“The system must allow any sort of information to be entered. Another person must be able to find the information, sometimes without knowing what he is looking for.”
Tim Berners-Lee, 1989

OPEN DATA

25 years of the web: open data, open innovation
When ODI President and Co-Founder Sir Tim Berners-Lee invented the World Wide Web, the idea of sharing data and knowledge was at the heart of his vision.

In 1989, as a young software engineer at CERN, Sir Tim saw how scientists wanted to share their findings with others around the world. He wondered whether their computers, and millions more, could somehow connect together through the Internet.

Sir Tim set out his vision for the World Wide Web by proposing a set of technologies that would make the Internet more accessible and useful: HTML, URL and HTTP. The first web page was served for CERN staff in 1990. Over the next few years, other people joined the web community and, in 1993, it became available for anyone to use.

Since then, the web has transformed our global community by allowing us to freely share information with each other. When open and accessible for all to use, data has driven change in government, business and culture, as our experts reflect on page three.

Businesses use open data to innovate and better serve their customers. In turn, they are sharing more about themselves, so their customers understand them better, as you’ll see on pages four and five. Governments are opening up their data to improve their efficiency, and so citizens can hold them to account and complement public services with their own enterprises. See page six for stories from Mexico, Burkina Faso and the UK, and page seven for an infographic on how the UK government can use open data to help solve big challenges, like housing and transport for a growing population, and emergency response in extreme weather.

Data has been inspiring our discoveries and inventions since long before the World Wide Web, or even computing, as you’ll see in our ‘cut out and keep’ centre page, which illustrates some of the discoveries that have transformed our access to information, from the Library of Alexandria to real-time apps.

As open data has shaped our past and present, it is also shaping our future. Making data available for anyone to use, reuse and redistribute enables us not only to find innovative solutions to modern challenges like education, crime and energy — see page 11 for examples — but also inspires cultural shifts and data-driven art, as you’ll see on page 10.

The open data movement is growing. We are excited to be a part of it.
Open data: how far have we come?

Open data puts power in the hands of the citizen

“Ultimately it is the citizen that stands to gain the most. The Met Office mission is to enable people to make informed decisions. We are more attuned than most to the benefits of this being done well, and the risks when it isn’t. Understanding our environment and how it changes, and using that to act differently gives us all enormous possibilities.”

— Charles Even, Chief Information Officer at the Met Office

Governments publish more public data, but there is still a way to go

“In the UK we publish data from across all departments of national government, local government and the devolved administrations. So, we have come a long way, but we cannot become complacent or be lulled into a false sense of security. There is much more data to release, those in power too often succumb to pressures to sell public data when it should be made an open public resource, and there is another huge challenge when it comes to increasing data literacy.”

— Sir Nigel Shadbolt, ODI Co-Founder

As we mark 25 years of the World Wide Web, we ask experts in different fields to look back on how far they feel open data has progressed and driven change in government, art, citizen empowerment and beyond.

Open data is a means to an end; not an end in itself

“As more open data becomes available, and people and companies develop the skills to create innovative projects and applications around the open datasets, we will see things happening that we couldn’t possibly have predicted. It is this unpredictability in the evolution of the web that is both the most exciting and challenging thing about it.”

— Dame Wendy Hall, Professor of computer science, University of Southampton

Data has gone beyond abstract analysis to solving practical problems

“We’re seeing a positive trend in putting data to practical use. People from all sectors are figuring out how to take it out of the realm of abstract analysis and start applying it to real world problems. That’s going to bring a lot of rapid progress in healthcare, finance, energy, education and many other areas.”

— Joel Gurin, Senior Advisor, The Governance Lab, New York University

The philosophy of open data applies to journalism

“Nothing comes of nothing. Nothing is new. No work of art, piece of writing or song has no referents or precedents, so why should we pretend otherwise? The ideology behind open data is as much about acknowledging this as it is about economic efficiency, and that point of view is clearly one that should affect the ways we think about the practice of journalism.”

