

The Open Data Economy Unlocking Economic Value by Opening Government and Public Data



Only Few Governments are Leveraging Open Data for Economic Benefits

Governments and public authorities across the world are launching Open Data initiatives. Research indicates that by October 2011, twenty eight nations around the world had established Open Data portals¹. Public administration officials are now beginning to realize the value that opening up data can have. For instance, the direct impact of Open Data on the EU27 economy was estimated at €32 Billion in 2010, with an estimated annual growth rate of 7%.²

However, very few governments are taking the right measures in realizing the economic benefits out of Open Data. Political support, breadth and refresh rate of data released, the ease in sourcing data and participation from user community determine the degree of maturity of an Open Data program. Capgemini Consulting conducted an analysis of 23 select countries across the world, which have already initiated Open Data programs, and rated them on a set of parameters (see Figure 1).

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We observed that countries with strong political support achieved higher maturity and better results in their Open Data initiatives.
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Figure 1: Parameters used for Benchmarking Countries on Open Data Initiatives

| | |
|------------------------------|--|
| Data Availability | <ul style="list-style-type: none">■ Breadth and Granularity of Data■ Latest/Refreshed Data■ Ease of Re-Use of Data |
| Political Leadership | <ul style="list-style-type: none">■ Government Initiative and Support |
| Data Portal Usability | <ul style="list-style-type: none">■ User Interface■ Search Functionalities■ Participation from User community |

Source: Capgemini Consulting

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We don't just want to lead the world in releasing government data — our aim is to make the UK an international role model in exploiting the potential of Open Data to generate new businesses and stimulate growth.”

– Francis Maude
Cabinet Minister
UK

We found that countries with strong political support achieved higher maturity and better results in their Open Data initiatives. For instance, UK, one of the top five countries that we have identified as having mature Open Data policies, shows the seriousness of Open Data initiatives by having a senior Cabinet Minister at the helm. Francis Maude, the cabinet office minister with responsibility for public transparency and Open Data spells the vision clearly, “We don't just want to lead the world in releasing government data — our aim is to make the UK an international role model in exploiting the potential of Open Data to generate new businesses and stimulate growth.”³ As a result of this political leadership, UK has been successful in strong dissemination of government data amongst users, with almost 9,000 datasets published and more than 541,500 dataset views^a since starting its Open Data portal in 2010.⁴

A strong political support for Open Data initiative does have an impact on the effective dissemination of government data but does not guarantee it. Of all the countries

analyzed, only 22% shared data that had significant breadth and was granular at the same time. The same figure for countries with strong political support stood at nearly 46%, which is relatively higher but still a lot less than desired. These included countries such as the UK and the US, which typically provided highly granular and extensive data, with respect to time period, geography and population demographics, across domains. For instance, in the UK over 700 public sector organizations publish data on its Open Data portal at a very granular level. This data spans across departments such as health, business, energy, education, among others, and is often available till the lowest level of administration. Also, sharing comprehensive data is only a first step. Governments and public authorities should ensure it is regularly updated to realize increased uptake of the data. We found out that most of the countries emphasized only on sharing the data; 96% of all countries did not regularly update the datasets or share information regarding updates.

Note: a. The “Views” defined as the number of times a page was loaded in the users’ browser.

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Our research found that only 22% of the countries shared comprehensive data that included both breadth and granularity.

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A metric closely linked to data availability is the usage of such released data. Data uptake, a reference to the number of downloads from users, depends on the ease with which it can be sourced from the Open Data portals. Over 60% of the countries we analyzed lacked enhanced search capabilities. In some of the cases, the Open Data portals, instead of acting as a central repository, redirected users to websites of concerned public sector bodies making it far more cumbersome to obtain data. Countries such as Norway, Austria and Estonia had search functionalities, which at best helped users by classifying datasets under categories, whereas countries such as the UK provided users with APIs^b to help make data search easier.

Another important factor determining the success of Open Data programs is participation from the user community. User participation is directly proportional to the amount of engagement through app competitions, discussion forums and blogs. Over 87% of the countries analyzed in our research appear to have missed out on its importance, having negligible or minimal user participation on their Open Data portals.

Sustained engagement helps in an increased realization of economic value from data and better management of data quality. The UK Open Data portal is among the few that have actively encouraged user participation. Discussion forums and blogs on the portal often involve representatives from the Open Data Institute or ministries/departments, with the aim of understanding users' requirements for datasets, managing data quality or sharing advice on data usage.

