 2012 and 2017.[17]

Much of the purely economic value attributed to the data revolution comes from the greater use and sharing of this data openly as 'open data' for businesses or social enterprises such as Duedil to reuse in order to create new data-driven products, or for citizens to use to engage more effectively with public bodies. A recent McKinsey report estimated that improved use of open data across just seven industries could generate $3 trillion in additional economic value each year, $900billion of which would fall to Europe.[18] As such there is a strong financial and economic case for 'opening up' public data and supporting the growth of data-driven businesses.

FOR THE PUBLIC AND THIRD SECTOR

In addition to benefiting from the economic rewards that come from supporting data-driven growth, governments can also learn much from how the private sector maximises the value of digitised data. Governments can also use data-enabled understanding and responsiveness to streamline processes and better target communications and services, and to develop

17 HM Government, (2013), "Seizing the Data Opportunity". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254136/bis-13-1250-strategy-for-uk-data-capability-v4.pdf, p.8/9

18 The seven industries are education, transportation, consumer products, electricity, oil and gas, health care, and consumer finance. See, J. Manyika et al., (2013), "Open Data: Unlocking Innovation and Performance with Liquid Information". Available at: http://www.mckinsey.com/insights/business_technology/open_data_unlocking_innovation_and_performance_with_liquid_information, p.6

new services which improve citizens' lives by using data as their main component.

BIG DATA, BETTER DECISIONS

Councils regularly use data to understand their areas and make decisions. But more advanced use of local data offers councils the ability to understand localities and social problems much better, and target helpful solutions to a far greater extent.

In places such as New York and Chicago the use of open data pulled together from various sources is helping to revolutionise how they target resources and make decisions. Closer to home, we know that similar sorts of big data-enabled initiatives are underway. For example the London Fire Brigade target their Home Fires Safety Visits to 'priority' area postcodes which data analytic software, derived from analysing data on demographics and fire prevalence, suggests are those where home fires are most likely to take place.[19]

Similarly in a number of places such as Gravesham, the councils have used predictive analytics along with data matching to predict the areas which are likely to have council tax violations and target them effectively.[20] Trafford have used open data to determine the best locations for defibrillators by mapping ambulance request data, analysing demographic and health data and crowdmapping existing sites; and Hampshire is using open data to forecast pressure points on GP surgeries over the next 5 years, allowing decision-makers to test the impact of different policy.[21]

19 London Fire Brigade, (2013), "Targeting those most at risk from fire". Available at: http://www.london-fire.gov.uk/Documents/Sup05-Targeting-those-most-at-risk-from-fire.pdf; London Fire Brigade, (2013), "Brigade visits prevent five thousand fires in London". Available at: http://www.london-fire.gov.uk/news/C92C30A17C5547278C728EF4B9A8B530_Visitsprevent5000fires.asp#.VPh7PPmsVU8

20 E. Copeland, (2014), "Small Pieces Loosely Joined". Available at: http://www.policyexchange.org.uk/webreports/small-pieces-loosely-joined/ ; Fujitsu, (2013), "Case Study?: Gravesham Borough Council". Available at: http://www.fujitsu.com/fts/about/resources/case-studies/CS-Gravesham-Borough-Council-171013.html

21 Cabinet Office, (2015) Local Open Data Champions presentation. Available at: http://data.gov.uk/sites/default/files/Local%20Open%20Data%20Champion%20Case%20Studies.pdf

SPOTLIGHT: NEW YORK DATA-DRIVEN DECISION-MAKING

In New York, the mayor established the Mayor's Office of Data Analytics (ODA), which amongst other achievements created a Data Bridge. This brings together formerly siloed information datasets on a single platform, allowing a cross-departmental data analysis from 40 different agencies. By applying analytics, the team has been able to find previously unknown patterns and relationships that lead to better decisions and resource allocation. For example in 2013 they wanted to find a way to crack down on restaurants illegally dumping cooking oil into sewers and contributing to blocked drains. By analysing data from the Business Integrity Commission, which collects data on whether local restaurants have a service to haul away their grease, and mapping this onto other geo-located data such as the location of drains and blockages, the ODA were able to supply inspectors with a list of statistically likely suspects so that their inspections were targeted. This resulted in a 95 percent success rate in tracking down restaurants which were dumping their waste illegally.[22]

When combined with new smart sensor technology, the Internet of Things (IoT), and Machine to Machine (M2M) information exchange, data promises to revolutionise the efficiency of supply chains and government processes. For example in Milton Keynes they are developing a project using sensors to measure the capacity of recycling bins and communicate this to the council's waste collection team in order to make sure only full bins are collected, revolutionising logistics and schedules, reducing the cost of waste collections and enabling the prioritisation of spending in other areas.[23]

22 A. Feuer, (2013), "The Mayor's Geek Squad", The New York Times. Available at: http://www.nytimes.com/2013/03/24/nyregion/mayor-bloombergs-geek-squad.html?pagewanted=all&_r=0; GCN, (2013), "How analytics is making NYC's streets and buildings safer". Available at: http://gcn.com/Articles/2013/10/04/GCN-Award-NYC-DataBridge.aspx?Page=2

23 MK:Smart, (2014), "MK:Smart – helping to deliver the Internet of Things in Milton Keynes". Available at: http://www.mksmart.org/blog/2014/05/23/mksmart-helping-to-deliver-the-internet-of-things-in-milton-keynes/

OPENING DATA, OPENING GOVERNMENT

Whilst some of these 'data solutions' are especially sophisticated, even the use of relatively simple performance dashboards can reap significant benefits to organisational performance. By presenting data about council targets and performance in an accessible format, dashboards can more easily engage and empower staff and councillors to maintain vision and performance against targets. In some councils this evidence and performance-based approach to policy and management is fully ingrained. For example one council service director in our roundtable group mentioned how in their council the council leader is 'into data' and is 'all about the "tartan rug" of the performance report', which is used at each council meeting to show how the council is doing across a number of metrics. Whilst often based on quantitative information, these statistics can then prompt further qualitative investigations. This isn't necessarily revolutionary, but it isn't always done.

The biggest rewards arguably come when the data on these sorts of performance dashboards is opened up externally to citizens and journalists as well as internally to staff or councillors, other departments, or partners organisations. In this context big data can improve transparency and accountability. For example in places such as New York, London and West Sussex councils have created publicly viewable and easily understandable data dashboards.[24] In the case of West Sussex this also shows how the council is performing in relation to a number of publicly viewable targets relating to things such as the take-up of free nursery entitlement for eligible two year-olds.[25] As the council leader commented, 'moving from paper to digital and giving residents the opportunity to see our performance at the same time as we do opens our accountability and gives us a very visual way of explaining how and what we're doing for our residents and communities, where and how we are spending the council tax.' [26]

24 NYC Mayor's Office of Operations, (2015), "Citywide Performance Reporting". Available at: http://www.nyc.gov/html/ops/html/data/data.shtml; Greater London Authority (2015), "London Data Store", Available at: http://data.london.gov.uk/

25 Adjacent, (2014), "Council launches performance dashboard". http://www.adjacentgovernment.co.uk/local-council-news/west-sussex-council-launches-performance-dashboard/; West Sussex County Council, (2015), "West Sussex Performance Dashboard". Available at: https://performance.westsussex.gov.uk

26 Adjacent, (2014), "Council launches performance dashboard". http://www.adjacentgovernment.co.uk/local-council-news/west-sussex-council-launches-performance-dashboard/

CITIZEN EMPOWERMENT AND CROWD SOURCED SERVICES

Opening up data can also lead to the creation of products and directories which enable empowerment, self-help, and drive better private and social products to meet local needs. For example, the Care Act requires councils to step up their provision of information and advice about care options and financial planning for care, and to do more to stimulate local service provision by the private and third sectors. By presenting data about care options and locations to citizens and professionals in more accessible ways, websites such as West Sussex's Local Offer, Northamptonshire's Breeze-e and Staffordshire's Marketplace are enabling citizens to have much greater control over their own care.[27]

Another example of how open data provided or re-used by councils can improve local services and decision-making are apps such as London Rent Map, which uses Valuation Office Agency data to show median rents in the city to researchers or those considering where they can afford to rent;[28] apps such as City Mapper, which use scheduled and real-time public transport data to inform people of the fastest and cheapest routes home;[29] and apps such as Range, which helps to eradicate poor nutrition amongst young people.[30] These data-driven apps and services for public and social benefit are based on open data often provided by public services.

SHARING DATA FOR BETTER CARE AND SUPPORT

Although much has been said about 'open' and 'big data' which is likely to be aggregate or non-personal data, some of the greatest benefits for individuals and society can come from the ability to connect and share

27 See West Sussex County Council, (2015), "Welcome to the West Sussex Local Offer". Available at: https://westsussex.local-offer.org/; Breeze-e, (2015), "For Customers: Tell us what you are looking for". Available at: https://www.breeze-e.com/for-customers/tell-us-what-you-are-looking-for.html; The Staffordshire Marketplace (2015), "Staffordshire Marketplace". Available at: http://www.staffordshiremarketplace.co.uk/home.html

28 Greater London Authority, (2015), "London Rents Map". Available at: http://data.london.gov.uk/case-studies/rents-map/

29 CityMapper, (2015), "Making Cities Usable". Available at: https://citymapper.com/london

30 Caravan Studios, (2015), "Help Youth Find a Meal". Available at: http://www.caravanstudios.org/#!range/c1ht6

individualised records for administrative purposes and with patients and relevant professionals. Through this citizens can have greater control and sense of self efficacy, smoother and less frustrating 'customer journeys', and better informed and targeted care and resources.