— Bill Thompson, Technology Critic

Open data gives people the tools to create world-changing art

“Open data transforms the way ordinary people interact with political leaders, commercial leaders and powers who shape our everyday life in both big and small ways. For artists — traditionally the explorers who go first to places ordinary people dare not go, and who open doors and show us new truths and inspirations — open data can give them the tools to create world-changing art. How thrilling is that?”

— Ruth Mackenzie, Digital Arts Consultant and Director of The Space

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As organisations use and publish open data more, new businesses are being founded to support them to do it. From platforms and portals to software and analysis, companies are providing diverse solutions that help make data easier to handle, use and understand.

- Geodata company GeoLytix uses census and transport data to help companies plan how many stores to have, where to put them and how to plan home delivery for better business.
- The data analytics group Demand Logic helped King’s College London save £390,000 a year in energy costs.
- Big data specialists Mastodon C analysed 40 million rows of open data from the NHS to expose £200m of potential savings.
- The open source platform DataPress helps governments and institutions to publish open data quickly and easily.

Open data reuse is creating market opportunities

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“Every startup should plan to use at least some open data — it’s a treasure trove, useful for finding out about potential customers and developing products.”

ScraperWiki

“Businesses will increasingly open up their data to revolutionise the way they compete, and inspire customer engagement.”

Deloitte LLP

“Businesses are sharing more information about themselves

Aside from using data that’s already available, businesses are also publishing data about their own work and institutions. Companies often underestimate what information they hold, and the potential of that data. Whether it’s records made about day to day business, products or overall sales, organisations are beginning to share more information, so they can give each other and their customers a better understanding of how they work.

CarbonCulture works with clients such as Allen & Overy, Hilton Worldwide and KPMG to measure and report on their energy performance, helping to share insights to reduce costs and carbon emissions.

For business ideas and more information about who is doing what with open data, see ODI Startups, ODI Members and our Open Data Awards nominees, all at theodi.org

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If you think using data to build a business is just for tech experts and big corporations, think again.

There are now many quick, easy and innovative ways to help understand and engage your customers.

Open data can be used to help many businesses target their services and marketing more strategically. Here are some tips on how:

Don’t panic if you’re not an expert —— If you don’t have technical skills or specialist software, this doesn’t need to hold you back. Open datasets are now supplied in spreadsheets and databases compatible with standard Microsoft Office software. Many now supply open data via web portals that help you find and extract it, while making it easy to understand.

The Office of National Statistics (ONS) website on neighbourhood statistics provides a visual tool that lets you select geographic units on a map and download related census statistics. This could help you analyse the demographic of an area around an existing retail store or consider a potential location for a new outlet.

Map out your customers —— ‘Segmentation’ is a great way of finding where your target customers are, based on their demographics and behaviour. It’s easier than it’s ever been to get information about your customers from external data sources, with many well-established commercial ‘off the shelf’ segmentation systems now on offer.

Be inventive: use different data sources —— Free, open data is becoming more widely available all the time: census data from ONS, transport data from Citymapper and welfare and housing statistics from the Department for Work and Pensions are all easy to access. Using them will help you understand more about the people you are selling to.

Use trusty postcodes —— To merge open data to your customer database, you will need your customers’ postcodes. ONS provides a postcode directory which acts as a lookup table to link to census and other geographic units, so data can be matched.

Use information you already have —— The best way to gain a more thorough understanding of your customers is to use information they give you about themselves. You can do this by offering incentives, like loyalty discounts, in return for signing up for a newsletter. But if you do this, you must gain consent from your customers, publish a clear privacy policy which states how you will use the data, keep the information secure and ensure you are registered as a data controller with the Information Commissioner’s Office.

Cross-check your customer information with open data —— Once you have data from your customers, you can match it to open data to build a customer demographic profile which you can use to target your promotional activity, like leafleting, more accurately.

Open data has brought about a shift in the way small and medium enterprises can do business, and levels out the playing field as more customers are going online. No longer is customer insight the preserve of banks and big corporations. It is a rich resource which can be used to provide valuable information to manage and grow your business.