After analyzing 23 countries, based on their positioning and pace of adoption of Open Data initiatives, we were able to classify them into three categories – Beginners, Followers and Trend Setters (see Figure 2).

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96% of the countries analyzed in our research shared data which is not regularly updated.

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Note: b. Application Program Interface is a set of routines, protocols, and tools for building software applications. A good API makes it easier to develop a program by providing all the building blocks. APIs can typically be used to extend reach of services, drive revenues and encourage third-party innovation.

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Of all the countries we analyzed, 87% are not utilizing user participation capabilities on their Open Data portals.
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Countries falling in the **‘Beginners’** category are those that are still in the initial stages of their Open Data journey. Data portals in such countries are typically characterized by the lack of good quality, updated data. They also have a complete absence of community participation on their respective portals. The

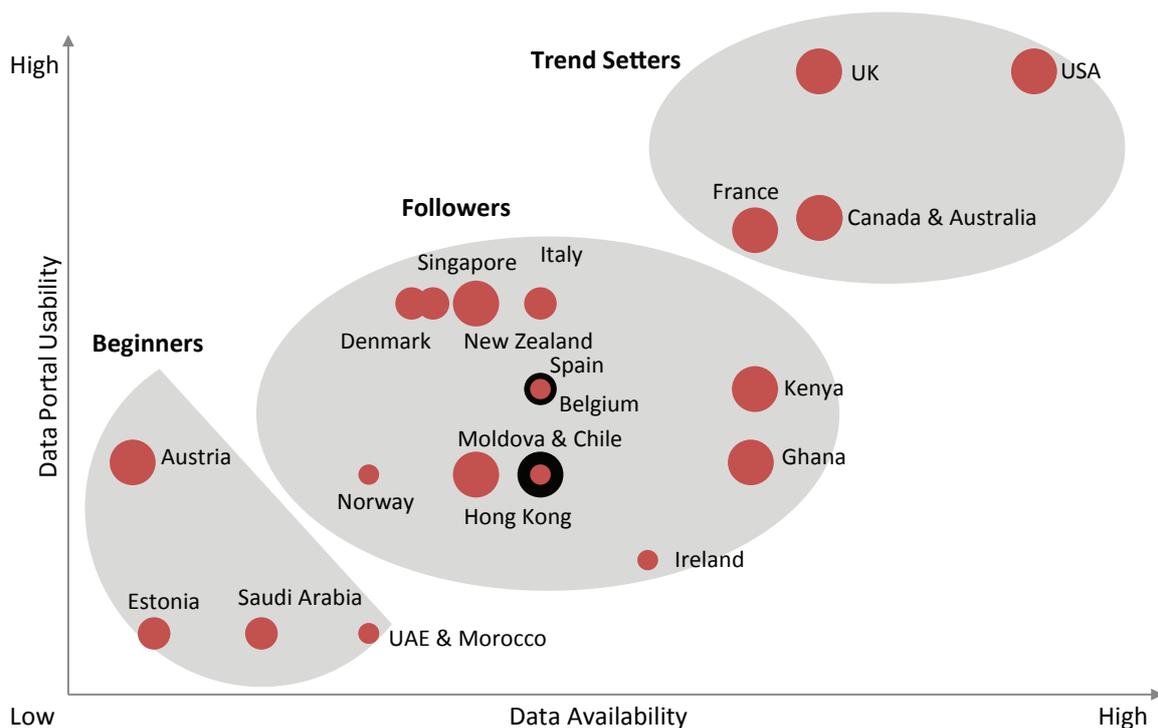
Open Data portals of these countries are rudimentary, with limited functionalities, making it difficult to search and utilize the data that they have opened up. All of the five countries in this category completely overlook the importance of releasing high value datasets with none of them sharing datasets for geospatial, meteorological and environmental information. Around 22% of countries in our research ended up in this category.

‘Followers’ typically include nations that have shown their intention and progressive approach towards Open Data by releasing a large number of datasets. They also provide better search functionalities on their portals, which makes it easy to obtain data. These countries also

experience better interaction with the user community, generally one-way communication, on their Open Data portals. Countries in this category, such as Denmark, Italy and Spain, have typically released a large number of datasets; however, these datasets lack granularity. The bulk of countries, around 56%, in our research fell into this category.

