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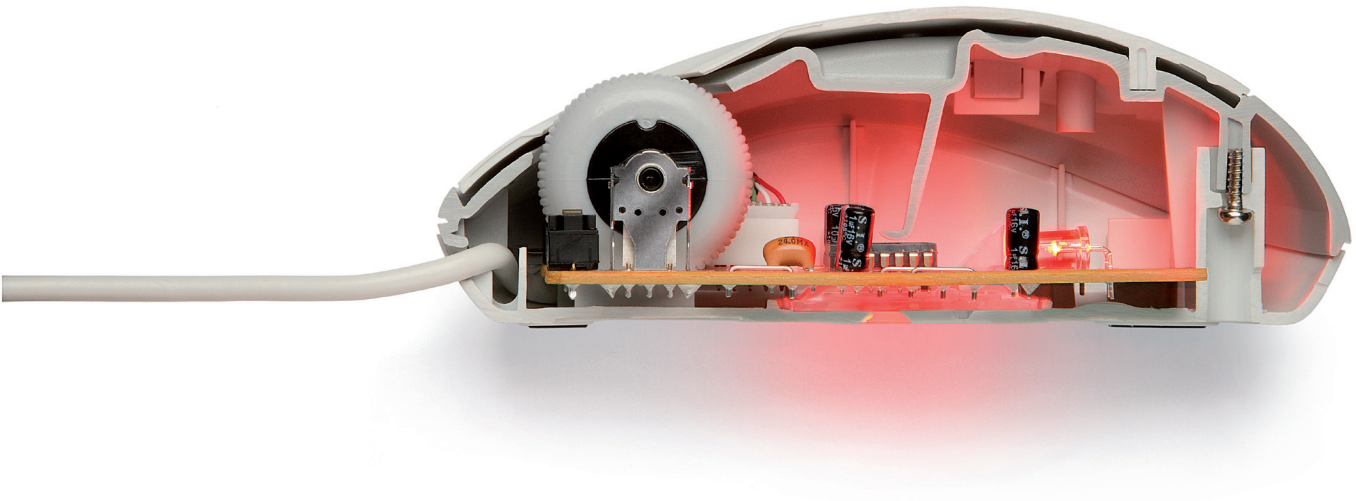
Open data
Driving growth, ingenuity and innovation



A Deloitte Analytics paper

Contents

Foreword

Welcome to this Deloitte Analytics white paper – the first from a new insight programme we have embarked upon this year in collaboration with Professor Nigel Shadbolt, Head of the Web and Internet Science Group at the University of Southampton and co-director of the Open Data Institute.

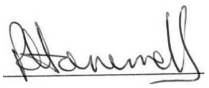
In a series of points of view and research papers, we are seeking to demonstrate that organisations in the future will need to compete primarily on the basis of the insights they can extract from data and turn into decisive action.

This publication presents Deloitte's vision for open data – a subject that has, until now, been overshadowed unhelpfully by considerations of 'big data'. Open data is about much more than improving government transparency and it is now emerging from its silent revolution.

We have arrived at a tipping point for businesses, consumers, governments and citizens. Publicly available resources have reached the critical mass necessary for businesses in all industries to be able to seize upon the rich tapestry of open data and use it to improve their products and services. Furthermore, we predict that businesses will begin to loosen the shackles on their own data by using open innovation to harness the interests and skills of a more digitally connected public. Together, these two mechanisms will change the way that businesses compete in the future.

We thank Nigel and the many executives who contributed their time to share their thoughts and ideas with us, and we commit to further research over the coming months to verify the value that open data can deliver to business.

We hope that you and your colleagues find our views thought-provoking and useful. We thank you for your interest and welcome your feedback.



Richard Hammell
Partner, Deloitte Analytics

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

Opendefinition.org

Executive summary

Open data will drive growth, ingenuity and innovation in the UK economy

Data is the new capital of the global economy, and as organisations seek renewed growth, stronger performance and more meaningful customer engagement, the pressure to exploit data is immense.

In recent months, businesses have become hooked on 'big data' – the term coined to describe the unremitting increase in data volume and the technologies needed to collect, store, manage and analyse it. In contrast, many businesses have a blinkered view of open data. Allowing anyone to use and redistribute data freely is viewed chiefly as a mechanism employed by governments to increase public service transparency and enable citizens to hold officials to account.

However, open data is an essential part of the burgeoning data landscape and a rich 'ecosystem' is beginning to emerge. Publicly available resources contributed by the Government and a growing number of businesses and citizens have reached the critical mass necessary to trigger a step-change in business attitudes towards open data. Businesses in all industries can now find relevant open data and use it to improve their products and services. New businesses, like Duedil, i3 Education Services, Parkopedia and Spotlightonspend, are emerging whose commercial models are predicated on the insight they deliver from open data.

Furthermore, businesses recognise that value cannot be derived from the data's volume alone. Leading organisations such as Google and Asos are already pushing ahead with opening up their own data to improve customer and supplier interconnectivity. And although businesses will need to overcome the inevitable tension between the value they traditionally ascribe to proprietary data and the value of opening up, making their data more accessible and combining it with other sources will dramatically increase its value to the economy.

Substantial education is required to ensure that individuals and businesses understand the benefits and challenges of open data. The growing value of open data must also go hand in hand with increasing levels of responsibility and governance on its availability and distribution.

Deloitte believes that the open data ecosystem has fundamental implications for the future of business and the nature of customer interaction. The trend towards greater provision and use of open data will be irresistible, forcing businesses to conceive new commercial models, derive higher quality insights, develop new ways of engaging with stakeholders and ultimately enable the economic and societal benefits of open data to emerge.

As a result, we foresee that open data, and not simply big data, will be a vital driver for growth, ingenuity and innovation in the UK economy.

There are four key aspects to our vision:

1. Every business will have a strategy to exploit the rapidly growing estate of open data.
2. Businesses will increasingly open up their data to revolutionise the way they compete.
3. Businesses will use open data to inspire customer engagement.
4. Businesses will work with the Government to establish a new paradigm in data responsibility and privacy.

To formulate this vision, Deloitte has sought a balance between our own views on the matters that we hope will further the debate on open data and the as-yet limited evidence from examples of open data in business. Our views have been reinforced by further qualitative evidence gathered through a series of roundtable discussions we held earlier this year with executives from organisations in the public and private sectors.

Our vision for open data

Every business will have a strategy to exploit the rapidly growing estate of open data

1

Businesses will seek out and use relevant open government data

The Government has now opened up over 8,000 unique datasets, most of them on data.gov.uk, the UK's official open data site, and more are being added every month.[1] The Government has estimated that the value of this data to the economy in 2011 was £16 billion.[2] The breadth and depth of data now available suggests that businesses in every industry will benefit from using it to improve the quality, completeness and utility of their own data and to look for opportunities to develop new services. For example, insurers can incorporate mortality, health, traffic, transport, environment and crime data; retailers can use demographic, population wealth and well-being, property and footfall data. The rapidly increasing commercial significance of open data and the growing amount of public and private sector data becoming available will demand a strategic response.

Government policy will become more proactive to encourage businesses to use open data

The Government's current approach is too passive to support businesses in fulfilling the potential of open data. A recent National Audit Office report on open data suggests that the Government lacks a firm grasp of whether the potential of its transparency programme is being realised.[3] In the future, the Government will encourage businesses to engage with open data by providing better explanations of the context surrounding public data resources, particularly around their scope and quality, and businesses will be able to draw on the relevant department or agency's in-depth experience to ensure that the data can be used in an appropriate way to champion innovation.