There are well known examples of how better data sharing about individuals helps to improve health and social care outcomes. But better data sharing impacts on all sorts of other areas too. For example linking up data should allow local public bodies to identify who is eligible for particular benefits, establish if they are receiving them, and target them so that they can do so. At present there is a low take-up of free school meal entitlement in many areas, particularly following the introduction of universal infant free school meals (FSM) which means parents have less reason to register. Yet this is problematic because if parents do not register for FSM then that impacts on the pupil premium that schools receive. In one report a school had 124 children claiming FSM, but 93 entitled were not claiming FSM, which meant that the schools were missing out on over £87,000 in pupil premium.[31] Local public bodies hold the data showing who is eligible for FSM based on housing and council tax benefits, and can identify families with school age children entitled to FSM but who haven't applied and notify them that they are automatically registered unless they opt out. Whilst many councils have not joined the dots for families using data in this way, others such as Liverpool have managed to do so, to clear public benefit.[32]

31 L. Tickle, (2015), "Schools discover the hidden cost of giving every infant a free hot dinner". The Guardian. Available at: http://www.theguardian.com/education/2015/mar/02/schools-free-school-meals-pupil-premium-funding?CMP=share_btn_tw

32 Ibid.

3 VULNERABILITIES

There is a clear role for local government to work with central government and businesses to harness some of the promise of local data and mitigate some of the risks so as to create an environment where the information economy, open data, big data and data sharing all contribute to social good.

There have been successes and many promising policies and initiatives to date to maximise many of these benefits, and overall the UK has many advantages which put it in a competitive position to reap the rewards of the global data-related markets and data for good movement. However it is clear that there are also key areas of vulnerability currently hampering local areas from releasing the potential of the data revolution.

Five main stumbling blocks evident from our research are:

1. **Infrastructure**
2. **Government release and use of data**
3. **Skills**
4. **Culture**
5. **Enabling standards and legislation**

1. INFRASTRUCTURE

Tools and infrastructure such as data storage and management facilities and connectivity are some of the key building blocks for a flourishing data economy. Without access to fast and reliable internet connections businesses cannot email customers and sell goods online, nor can they analyse their online sales and target customers effectively, with negative implications for business growth. Nor can citizens benefit from data enabled public services and information sources. A perceived lack of supportive infrastructures may also discourage investment.

In the UK broadband and superfast broadband has received substantial public and private investment in recent years, and the UK was 7th in the World Economic Forum's 2013 Networked Readiness Index.[33] However there are still issues, and the UK is slightly below the OECD average of business connectivity owing to slightly lower subscription rates by micro and small businesses.[34] Additionally there are clear issues with rural broadband. A recent survey by the Federation of Small Businesses uncovered rural businesses' dissatisfaction across a number of areas, including reliability (47% dissatisfied), upload speed (61% dissatisfied) and download speed (61% dissatisfied) - representing nearly a 50% gap in reported satisfaction levels with comparable urban businesses.[35]

Councils we spoke to highlighted how the difficulties with the rural broadband programme, including what some saw as the monopoly of the programme by BT, mean that the cost of extending broadband to more remote areas was exceptionally high. One county council officer we spoke to estimated that at the beginning of their rural broadband programme the cost of extending broadband to dwellings was £1,500 per dwelling, but for houses at the end of the programme the cost would be £10,000 per house.

2. USING, INTEGRATING AND RELEASING DATA AND GENERATING DEMAND

What government does with its own public sector information has a direct bearing on the growth of the data economy. The European Commission estimates that between 15% and 25% of total data used in e-commerce trading is based on public sector information.[36] If that public sector data is

33 HM Government, (2013), "Seizing the Data Opportunity: A Strategy for Data Capability". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254136/bis-13-1250-strategy-for-uk-data-capability-v4.pdf, p.30-31

34 Ibid.

35 Federation of Small Businesses, (2015), "FSB uncovers a 'two-speed digital economy'". Available at: http://www.fsb.org.uk/News.aspx?loc=pressroom&rec=8866

36 PIRA study, (2000) "Commercial exploitation of Europe's public sector information report", quoted in HM Government, (2013), "Seizing the Data Opportunity: A Strategy for Data Capability". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254136/bis-13-1250-strategy-for-uk-data-capability-v4.pdf

provided freely and openly for developers to make products with, it provides low barriers for entry to market for developers. As these developers start making money they will begin paying taxes, providing a revenue stream for government. It is therefore not surprising that a recent report from Deloitte estimated that the direct value of public sector information alone to the UK economy is around £1.8 billion per annum, with wider social and economic benefits bringing this up to around £6.8 billion.[37]

The UK is considered a world leader in open data and between 2010 and 2013 released 10,000 datasets, the largest amount of government data by any country in the world. Central government also announced a call to arms for open data in local government, and set out the minimum data that local authorities should be publishing, the frequency it should be published and how it should be published.[38]

Some councils are going far beyond this bare minimum, and are releasing a wide array of administrative data in formats that meet open data standards and are thus most useful for developers and most likely to generate useful apps and products. Hack days inviting social enterprises to use public sector data on particular challenges are becoming much more common, as are open data portals such as New York's data store, Bath Hacked, London Data Store and Leeds Data Mill.[39] These initiatives are local government backed or supported web based platforms which bring together and publish public open data and coordinate and help local data enthusiasts and businesses to use the data.

However these initiatives are taking place in a minority of councils only, and in many councils much useful data isn't being collected or released openly and in useable formats. There are many opportunities relating to the use of data that councils are missing out on. Compared to US local governments such as New York and Chicago in particular, the UK appears to be lagging behind.

37 HM Government, (2013), "Seizing the Data Opportunity: A Strategy for Data Capability". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254136/bis-13-1250-strategy-for-uk-data-capability-v4.pdf. p.8/9

38 See: Transparency Code for Local Authorities, May 2014

39 See Socrata, (2015), "NYC Open Data". Available at: https://nycopendata.socrata.com/; Bath:Hacked, available at http://www.bathhacked.org/ ; Leeds City Council, (2015), "Leeds Data Mill". Available at: http://www.leedsdatamill.org/; Greater London Authority (2015), "London Data Store". Available at: http://data.london.gov.uk/

SPOTLIGHT: SOME MISSED OPPORTUNITIES IN USING AND OPENING UP DATA – DATA QUALITY, DETAIL, DESIGN AND FORMAT

The quality of councils' protected and open data can be much improved. Some protected datasets for internal use still do not hold the NHS number as an identifier, for example. Openly published data is not often published in the right format and often does not include enough detail to allow meaningful analysis. One council commentator mentioned that "although information is published on spend it does not provide enough granularity for deep insights". When considering IT spend in relation to procurement strategies for example, it is not usually possible to distinguish between councils' IT outsourcing spend and business process outsourcing spend. This makes it difficult to really get under the skin of what some deals/commercial arrangements are costing the sector. Better quality and coded data would allow much better insight and analysis.

Similarly at the moment councils often provide general information on ageing and vulnerable populations and commissioning priorities in the Market Shaping documents they produce for adult social care providers. However if this were combined with accurate information about contract end dates, and data on existing care home locations, and were opened up and provided in formats which allow the data to be easily integrated and mapped, this information would be a far more useful and valuable resource for care providers attempting to target their offers and fill gaps in the social care marketplace. Improving information should stimulate competition and the cost and quality of proposals offered by providers to the state and private purchasers. This data could be presented and analysed in formats created by individual councils. Alternatively if councils provide the data about contracts in standardised open data formats, then existing organisations such as SpendNetwork have tools which aggregate and visualise this data freely.[40] *At the moment whilst these tools exist,*

40 SpendNetwork see at https://spendnetwork.com/index/

since few councils provide open data about contract end dates and do not provide it in the right formats, the tools are of limited value.

Additionally council care directories which present data about local care providers are often missing tricks. Their design can be improved so that they are much more clearly based on user needs rather than councils' views about how the data should be presented, and councils miss tricks by not syndicating and reusing content from quality, well-resourced third party sites – through widgets and open application program interfaces (APIs). This would enable the directories to be more up to date, reduce time and effort for council staff, and allow useful information such as CQC care home ratings, for example, to be linked to council maps and directories.[41]

There is even more scope for improvement in sharing and pooling of data. Predictive and analytical tools like those used by the New York's Office of Data Analytics are effective because they bring together data from a range of partners. The more information and the more data used, the more accurate the predictive models. Additionally, compiling and bringing together various sorts of administrative data can have other benefits. At a strategic level, we know there is a need for greater coordination between public and voluntary sector organisations. NLGN's work and that of others has frequently highlighted the need for more linking and sharing of aggregated data on spending, service outputs and outcomes between public sector organisations to enable them to better plan, commission and coordinate activities. Integration and pooling of 'whole place' budgets and services rests on the sharing and pooling of data. [42]

There are some excellent initiatives in this direction, such as data and JSNA information 'observatories', which bring together aggregated local administrative data sources for public servants and partner organisations. But these do not cover some of the most useful data for planning purposes,

41 Socitm, (2015), "Redesigning Health and Social Care". Available at: http://www.socitm.net/system/files/Redesigning%20health%20%20and%20social%20care%20summary%20January%202015.pdf

42 C. Mansfield and M. Beresford, (2014), "Smart Budgeting: Integrating Financial and Strategic Planning for Outcomes". L. Wilkes, (2015) " A Design for Life: How Councils and Housing Associations can Collaborate for Impact", L. Wilkes, (2014) "The DIY Ethic: Business Models for Community Integration" http://www.nlgn.org.uk/public/2014/the-diy-ethic-business-models-for-community-integration/; L. Wilkes, L, (2014) "Break on through: Overcoming Barriers to Integration"

tend to focus on public sector administrative data rather than those of other partners, and do not necessarily allow the linking of different data sources to establish relationships which are often most useful for understanding local populations. Data Co-ops – vehicles which would enable the linking of personal, organisational and public open data between community organisations and/or across sectors and with individual service users – offer a promising avenue for development to overcome this. However these are only currently in development. [43] This lack of progress in relation to public sector data categorisation, quality, use, release of data are inextricably linked to the next few vulnerabilities of: skills; culture; and enabling standards.