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Only 22% of the countries in our analysis turned out to be Trend Setters.
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Figure 2: Benchmarking of Open Data Initiatives, Select Countries, 2012



Note: Size of bubble represents level of government support.
 Source: Capgemini Consulting Analysis

Our Open Data Benchmarking Research

Methodology

We undertook an extensive research of the Open Data portals of each of the selected countries that had already initialized some Open Data initiatives, in order to analyze their maturity. We looked at various aspects of the portals ranging from availability of data to political leadership to data portal usability. All the countries were rated on a scale of 0 to 3 (where 0 was the lowest and 3 was the highest rating).

Countries Analyzed

USA, UK, France, Canada, Australia, New Zealand, Singapore, Hong Kong, Kenya, Ghana, UAE, Saudi Arabia, Norway, Estonia, Austria, Moldova, Italy, Spain, Morocco, Belgium, Ireland, Chile and Denmark.

Key Parameters

1. Data Availability

Countries were rated on their emphasis on sharing comprehensive information, which included focusing on various aspects such as number of datasets published, sharing datasets with high value information, granularity of the data and information regarding the nature of datasets.

2. Political Leadership

This parameter rated countries on the level of political support or guidance for their Open Data initiative.

3. Data Portal Usability

This parameter included a complete view of the functionalities and ability of the respective Open Data portals to facilitate an increase in data uptake. It included aspects such as ease of user interface, search functionalities and presence as well as usage of capabilities to encourage participation and communication with users.

Research Findings

1. Overall Findings

- Only 22% of countries shared data that can be classified as comprehensive – data with high value information, granular in nature and including extensive datasets.
- 96% of the countries analyzed share data which is not regularly updated.
- Over 60% of the countries we analyzed lacked enhanced search capabilities.
- 87% of the countries are not utilizing user participation capabilities.

2. Category-wise Findings

Beginners

- All the countries in this category do not emphasize on the quality of the data, which often lacks both breadth and granularity.
- Countries in this category were characterized by complete absence of user participation capabilities.

Followers

- Only 8% of Followers share data that can be categorized as having the right amount of granularity and comprehensiveness.
- Almost 92% of Followers do not utilize their Open Data portals for an effective dialogue with users, while the rest completely lack this capability.

Trend Setters

- 80% of Trend Setters share data having a high degree of comprehensiveness.
- 100% of the countries in this category boast of political support for Open Data program coming from the country's highest offices.
- Over 60% of Trend Setters achieved considerable user participation on their Open Data website.

‘Trend Setters’ represent the current leaders in Open Data initiatives. These countries are characterized by their emphasis on releasing extensive amounts of datasets, which are updated at regular intervals. The portals for these countries are enabled with significant capabilities for making information easier to source and generating dialogue amongst the user community through forums and discussions. Within Trend Setters, we see the emergence of two clear categories. Countries such as the UK and the USA, among the early adopters of Open Data initiatives, publish data with significant breadth and granularity accompanied with discussion forums and blogs to drive engagement among users. At the same time, there are countries such as France that only initiated its Open Data programs a year back but have managed to use government support to achieve

significant progress in a short period of time. While this has resulted in driving data breadth, granularity is still missing. Our results indicate that only very few countries, around 22%, can be classified as Trend Setters.

On further analysis of these categories, we found that countries that share comprehensive and updated data achieve a higher level of user participation. For instance, out of ‘Trend Setters’, characterized by high focus on comprehensive and updated data, over 60% were able to interact or initiate discussion with users on their website. On the other hand, all ‘Beginners’ had complete absence of user participation on their Open Data portals.

These findings reflect that a strong political will/vision in itself does not guarantee the

success of Open Data initiatives. It is important that this vision be adequately complemented with efforts towards sharing quality data with users, ensuring its increased uptake and an active participation from the user community. A coherent approach towards achieving these objectives is essential, in order to realize maximum economic benefits from Open Data initiatives.

These economic benefits revolve around revenue growth, cost savings and improved efficiency, and employment generation while developing skills (see Figure 3). In the rest of the paper, we delve into each of these key economic benefit areas.