Businesses will help the Government to enhance the quality and consistency of public services

By providing their data-related capabilities to analyse public data, businesses will help the Government reveal underperformance and pinpoint inconsistencies. Through this closer partnership, bad practices will be reduced and best practice institutionalised through change programmes aimed at improving outcomes. As currently demonstrated in tax and welfare, businesses will also help government departments reduce error and increase detection rates for fraud through the use of analytics.

2

Businesses will increasingly open up their data to revolutionise the way they compete

Opening up business data will enable new data-as-a-service business models

Leading businesses, such as Google and Asos, recognise that new business models, which are based on free access to their data, have the potential to generate a good return on investment. They also stimulate increased engagement with developers and consumers, and positively disrupt the market. Their success will kindle new commercial ventures (both standalone and within large-scale companies), which will use mash-ups of open government data and their own proprietary information to offer free and premium services to consumers. They will generate new sources of revenue and ignite new opportunities for creativity and innovation.

The economic contribution of these new businesses will overtake the contribution from open government data alone. Several examples point to such a powerful economic impact: for instance, in late 2011, Duedil, an open data start-up, was valued at around £20 million by investors keen to acquire the company.[4] And in 2010, Factual, a US-based start-up and aggregator of publicly available data received a first tranche of investment funding of $25 million.[5]

Businesses will experiment with opening up discrete quantities of data

Our roundtable discussions suggested many businesses are wary that open data involves opening up everything for free. However, in the early stages, businesses will be selective and directed in which data to open up to quantify specific commercial and customer benefits and develop their open data strategy. Under the continuing data deluge, businesses that struggle to identify which of their many data sets has value or that cannot find the necessary analysis skills in-house, will tap into the resources of the crowd. They will open up discrete data resources and challenge their customers or the wider public to submit ideas or develop solutions in exchange for financial rewards.

Goldcorp, Boehringer Ingelheim and Dunhumby are examples of businesses that have used such open innovation successfully, and competition websites, such as Kaggle.com and Innocentive.com, will continue to grow in popularity. Specialist competitions will also be used by businesses as a way of attracting and selecting talent with new models of employment (part- and full-time) developing. Businesses will also draw on the resources of the crowd to clean their data and improve its accuracy.

Businesses will open up data to collaborate more effectively with partners and suppliers

Opening up data will drive more collective business behaviours and, in particular, help organisations to optimise supply chains by making all elements of service or product provision more open and efficient. The increasing availability of open data from governments as well as businesses will give rise to more collective behaviour as unexpected links and opportunities emerge between different data sets.

3

Businesses will use open data to inspire customer engagement

Businesses will give data back to help customers get the best deals

Consumer groups and the Government will redouble their efforts to help customers pool their data to benefit from economies of scale. More collective purchasing schemes will emerge, similar to the recent collaboration between the community website 38 Degrees and Which?, the consumer organisation, which helped individuals with similar usage profiles purchase energy deals collectively.[6] Through a combination of regulatory pressure and commercial opportunity, businesses will get in the habit of providing customer data back to individuals, and will make it easier for existing and potential customers to use their data to find the best deal.

Customers will engage with businesses that are more open with their data

Despite their apparent openness, recent Deloitte research suggests that in a variety of scenarios nearly 70 per cent of individuals are opposed to organisations using their personal data or other data about them.[7] In the future, engaging individuals through social media rather than simply monitoring what they post will start to build tremendous value for all parties and also create a wealth of data, especially around customer sentiment or suggestions, which businesses will use to enhance service quality and customer experience.

Giving data back, and being transparent about the way it is used and the benefits it can deliver to customers, will help businesses establish a reputation for being smart and responsible with open data.

Consumer pressure will compel businesses to become more transparent, not less

Value- and environment-conscious customers will continue to put tremendous pressure on all organisations to be more transparent about their business dealings and corporate and social responsibilities. Some leading businesses, like Enel, Italy's largest power company, and Nike, are more proactive, publishing their data to demonstrate a commitment to transparency and sustainability.[8, 9] Other organisations that follow such steps will benefit from a more positive perception of their brands, which will not only improve customer engagement and retention but also enhance shareholder confidence.

4

Businesses will work with the Government to establish a new paradigm in data responsibility and privacy

Businesses and public sector bodies will recognise that traditional safeguards do not go far enough

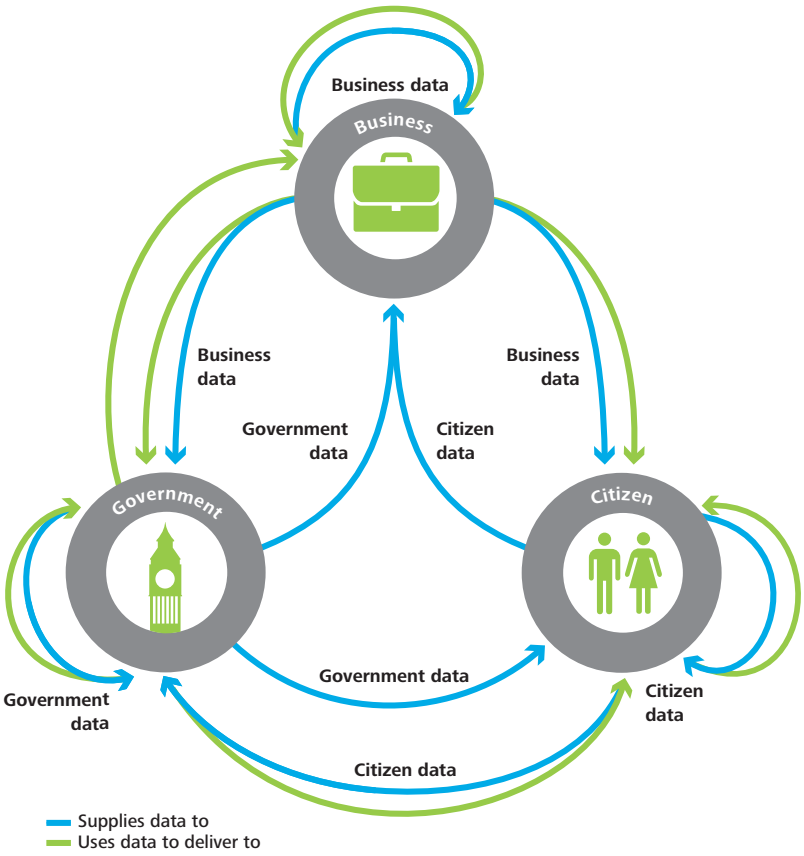
The increasing volume, complexity and openness of data challenge the current regulatory and technological safeguards for privacy. New policies and practices will be required to create the environment for both growth and protection.

This is due to the increased likelihood that by combining data sets of increasing size and granularity, the identity of individuals will be revealed despite measures implemented in each data set – a phenomenon referred to as the 'mosaic effect'. And, while big data is often processed behind closed doors, the rise of the open data ecosystem will trigger a new public debate, which, in turn, will recalibrate society's conventions and increase the moral standards applied by businesses towards privacy and the responsible use of data.

Organisations will do more to understand and deal with the unintended consequences of open data

Although the original intention behind publishing data may be to deliver a specific benefit or a greater public good, the serendipitous use of open data will continue to give rise to unintended and potentially harmful consequences. Businesses and public sector bodies that consider opening up will start to dedicate efforts to identify potential benefits and hazards, and the means by which they can be realised or mitigated. Organisations will also consider conducting small-scale experiments by opening up elements of their data to understand what might happen for both good or harm if further data is released.