3. SKILLS AND UNDERSTANDING

Various reports suggest that the UK lacks the skills to expertly prepare, share, publish and analyse data and create and purchase data-related technologies in both the private and public sectors, and there is agreement that certain regions and sectors suffer from skills gaps that have held back growth.[44] Data analytics skills in particular are likely to be in short supply in the future. Indeed, a shortage of skilled workers in the overall data analytics market is cited as one of the key barriers to further data analytics activity for businesses both globally and in the UK, with one global survey finding that 46% of respondents quoted staff shortages as the most common barrier to implementing data analytics. The lack of female data scientists and engineers is also particularly problematic, affecting business performance

43 Our Data, (2014), "Hypothesis". Available at: http://ourdata.coop/mission/#hypothesis. Data co-ops would facilitate the collection of standard, interoperable data from VCSEs about their activities, their beneficiaries and their impacts and to have it analysed, bench-marked and re-presented to them to aid planning, service design, tender development and organisational transformation efforts. By doing so it would therefore seek to address persistent social, economic and environmental challenges and attract investment and/or payment by results contracts as 'ethical data-driven impact investment vehicles'.

44 UKCES (2011) 'The Supply of and demand for High-Level STEM skills' and UKCES (2013) 'Supply of and demand for High-Level STEM skills.' http://www.ukces.org.uk/publications/er77-high-level-stem-skills-supply-and-demand cited in Nesta, (2015), "The Geography of the UK'S Creative and High-Tech Economies". Available at: http://eprints.qut.edu.au/82040/1/geography_uks_creative_high-tech_economieswv20151.pdf; IPPR, (2015), "Technology, Globalisation and the Future of Work in Europe Essays on Employment In a Digitised Economy". Available at: http://www.ippr.org/assets/media/publications/pdf/technology-globalisation-future-of-work_Mar2015.pdf

and inequality in all sorts of ways.[45] This is against a backdrop where e-skills UK predicts an increase of between 13% and 23% per annum in demand for big data staff between now and 2017, and where women are some of the biggest users of data-driven products and technologies.[46]

The lack of public sector skills and familiarity to work effectively with data was highlighted in a Deloitte report.[47] This is also supported by the most recent LGA survey of research capacity in local authorities which found that 40% and 37% of respondents felt that they did not possess adequate predictive modelling and financial analysis skills to adequately carry out their roles, 30% of respondents also felt that they did not have the skills to make use of online tools and techniques for visualising data (e.g. Googlemaps), and 29% felt that they did have the skills to design schemas, databases and queries to produce open data.[48]

Non-specialist and bridging skills are key. Outside government data companies are seeking workers with a new mix of skills – including analysis, coding, business sense and creativity.[49] Within councils this is also the case and it is vital that policy makers and heads of service are confident handling and understanding data and communicating their data needs to specialists.[50] The time has come for a new type of local government worker Within and outside government those with the mix of specialist data and business skills have been described as 'unicorns' – they are hugely sought after yet very rare and hard to find. In a recent study of UK companies, NESTA

45 Growth in Women's Employment of STEM http://www.wisecampaign.org.uk/about-us/wise-resources/uk-statistics-2014/september-2014; Women's Engineering Society – Useful Statistics http://www.wes.org.uk/statistics; Martha Lane Fox, Transcript of Richard Dimbleby Lecture 2015. Available at: http://www.doteveryone.org.uk/

46 HM Government, (2013), "Seizing the Data Opportunity: A Strategy for Data Capability". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254136/bis-13-1250-strategy-for-uk-data-capability-v4.pdf, p.19

47 Deloitte, (2013), "Market assessment of public sector information", commissioned by the Department for Business Innovation and Skills cited in HM Govt (2013), "Seizing the Data Opportunity: A Strategy for Data Capability" p.19

48 LGA, (2013), "LGA survey of research capacity in local authorities". Available at: http://www.local.gov.uk/c/document_library/get_file?uuid=b3ccf836-9828-49fe-9781-a5e8662f87df&groupId=10180 p.33

49 Nesta, (2014), "Model Workers: How leading companies are recruiting and managing their data talent". Available at: http://www.nesta.org.uk/publications/model-workers-how-leading-companies-are-recruiting-and-managing-data-talent.

50 C. Mansfield and M. Beresford, (2014), "Smart Budgeting: Integrating Financial and Strategic Planning for Outcomes". Available at: http://www.nlgn.org.uk/public/2014/integrating-financial-and-strategic-planning-for-outcomes/

found that four in five of the companies they interviewed were struggling to find workers with the right mix of talent they need, and that this was especially the case outside of London.[51] There is often a lack of basic understanding about the benefits of digital technology and 'data' amongst businesses, and especially SMEs. For example in Birmingham their recent Digital Audit showed that 92% of SMEs think that digital capability is important for their businesses, but 57% did not fully understand what benefits they would gain from using digital technologies.[52] As one Cabinet Member at our roundtable noted: "Many SMEs run from the idea of 'data'. Most are not switched on to the idea even of using a CRM to understand their customers, for example".

Within government this situation is similar:

"We might have people who can crunch data, but not talk about it to other people … We need people who can bridge the gap, those who can talk about data to non-data specialists. At the moment people [non data specialists] don't even know what they're asking for; it's hard even to get to a point where people can ask a query in a meaningful way" (Council Officer)

The What Works centres are attempting to fill the research and data understanding gap, and the central government the new civil service reform plan, the local government Graduate Recruitment Programme, and changes to the national computing curriculum are all part of attempts to secure a pipeline of talent. However there is certainly more that can be done.

4. CULTURE, TRUST, AND OPENNESS

This lack of skill and understanding – particularly amongst senior leadership – can contribute to a sense that investing in data analytics and opening up data is pointless, time consuming, costly, and risky. Respondents in our roundtables felt that the benefits are not well enough known within the public sector and amidst the public, whilst the risks are overblown and misunderstood.

51 Nesta, (2014), "Model Workers: How leading companies are recruiting and managing their data talent". Available at: http://www.nesta.org.uk/publications/model-workers-how-leading-companies-are-recruiting-and-managing-data-talent.

52 Birmingham Digital Audit http://gbda.org.uk/wp-content/uploads/2015/02/Greater-Birmingham-Digital-Audit.pdf?acf6e4 Feb 2015

Indeed, there is a sense that most of the development with relation to open data in particular has been extrinsically motivated by mandate from central government rather than because councils thought it would benefit them: the open data agenda first reached councils in the form of the mandate to publish spending data transparently. Whilst this had benefits, some of the unintended consequences and media surrounding this left a bitter taste in the mouth of many, and a sense that the main point of opening data was to comply with central dictat rather than to promote better services and a flourishing economy. For those that are sold on the benefits of open data, it can take strong leadership to convince others that investing in providing and improving big and open data is a worthwhile initiative, especially in the austerity context and when at a local level the 'big data' evidence about 'open data' returns is relatively undeveloped.

"When the benefit is unknown and unclear, how do we convince people [to commit to open data platforms]?" (Chief Executive)

"In this context of austerity we're encouraged tothink what is a must-do, what is nice-to-do. The data observatory in my area was only kept open because I fought tooth and nail for it." (Chief Executive)

Trust around data sharing is an issue in many ways. Often a barrier for sharing individual data is that those responsible for patient and personal data worry that other organisations may apply different standards of confidentiality and that they will be blamed if the data they share then goes astray or is misused.

In relation to aggregate rather than personalised data sharing, fears also exist that data will be misinterpreted and lead to false conclusions – particularly in the absence of staff and citizens well equipped to understand the parameters of what different sorts of data does and does not tell us. As others have also pointed out, an increase in data and computing power does not necessarily lead to better decisions.[53] This is particularly true amongst charities, who sometimes feel that an over reliance on quantitative data will lead to technocratic approach based on poor quality data or false conclusions and a lack of attention to less easily quantifiable insight. There

53 Policy Exchange, (2012), "The Big Data Opportunity". Available at: http://www.policyexchange.org.uk/images/publications/the%20big%20data%20opportunity.pdf, p.23

is also a misperception amongst many that the public sector 'open data' agenda is about sharing personal and identifiable information, when in fact it is about sharing aggregate, non-personal data.

"When I speak to colleagues they are worried about doing things in this area and getting it wrong. In our council the drive for digital and open data is quite dependent on [cabinet member well acquainted with data and technology] driving it, but without them it's just a small group of people only who 'get it', and we are acting against a default organisational culture going the other way and systems which are so big and clunky" (Policy Officer)

Similarly there is a perception amongst some that specialised public service Security and Information Governance advisers do not always have the necessary knowledge and wider sector awareness to realise how they might link up protected data for major public benefit, and therefore block this even when legislation might actually permit it. As one council staff member noted, "my experience is that this professional group isn't tuned in fully to the 'art of the possible' and therefore adopt risk averse stance".

Respondents at our roundtables noted how public sector organisations also often did not trust that disclosed data would not be used punitively against them, and hence were weary of releasing some data. One council spoke about the concern that releasing data on local public sector assets might make these assets prey to central government, and another spoke of concerns about performance management and the historic association between the use of data analytics with a 'targets and terror' mentality. Whilst openly measuring performance can be helpful in many ways through stimulating competition and accountability, when under-performance against a target is met with terror rather than constructive support this can clearly put off disclosure where there is no legal obligation to do so. At an extreme this sort of approach can also lead to the 'gaming' or falsification of performance related data.
As two respondents noted:

"We want to use the patient profile of GP practices to reshape and target services. There are [X number of] practices in our council, and about half are up for doing this. We're trying to refocus other public services behind GP data. But GP's have anxiety – even if it's aggregated data, there's a

performance issue – that we'll be able to compare the relative performance of one primary care unit against another – and there are worries about that (and how data is interpreted and used)" (Chief Executive)

"Data sharing can't be divorced from a new settlement relating to devolution. If there is an atmosphere of suspicion, fears about opening up data to other organisations will be justified. But if we reset that then trust can be engendered." (Chief Executive)

Issues of control and responsibility are also evident barriers preventing councils from opening up policy and service delivery in the way that accompanies opening up data and information. As one respondent noted:

"Culturally people are still quite resistant to hack days and open data. Some councils have particular histories and legacies of falling foul of data protection which casts a shadow and leads to a reluctance to take risks. People are also quite anxious and nervous about opening up data. But this is related to an ingrained attitude to service delivery – the hack day methodology as way of achieving local outcomes as a concept is very difficult for many people… Staff think they are there to deliver public services rather than deliver as facilitators. Cultural change to alter this is very challenging… This is especially true where there is a strong command and control culture" (Director of Customer Services)

Councils are sometimes also unwilling to relinquish control over 'their' information, and some think that councils could gain more economic benefit by attempting to sell their data rather than release it freely for developers to use. As one mentioned:

"Should we not charge for our data? We're being encouraged to be commercial, could we not release it as a commercial product and gain income for the council? Companies such as Experian and Mosaic use our public sector data which they then try and sell to the council." (Council Officer).