Figure 3: Economic Benefits of Open Data

| | Drive Revenue through multiple areas | Cut Costs and Drive Efficiency | Generate Employment and develop future-proof skills |
|---------------------------|---|---|--|
| Benefit to Government | <ul style="list-style-type: none"> Increased tax revenues through increased economic activity Revenues through selling high value added information for a price | <ul style="list-style-type: none"> Reduction in transactional costs Increased service efficiency through linked data | <ul style="list-style-type: none"> Create jobs in current challenging times Encourage entrepreneurship |
| Benefit to Private Sector | <ul style="list-style-type: none"> Drive new business opportunities | <ul style="list-style-type: none"> Reduced cost by not having to invest in conversion of raw government data Better decision making based on accurate information | <ul style="list-style-type: none"> Gain skilled workforce |

Source: Capgemini Consulting Analysis

Realizing Revenue Growth using Open Data

The emergence of open ecosystems, thriving on private data, has resulted in the emergence of many new firms. For instance, the APIs (Application Programming Interfaces) by companies such as Facebook, Twitter and Google consistently see multiple billion calls every month⁵. APIs help companies extend reach of their services, drive revenue growth and encourage third-party innovation. This is a scenario that can be successfully replicated with public data as well. In fact, the infomediary sector in Spain, a sector that comprises solely of companies that sell services on top of Open Data, generates 330-550 million Euros annually⁶.

Increasing the Volume of Private Sector Business Activity

Open Data enables an increase in business activity by allowing the creation of new firms, new products and services. Several countries, including USA, Spain and Finland, have seen Open Data have a tangible impact on the volume of business activity in their geographies.

Encouraging New Firm Creation

Open Data drives growth by **stimulating the creation of firms** that reuse freely available government information in innovative ways. In Spain, a study estimates that there are over 150 companies focused solely on the infomediary sector⁷.

Creating New Products and Services

Small and medium companies with **products and services** based on Open Data, such as Global Positioning Systems, financial services and software applications, also generate new businesses and jobs. According to a Finnish study, firms that reuse government released geographical data, either freely or at marginal costs, grew 15% more per annum than in countries that price such information with an objective of recovering costs⁸. For instance, The Weather Channel, an American television network, and Garmin, a firm that develops consumer, aviation, and marine technologies (with market cap of over \$7 billion at end of January 2013) were built using raw government data⁹.

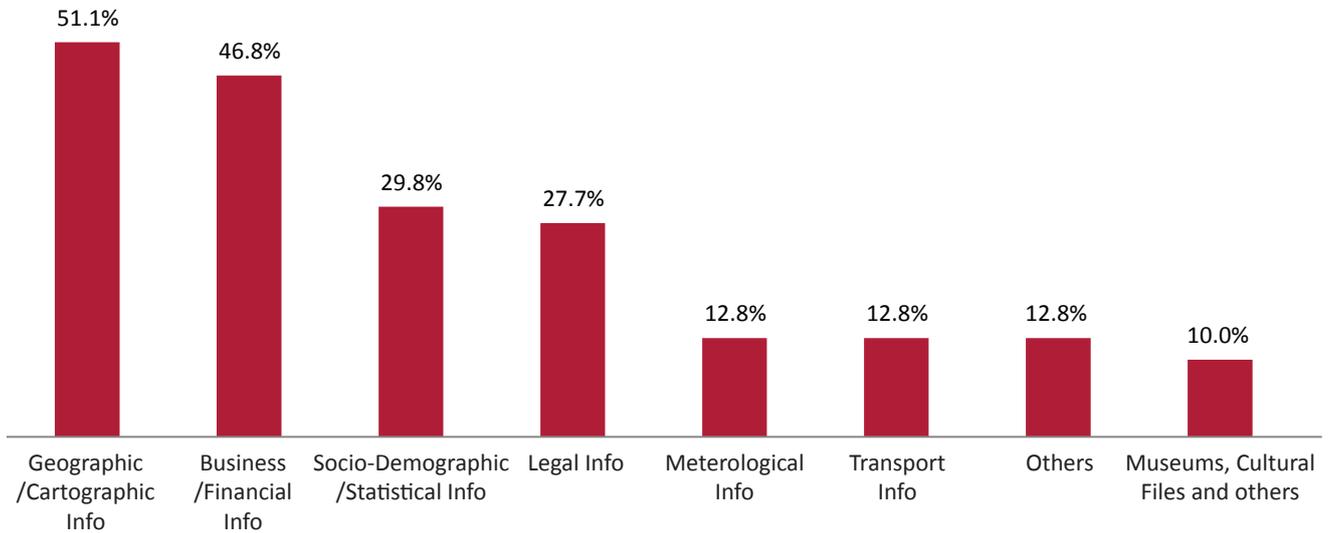
Furthermore, businesses can generate high returns through the development of new products and services based on **high value data domains** (see Figure 4). For instance, BrightScope, a California financial information startup, used government data to help the consumers understand fees associated with their retirement savings accounts. Similarly, data domains such as Economic, Geospatial and Environmental have higher commercial impact. For instance, Open Data from the US National Weather Service supports a private weather industry worth over \$1.5 billion per year¹⁰.