John Murray is CEO of Fusion Data Science and a lecturer in computer science at the University of Chester
Transforming government with open data

Governments around the world hold huge amounts of data. Many are beginning to open it up for citizens and businesses in order to monitor and improve all sorts of things – from education and health to crime rates and traffic.

Empowering citizens in Burkina Faso

Burkina Faso in West Africa, ranked by the UN as the third poorest country in the world, this year launched its Burkina Open Data Initiative as part of its pilot open data platform: data.gov.bf. The platform aims to boost innovation, grow the economy and make the government more transparent. It now has over 50 government datasets that can be accessed and reused by anyone – from Ministry of Health data on the number of beds in public and private hospitals to the number of malaria deaths and vaccination coverage throughout the country. The goal is for local startup companies and entrepreneurs to use this open data to develop innovative new services which will benefit all Burkina citizens. One of the apps the platform supports is Our Schools, Our Data (Nos Écoles, Nos Données), which provides access to information about schools in a user-friendly way. The initiative is supported by the UK’s Open Data Institute, its Paris Node: FivebyFive via the Partnership for Open Data and the World Bank.

Solving urban problems in Mexico

Governing a metropolis like Mexico City brings many challenges. Regulating its sprawling public transport network, minimising its security risks and all the while keeping its 21 million residents engaged and satisfied are all tasks the city authorities have to tackle each day. The Mexican Government is now looking to open data and local developers for solutions. In October 2014, ODI trainer Dr David Tarrant visited the city’s purpose-built ‘laboratory’ to lead a workshop aimed at finding innovative solutions for how to govern a city in the 21st century. He explained how opening government data for developers to build apps like Citymapper can help citizens plan their transport, and how giving citizens access to data can help them feel connected. Datosabiertos.df.gob.mx is gaining momentum as an open data portal that stores government data.

How can you tell if a government is really open?

An Open Data Certificate provides a benchmark for the quality of open data. By testing datasets against the quality standard and conditions it sets, the certificate helps to identify gaps and provides practical steps to improve how data is released. The UK Government is leading the way in improving the accessibility of open government data, having adopted the certificate into its open data policy. Data.gov.uk is the UK’s largest catalogue of open government data and provides metadata about public sector datasets. Having integrated with the certificate, thousands of its published datasets have already been certified. As more governments and open data enablers adopt and use it, the certificate is fast becoming a useful instrument for measuring the impact and effectiveness of a government’s open data strategy.
Over the next 15 years, the UK population will increase by almost 10%, to around 70.7 million people, with an increase of around 232,000 households each year. To prevent and reduce the impacts of climate change, the UK has committed to reducing greenhouse gas emissions by 80% from 1990 to 2050. Rising temperatures are likely to cause extreme weather. Rainfall will continue to increase, particularly in winter, and rising sea levels will also cause more floods, which will affect up to 1 million people per year. Cities throughout the UK are developing plans to cope with more people using existing transport infrastructure in future. More people relying on trains and buses will contribute to the strain.

Open data about flood plains, energy supplies, health infrastructure, roads and other services can help inform smarter housing. Open data about drug prescriptions, health centres and census information can help improve health services and lower their costs. Open data about commuter patterns, the times at which public transport is most stressed and in which areas, will be key to target transport improvements over the next 15 years.

Illustration: John Devolle
Let there be data
1961 MICROFICHE
A film that records printed text in miniaturised form

1968 PERSONAL COMPUTING
Douglas Engelbart presents the fundamental elements of modern personal computing

1982 CD
Phillips and Sony make Compact Discs commercially available for the first time, storing data digitally using LaserDisc technology

1986 BBC DOMESDAY PROJECT
Citizens in the UK were asked to record what they thought would be of interest in another 100 years on LaserDisc, to be read by and navigated using a tracker-ball pointing system

1989 WORLD WIDE WEB
Sir Tim Berners-Lee makes public his proposal for “a large hypertext database with hypertext links”

1999 MP3
A record company called SRS Corporation is the first to distribute music tracks in the MP3 format

2001 WIKIPEDIA
Wikipedia, the free, online encyclopedia, is formally launched, announced by its Co-Founder Larry Sanger on the Nupedia mailing list