This is arguably a misconception born from a lack of understanding that there is in fact little market to sell data back in this way, and the aforementioned cultural reluctance to relinquish power and control to local people.

5. ENABLING LEGISLATION AND GOVERNANCE

Enabling legislation and governance certainly is a barrier in the public sector, particularly in relation to sharing and linking some big data between organisations, and sharing identified data about service users for public benefit. Whilst much data sharing is arguably strangled by fear and culture, there are real governance and legal data sharing barriers. For example at the moment the effort to allow the NHS and social care staff to access patient records more easily is hampered by the fact that local authorities use the Public Services Network (PSN) to exchange sensitive information with other parts of the public sector, and the NHS uses its own HN3 network for exchanging such information within the NHS. In addition to this, the lack of common information governance policies between the PSN and HN3 networks, and multiplicity of different software systems which are not interoperable, hinders crossover of information between them. As one chief executive mentioned:

"We are near or on track for joined up safeguarding system, but we are far from a joined up data sharing system between NHS and social care"

Similarly, as the conclusion of a recent Open Policy Making group on data sharing points out, the law surrounding data sharing between different public bodies is complex, with powers to share data scattered across a very large number of statutes which are sometimes unclear. A recent Law Commission report identified that there are problems with the form of the law relating to data sharing that could usefully be addressed, and that there are problems not directly due to the form of the law which could be alleviated by law reform.[54]

As a result a recent Open Policy Making group recommended a power to ensure that all public bodies are able to link two or more datasets for the purposes of research from two or more data controllers using accredited bodies and Trusted Third Party Sharing. They also recommend a new permissive power should be introduced to allow defined public agencies to share data with defined public agencies for the purposes of improving the

54 Law Commission, (2014), "Data Sharing between Public Bodies". Available at: http://lawcommission.justice.gov.uk/docs/lc351_data-sharing.pdf

delivery or targeting of public services in specified areas of social policy, which would operate in accordance with a number of principles.[55] This is a welcome development, which would complement a focus on culture.

But it is important that new moves around data sharing also allow patients to access their own data. At the moment few people have access to their own care data, which limits their ability to manage their care and reap the full benefits of better personalisation. In the initial health and social care integration pilots for example this was evident: whilst practitioners reported better integration, owing to little patient involvement in their data and decisions relating to their care patients did not report improvements and 'person centred' care remained elusive.[56] The National Improvement Board has pledged in its November 2014 framework that as of March 2018 all individuals will be able to view their care records. The focus will initially be on NHS data but would extend to wider records held by councils and other providers. However this is far from possible at the moment.

Development of other standards relating to data are also requisites for a flourishing data economy. For example it is important that 'open data standards' which allow different organisations to handle and share open data properly are developed and that those already in existence (such as Open 311) are adhered to.[57] It is also key that data is collected and curated consistently with technical and metadata standards. This is something which has received much less attention than it should and dramatically affects the usefulness of data that is collected and held in systems.[58] As one council Chief Information Officer noted:

55 Data Sharing, (2015), "Updates from civil society engagement with the UK Government on data sharing". Available at: http://datasharing.org.uk/conclusions/#_ftnref15

56 Department of Health, (2012), "Evaluation of DH's integrated care pilots: main report". Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_133124

57 Open311 refers to a standardized protocol for location-based collaborative issue-tracking that provides open channels of communication for issues that concern public space and public services. MySociety describe Open 311 as 'a standardised way for computers to report problems (like potholes or fallen trees) to the computers run by the bodies that can fix them (like local governments or city departments)... Open311 is the mechanism through which citizens can slot their service requests directly into the computerised 'to do' lists of local government staff, and the way they those citizens can get back progress updates more quickly and easily.' See: https://www.mysociety.org/2013/01/10/open311-introduced/

58 HM Government, (2013), "Seizing the Data Opportunity: A Strategy for Data Capability". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254136/bis-13-1250-strategy-for-uk-data-capability-v4.pdf, p.44

"This is a huge point … if only we understood the value of our data better we would then manage it optimally – how many councils have clearly defined who is the data owner for an individual system and given them the accountability to make sure it is managed properly and is current?"

There is also a need for better standards and legislation relating to private sector data openness and use beyond the Data Protection Act. Indeed, there are serious concerns being raised by a number of 'data dissidents' about some of the ethical issues relating to the data revolution. As just one example, there is an issue around how private companies' use of personal data 'given away' by users of 'free' platforms and apps such as Facebook is leading to behavioural profiling of consumers which increases the use of advertising for more exploitative practices such as price discrimination, and predatory markets for some products such as subprime mortgages or payday loans.[59] There are also concerns about the amount of access individuals have to their own private sector data, which is only partially countered by central government's MiData initiative.

Some of these issues are not directly related to local or central government's use of data, and their existence does not in any way license local governments to stand still in relation to using data better themselves or supporting businesses to do so. However these concerns are highly relevant to local government because whilst it may drive growth, the private sector data environment can have negative fallouts for citizens, which councils have responsibility to remedy. Additionally, these private sector issues risk creating an environment of distrust and anger relating to the disclosure of information which could in turn threaten the faith that people put in public service data collection and use. Ensuring that the UK has a fit regulatory framework around data will empower and protect citizens, ensure the revolution does not 'derail itself', and as such be a competitive advantage for the UK.[60]

59 N. Newman, (2014), "How Big Data Enables Economic Harm to Low-Income Consumers". The Huffington Post. Available at: http://www.huffingtonpost.com/nathan-newman/how-big-data-enables-econ_b_5820202.html

60 See for example Perrin, W (2014) 'Open Data in Society - Don't Let The Data Revolution Derail Itself' http://www.digitalgovernmentreview.org.uk/news.html

SPOTLIGHT: MIDATA AND ACCESS TO PERSONAL DATA HELD BY PRIVATE COMPANIES

At the moment data collected by private companies about people's behaviour, including data inputted into apps by individuals, is not often made easily available to individuals. For example it is not often possible for the data about our weight or exercise habits that we input to health apps to be downloaded by us in usable formats such as Excel spreadsheets, or sharable with some other applications that we might want to use to open it. Being able to do so would offer us the opportunity to understand our own behaviours and make more informed decisions based on it.

For example it is not always easy for us to access data about our mobile phone usage in order to analyse it and see whether we are getting the best deal. Our data is an asset to companies and often it is not in their interests for us to easily access it. The UK Government established the MiData initiative to improve consumer empowerment and access to data held by companies and a power to compel businesses to release consumers' electronic personal data if they don't do so voluntarily was included in the Enterprise and Regulatory Reform Act 2013. However to date a voluntary approach has been taken[61]*, and whilst more data in key areas such as energy, mobile phone and current account data is available to consumers, there has arguably been little real change for most. This is partly because demand and understanding of this issue amongst consumers is undeveloped, but also because companies are still not providing data in formats that allow effective comparison.*[62]

61 Department for Business Innovation and Skills, (2014), "Review of the midata voluntary programme". Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/327845/bis-14-941-review-of-the-midata-voluntary-programme-revision-1.pdf

62 Ibid, p.3-4

4 NEXT STEPS TO HARNESS LOCAL DATA

We have argued that councils need to be doing more to combat these vulnerabilities in order to release the potential of the data revolution for their places. But what can councils realistically be doing? Here we outline a number of core activities that councils should be doing in order to support and shape the data revolution in their areas and nationally.

Binding these activities is the idea that councils should play a more active role in stimulating supply and demand, for data itself, and the skills to make use of it; and developing their capacity to shape local and national policy.

CREATING STRATEGIES AND BROKERING PARTNERSHIPS

Local government is uniquely placed to shape local technology and data-driven economies. As one of our roundtable attendees noted:

"This is a contested territory at the moment – some would say local government should concentrate on knitting – things such as adult services. But we have a unique understanding of localities and the partners that work within them." (Cabinet Member)

Councils play an important role providing infrastructure, creating environments where data-driven and creative economy companies wish to base themselves, providing access to finance and property, and stimulating the demand for data amongst businesses as a whole and through their role as purchasers of data and data technologies.