Figure 1. The open data ecosystem



Source: Deloitte LLP

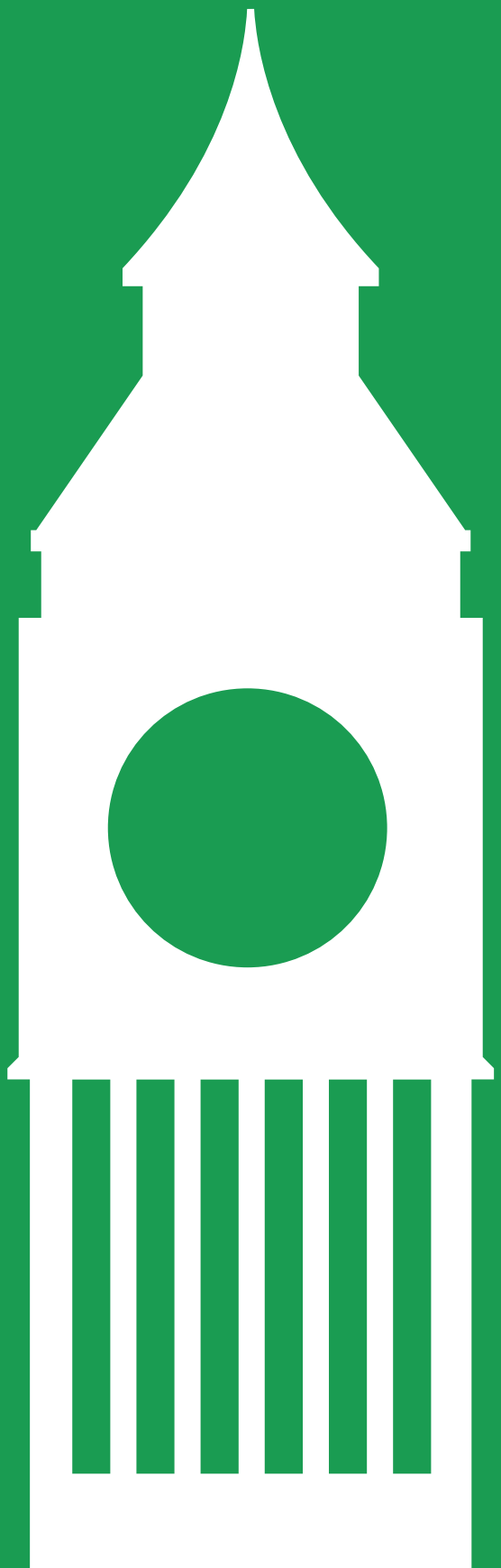
There are three principal constituencies in any successful open data ecosystem: government, business and citizen. Each constituency supplies data to itself and to others. In turn, businesses and government use the data to deliver services demanded by all constituencies. The three classes of open data supplied by the constituencies and used to deliver services are:

Open government data – data produced, collected or paid for by the public sector, subject to restrictions relating to *sub judice*, national security, commercial sensitivity and privacy. In addition, special commercial arrangements also being made for certain trading funds, including Companies House, the Ordnance Survey, the Meteorological Office and HM Land Registry, which together form the newly created Public Data Group.[10]

Open business data – data produced or collected by the private sector and published freely and openly, subject to restrictions that individual businesses decide to put in place.

Open citizen data – the personal and non-personal data of individual citizens published into the open domain.

Build a strategy to use open data



Businesses will seek out and use relevant open government data

The UK Government has now opened up over 8,000 unique datasets on data.gov.uk and through affiliated sites such as data.london.gov.uk. Many other countries also have open data policies. As well as official government-sponsored websites, there are numerous unofficial sources of government data – usually compiled by publicly spirited individuals or communities – or aggregators, such as datacatalogs.org, which publish hyperlinks and data sets from many public sector organisations.

Deloitte research indicates that a total of 49 countries now have more than 220 distinct official or unofficial open data websites, which provide downloadable public datasets at a national, local or city level. There are many more individual government departments or agencies that also have websites, but these have not been included in our count. The list is dominated by sites in the UK, the United States and Canada, but almost every populated world region is represented.

In a March 2012 research note, Policy Exchange, one of the UK's leading think tanks, presented examples of different types of open government data, as illustrated in Figure 2.

Figure 2. The UK's public data universe

Types of data	Public sector users	Examples
• Management information and other operational data collected or created as part of the day-to-day business of government	• Whitehall departments • Government agencies and non-departmental public bodies • Local government institutions	• Departmental accounts and organisational structures • Registers of public property • Public spending data • Non-personal data related to the health and education systems • Calendars of public holidays and other key administrative information
• Geographic and other data describing the physical and environmental characteristics of the UK	• Emergency services • Military • Coastguard • Mountain rescue • Environment agency/departments	• Maps and charts • Meteorological data • Hydrographical data • Postcode and address data files
• Administrative data describing the business environment and public realm	• Tax and welfare administration • Planning authorities • Courts and justice system	• Company registrations • Land and property registrations • Planning data • Vehicle and mileage data
• Data related to public transport networks and transit systems	• Public transport operators • Public infrastructure bodies	• Timetables • Fare schedules • Planned and emergency works • Transit loading data
• National statistics describing the UK economy, state and society	• Whitehall departments • Government agencies and non-departmental public bodies • Local government institutions	• National accounts • Surveys of attitudes and behaviours • Other statistics collected for analysis and/or the public record
• Data created in the course of conducting publicly-funded research	• Universities and other educational establishments	• Various mass datasets • Published research

Source: Policy Exchange[11]

Figure 3. Reasons for the Government to open up and reasons for them to remain closed

Government

Reasons to open up to other public sector bodies:
- improve public services and outcomes
- provide oversight of activities of a wide range of public sector bodies.

Reasons for other public sector bodies to need data:
- measure performance and perform benchmarking
- inform strategic decisions
- improve productivity
- improve efficiency of public services
- reduce overall costs of collecting and managing data
- make sense of disparate data and provide a view of aggregate fiscal risk
- satisfy legal or mandatory reporting requirements.

Government

Reasons for not opening up data to other public sector bodies:
- loss of revenue, particularly for trading funds
- increasing departmental scrutiny
- cost and effort associated with maintaining data.

Reasons other public sector bodies have for not demanding data:
- lack of awareness.

Reasons for opening up to businesses:
- stimulate economic growth by encouraging businesses to exploit the open data
- generate competition
- help private sector suppliers of public services
- add value to business data
- improve business decisions.

Reasons for businesses to need data:
- increase fidelity and utility of own data
- offer new data-enabled services to customers
- satisfy journalistic interest.

Business

Reasons for not opening up data to businesses:
- loss of revenue, particularly for trading funds
- embarrassment over content or quality.

Reasons businesses have for not demanding data:
- lack of awareness
- lack of understanding of potential utility
- seen to be irrelevant to business.

Reasons for opening up to to citizens:
- demonstrate transparency and anti-corruption measures
- increase public access to data
- facilitate markets and choice for consumers
- build trust and improve reputation and moral standing
- reduce costs of Freedom of Information requests
- improve quality of data
- stimulate innovation and entrepreneurship, and crowd-source ideas
- create a platform for public engagement nationally and locally.

Reasons for citizens to need data:
- satisfy curiosity and academic interest
- build personal status by reusing data
- offer insight back to local community
- build entrepreneurial business
- hold public sector officials and institutions to account
- use 'real-time' information to make life easier.

Customer or Citizen

Reasons for not opening up data to citizens:
- increasing public scrutiny of organisational or even individual performance
- loss of revenue, particularly for trading funds
- embarrassment over content or quality.