2006 SVALBARD GLOBAL SEED VAULT
A secure seedbank in Norway is established to preserve a wide variety of plant seeds

2007 iPHONE
“The phone was not just a communication tool but a way of life”
Apple CEO, Steve Jobs

2012 DNA DIGITAL DATA STORAGE
First research is published to show that digital data can be stored in the base sequence of DNA

2013 "Wikipedia is first and foremost an effort to create and distribute a free encyclopedia of the highest possible quality to every single person on the planet in their own language”
Wikipedia Co-Founder: Jimmy Wales

Sources:
- Produced using open knowledge: Digital Extremities http://www.digitalextremes.com
- The Independent: http://www.independent.co.uk/lifestyle/gadgetsandtech/news/ webat50/firstweb20/ebonyandtubalchinesephotoprotectinternetarticles186346.html
- The Institute for Advanced Study: http://www.ias.edu
- Turing, A. (1950) Computing Machinery and Intelligence
- UCLA Department of Epidemiology: http://epi.ph.ucla.edu
- The World Wide Consortium: http://www.w3.org

Illustration: John Devoloe

Thank you to Wikipedia for being a pioneer of open knowledge, and to artist Sam Meech for inspiring us to examine the connection between punched cards, computing, and data.
Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0)
We Need Us is a ‘living’ dynamic artwork, powered by people, defined by data-driven unpredictability.

We Need Us takes metadata from citizen science platform Zooniverse, where anyone with a computer can support science projects by classifying data.

The artwork focuses on the intersection between scientific discovery, open data and our human responses to the two. It reflects the ways in which we humans produce, use and react to the growing amount of data that is available to us: from craters on the moon’s surface to cancer cells. Every minute, We Need Us counts users and their classifications, and uses the live metadata to create rhythms that are translated into moving shapes and play different sounds.

“I chose to use metadata to influence the work instead of choreographing it. I wanted We Need Us to be just outside of my control: to re-animate the data and bring it, through the work, to life.” — Julie Freeman, ODI Art Associate

WeNeedUs.org
theodi.org/culture
Open data is being used to find innovative solutions to many challenges, which could make for a safer, more efficient and sustainable future in all areas of society.

The Open Data Challenge Series has set seven challenges to generate innovative and sustainable open data solutions to social problems. The programme, run by the ODI and Nesta, provides winners with funding and support to develop their products. Meet the first three winners...

**Crime and justice**

Around half a million bikes are stolen in the UK every year, with very few returned to their owners. Check That Bike!, run by John Moss, has developed an open data service to help cyclists check whether a bike has been stolen. It works by accessing different databases with information about stolen bikes, from police data to local registers, manufacturers and insurers. When buying a bike, cyclists can cross-check its unique frame number with Check That Bike! John’s idea won the Crime and Justice Open Data Challenge in February, 2014, and will hopefully incentivise cyclists to report thefts and help the police to return stolen bikes to their rightful owners.

“This is an open data project. The aim is to collect as much information as possible about unique numbers on bikes and offer a search engine ... I need a constant flow of data, which is currently coming in dribs and drabs.”

John Moss, Founder, Check That Bike!

**Education**

Wherever you are in the world, it’s important but often difficult to make sure your children are getting a good education. Whether you’re finding a school, choosing a subject or engaging with your child’s learning, open data can help. Skills Route uses open data on how schools and colleges perform in different subjects, to help people find schools that suit them and check their expected grades at each. Based on these predictions, the tool also lists potential higher education institutions and routes for career progression, with average salaries. Skills Route won the Open Data Education Challenge in June, 2014.

“40,000 Year 12 students drop out of school each year, often because they start a course that isn’t appropriate for them. We developed Skills Route to provide young people with an engaging way of finding out about the options available to them.”