Tailored local strategies enable a focus on different areas' competitive advantages, assets, heritage, and existing businesses.[63] Brokering

63 Tech City UK, (2015), "Powering the Digital Economy". Available at: http://www.techcityuk.com/wp-content/uploads/2015/02/Tech%20Nation%202015.pdf

partnerships with businesses are central to these. For example in Birmingham the council's Digital Birmingham established their Smart City Roadmap after brokering relationships with businesses such as Amey. Similarly Bristol and Bath's fast growing data analytics and digital hub has benefited from the establishment of inward investment networks and agencies backed by the LEP, council and local businesses.[64]

Local government driven strategy is especially important to manage and harness the benefits of the data-driven economy for all business, people, and places. At the moment the data-driven economy is geographically skewed to London and the South East, with many areas missing out from the associated economic and social benefits of this growth.[65] Employment in the creative economy is growing rapidly, and faster than the workforce as a whole.[66] However these sectors, and the creative economy in particular, are far more concentrated in London and the South East compared to other sectors, despite the skills base for these jobs being more dispersed. The recently announced Budget 2015 plans for the funding of tech hubs in Sheffield and Leeds will go towards combating this, but other areas not benefiting from this central support need strategies to identify if they have the potential to grow and to build partnerships to do so.[67]

Similarly strong local and national strategies are needed to combat the labour market inequalities that the increasing automation of labour – the so called 'second machine age' – looks likely to exacerbate. Indeed, increasing automation is likely to dramatically reduce demand for middle and lower skilled white collar jobs such as paralegals and call centre operators, with profound societal implications on unemployment. Without concerted local, regional and national attention, these risk leading to increased social and gender inequalities in the labour market and the distribution of wealth.[68]

64 Bristol and Bath, (2015), "Bristol and Bath… the next big step for your business". Available at: http://www.bristolandbath.co.uk/why-bristol-bath

65 Nesta, (2015), "The geography of the UK's creative and high-tech economies". Available at: http://www.nesta.org.uk/sites/default/files/summary_geography_uks_creative_high-tech_economies2015.pdf

66 Ibid.

67 Ibid.

68 J. Lanchester, (2015), "The Robots are Coming: Review of 'The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies" and "Average is Over: Powering America beyond the Age of Great Stagnation", London Review of Books, Vol 37. No.5. Available at: http://www.lrb.co.uk/v37/n05/john-lanchester/the-robots-are-coming

SPOTLIGHT: THE IMPACT OF AUTOMATION OF LABOUR

In their recent book 'The Second Machine Age' Brynjolfsson and McAfee suggest that we are seeing a 'great decoupling' of productivity and employment, which have traditionally increased in tandem. The same technologies making many jobs safer, easier, and more productive also threaten wages and reduce the demand for many types of human workers – especially those who work in low and middle skilled and waged white collar jobs such as credit analysts, package handlers, paralegals and telemarketers – whose jobs which will be replaced by new combinations of robots and software processes.[69] The implications of this in terms of unemployment may be profound and if unchecked may also exacerbate other inequalities as lower skilled jobs, which are currently filled disproportionately by women and ethnic minorities, are those that reduce.

Either way it will require local and central government training and education policies which are directed away from a focus on basic numeracy and literacy to a broader set of personal and intellectual skills such as idea generation and complex communication not easily replicated by machines.[70] Similarly this vision may also prompt and require a new form of social contract. As John Lanchester has recently pointed out "the robots will only eat all the jobs if we decide to let them",[71] and a more positive vision of an increasingly robotic future is possible if the ownership and profits reaped from automation are spread more evenly across society rather than simply amassing in the hands of the large companies. Either way, these likely changes may prompt a fundamental upheaval in society as we know it.

69 E. Brynjolfsson and A. McAfee, (2014), "The Second Machine Age: Work, Progress and Prosperity in a time of brilliant technologies". Available at: http://www.washingtonpost.com/opinions/review-the-second-machine-age-by-erik-brynjolfsson-and-andrew-mcafee/2014/01/17/ace0611a-718c-11e3-8b3f-b1666705ca3b_story.html

70 Ibid.

71 J. Lanchester, (2015), "The Robots are Coming: Review of 'The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies" and "Average is Over: Powering America beyond the Age of Great Stagnation", London Review of Books, Vol 37. No.5. Available at: http://www.lrb.co.uk/v37/n05/john-lanchester/the-robots-are-coming

Having specific Data, Digital or Open Data strategies relating to information management and open data is useful as a 'go to' for these issues. For example Glasgow's Open Manifesto[72] is a useful guide. Data should also be integral and linked to other strategies, and data or digital strategies should cover issues relating to skills and collaboration across public services. Birmingham's Smart City Roadmap[73], and the London Borough of Islington and the London Borough of Camden's digital strategies, are examples of councils moving in this direction.[74]

FOSTERING DATA CAPABILITY SKILLS

Access to talent is a key factor for many digital businesses, and local authorities' key brokering and facilitating role needs to involve attracting and fostering digital and data capability skills amongst citizens of all backgrounds and sexes. This is vitally important – and a good supply of skilled workers and strong technical infrastructure have been noted by digital companies as top factors determining company location.[75]

Councils can do much to support this. For example in Islington's 'Tech Roundabout' cluster in Old Street, and Camden's new King's Cross development, these London councils are working with businesses to carve a role for the areas as creative hubs. By creating positive environments and facilitating networks for learning they are helping businesses to attract the highly skilled graduates they seek from all over the world, and thereby are attracting new businesses to locate in the area.

This strategy need not just be the reserve of big cities. Margate has a thriving computer game cluster, which benefits from the councils' engagement with both the industry and local universities, and its easy access to affordable property close to the sea. Councils should be actively using resources such as NESTA's maps of nascent creative economy clusters to identify where

72 See http://open.glasgow.gov.uk/content/uploads/2013/11/FC_OPEN-Manifesto.pdf

73 See http://www.islington.gov.uk/about/council-documents/Pages/ict_strategy.aspx; http://www.camden.gov.uk/ccm/navigation/council-and-democracy/camden-plan/strategies-and-partnerships/digital-strategy/

74 See https://birminghamsmartcity.files.wordpress.com/2014/03/birmingham_smart_city_roadmap_03_03_20141.pdf

75 Tech City UK, (2015), "Powering the Digital Economy". Available at: http://www.techcityuk.com/wp-content/uploads/2015/02/Tech%20Nation%202015.pdf

these might develop, and work to nurture these through the provision of hubs, office space, and initiatives that harness local assets.

Councils should also stimulate demand for data collection and use, and skills training, amongst *existing* local businesses and citizens. In particular they should be showcasing how SMEs can use local data to their advantage and encouraging them to do so. In St Albans they are doing this by bringing together council and other partners to stoke-up interest in the benefits of data technology and analysis amongst the public and commercial sectors and amongst universities and local schools. They have established a 'Silicon Abbey' network of interested parties, and spread their message at a 'Silicon Abbey Festival'.[76]

Similarly, following an audit which highlighted a lack of digital awareness amongst SMEs and a demand for further training, Birmingham City Councils' Digital Birmingham have launched a Digital Skills Academy in conjunction with the Greater Birmingham and Solihull LEP which offers free face to face sessions to help SMEs make the most out of data and digital technology.[77] This includes a session on realising the value of data, which covers the importance of big data, business ethics when using data, data storage, and open data as a business opportunity. Camden have followed a similar path targeting the next generation, and have worked with Camden Town Unlimited – the local Business Improvement District – to establish a free 12 week coding course for young people, which works to encourage participants to see what it means to have a career in the technology industry. Camden Council provide open public sector data to the young people for them to use as material to build their portfolios.

There is scope for these sort of initiatives to be adopted elsewhere, and taken further by forming new partnerships with further education institutions. Partnerships with universities are especially important since big data companies are more likely than other technology employers to consider masters and PhD programmes as key to building skills.[78]

76 Local Digital, (2015), "Unlocking Open Data for Smarter Business and Smarter Communities: St Albans". Available at: http://www.localdirect.gov.uk/event/open-networking-event-unlocking-open-data-for-smarter-business-and-smarter-communities-st-albans/; Silicon Abbey, (2015), "A digital future for St Albans". Available at: http://siliconabbey.com/

77 Greater Birmingham Digital Business Academy http://gbda.org.uk/

78 Tech City UK, (2015), "Powering the Digital Economy", available at: http://www.techcityuk.com/wp-content/uploads/2015/02/Tech%20Nation%202015.pdf

DEVELOPING THE PUBLIC SECTOR WORKFORCE

Councils should be using the same sorts of strategies that businesses use to secure data specialist and data literate staff to work within their organisations. They should be actively building their reputations as 'places to be' for talented men and women, participating in innovative activities such as Nesta's Open Data Challenges, holding their own inclusive 'hack days', building links with universities and businesses, and making vocal contributions to debates about data, evidence and technology. Applied problem solving opportunities are attractive to many data graduates, and councils should be emphasising the potential for highly rewarding real world problem solving to them. In this way Camden's work with Camden Town Unlimited has scope for even more development, and more formal partnerships between universities and councils – for example establishing schemes where students use council data and challenges for coursework projects – will be fruitful. Indeed, by releasing administrative data openly as cities such as New York and Boston have, and harnessing the power of graduates and volunteer data enthusiasts, local governments can benefit from the skills of graduates not in their direct employment.

There is also further room for developing partnership and placement schemes with businesses and other public sector agencies. One council we spoke to mentioned how they had seconded council staff to consultancies for a year or so, and benefited when staff came back with different ways of working, including a far greater focus on using data. This sort of initiative has scope to be taken further, with far more placements within businesses, and with councils hosting trainee consultants as part of the package.

Where the data literate communicator 'unicorns' are hard to find, councils should be pooling their resources internally to create teams with the right mix of skills. As a council research manager noted, "no one has got all the skills. But when we all pull together in a council, we do." This is often most profitable when teams are brought together to solve particular problems: "What's good is putting together research and IT people, giving them a problem to fix together" (Research manager).

We think councils should also be pooling their resources more widely. Very worthy horizontal 'digital' initiatives such as LocalGov Digital and DCLG's

LocalDigital workstream exist to encourage collaboration across the sector and increase skills, and in the 2015 Budget the government recently gave the central Government Digital Service greater remit to work with local government.

Yet these are piecemeal and insufficient initiatives and as a result we have previously argued for the creation of a Local Government Digital Programme with a central support unit to coordinate local government activity, and which would also include a Local Government Digital Development Skills Programme to attract both skilled recent graduates and more mature developers to the local government workforce.[79]

As part of this programme or on a standalone basis, we also believe there is scope for the creation of regional Public Data Analytics Hubs drawing together talent from across a region to use data to solve common local problems. These would build on and bring together existing data observatories and hack day methodology, but would involve longer projects and feature greater collaboration between sectors and across local public and social services. They would also provide open-source templates so that the methodologies can be easily replicated by other areas facing similar problems.