Reasons citizens have for not demanding data:
- lack of awareness
- lack of interest
- worries over security and privacy
- potential difficulty in using it.

Positive Negative

Source: Deloitte LLP

Such is the scope of published data that most businesses can find relevant examples to enhance the richness, quality and accuracy of their own assets – regardless of whether they choose to open up or not. However, businesses need to recognise that their demand for open data is one of the most significant stimuli for government policy. Without it, there is a risk that the ecosystem will falter and government initiatives will stall. The Government's reasons for and against opening up are detailed in Figure 3.

Open government data can be used to enhance data already held by businesses. This works both intra-industry and inter-industry. For instance, businesses offering transport services to customers can combine their own data with that from the public transport network to provide tailored itineraries, and healthcare providers can use public healthcare, demographic and social deprivation data in combination with their own data to configure their services more accurately to serve client needs.

Across different industries, businesses can combine existing customer data with open government data covering a wide array of sectors to enable more accurate segmentation and profiling of lifestyles and life events; retailers could use open transport data, demographics and wealth data to identify new locations for store placement or advertising; insurers can use mortality, crime, transport, meteorological and environmental data to develop better location-based models of risk to ensure customers are charged appropriate premiums for where they live.

Businesses can also make use of open government data to offer new data-led services, which package the data and present it to customers in an attractive and easy-to-use way. Current market activity is focused around a relatively small number of entrepreneurial businesses, such as those illustrated in Figure 4. Many of these entrepreneurial businesses are taking advantage of the trend towards mobile data-enabled applications, which can serve customers wherever they are and whatever they are doing. These innovations can be replicated by businesses of any scale, and also offer investment and acquisition opportunities that could help more traditional businesses transform their brand and market positioning.

Government policy will become more proactive to encourage businesses to use open data

The challenge for the UK Government is not with the supply of data – although some of the roundtable participants argued that many government departments and their agencies still have a long way to go before they can consider themselves to be truly open. Instead, the principal emerging challenge – not just for the UK but for all nations embarking on the open data journey – is encouraging other public sector bodies and businesses to use the open government data as a matter of course.

Many of the businesses we spoke to during our roundtable discussions were simply unaware of the extent and depth of open government data now available. This suggests that it is not enough for public sector bodies simply to publish this data; they also have a duty to educate businesses that may be able to exploit the data's full potential by drawing on their intimate and unrivalled expertise, which in many cases has been amassed over years or even decades. Education, however, is not a one-way street. Businesses, too, should plan to keep watch for forthcoming open data releases and actively seek out better explanations of existing data resources from the relevant government department or agency.

> "Having this public data enables social enterprises to start up anywhere in the country, reinforcing local economies and also enabling a new generation of small businesses to be created."
>
> Theo Bertram, Google[12]

Figure 4. Examples of innovative companies delivering services using open government data

Red Spotted Hanky	Launched in 2010, Redspottedhanky is an online ticket retailer which aims to offer customers an easier way to book without any administration or payment fees. Redspottedhanky relies on data from the rail industry to offer customers low-cost advance bookings. The business employs 13 people and is growing fast, with a loyalty scheme, a tie-up with Tesco and a 'price-promise' for customers.
Duedil	Duedil is a business information provider based in London's Soho. Duedil gives free access to governance and financial information for every company in the UK and Ireland, and combines this with data from online sources, Application Programming Interfaces (APIs), social networks and more. Duedil was launched in April 2011 by entrepreneur Damian Kimmelman and has now grown from six employees to 14. Its aim is to make business more transparent, by opening up company information to make the due diligence and research process simple and intuitive. By aggregating and linking all the available information, users can gain a comprehensive understanding of businesses and the people who run them. The information currently available on the site will always remain free. However, in the near future, it will offer a platform to sell premium data – whether privately bought or proprietary. In one year it plans to double the size of the team again, and aims to become the number one source of company information in the UK.
Parkopedia	Parkopedia is an innovative open data company which fuses location and other local data. A small UK-based business, it uses live data from local authorities to help drivers identify free car parking spaces. Parkopedia has grown to become the world's leading source of parking information covering more than 20 million spaces in 25 countries. Used by millions of drivers, Parkopedia's services include a pre-booking tool which allows drivers to book parking online, and real-time parking space availability information. Parkopedia also works with other organisations (e.g. AA, the UK's Automobile Association) to integrate its data into journey planner mobile applications and 'satnavs'.
Spotlightonspend	Spotlightonspend is a managed service that is comprised of everything necessary to facilitate cost-effective publication of the spend and related information you elect to make available to the general public. Spotlightonspend is designed to: • cut costs by removing the need to add to the workload of current staff or increase headcount • eliminate the complexity of becoming and staying compliant with policy • reduce the risk of inadvertent breach of data protection legislation • enhance the information published to improve its accessibility, relevance and value for the intended audience – the general public.

Source: Open Data Innovation Community Hub and whatis.spotlightonspend.org.uk

Businesses will help the Government to enhance the quality and consistency of public services

Open data encourages a stronger partnership between government and businesses, especially where the Government can draw on businesses' capabilities for managing and analysing data and their expertise in strategy and change management.

Businesses can offer their information management services to help the Government reduce the level of effort and cost incurred by the separate departments and agencies that collect and manage similar data assets. In particular, businesses can use open government data to identify opportunities that would allow the Government to take a more unified approach. This will help to improve the data's quality and accuracy so that decisions made using it become more reliable. Thus policy and service implementation will be strengthened considerably.

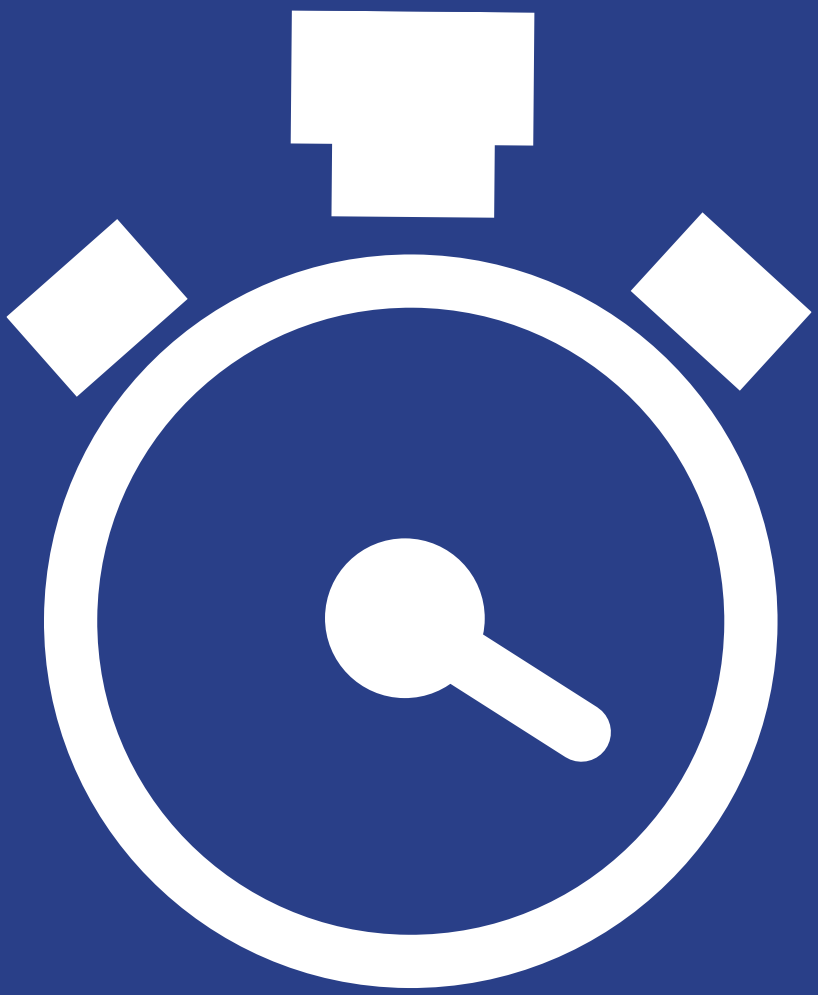
More complete and accurate data will also result in fewer errors and, with appropriate use of analytics, reduce the likelihood that fraud will go undetected. In December 2011, for instance, the Government opened up prescribing data for every General Practitioner in the UK.[13] This data, which includes the name of the chemical or product, number prescribed, number dispensed, net ingredient cost and actual cost for every prescription every month, could potentially be mined by the Department of Health to identify statistical anomalies that could point towards error or other issues with a deeper clinical meaning.