Supplementing Existing Products

Innovative solutions can be developed through a **mix of public sector and proprietary information** such as data-as-a-service. For instance, CloudMade, an applications development company, leverages OpenStreetMap data from the transport domain and supplements it with various datasets from alternative sources in order to create comprehensive location data. Revenue is generated by supplying this information at a price to developers and application publishers of geo-enabled products¹¹.

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Figure 4: Most Popular Open Data Domains: Percentage of companies working with specific domain of Open Data (n=150), Spain, 2012



Source: Spanish Open Data Portal Annual Report, “Characterization Study of the Infomediary Sector”, July 2012

Generating Additional Public Sector Revenues

For governments, opening the public sector information vault can lead to financial gains. Revenue generation accrues from two broad areas: namely charging from data and tax income accrued due to commercial activity on Open Data.

Generating Revenues from Charging for Open Data

Most countries/departments provide free access to citizens with more opting for an ability to view rather than to download. Some countries appear to be taking an intermediate path by allowing non-commercial reuse at zero cost, charging for commercial usage. For instance, CENDOJ (the Spanish Judicial Documentation Centre), responsible for managing all of Spain’s legal documentation,

provides government data free for consultation to any citizen not intending to reuse the information and charges commercial re-users on the basis of license cost per sentence¹². There is evidence of pricing significantly impacting the usage of Open Data. For instance, in cases where organizations have moved to marginal and zero cost charging or cost-recovery models, the number of re-users increased by between 1,000% and 10,000%.¹³ Some public sector bodies have also shown that substantial price reductions can be done without impacting overall revenues since they lead to a significant growth in usage. In fact, reducing the price of Open Data usage could lead to an increase in the revenue generated from it. For instance, the Austrian public sector body responsible for geographic information, BEV, lowered charges by as much as

97%, resulting in a 7,000% growth in demand for certain product groups. In essence, BEV was able to increase its geographic Open Data sales revenues by 46% in the four-year period after the pricing review¹⁴.

“*In countries where organizations have moved to marginal/ zero cost charging models, the number of re-users increased by between 1,000% and 10,000% leading to an increase in revenues.*”

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Generating Increased Tax Income from Commercial Usage of Open Data

Governments can generate long-term tax revenue growth through a wide range of direct and indirect applications of Open Data across the economy. The aggregate direct and indirect economic impact from such applications and their use across the EU27 economy is estimated to be €140 billion annually¹⁵. The corresponding increase in tax revenues is a direct monetary benefit to governments.



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Open Data disrupting Real Estate Marketplace

Zillow, a Real Estate advertising network, is a notable example of technology startup flourishing on Open Data. The company established a successful business by creating a living database of homes across the United States. This database is built from a range of sources such as county records, tax data, listing of homes for sale or rental and mortgage information.

The website combines mapping data with information on local land value and house price to create a service which accurately estimates the value of a house at a given address. One of its main offering Zestimates (an advanced statistical predictive tool) provides up-to-date information on home values and rental prices. The company has over 30 million unique users per month scrolling through its database of more than 100 million homes.

Zillow has grown significantly since 2006 with its revenue doubling at \$66.1 million in 2011, compared to \$30.5 million in 2010. As of December 2011, the company had 329 full-time employees. It successfully launched its IPO in July 2011.

Source: Company website and press releases

Achieving Cost Savings While Increasing Transparency

For governments, opening up public sector information has significant potential for cost savings and improving service efficiencies.

Reducing Transactional Costs and Redundant Expenditure

Public administration officials typically spend a significant amount of time and resources in answering queries that arise due to legislations allowing citizens to gain access to data. Providing data for citizens online in a searchable format has a direct impact in reducing the cost of servicing. For instance, Bristol City Council reduced transaction costs when they introduced an Open Data catalog. The cost to the council for a typical service transaction was found to be 15 times more expensive if answered in person or telephone than if answered over the Internet¹⁶.

Similarly, Open Data and access to real-time information saved over \$1 million for the city of San Francisco in the US. The city's Chief Innovation Officer announced in June 2012 that access to real-time transit data resulted in 21.7% fewer SF311 calls¹⁷. This decrease in call volume resulted in savings of over \$1 million a year¹⁸.