OPENING UP DATA

The simplest way for local government to further this agenda is for the sector to collect and release more useful data in accessible open data formats, and encourage others to use it.[80] This process can be both inexpensive and very easy. For example the Bath Hacked open data portal was instigated by councillors who had heard about open data, and then carried forward by local civic coders and businesses who were engaged through a hack day set up by the council research manager.

"We developed a reactive and iterative policy on it. The group said that the flat CSV files we released were not good enough so we improved

79 M. Beresford, (2014) 'Smart People, Smart Places: Realising Digital Local Government' http://www.nlgn.org.uk/public/wp-content/uploads/Smart-People-Smart-Places.pdf

80 There have been various practical guides produced about how to do this, with the ODI's being the most recent. ODI, (2015), "Open data in government: how to bring about change". Available at: http://theodi.org/open-data-in-government-how-to-bring-about-change

that, and we used money they'd largely raised through events they'd set up to establish open data platform quickly, without needing to go through procurement. The platform is owned by the group which is now a Community Interest Company, it's been really cheap to set up, and our role as a council has just been to ask 'how can we help you?'" (Council Officer)

Bath is lucky to have a strong existing community of data businesses and data enthusiasts, and in areas with a less developed enthusiast population this may be more of a challenge. But it is an example of how easy it *can* be, and in the many areas with nascent or established technology sectors there is no excuse not to be engaging with them in this way.

OPENING UP GOVERNMENT

The new sort of local government worker required to embrace this agenda and improve our places needs not just more data handling skills and understanding, but also a mentality of openness: reaping the benefits from big and open data, and empowering communities to use data to contribute to solving their own challenges, requires a mind-set where staff are comfortable as facilitators rather than simply providers.

As a number of local government respondents noted, we need to be opening up minds and roles as well as data:

"I don't think any local authority has transformed itself. There are good ideas, but behaviours are generally the same as they were a decade ago. We need to nudge ourselves, to open up and decide not to control the data … As officers and councillors we try to find niche roles. But we must rail against the tendency to try and consolidate the needs of the organisation, and learn to let go." (Chief Executive)

One respondent suggested that the tendency not to let go is often ingrained amongst service managers and frontline staff – with councillors and senior leadership in their council being more willing to take risks. This is best overcome through assurances of support and guidance from senior leaders, explaining concepts clearly, and gradually building confidence amongst staff:

"If you chunk it in bite size pieces, it's okay and more palatable. Then you grow sense that 'it's okay, we did this, and we survived!' You need to build confidence as staff have spent a long time being told they can't do things. So it's about trying to create a more permissive framework" (Director of Customer Services)

"One message for others is: get it clear to staff and councillors about audit and regulatory functions. The terror of a huge fine from the Information Commissioner's Office was so huge it definitely scared members. We had to take members to meet the developers asking for open data to show them that the developers only want to know if the restaurant around corner is clean – they're not out to demand and share sensitive data or maliciously expose the council" (Council Officer)

THOUGHT LEADERSHIP AND STAKEHOLDER ENGAGEMENT

Finally, to move forward on the creation of relevant enabling standards and legislation, and to combat some of the dangers around private sector use of digital technology and inequalities that maybe exacerbated as a result of increased data use and technological advancement, we believe local governments need to engage in shaping the data debate to a greater extent. Councils bargaining for devolution deals should make sure that data, the oil that will slick the wheels of collaboration, is not forgotten. And councils should be engaging on a sector wide basis and contributing to the debate on a wider level.

Individual councils and associations of councils are doing this to some extent, but it is fair to say that there is no unified and fully informed voice speaking on behalf of the sector and for citizens. Local government need to step up as a sector, and pitch in to the debate.

We therefore argue that this void could be filled by a centralised unit coordinating the Local Public Services Government Digital Programme, who could liaise with central government on behalf of the sector in relation to issues such as procurement and privacy regulation, and co-ordinate work streams to establish 'lead' authorities to progress particular issues and minimise duplication.

Whilst it is true that local government needs to embrace a 'just get on with it' mentality with regards to adopting digital technology and dealing with data, this needs to include a thorough engagement as a thought leader and important stakeholder with some of the real concerns in this area, and a commitment to asking difficult questions and challenging businesses when this is necessary. The revolution in data technology is one of the huge advances of the age, and is going to have even more dramatic implications in the next few decades. Any council that avoids engaging with it does so at their peril and does a disservice to their citizens.

5 RECOMMENDATIONS

We therefore make the following recommendations to central and local government to drive this agenda forward:

- Primarily, local government should **release more public sector data in open data formats** via accessible platforms for use by businesses, social enterprises the voluntary sector and other local groups.
- Whilst this delivery (organised by policy teams, research managers, IT or digital leads) can precede and feed into a data strategy developed at a later date, it is important that senior **council directors come together, with input from frontline staff, managers and other public sector partners, to scrutinise the way they currently use data across the board** and **create data strategies** which should relate to both open data and protected data. These should cover issues such as information governance, data sharing and integration, the impact of procurement and software on data, staff and citizen data handling skills, and citizen access to personal data. These strategies should include detailed plans to overcome locally identified blockages or issues, rather than 'sound-bite' broad principles, and feature practical steps to gradually change staff cultures of risk aversion.
- Local authorities should collaborate with each other and with local further education institutions and employers to **foster digital skills and demand for public sector open data amongst existing businesses and SMEs in particular**, learning from a number of Digital Business Academies established around the country. This should be a cross-council initiative, involving leads in education and skills, economic development, and digital champions, and should involve collaboration with LEPs.
- Digital, HR and further education/skills leads within councils should work together to attract data literate staff by **developing their reputations as exciting places for problem solving**, and developing their existing workforce by forming exchanges and **placement partnerships with consultancies, universities and further education institutions.**

- Local economic development leads should identify whether they have the foundations for **embryonic data and technology business clusters** and use their place shaping powers and relationship with LEPs to develop these.

- We recommend the establishment of a **Local Government Digital Programme**, as argued in a previous NLGN report.[81] This would involve the establishment of a small central unit led by DCLG. Reflecting the importance of cross-public sector integration, it should feature cross-departmental support and representation from relevant central government departments such as the Government Digital Service (GDS), Cabinet Office, Department of Health, and HMRC, who would co-produce a work programme and strategy with local governments. Local governments and existing relevant and representative organisations such as LocalGov Digital, LGA, NESTA, and SOCITM should be integral to development of the programme's strategy, and the central unit should include local government staff.

  The unit would provide extra capacity to coordinate various existing initiatives; act as a central thought leader for the sector to advocate on behalf of councils and local people, and develop common strategies, standards, and any necessary legislative proposals; deliver any overarching initiatives or campaigns; ensure that commercial interests do not have an unfairly dominant voice in debates; and lead on the development of a **Local Government Digital Development Programme** to attract skilled graduates and mature data specialists to the local government workforce on full time and more flexible project-by-project bases. The overall programme should cover key themes such as skills development, interoperability, the development of open standards and APIs to support the interchange of data, common information governance skills and standards, data and digital infrastructure, procurement and proprietorial systems, and campaigns to develop citizen demand for data and digital services. The programme should be initiated in the **2015 Autumn Statement** at the latest.

- Independently or as part of this programme, we recommend the creation of a **network of regional Public Data Analytics Hubs** to pool public sector staff, university students and volunteers to solve

81 M. Beresford, M (2014) 'Smart People, Smart Places: Realising Digital Local Government' http://www.nlgn.org.uk/public/wp-content/uploads/Smart-People-Smart-Places.pdf

local problems using local data. Learning from the New York Mayor's Office of Data Analytics, these would build on and bring together existing data facilities such as Public Health Observatories and hack day methodology, but involve longer projects and feature greater collaboration between sectors and public service partners. These Hubs would also provide open-source templates so that methodologies and coding can be easily replicated by other Hubs or areas facing similar problems. Within local government, this should be led by research and policy managers with cross-department assistance.

- We recommend the development of a **Local Government Open Data Index** and **Open Data Top 30** to allow councils to assess their open data maturity, and to celebrate the most open data mature organisations in the sector. This could be run by the Open Data Institute (ODI) with backing from the industry and the Local Government Digital Programme, DCLG and GDS. Councils would undertake an assessment which would be based on the ODI's open data maturity model, existing reports on data.gov.uk, and the ODI's award of Open Data Certificates to councils.[82] Following this, individual councils would gain feedback and pointers about their overall place in relation to comparable organisations, their strengths and weaknesses, and how they can develop.

  Whilst the in-depth feedback following assessment would only be available for council internal purposes, a list of the Top 30 performing councils according to the assessment indexed score would be published to publically showcase and celebrate the Top 30 councils. This would bring together a list of good practice exemplars for other councils to learn from in one place, and stimulate healthy competition amongst councils to be amongst this Top 30 group. Aggregate data based on all councils' assessments which would not identify individual councils could also be published to give a 'state of the nation' report on open data maturity across the sector.

- An **overhaul and rationalisation of data sharing legislation**, taking on board the recommendations made by the recent Open Policy Making group investigating this issue.[83]

82 See http://theodi.org/blog/public-draft-of-the-open-data-maturity-model and http://data.gov.uk/data/report/openness

83 See conclusions of civil society and public sector policy discussions on data use in government available at: http://datasharing.org.uk/conclusions/

6 CONCLUSION

The 'data revolution' is happening all around us, and it has so much to offer local public services as they go about their businesses of helping people and making the world a better and less frustrating place. Already it is supporting councils and their partners to better understand perplexing social problems and target resources more effectively; it is joining the dots so schools receive the pupil premiums they deserve; it is revolutionising waste collection routes as we use sensors to measure which bins are full; prompting us to set ambitious visions for our areas and helping us stick to them; and it is transforming local services in many other ways.