In 2004, Sir Bruce Keogh, Britain's leading cardiac surgeon and now Medical Director for the National Health Service (NHS), persuaded his peer group to publish outcome data, including mortality rates, for hospitals and surgeons across the UK. Surprisingly, the data showed considerable variations in outcomes. As a consequence of opening up, bad practices began to be eliminated and best practice spread. Over the next few years, mortality rates fell by 22 per cent.[14] Taking this pioneering concept further, in March 2012, the NHS Atlas of Variation in Healthcare for Children and Young People was published.[15] This document is aimed at reducing unwarranted variations in healthcare provision to increase value and improve the quality and efficiency of care. Ultimately, by using data to identify and reduce discrepancies, the health outcomes for children and young people will be improved.

As well as focusing scrutiny on particular sectors, open government data can help entire cities function more efficiently. Cities and towns make sensible loci for open data because they are self-contained and much of the government data produced or collected by local authorities is of direct interest to businesses and the local population.

> "Open data is creating a bottom-up data economy where 24/7 citizen-led scrutiny will revolutionise public services – the social and economic implications are potentially immense."
>
> Sean McMahon, i3 Education Services[16]

Change the way your business competes



Opening up business data will enable new data-as-a-service business models

When we first raised the idea of businesses opening up their data, most of the private sector participants at the roundtables baulked at the thought. First of all, according to the accepted definitions of open data, opening up business data means providing access to everyone – even competitors. Second, the data must be available free of charge – even for commercial use. Despite their concerns, many businesses acknowledged that they were already open, at least to a limited degree: listed companies provide quarterly and annual returns, and other regulatory news items, and online retailers provide web-based access to products and inventory information.

There are numerous reasons for businesses to open up their data, as shown in Figure 5.

The qualitative evidence suggests that the challenges to opening up are not technical, they are cultural. The principal concern among businesses is that giving away data gives away value and provides advantage to sharp-eyed competitors.

Despite this, several new business models can run successfully in parallel to 'free'. Among them, the 'freemium' model provides businesses with the opportunity to give away basic data to encourage customers to engage with the company and use related services while the company charges a premium for access to more detailed data. Alternatively, cost substitution through advertising – the original Google model – provides an indirect return on investment when data is given away for free. Businesses can also develop and charge for access to specialised applications or ask users to subscribe to web Application Programming Interfaces.

For example, soon after its launch in 2011, Duedil, the open data start-up which combines data from Companies House and other open and proprietary sources, was approached by a number of organisations keen to acquire the company that valued it at around £20 million.[17] In a sign of the expected returns in open data, Factual, a US-based start-up and aggregator of open data for application developers, received a first tranche of investment of $25 million in December 2010. Factual's resources include government data, data for over 350,000 consumer products, and an array of assorted data on topics as diverse as the height, weight and body mass index for celebrities and cheat-codes for video games.[18] In a presentation to the Web 2.0 Expo in 2011, Hal Varian, Google's chief economist, estimated that his company's contribution to the US economy was $119 billion, with $54 billion coming from sales of advertising on its search engine, and the remaining $65 billion coming from the amount of time that Google saves employees and researchers compared to traditional library-based searches.[19]

Although these examples are not yet sufficient to enable us to estimate precisely the usage of or demand for open business data, nor the contribution such business models can make to the UK economy, they suggest that the impact of open business data will be significant. Further research is needed to build an evidence base. Indeed, one of our roundtable participants hypothesised that traditional economic models could be turned on their heads by data-as-a-service models: in the future, giving away as little as 20 per cent of a company's data could generate 80 per cent of its returns.

Figure 5. Reasons for businesses to open up and reasons for them to remain closed

Business

Government

Reasons to open up to government:
- comply with legal or regulatory obligations
- sell data-related services to government
- improve collaboration with local government
- provide insight into investment and innovation
- support public – private partnerships.

Reasons for government to need data:
- measure performance and perform benchmarking of contractors
- inform strategic decisions
- provide a view of aggregate procurement risk.

Reasons for not opening up data to government:
- loss of revenue
- increasing scrutiny
- cost and effort associated with maintaining data
- worries about warranties and liabilities.

Reasons government has for not demanding data:
- lack of awareness.

Business

Reasons for opening up to other businesses:
- sell data-related services to other businesses
- help partners and supply chain
- gain richer understanding of customers and their life circumstances
- improve collaboration
- support industrial communities
- support local businesses and charities.

Reasons for other businesses to need data:
- obtain intelligence on competitors
- increase fidelity and utility of own data
- satisfy journalistic interest.

Reasons for not opening up data to other businesses:
- loss of competitive advantage
- lack of understanding of potential utility or benefit
- embarrassment over content or quality
- cost and effort associated with maintaining data
- worries about warranties and liabilities.

Reasons other businesses have for not demanding data:
- lack of understanding of potential utility of others' data.

Customer or Citizen

Reasons for opening up to customers:
- comply with legal or regulatory obligations
- sell new data-related services to customers
- demonstrate transparency and anti-corruption measures
- build trust, improve reputation and moral standing
- crowd-source solutions
- crowd-source improvements to data quality
- create a platform for social engagement with customers
- engage data scientists and attract talent.

Reasons for customers to need data:
- improve experience with business
- satisfy curiosity and academic interest
- build personal status by reusing data
- offer insight back to local community
- hold executives and businesses to account
- use 'real-time' information to make life easier.

Reasons for not opening up data to customers:
- increasing scrutiny of business performance
- loss of revenue
- embarrassment over content or quality
- worries about warranties and liabilities.

Reasons cutomers have for not demanding data:
- lack of awareness
- lack of interest
- worries over security and privacy
- fear that it will cost money
- potential difficulty in using it.

Positive Negative

Source: Deloitte LLP

Some businesses already have an open data policy. Four are described in Figure 6.