Openness also aids in cutting down on public expenditure as public bodies are made more accountable for financial discrepancies. For instance, in California USA, the state transparency portal (that cost around \$21,000 to implement) saved the state over \$20 million when visitors identified unnecessary expenditure. The savings came after visitors to the site noticed an audit that showed that many of the vehicles in the state's fleet were not needed¹⁹.

Improving Service Efficiency through Linked Data

Integrating and publishing data can enable public bodies improve service efficiency by enabling efficient collaboration between business stakeholders and public bodies. The publication of MRSA infection rates in UK hospitals is a case in point. The National Health Services (NHS) in UK started publishing infection rates of all hospitals on the portal data.gov.uk²⁰. This publication, coupled with the sharing of league tables showing the worst hospitals, encouraged exchange of best practices amongst hospitals. It brought down infection rates from around 5,000 patients annually to fewer than 1,200. The initiative

also achieved a cost savings of £34 million. Though the savings cannot be solely attributed to opening up data, the efficiency of hospitals and exchange of best practices has had a significant effect on hospital functioning and public health. Further, NHS has been publishing outcome data for hospitals and surgeons since 2004. This has led to a drop in mortality rates by 22% as it became easy to spot the pain points and improve cardiac healthcare services²¹.

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The logo for Mastodon C, featuring the text 'MASTODON C' in white on a green rectangular background, followed by a small white icon of three people.

Open Data identifies possible prescription savings worth millions

In 2011-12, the NHS in England spent more than £400m on statins, a class of drugs used to prevent cardiovascular problems, out of a total drug budget of £12.7 billion. Some of these drugs are more expensive than others: patented ones can cost 20 times more than generic versions.

The current evidence shows that all drugs from this class are equally safe and effective, so doctors are usually advised to use the generic versions initially. With the aim of analyzing the prescription pattern of these drugs - Mastodon C, a big data start-up company incubated at the Open Data Institute and Open Health care UK (a consortium of NHS doctors and technologists dedicated to improving patient care by opening up health data), worked with publicly available NHS prescription data. They looked at the entire prescriptions dataset (over 37 million rows of data) and analyzed how much money was spent in each area on more expensive drugs. It was found that on an average £27m a month of potentially unnecessary expenditure on the two proprietary statins took place in 2011 in the NHS in England. And savings of over £200m could have been achieved for the NHS, had every doctor prescribed cheap statins.

Encouraged by the findings, the team intends to go further ahead and identify similar potential savings in different prescription categories as well.

Source: Open Data Institute Case Study

Creating Jobs and Disseminating New Skills by Leveraging Commercial Potential

In today's challenging economic times, Open Data can act as a significant aid to Government efforts at creating jobs. And at the same time, it can complement the efforts of the private sector to boost the skill set of the hiring pool.

Creating Jobs using Open Data and its Commercial Potential

The potential for job creation through commercial usage of Open Data is significant. In Spain, a study found that the infomediary sector (companies that sell services on top of Open Data) employs around 4,000 people and generates 330-550 million Euros annually that can be directly attributed to Open Data reuse²².

The market size and growth of the geographic information sector shows the potential of Open Data as an engine for job creation. The German market for geo-information in 2007 was estimated at €1.4 billion, a 50% increase since 2000. In the Netherlands, the geo-sector accounted for 15,000 full time employees in 2008²³. Similarly, in Australia, in a study done to understand the impact of open geospatial data, it was observed that over 31,400 people were directly employed in the spatial information industry.²⁴

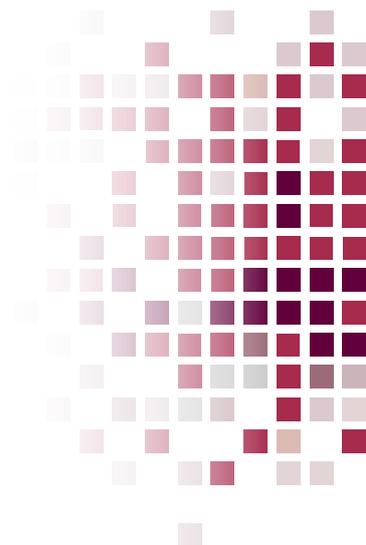
Disseminating Big Data skills using Open Data as an Introductory Platform

Job creation is a direct and short-term economic impact of Open Data. However, a larger, and more long-term benefit of opening up data is the impact that it has on dissemination of skills around Big Data²⁵. The opportunities around Big Data are indeed significant. It is estimated that by 2015, Big Data demand will reach over 4.4 million jobs globally. However, globally, there is a significant dearth of skills around Big Data and its application. It is expected that only a third of the 4.4 million positions are likely to be filled²⁶. Opening up government data can act as a driving force for individuals and organizations as they attempt to create value on top of such data. Developing Big Data skills is a strategic area for governments across the world and answers a growing need in the business community. In the Spanish study cited earlier, it was observed that over 50% of all staff in firms dealing with Open Data were engineers or had higher level qualifications.