But the benefits that we reap from data now are only the tip of the iceberg, and there is so much else to be grasped.

In the past data and digital technology was seen as a 'nice to do'. But given the financial imperative, the need for greater multi-agency integration and more efficiency, and the dramatic new potential of what we can do with data, it is now a 'must do'. Only with better understanding of data analysis and handling, and smoother information flows, can we boost our economies, transform our public services and tackle the big overarching challenges that we face.

But local public services also need to get 'good' at data for other reasons. As the data revolution so rapidly changes the world and brings us new bounties it is also opening up new challenges. Issues around consumer exploitation and disempowerment, security, and labour market inequality are also being changed radically and cannot be ignored. Politicians and public servants need to keep abreast with these developments, to understand the real risks that the data revolution poses, and shape it so that it works for the public good. The alternative is to fail our citizens and render ourselves irrelevant.

To do this there are a number of stumbling blocks that need to be addressed. These focus on infrastructure, skills, culture and enabling

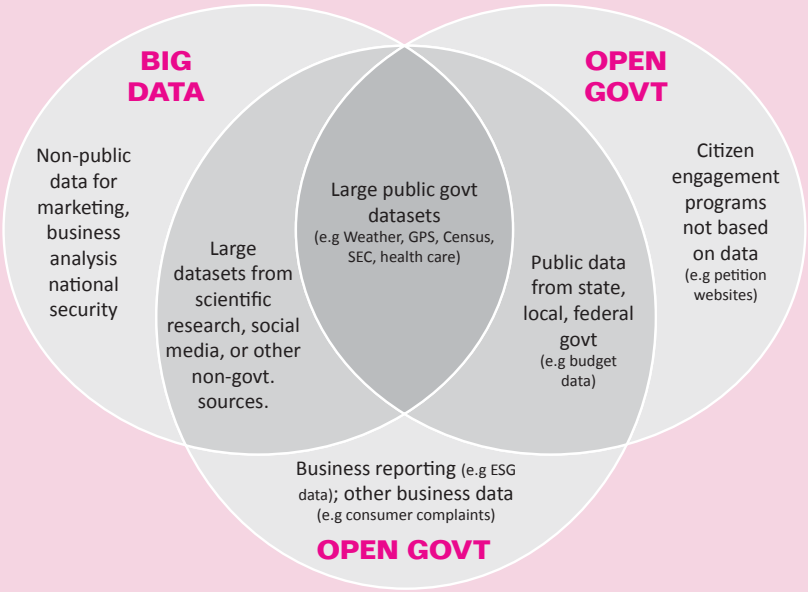
standards and governance. Specifically councils must individually take steps to address data governance, attitudes to risk, and knowledge. And they must get into the habit of a different data aware way of working on a day-to-day basis: using evidence more smartly when making decisions, or remembering to use relevant data visualisations not just heavy documents in order to put across ideas in presentations or in meetings.

But work must also be done across sectors and between agencies to develop common cultures, standards and governance structures. Finally councils must work together and with central government to increase local government data analytic skills, to shift the balance of knowledge and thus power between the public sector and private companies, and to prompt providers to work with the sector towards the goals of openness and integration. We have suggested a number of recommendations that we believe will enable local places to do this.

These are cross public sector issues. But if local authorities can take the lead in transparency and data use, and work with central government to instigate fundamental changes, other public sector organisations will follow. We are excited by what the future holds.

APPENDIX 1: DATA GLOSSARY AND DIAGRAMS[84]

FIGURE 1: One way of visualising the difference between big data, open data, and open government. Source: Joel Gurin[84]



ADMINISTRATIVE DATA Administrative data refers to information collected primarily for administrative (not research) purposes. This type of data is collected by government departments and other organisations for the purposes of registration, transaction and record keeping, usually during the delivery of a service.

84 These are not the legal definitions, and should not be taken as such. Please see Information Commissioners Office guidance for more definitions. https://ico.org.uk/for-organisations/guide-to-data-protection/

85 See Joel Gurin, Open Data Now Blog http://www.opendatanow.com/2013/11/new-big-data-vs-open-data-mapping-it-out/#.VS0ntvnF9U9

AGGREGATED DATA A combination of unit records created with the objective that individual details are not disclosed. In a health patient context, in aggregated data individuals are merely counts, such as incidences of Malaria, TB, or other diseases. Aggregate data cannot provide the type of detailed information which individual or patient level data can, but is important for planning and guidance.

ANONYMISED DATA Data relating to a specific individual where the identifiers have been removed to prevent identification of that individual. Essentially the same thing as de-identified data. Anonymous data is not, or should not be, directly or indirectly be identifiable. As a minimum, to make data anonymous, all direct identifiers (such as names, address/date of birth combinations, social security numbers) must be removed; this is called de-identification. However, de-identification by itself does not make information anonymous as the resulting data may still indirectly relate to the data subject.

BIG DATA Big data is a broad term referring to datasets that are so large or complex that they require innovative forms of information processing for analysis. Big data analytics refers to the techniques – such as predictive analysis – which are used to process this data in order to gain enhanced insight into behaviours and therefore to improve decision-making. Whilst traditional examples of 'big data' might include very large surveys or census data, a more novel example would be datasets about people's likes and preferences gained from social media. Some definitions argue that 'big data' refers specifically to data which is high-volume, high-velocity and high-variety.

DATA Data is qualitative or quantitative statements or numbers that are assumed to be factual, and not the product of analysis or interpretation. Strictly speaking a distinction can be made between data, information and knowledge: data is words, numbers, images or sounds without context; information is the collection of this data in a context or structure such as a sentence or database which gives them meaning; and knowledge is the ability to understand this information to form judgements and make decisions. An example of qualitative information is a social worker's written case notes about a vulnerable child, and quantitative information might be the number of people who have used a service or who live in an area,

arranged in a spreadsheet. Generally in this document we have used the term data to include information.

DATA LINKING A technique that involves bringing together and analysing data from a variety of sources, typically data that relates to the same individual. Linking data might involve joining up two data sets about the same set of local residents to better understand their needs.

DATA SHARING The transfer of data between different organisations to achieve an improvement in the efficiency and effectiveness of public service delivery.

DATASET A collection of data, usually presented in tabular form, presented either electronically or in other formats.

DE-IDENTIFIED DATA Data that cannot directly identify an individual, and so does not amount to personal data under the first limb of the definition of Personal Data under the DPA. This data could nonetheless potentially amount to personal data under the second limb of the definition of Personal Data under the DPA if the individual to which it relates could be identified from the combination of that data with other data held or likely to be held by the data controller.

GEOSPATIAL DATA Also known as spatial data or geographic information, it is the data that represents the geographic location of natural and man-made features on Earth. Spatial data is usually stored as coordinates of points, lines and areas and may include their topological relationship and attributes.

GOVERNMENT/PUBLIC DATA Data collected by the government or public services. This can be contrasted with data collected by private companies.

IDENTIFIABLE DATA Data which includes personal identifiers and so can be attributed to an identifiable individual from the information itself alone taken as a whole (i.e. including mainly but not exclusively data falling within the first limb of the definition of personal data in the DPA, so for example this could also include Date of Birth information, though this alone would not identify an individual, if it was part of a collection of other data that taken together could be identified as relating to a specific individual; it could

also include information that identifies a specific legal person, such as a company, which would not fall within the definition of personal data).

LINKED DATA Data described by an identifier and addresses to permit linking with other relevant data which might not otherwise be connected, improving discoverability. It may contain embedded links to other data. Not to be confused with data linking.

METADATA Data that describes or defines other data. Anything that users need to know to make proper and correct use of the real data, in terms of reading, processing, interpreting, analysing and presenting the information. Thus metadata includes file descriptions, codebooks, processing details, sample designs, fieldwork reports, conceptual motivations, etc., in other words, anything that might influence the way in which the information is understood.

OPEN DATA The Open Data Institute define open data as data that anyone can access, use and share. In the context of this report, open data means data that is accessible (ideally via the internet) at no more than the cost of reproduction, without limitations based on user identity or intent; in a digital, machine readable format for interoperation with other data; and free of restriction on use or redistribution in its licensing conditions. The licence can however require that people who use the data must credit whoever is publishing it (this is called *attribution*), or that people who mix the data with other data have to also release the results as open data (this is called *share-alike*). Open data could be originally collected by private companies or the public sector before it published openly.

In a local government context open data generally refers to non-personal data, or data which is aggregated. For example, the Department for Education makes available open data about the performance of schools in England. The data is available as CSV and is available under the Open Government Licence, which only requires reusers to say that they got the data from the Department for Education. There are different ways of judging open data, such as the star rating, which has 5 star linked data being the most useful.

PERSONAL DATA This is data relating to a specific individual where the individual is identified or identifiable in the hands of a recipient of the data. This can be seen to be in contrast to non-personal data.

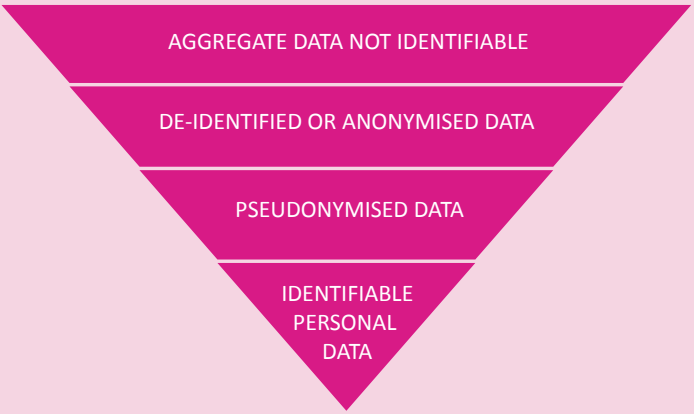
PRIVATE SECTOR DATA Data collected by private companies rather than government or public bodies.