Figure 6. Examples of businesses that have opened up their data or are using other companies' data

Enel	Enel, Italy's largest power company, launched its open data site in August 2011 with three principal objectives: • to increase transparency and involvement by all stakeholders • to improve the business – better information makes better markets • to encourage innovation – open data stimulates the development of new applications.[20] Sustainability data and financial performance data are included.
Nike	Nike publishes an annual Sustainable Business Performance Summary, which describes key data and metrics relating to the company's sustainability efforts. In conjunction with the release of its report, Nike has also recently launched an interactive web experience at www.nikeinc.com enabling users to explore Nike's value chain and learn more about its progress and commitments regarding each impact area. It also provides tools where users can design footwear and clothing, check the environmental impact of various material selections and explore the company's global contracted manufacturing base with an interactive map. [21]
Asos	In December 2011, the online fashion giant Asos opened up its product and basket services data to external web developers in a bid to extend its wider online presence by allowing others to build Asos-related services.[22]
MusicMetric	MusicMetric provides insights and understanding into online consumer behaviour globally for the entertainment industry. They aggregate and analyse all music-related information available on the web – from websites mentioning an artist or release, the social networks frequented by music fans, peer-to-peer networks used to trade music and anywhere music fans leave a comment. MusicMetric currently tracks and indexes data for 600,000 artists and over ten million individual releases. MusicMetric provides a limited set of data for free, and offers two data products as a subscription service.[23]

Source: Deloitte LLP

Businesses will experiment with opening up discrete quantities of data

Many businesses mistakenly believe that opening up means publishing everything. However, as the data deluge continues unabated, some organisations are struggling to get to grips with the sheer volume and complexity of the data they are collecting; they cannot understand the value of it or how best to extract insights from it. Businesses, of course, are free to choose what they open up and what they keep closed. And just as the Government hopes to stimulate innovation and the development of new applications using open government data, businesses, too, can tap into the resources of the crowd by publishing some of their data and challenging customers or the public at large to submit their ideas and develop better solutions – an approach referred to as open innovation, which incurs very little cost.

For example, in 2000, Goldcorp, a Toronto-based mining company, ran one of the best known crowd-sourcing competitions by opening up some 400Mb of the company's proprietary data to the public and offering a total of $575,000 prize money for the best estimates and methods for finding gold deposits in their mines. Contestants identified 110 targets, more than 80 per cent of which yielded substantial quantities of gold. And since the competition was initiated, eight million ounces of gold have been found – worth over $3 billion. Over seven years, Goldcorp increased its market capitalisation from $100 million to $9 billion.[24]

Dedicated open data competition websites, such as Kaggle.com and Innocentive.com, encourage organisations of all types to publish their data and incentivise individuals and teams to come up with better solutions. Businesses such as Boehringer Ingelheim, a health research company, and Dunhumby, a customer analytics company, are using Kaggle.com to tap into the resources of the crowd.

But competitions are not the only way of developing innovative solutions. With open data, almost any solution or service improvement is possible. For instance, by opening up their data, retailers can use crowd-sourcing to provide new ways for consumers to access their products, and manufacturers can use the crowd to prototype and test virtual designs.

Competitions also provide a way for businesses to attract data talent – the scientists and mathematicians who can make sense of complex data – which is in limited supply. A recent study by the Centre for Economics and Business Research suggests that 58,000 new jobs will be created in the UK economy by 2017 as a result of data.[25] Opening up business data or making use of available open data may be interpreted by prospective employees and data scientists as a sign that a company is innovative and forward-looking. Moreover, businesses can use their data in competitions to attract, challenge and even select new talent. On Kaggle.com, for instance, successful competitors from fully open contests are sometimes invited to participate in elite private contests, which may include access to proprietary or commercially sensitive data.

Businesses will open up data to collaborate more effectively with partners and suppliers

Our roundtable participants thought that opening up data may help to drive more collective business behaviours. In particular, opening up business data can help other organisations in the supply chain optimise their approach, thus making all elements of service or product provision more efficient.

However, the participants thought that organised collaboration outside the supply chain, while possible, may be very difficult to achieve in practice. They speculated that the businesses most likely to call for such cooperation would be information-poor, without the necessary data assets themselves. Nevertheless, participants considered that greater availability of business data would progressively give rise to more collectives – not just within industry sectors but also across them – as unexpected links and opportunities emerged between data sets, and as more open data became available. In this context, open data benefits the wider community while still preserving the ability of individual businesses to compete.

Members of the airline industry, for example, used to be fiercely protective of their data. They did not want to give away commercial advantage. Customers had to visit an airline's website to find flights, more often than not searching on different websites before having sufficient information to make a decision on which one to book. Then flight search engines emerged, 'scraping' data from individual websites to present customers with unified information on timetables and prices. Although the airlines initially fought this change, over time they began to realise that opening up their data generated more business.

While opening up business data may increase the level of scrutiny from customers, it can also help them find, compare and understand products and services better. For many businesses, this trade-off is positive, stimulates growth overall and drives fairer competition.

"Open data offers the prospect of instant connectivity between partners, as in open supply chains, where businesses source from places they might never have considered or even suspected could be a source. Open data can reduce integration costs, improve transparency and harness the innovation of others."

Professor Nigel Shadbolt[26]

Change the way your business engages with customers

Businesses will give data back to help customers get the best deals

MiData, an initiative between businesses, consumer bodies and regulators in the UK, endorses the key principle that data should be released back to consumers. Although MiData falls outside the strict definition of open data, from a business perspective, the initiative, and other similar attempts to encourage citizens to take more direct control of their data, is essential to increasing customer engagement more generally with open data.

Over time, businesses that sign up to the voluntary code will give consumers access to their personal data in a portable, electronic format – a concept identical to open data. According to the Department for Business, Innovation and Skills (BIS), "Individuals will then be able to use this data to gain insights into their own behaviour, make more informed choices about products and services, and manage their lives more efficiently."[27]

A minority of customers are already proactive in controlling their data. Some are even very open with it – particularly on social networking sites – and a minority are happy to exchange their data for better and more tailored services from businesses or to support a wider public good. Some, though, are worried about data security and potential invasions of privacy.

These concerns affect how they view open data and how they use it. Such concerns also affect their willingness to provide their data in the first place. Together, these concerns currently drive closed individual behaviours and a lack of willingness to engage with businesses.

There are many reasons why customers or citizens may adopt certain behaviours towards their data. A number of these are highlighted in Figure 7.

Allowing individuals to provide their own data and use it to access economies of scale or to get the best deal is crucial to increasing engagement. For example, BIS is introducing a range of new initiatives, including encouraging local areas to develop their own collective-purchasing deals, producing an advice toolkit for consumers, introducing a new collective-purchasing innovation prize and piloting a green collective-purchasing scheme.

The community website 38 Degrees brings together people to take action on issues that matter to them. They have recently collaborated with Which?, the consumer organisation, to help individuals with similar usage profiles purchase energy deals collectively.[28] In the US, the Green Button initiative is similar and is complemented by an equivalent approach to accessing healthcare services via the Blue Button.[29]

> "We will see … profound changes: A shift away from a world in which certain businesses tightly control the information they hold about consumers, towards one in which individuals, acting alone or in groups, can use their data or feedback for their own or mutual benefit."
>
> Better Choices: Better Deals[30]

Figure 7. Reasons for citizens to open up and reasons for them to remain closed

Citizens

Government

Reasons to open up to government:
- comply with legal requirements e.g. planning process, land registry, census
- provide feedback on public consultations
- benefit a greater/public good.

Reasons for government to need data:
- solicit feedback on planning applications
- inform future policy decisions
- measure state of population.

Reasons for not opening up data to government:
- worries about security and privacy
- fear of retribution for criminal activity.

Reasons government has for not demanding data:
- fear of trespassing on privacy.

Business

Reasons for opening up data to businesses:
- no other option
- improve quality of services
- receive more tailored services
- benefit from collective-purchasing power
- insights into their own behaviours
- richer, more accurate and timely information
- participate in markets in a more informed and confident way
- receive recommendations.

Reasons for businesses to need data:
- build better customer profile to increase fidelity and utility of own data.

Reasons for not opening up data to businesses:
- embarrassment over content or quality
- concern about businesses using data for profit
- worries about security and privacy.

Reasons businesses have for not demanding data:
- fear of trespassing on privacy.