Given the benefits that can be realized through Open Data programs, we believe a structured approach in implementing Open

Data initiatives is necessary to actualize this opportunity. In the next section, we detail the focus areas in a stepwise approach for governments to derive value out of Open Data.

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How Can You Derive Economic Value from Open Data?

Opening up data is not a straightforward task. It starts with government willingness to open up data. Once there is a broad buy-in to opening up public data, governance structures should be established to oversee all Open Data initiatives. Governments will need to decide on the type of data that is prioritized for release and how best to offer this data to developers. The final step in enabling governments to allow Open Data to flourish is to drive its uptake – both by citizens and by developers (see Figure 5).

Build a Vision

A first step is to build a vision around the possible and tangible benefits from Open Data. This vision needs to be driven from the top, typically with strong political leadership directing the efforts. For instance, in the UK—a “Trend Setter” in our analysis—Open Data efforts are led by Francis Maude who says, “This Government

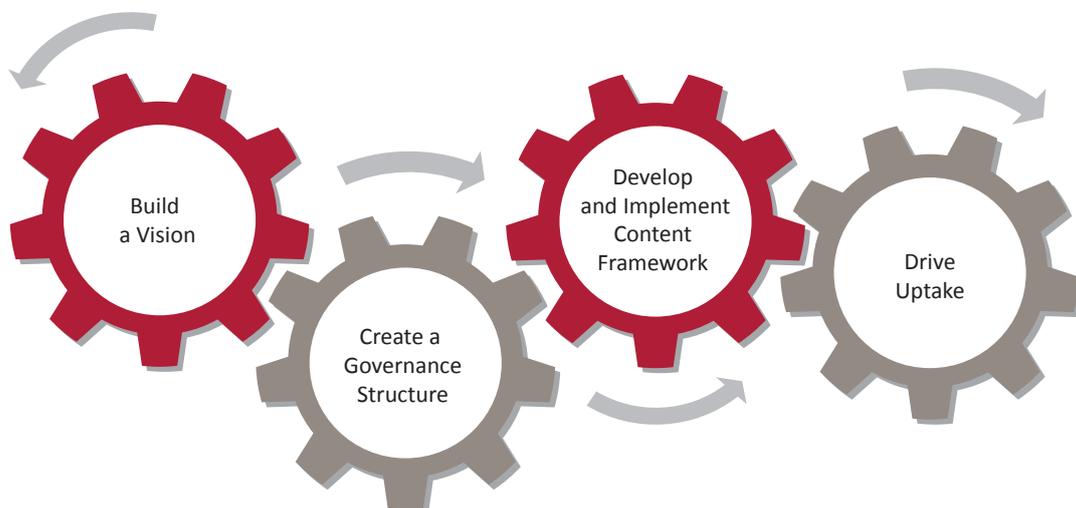
believes Open Data will be the essential characteristic of future public policy”²⁷. It is important that such a vision percolates down from the top to garner support from ministries and civil servants alike for effective functioning of Open Data initiatives. A similar vision from the country’s highest office is helping France in building a robust Open Data program. Through a directive from the Prime Minister’s office, France created Etalab, an agency responsible for creating and maintaining its Open Data portal. Along with this, Etalab is responsible for coordinating the activities of ministries and in supporting public administration with facilitating the widest possible reuse of its public information. Since the launch of the French Open Data portal in December 2011, over 350,000 datasets have been published on it and it has achieved more than 750,000 visitors and over 394,000 downloads.²⁸

Create a Governance Structure

Governments need to develop institutions with an explicit mandate to frame and encourage the development of Open Data. For instance, the Open Data initiative in UK is being advocated and encouraged by various bodies, which have well-defined roles for greater coherence in achieving Open Data objectives (see Figure 6).