PSEUDONYMISED OR CODED DATA Data relating to a specific individual where the identifiers have been replaced by artificial identifiers to prevent identification of the individual.

DIFFERENT LEVELS OF DATA IDENTIFIABILITY

The below diagrams and examples help to explain how different types of data enable identification of individuals to a greater or lesser extent.[86]

FIGURE 2: Levels of data identifiability



86 This is for illustrative purposes only and should not be assumed to match legal definitions such as those relating to the data protection act. Please see ICO guidance for legal definitions. https://ico.org.uk/for-organisations/guide-to-data-protection/

AGGREGATE DATA

E.g. Number of people with learning disability within council area.

Council area	No. of people with learning disability	No. of people claiming benefits
Anyborough	343	234

DE-IDENTIFIED OR ANONYMISED DATA

E.g. Data on individuals with identifying data removed.

Index	Learning disability	Claiming benefits
Person 1	Yes	No

PSEUDONYMISED DATA

E.g. Data on individuals with names changed.

Pseudonym	Other identifier such as d.o.b	Case worker	Learning disability	Claiming benefits	Next care meeting schedule data
JB	04.03.1975	Jasmine W	Yes	No	15th August 2015

IDENTIFIABLE PERSONAL DATA

E.g. Data indentifying individual people.

Name	Other identifier such as d.o.b	Case worker	Learning disability	Claiming benefits	Next care meeting schedule data
Joe Bloggs	04.03.1975	Jasmine W	Yes	No	15th August 2015

APPENDIX 2: DIGITAL GLOSSARY

API An Application Programming Interface (API) is a language and message format used by an application to communicate with another application or a computer's operating system. APIs are set of protocols which allow different computer programs to speak to each other. App – An app is a computer programme (application) designed to run on mobile devices such as smartphones and tablet computers. The simple interface of apps contrasts with traditional applications designed to run on desktop or laptop computers. Apps are exclusively purchased online, normally through central markets such as the Apple App Store or Google Play. Apps are often the most suitable format for providing simple online services. An example of a commercial app might be Facebook for iPhone or Android, or WhatApp messenger.

APPLICATION An application is computer software that is designed to help people perform an activity, e.g. word processing, communication or a game. It contrasts with system software that manages the computer itself, such as Windows. Applications designed to run on desktop or laptop computers may be purchased from a variety of sources, including via retail stores such as iTunes or the Government's G Cloud store, and directly from developers. Applications designed to run on mobile devices are known as apps. Examples of applications include Microsoft Word, Skype and Spotify.

CRM SYSTEM Customer Relationship Management (CRM) is a model and suite of technology that organizes and automates and manages contact with customers, including sales, marketing, customer service and technical support. It allows an organization and its employees to share and access information about all interactions with a client, supporting continuity and coherence of communication and progressive development of the relationship. Many councils use CRM systems to manage their contacts with customers, although these do not always cover all departments.

GDS The Government Digital Service (GDS) is a unit within the UK Cabinet Office committed to implementing the Government's Digital Strategy and leading the digital transformation of central government.

INTEROPERABLE Interoperability refers to the ability of computer systems and applications to work together. It encompasses communication between different systems and the ability to share and access data stored and produced on different systems. Interoperability is a critical requirement for the effective sharing of information and the integration of public services.

SMART CITY The concept of a smart city describes a city that achieves efficiency in governance through investment in and employment of intelligent computer systems and wide public participation. Smart cities generally encourage and invest in a high-skilled workforce and high-technology industries. SME – Small and Medium sized Enterprises (SMEs) are companies whose personnel numbers fall below certain limits.

SOCIAL MEDIA Social media refers to online applications and networks that allow individual members of the public to create, share and exchange information directly with one another, in both private and public settings. In this form of media, the public are active producers of content, rather than passive recipients. The content creation model of social media differs fundamentally from traditional media outlets, which rely on the dissemination of information to the public from a limited number of professional sources. Prominent forms of social media include Facebook, Twitter, Wikipedia, YouTube and LinkedIn.

APPENDIX 3: USEFUL RESOURCES AND PUBLICATIONS

OPEN DATA INSTITUTE (2015) OPEN DATA IN GOVERNMENT – HOW TO BRING ABOUT CHANGE

Using international examples, this useful resource provides practical guidance about how to implement open data initiatives in government.
www.theodi.org/open-data-in-government-how-to-bring-about-change

BIG INNOVATION CENTRE (2013) – LESSONS FROM A PUBLIC-PRIVATE BIG DATA HACKATHON

A report presenting the lessons learnt from a hackathon organised by the Big Innovation Centre and Camden Council. The hackathon involved many of the Big Innovation Centre's partners including universities, public bodies, and companies; such as Barclays Bank, EDF Energy, GlaxoSmithKline and Google.
www.biginnovationcentre.com/enterprising-state

NLGN (2014) – SMART PEOPLE, SMART PLACES: REALISING DIGITAL LOCAL GOVERNMENT

Accessible report making the case for digital local government, introducing the promise that digital technology (including data technology) offers local areas, providing case studies, and including practical ways councils can embrace the digital agenda in their areas.
www.nlgn.org.uk/public/2014/smart-people-smart-places-realising-digital-local-government/

LGA (2014) – TRANSFORMING PUBLIC SERVICES USING DIGITAL TECHNOLOGY

Report featuring examples of where councils have used digital technology, and data, to transform particular local services.
www.local.gov.uk/web/guest/productivity/-/journal_content/56/10180/6357119/ARTICLE

NESTA

NESTA is a charity aiming to improve innovation. They deliver projects and research to drive innovation, and fund external organizations for this purpose. They take a collaborative and general approach, and are keen to support and pilot relevant specialist projects. They have many projects relevant to digital technology and public services, and have recently launched projects such as Code for Europe, Digital Social Innovation and the Open Data Challenge series. Their website features information about events they run, research publications, and their weekly newsletter and blogs which provide insight into other innovative developments in this field. www.nesta.org.uk NESTA is a charity aiming to improve innovation. They deliver projects and research to drive innovation, and fund external organizations for this purpose. They take a collaborative and general approach, and are keen to support and pilot relevant specialist projects. They have many projects relevant to digital technology and public services, and have recently launched projects such as Code for Europe, Digital Social Innovation and the Open Data Challenge series. Their website features information about events they run, research publications, and their weekly newsletter and blogs which provide insight into other innovative developments in this field.

www.nesta.org.uk

LOCAL DIGITAL

Local Digital is DCLG's campaign to foster the development of faster, better, cheaper local digital services. It is contracted to UKAuthority with funding from DCLG and the supplier community. The campaign website has links to events, news channel, and newsletters on topics such as channel shift, customer journey mapping, procurement and service design standards that are free to interested parties.

www.ukauthority.com/LocalDigital

LOCALGOV DIGITAL

LocalGov Digital are a practitioner led network aiming to raise standards in web provision and the use of digital by councils across the country, and to create a flexible digital framework that is able to respond to local needs. They have a core steering group, and 'workstreams' on issues such as Rewiring Local Democracy, Infrastructure and Technology led by practitioners. They have created useful free open source resources for the

sector such as a usability dashboard which enables councils to gather feedback from peers and the public on tasks across their websites, and web content standards. These resources and information about physical and virtual events, and information about how to get involved, can be viewed on their websites.
www.localgovdigital.info

SOCITM

The Society for Information Technology Managers (SOCITM) is a professional body founded in 1986 for those involved in the leadership and management of IT and digitally enabled services delivered for public benefit. They run on a membership based structure, with useful information, benchmarking, events and reports available to fee paying members or those willing to purchase their reports.
www.socitm.net

ODI

The Open Data Institute (ODI) is a non-profit organisation founded by Tim Berners Lee and supported by funding from the UK Government to spread the use of open data. They convene world-class experts to collaborate, incubate, nurture and mentor new ideas, and promote innovation. They hold events, support start-ups, undertake research, provide open data certificates, run 'open data challenges' to stimulate innovation, and aim to influence policy. Their website has information about courses and learning events they run, and useful guides about issues surrounding open data.
www.theodi.org

LGA – LOCAL TRANSPARENCY

Resources from the LGA about local transparency, including information about the Open Data Breakthrough Fund and Local Government Transparency Code.
www.local.gov.uk/local-transparency

OPEN GOVERNMENT PARTNERSHIP

The Open Government Partnership (OGP) was founded in 2011 to provide an international platform to support local campaigners make their governments more open, accountable, and responsive to citizens. Since 2011 OGP has

expanded to 60 countries including the United States, Argentina, Norway, Kenya, Finland and Ghana. Technology and innovation is considered a core enabler of 'open government'. The below websites provide information on the partnership and about the UK Government's OGP Action Plan 2013, including information about open data.
www.opengovpartnership.org
www.opengovernment.org.uk

DATA.GOV.UK

A Cabinet Office backed website which aims to promote innovation though encouraging the use and re-use of government (central and local) data-sets. It includes a central directory of data available and of applications made from open data, as well as useful glossaries and blogs.
www.data.gov.uk/

SOCRATA

Socrata, the leader in data-driven government, is a cloud software company focused exclusively on democratising access to public sector data for the most innovative organisations around the world.

Customers include the European Commission, Bristol City Council, London Borough of Camden, Surrey and West Sussex County Councils, Bath and Northeast Somerset and over 275 governments worldwide.

Socrata's solutions assist government leaders in improving transparency, modernising citizen access to information and bringing data into every decision, all with unprecedented speed and cost savings.

Delivered as turnkey services, Socrata's technologies unlock data trapped in enterprise silos, mobilise and transform it into useful information that everyone can easily access, visualise, share and reuse.

To learn more about Socrata, **visit www.socrata.com**

Socrata

There's a buzz about data – terms such as big data, open data, linked data are increasingly talked about and data has been described as 'the new oil'.

This paper from NLGN is intended to demystify this 'data revolution' – to set out in clear language what it is all about, and how local governments can harness its value for their areas.

Supported by