Customer or Citizen

Reasons for opening up data to other people:
- maintain social contact with friends, family and colleagues
- sell data-related services to other citizens
- crowd-source ideas
- form communities and collectives.

Reasons for other people to need data:
- maintain social contact with friends, family and colleagues
- satisfy curiosity and academic interest.

Reasons for not opening up data to other people:
- no need
- embarrassment over content or quality
- worries about security and privacy.

Reasons other people have for not demanding data:
- lack of awareness
- no need
- lack of interest
- worries over security and privacy.

Positive Negative

Source: Deloitte LLP

Customers will engage with businesses that are more open with their data

The challenge for all industries is to build customer awareness – of what data is and what is not collected or used and, crucially, what data will be opened up. Being transparent about privacy and security measures, and ring-fencing data likely to generate significant customer concern, will help businesses to establish trust and still allow opportunities to be created.

A recent European Union survey has found that UK consumers show some of the lowest activity in Europe, in terms of comparing prices, reading terms and conditions, and showing interest in consumer information.[31] This finding is backed up by a recent Deloitte study of the public's attitudes towards data use conducted in April 2012, which suggests that although 82 per cent of individuals we surveyed were aware that their data was collected and used by organisations, the majority did not know what would happen to the data or lacked confidence in the benefits that were supposedly delivered to them as a result.[32] Therefore, businesses need do more to educate customers about what they are doing with their data.

Engaging individuals in a meaningful conversation using social media rather than simply monitoring their posts for sentiment can build tremendous value for all parties. Businesses can use social media to make their use of customer data more visible, help customers to use and assess it, and create a wealth of data, especially around customer sentiment or feedback, which they can use subsequently to enhance service quality and customer experience.

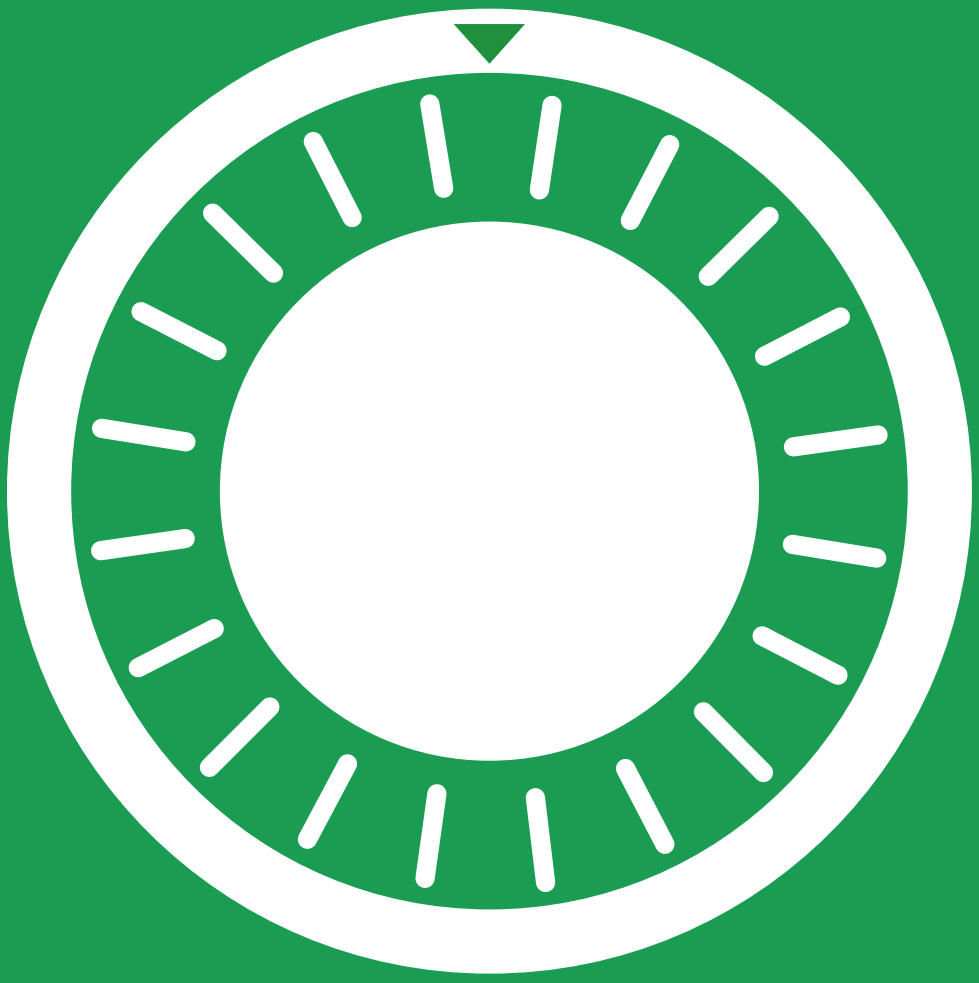
Consumer pressure will compel businesses to become more transparent, not less

In the wake of the 2008 financial crisis and mounting environmental concerns, the public is demanding that businesses adopt higher ethical and environmental standards and give back more to society. For instance, the company Chrinon Limited, which is behind OpenCorporates.com and other open data sites, is using open data from governments and businesses to create a free resource for anyone to discover information about the corporate world, including accounts, director appointments and recent financial transactions. The public availability of this information will drive greater business transparency.

A more proactive approach to opening up data can help to forge a new, more trusted relationship between businesses and consumers; a relationship based on evidence rather than hearsay. And while there may be no direct financial return, both Enel and Nike, for example, are publishing data to demonstrate their firm commitment to sustainability. According to Nike, the company has been reporting its environmental and social performance around key impact areas including waste, water, energy, toxics, climate and labour since 2001. As well as enabling businesses to take a leadership position on sustainability and corporate social responsibility issues, such efforts may also help to create a more positive perception of their brands and improve customer engagement.

> "Nike is known globally for our innovative performance products and sustainability has now increasingly become core to our business approach."
>
> Mark Parker, President and CEO, Nike Inc.[33]

Tackle the challenges of open data



Businesses and public sector bodies will recognise that traditional safeguards do not go far enough

Rapid advances in information and communications technology cause headaches for legislators. And for initiatives like open data, there are often calls for new legislation to provide the necessary controls or to protect the rights of customers and citizens.

However, Deloitte questions the need for new legislation around open data, particularly as the European Commission has published new proposals for Europe-wide data protection, which will – if enacted – enshrine in national law additional rights for citizens. Instead, different social conventions and perhaps a more exacting moral code for organisations may be sufficient to protect the rights of individuals. New legislation should be the act of last recourse.

The combination of greater organisational transparency and individual empowerment suggests that new moral codes in the future will be forged through partnerships between organisations and the individuals represented within the data. All organisations should take an active role in engaging citizens and customers in a conversation about the data – perhaps using the MiData charter to define clearly what data is collected, how it is used and what the benefits are to the individual and to the wider community. Organisations should also obtain citizens' and customers' informed and explicit consent.

The success of these partnerships will rest on a broader public debate about the challenges of open data and the responsibility it places on organisations, especially around privacy.

In a national poll carried out for Deloitte's Media Democracy Survey in March 2012, we discovered that 85 per cent of respondents expressed concern about their personal data being taken by organisations.[34] It may be that these concerns have reached such a high level as a result of the spate of data breaches in recent years, particularly where the unencrypted personal data of millions of people has been lost. As public awareness about the scale of ongoing data collection and analysis will surely increase, such concerns have significant implications for open data.

Advocates of open data talk about techniques such as anonymisation (where personally identifiable information is removed) or pseudonymisation (where personally identifiable information is replaced with unique codes), which go some way to alleviate these legitimate privacy concerns. Organisations also aggregate data, so that characteristics that can be used to identify individual people are replaced by more widely applicable profiles.