Steve Preston, Founder of MIME Consulting, the company behind Skills Route

**Energy and the environment**

More startups than ever are using open data to develop products that help communities to use energy more efficiently. Community Energy Manager is one of them. The online tool was developed by Matthew Wood and Mark Corbin to help community groups support their local area by brokering energy efficiency improvements and reducing carbon emissions and fuel bills. The tool pulls together data on energy saving interventions, so people and communities can choose those best suited to their situation. It also makes money for communities by notifying Green Deal providers when lots of people need a new boiler, for example, and getting referral fees back. CEM won the Energy and Environment Open Data Challenge in July, 2014.

“Open data is the first step of the process, so when a community group registers they can use open data to identify the areas they are interested in, and that need the most attention.”

Matthew Wood, Co-Founder, Community Energy Manager
We’ve all been in the uncomfortable position of needing the toilet, but not knowing where to find one. For those with disabilities or problems with continence, it is all the more difficult. This is a problem that Gail Ramster, a researcher in community-led design, is trying to solve using open data. Gail came to the Open Data Institute to explain how, during a Friday lunchtime lecture.

Gail works on ways to improve design and accessibility of public toilets. It struck her that public loos would be much more accessible if people were able to look up where their nearest ones were, and check them for privacy and quality. A simple idea, with a complicated solution which demonstrates the kinds of barriers you can come across when accessing open data.

Gail decided to make her own Great British Public Toilet Map. But to make a map, you need data, and data on toilets is hard to come by.

When Gail began her search, she found that there were already two national datasets that featured toilets: Ordnance Survey, which shows public conveniences (PC) on their maps, and OpenStreetMap, which has over 4,000 toilet locations. But, because these are broad mapping projects, they only show public toilet locations or buildings, and don’t have information on publicly accessible toilets in supermarkets, town halls or cafes.

Gail’s next port of call was data.gov.uk, where government data on all sorts of public services is published. But she didn’t find the national public toilet database she was looking for, and alerted officials to the fact that there wasn’t one. When Gail approached local councils, their geographic information system managers said that they knew where the toilets were but could not say, because Ordnance Survey had restrictions on the reuse of data it had already mapped.

However, Ordnance Survey has recently decided to allow councils to reuse its intellectual property on toilet data, and said that if others were to ask for the data, it would be likely to grant them access. The Great British Public Toilet Map is now making freedom of information requests for councils to open up their data on toilets.

The project is being helped along by the Local Government Open Data Incentive Scheme, administered by the Local Government Association on behalf of the Open Data User Group, which includes the publication of public toilet data from hundreds of councils.

Little by little, national public toilet data is beginning take shape. The Great British Public Toilet Map now covers 33 boroughs in London. If local councils continue to open their public toilet data, Gail’s map will be able to cover much more of the UK and help us all find our nearest loo — wherever we are.

ODI Friday lunchtime lectures are for everyone and free to attend. You bring your lunch, we provide tea and coffee, an interesting talk and enough time to get back to your desk.

Find out all all about the ODI’s learning and open data courses at theodi.org/courses
CALL YOURSELF A DATA NERD?

Think you know your GitHub from your Socrata?
Put your skills to the test with ODI Trainer David Tarrant’s big fat open data pub quiz.

So, how did you score?

1-3: Commiserations, you’re an open data novice. Stick to other chat in the pub for now, and pop along to one of the ODI’s ‘Open data in a day’ courses to bring you up to speed.

4-7: Not bad! You’ve got enough to get by, but there’s a lot more data-driven-tech-trivia out there to learn! Come to our next #ODIFridays lunchtime lecture, and see what you can discover.

8-11: Is that you, Tim? If you don’t already work for the ODI, you should consider applying for the next available post. If you want to get even more open data savvy, come to the ODI’s next 3-day ‘Open data in practice’ course to swallow up everything from licensing to data-viz.