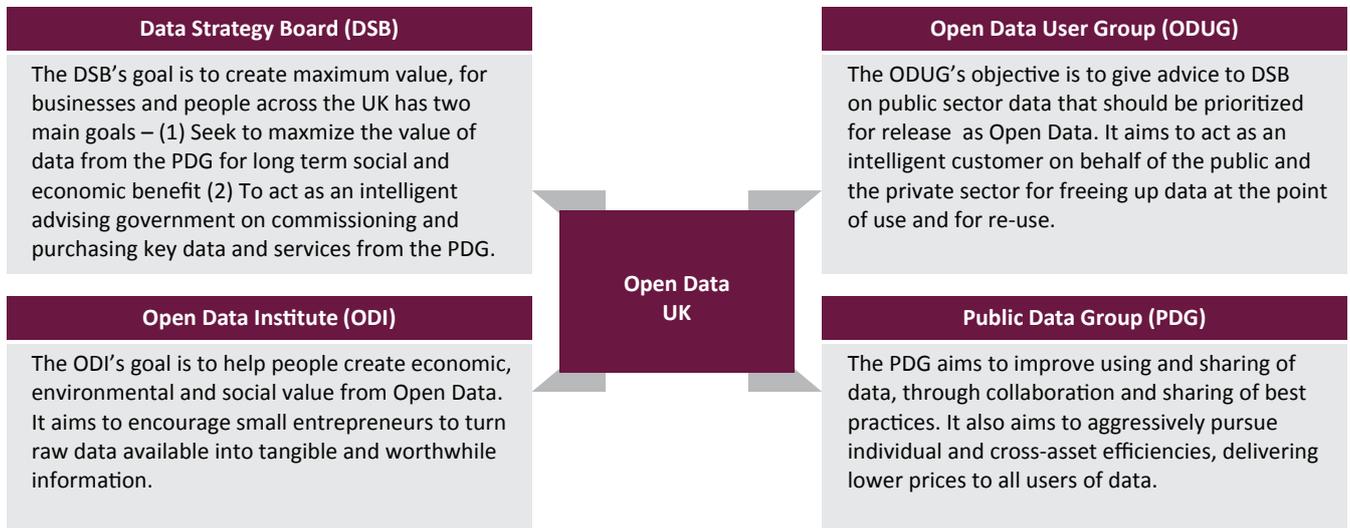
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Open Data initiatives need to be driven from the top with strong political leadership.
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Figure 5: Focus areas in Implementing Open Data Initiatives



Source: Capgemini Consulting Analysis

Figure 6: Open Data Bodies in UK and their Roles



Source: Capgemini Consulting Analysis

Develop and Implement a Content Framework

Governments should structure data to ease reuse of data, optimize the number of datasets, ensure the data is regularly updated and reduce disparity. Structuring of data will increase downloads of datasets and help private developers to build varied data-based applications. A periodic process has to be followed in the creation or collection of the raw data. The raw data at the local, national or international level needs to be aggregated to create more comprehensive datasets and allow for joint storage and retrieval. Also, emphasis should be on identifying and making available the kind of data, which provides maximum commercial reuse and generates the most interest from users.

Further, governments need to ensure that data shared with users should be in a non-proprietary format and data across government portals should be

linked. This would help achieve greater dissemination and uptake of Open Data. Applying the linked data principle also adds value to the information through combinations with other data, such as demographic, traffic or environmental data.

Drive Uptake

Any amount of Government effort in setting up institutions and frameworks around Open Data isn't of much help if there are no initiatives to encourage its usage. Governments should encourage citizens and businesses to actively use the data and engage with it. The intent should be to motivate users to actively seek out more datasets that can help address issues that impact them. Creating a platform of e-learning for non-qualified users, with tutorials and information, will provide them with the tools to analyze, transform and share public data. At the same time, governments should ensure that they encourage the developer community to create

value-enhancing applications. A good way of mobilizing developers would be through launching Open Data challenges. In a EU Open Data challenge conducted in April 2011, there were over 430 entries in a period of 60 days²⁹. The competition was conducted across four categories - ideas, applications, visualizations and datasets.

In summary, opening up data holds the key to unlocking economic gains from multiple perspectives. Governments and public authorities need to view Open Data not just as an opportunity to bring in transparency and accountability in their functioning, but also as an enabler of economic growth and a driver of innovation. In these challenging times, it offers the opportunity to drive tangible economic value and stimulate growth and innovation. Governments wishing to establish their position in tomorrow's digital world should leverage the potential that Open Data holds.

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