The challenge for open data, though, is that none of these techniques provides absolute protection of identity because of a phenomenon referred to as the 'mosaic effect'. In an increasingly digitised and open world, it becomes harder for individuals or organisations to obfuscate or eradicate identity, and the traditional analogue provisions of privacy are rendered unfit for purpose.

The mosaic effect: putting together data from different sources (pieces of the mosaic) increases the likelihood that the resulting 'picture' will reveal the identity of the individual. This could happen despite the protections implemented in each data set.

The onus should instead be placed on organisations to use their data responsibly and only in a manner acceptable to the individuals. In this way, although identity could in theory be established, privacy can still be preserved by choice – to a degree controlled by the individual, who can be as open or as closed as they like.

These kinds of steps are already being considered elsewhere. For example, in March 2012, the Federal Trade Commission (FTC), the US's chief privacy regulator, concluded a two-year study of internet privacy by issuing a report that called for sweeping changes by businesses and policymakers to help consumers better understand and control the information being collected about them.[35] The FTC report calls for businesses to:

- build in consumer privacy protection at every stage in developing their products and delivering their services
- give consumers the option to decide what information is shared about them and with whom
- disclose details about their collection and use of consumers' information, and provide consumers with access to the data collected about them.

The FTC report complements President Obama's new plan to protect privacy in the internet age by adopting a consumer privacy bill of rights, which also seeks to implement many of the same initiatives as the MiData programme in the UK and the proposed European Commission Directive on Data Protection.[36] The Administration's plan will give consumers several key rights, among them the right to exercise control over what personal data companies collect from them and how they use it, the right to access easily understandable information about privacy and security practices, and the right to access and correct personal data in usable formats.

An approach based on individual choice builds better engagement and trust between individuals and the organisation opening up the data. This is very important when individuals might choose to set different parameters for how their personal data can be used by organisations in other contexts. For example, it is possible that a large proportion of the population would, on the one hand, be happy for their health records to be opened up if they thought that it would help fight common diseases, but may be unhappy on the other at the prospect of their data being used by pharmaceutical companies to make extra profit.

With open data, choice works best and is simplest to implement at the point of data collection rather than at the point of data use. This does not change the fact that organisations making use of open data should be transparent about their sources of data, but it does mean that the burden of responsibility is on the original publishers.

Giving people the choice assumes that they have sufficient understanding of what information is held about them and the scenarios that make use of this information to provide benefits. This understanding is a prerequisite for individuals to be able to trade off their privacy for some kind of benefit, and provides an opportunity for all organisations involved with open data to build trust with the public.

Building this incentive programme and engaging the public through new online channels – such as social media – will be an important step towards tackling what many of our roundtable participants considered to be the most difficult of all open data challenges. It is also where new regulations and a public debate about new social conventions could potentially come into play.

Organisations will do more to understand and deal with the unintended consequences of open data

One of open data's greatest strengths is serendipitous reuse – the way the data is ultimately mixed with other sources of information and used is not always predictable. This is why open data is so attractive to innovators and entrepreneurs.

The challenge with such openness, though, is that the law of unintended consequences comes into play. For example, after spending data was released by local government, there were some instances of invoice fraud, but this then made the authorities much more vigilant about how they settled invoices, which had previously often had a poor verification process.

Crime data can also threaten the traditional insurance model, which distributes risk over wide areas and demographies, by providing insurers with a much more granular view of risk – potentially down to the individual level. The consequences for insurance pricing and the premiums paid by individuals deemed to be high-risk are significant.

Accountability is also a double-edged sword. Although publishing such data as detailed hospital, school, social services or police league tables may be in the wider public interest, greater data granularity may allow underperforming doctors, teachers, council workers or police officers to be singled out by interested members of the public prepared to do a small amount of additional data analysis.

These examples demonstrate that with open data, although the original intention may be to deliver a greater public good, the unintended consequences may single out more vulnerable communities or individuals for exploitation.

However, to deny unintended consequences is to deny access to innovation. We have to accept that to tap into the benefits of opening up data we have to leave open the possibility of unintended consequences. This is a difficult balancing act to achieve and one for which there is no perfect solution. It is similar in many respects to the debate around 'net neutrality' – should the state step in to regulate content and access to the Internet, or should the Internet remain open and free with its attendant cyber security risks?

Public sector bodies and businesses should not leave it entirely to chance, though. Some degree of due diligence should be performed to understand the data landscape well enough to identify potential benefits and hazards. This can be done within the organisation by bringing together a diverse group, including protagonists as well as critics, to perform 'red teaming' – to view the data from a competitor's or a customer's perspective. Red-teaming will enhance decision making and probe potential weaknesses in strategy, either by specifying a customer's preferences or a competitor's strategies, or by simply acting as a devil's advocate to weigh up potential courses of action.[37]

Not all unintended consequences are harmful, of course, and organisations should also consider conducting small-scale experiments to understand what will or might happen for both good or harm if particular data sets are released. Opening up health data, for example, may help to drive these issues through and force the public towards a more conscious decision about the circumstances under which greater good will win out over disruptions to individuals.

How well is your business doing?

The journey is just beginning

When the UK Government set out on its open data journey in 2009, few people would have realised that three years later data.gov.uk would become the largest resource of its kind in the world, with an economic potential estimated at £16 billion. However, that potential rests on others, especially the private sector, wanting to use the data. Moreover, an entirely different class of open data – currently locked up inside businesses – has equivalent potential. Together, we believe that open government and open business data can create a much more effective ecosystem and contribute billions of pounds to the UK economy.

For businesses, opening up is a five-step journey that starts with traditional closed models. In time, businesses will experiment with limited data sharing, and eventually the market will become highly liquid and start to configure around businesses that use open data to compete in entirely new ways and create a more proactive and transparent relationship with their customers.

What next for our research?

More and more businesses are setting out on the open data journey. However, the evidence that demonstrates the economic impact of opening up is still sparse. During 2012, Deloitte will continue its research into open data, aiming to build up a greater body of evidence to support the views expressed in this paper.

Figure 8. The Five-step open data journey

	1	2	3	4	5
Is your business using available open data?	We are unaware of government policy, available data or its benefits	We are aware of available data but do not use it within existing operations or services	We are aware and use available data occasionally within existing operations or services to customers	We are aware and use available data regularly within existing operations or services to customers	We use available data regularly to deliver new and existing services to customers
Is your business opening up its own data?	We do not publish any business data and are unaware of any need to do so	We are aware of other businesses opening up their data but do not publish any ourselves	We publish a small subset of existing business data to address specific (e.g. regulatory, product list) information on request	We publish business data to run experiments and competitions to address specific information on request	We publish significant quantities of business data, run red-teams and provide information on privacy and security measures
Is your business engaging customers with their data?	We do not give detailed data back to customers and have little or no engage-ment with them about data	We are aware of some customer demand for data but do not give it back	We give specific data back to individual customers upon request but have limited engagement about their data otherwise	We routinely give specific data back to all customers but have limited engagement about their data otherwise	We actively educate and engage customers about data, routinely give detailed data back and allow potential customers to use their data to interrogate our services

Notes

1 As of 11 May 2012, www.data.gov.uk claimed to provide over 8,400 datasets, although the precise number depends on the extent to which individual datasets can themselves be partitioned. For instance, in a speech to the Open Data Innovation Community event in Birmingham in April 2012, the Cabinet Office Minister, Francis Maude MP, suggested that the Government has now made more than 40,000 unique datasets available.
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