1. Who invented the internet?
   A. Vint Cerf and Bob Kahn
   B. Tim Berners-Lee
   C. Dustin Moskovitz and Chris Hughes
   D. An’r Dec

2. On May 9th 2013, president Obama put in place an executive order in the USA. What was it?
   A. For every government agency to use open data
   B. For all White House staffers to Tweet more
   C. To make government information open and machine readable by default

3. Which company made the most from the HTML link tag?
   A. Google
   B. Wikipedia
   C. Facebook

4. To the nearest ten million, how many websites were there by the end of 2012?
   A. 300 million
   B. 630 million
   C. 750 million

5. Which page are you most likely to land on if you start on a random Wikipedia article and keep following the first link to another Wikipedia article?
   A. Philosophy
   B. The Wikipedia home page
   C. Milady Cyrus

6. Bonus point! What is the probability that you’ll end up on that Wikipedia page?
   A. 7.37%
   B. 85.93%
   C. 94.52%

7. The Large Hadron Collider in Switzerland is one of the largest science experiments in the world, but how much data do they collect?
   A. 0.0002%
   B. 35.335%
   C. 98.999%

8. There are approximately 1000 gigabytes in a terabyte, 1000 megabytes in a gigabyte, 1000 kilobytes in a megabyte and 1000 bytes in a kilobyte. There are 8 bits in a byte, so what are 4 bits called?
   A. A half-bit
   B. A nibble
   C. A chewil

9. After the 2010 earthquake in Haiti, which world-wide community contributed within 48 hours, in a way that helped every group working at the scene, including local emergency services?
   A. OpenStreetMap
   B. MapAction
   C. CrisisMappers

10. Bonus point! How many edits did it take?
    A. 600
    B. 1350
    C. 568

11. Which celebrity star is loved by more robots than real humans?
    A. Bill Gates
    B. Justin Bieber
    C. Mark Zuckerberg
The Open Data Institute is celebrating innovation and excellence in the ways open data are used and published with its first ever Open Data Awards. Here are the finalists...

Open Data Business Award — celebrating open data used to transform business

Geolytix — builds innovative algorithms and tools that help retailers make better decisions about location planning.

OpenCorporates — shares data on corporate entities as open data under the sharealike attribution Open Database Licence.

Socrata — helps public sector organisations improve transparency, citizen service, and data-driven decision making through a data portal, apps and services.

Open Data Individual Champion Award — celebrating an outstanding individual pioneer of open data

Irina Bolychevsky — Irina and her team build, maintain and deploy CKAN, a tool for open data publication and discovery.

Nicolas Baldeck — as founder of the Open Meteo Foundation, Nicolas promotes open data and open technology to drive meteorology.

Owen Boswarva — a champion for communicating open data news and information to wide audiences via social media networks.

Open Data Innovation Award — celebrating open data used as a tool for innovation, in any sector

Community Insight — a charity and social enterprise committed to finding solutions that help housing providers transform their businesses to better meet the needs of their residents and the communities they live in.

OpenFoodFacts — a free, open and collaborative database of food products from around the world.

Shoothill for GaugeMap — a specialist in data visualisation and online mapping technologies, creating bespoke online applications to help clients unlock the power of open data.

Wikidata — provides structured open data about the world to Wikipedia to help share knowledge in thousands of languages.

Open Data Social Impact Award — celebrating open data used as a tool for social good

Internews in Kenya — supports journalists to use open data to tell stories in areas like health, road safety, democracy and governance.

Plantwise — a global programme, led by CABI, to increase food security and improve rural livelihoods by reducing crop losses.

UNHCR — provides up to date information about refugees through data visualisations and giving direct access to datasets.

Open Data Publisher Award — celebrating high publishing standards and the use of challenging data

Epimorphics — enables commercial, governmental and third sector clients to deliver open datasets, data models and data-centric applications.

Open NY — New York’s open data portal, with a high metadata standard that is followed for every dataset published.

WikiData — provides structured open data about the world to Wikipedia to help share knowledge in thousands of languages.

Meet the judges

Dr Nick Appleyard — Head of Digital at Technology Strategy Board

Kathryn Corrick (Chair) — Head of Content & Learning, Open Data Institute

Andrew Fletcher — Senior Manager of Collaborative Projects, Data Innovation Lab

Paul Malby — Director of Open Data and Government Innovation, UK Cabinet Office

Rahma Mian — ICFJ Knight International Journalism Fellow, Pakistan

Beth Noveck — Director, The Governance Lab, New York University

Dr David Tarrant — Trainer, Open Data Institute