

OPEN DATA'S IMPACT

GREAT BRITAIN'S ORDNANCE SURVEY

A Clash of Business Models



By Christina Rogawski, Stefaan Verhulst and Andrew Young

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GREAT BRITAIN'S ORDNANCE SURVEY

A Clash of Business Models

Dimension of Impact

- ✓ Creating Opportunity
- ✓ Economic Growth

Summary

Ordnance Survey (OS), Britain's mapping agency, is considered to be one of the best sources of geospatial data in Great Britain. Its data supports essentially any industry or activity that uses a map: urban planning, real estate development, environmental science, utilities, retail, and much more. Creating data that is not only profoundly useful but technically impressive results in high demand for OS data. However, despite the launch of its OS OpenData platform in 2010, and despite initiatives to spur innovation with the private sector, much of OS data is

part of a fee-based licensing model. OS is required to be self-financing, a goal it has historically achieved by charging fees for its data. In recent years this model has come into conflict with the U.K. government's commitment to open data, the broader open data community, and even elements of the private sector. Today, OS uses a mixed-cost model, with some data open and some data paid, but tensions between these two aspects (open and closed data) persist.

Key Takeaways

- The impacts of a given open data set can span a vast array of sectors and users – in the case of OS' data, everything from medicine to mapmaking.
- The relationship between public data providers and private industry actors can create new value and

opportunities from open data, but also risk creating conflict and stifling innovation if barriers such as fees are placed upon data sets. Such a system, however, can allow public data providers to grow revenue from the private sector, rather than from taxpayers or other government agencies.

- Some governments and institutions are still making efforts to determine the best open data policies that balance financing needs with open data principles.
- Whether government entities should be investing in research and product development directly, rather than focusing efforts on supporting private sector actors to innovate, remains a difficult debate.
- Collaborating with users through directly crowdsourcing ideas, formal stakeholder engagement or analyzing user behavior can help increase understanding of how to best make use of open data and can ensure that data owners build partnerships, products, and/or release data in ways that can create maximum value for end users.

I. CONTEXT AND BACKGROUND

OS Background

Ordnance Survey traces its roots to 1745, when the British government ordered its defense ministry at the time – the Board of Ordnance – to map the Scottish Highlands in response to a rebellion, and then to survey England's southern coasts as the nearby French Revolution broke out. The first Ordnance Survey maps were published in 1801, and over time, the design of OS maps came to focus less on military users and more on a diverse set of general users, particularly as the emergence of railroads, cycling and automobiles increased public demand for accurate maps.¹ These maps have long been popular with the private and public sector alike, generally admired for both their technical and artistic elements.²

Historically, OS has been proactive in integrating new technologies – e.g., aerial photography – that have held potential to improve and enhance the accuracy of maps. In 1971, computers and digital mapping were introduced. In 1974, the traditional one-inch map was replaced by a metric 1:50,000 map,³ one of the large-scale maps OS continues to use today, which portray real-world features larger on the map to provide a very high level of detail.⁴ Large areas of 1:25,000 scale mapping were also used to create a series of Outdoor Leisure Maps, which remain popular among outdoor enthusiasts and travelers.⁵

1 "Our history." Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

2 Wainwright, Martin. "Ordnance Survey maps are worth paying for." The Guardian. April 3, 2010. <http://www.theguardian.com/commentisfree/2010/apr/03/ordnance-survey-maps-online>

3 This means that a distance of 1cm on the map represents 50,000cm (500m) in the real world. "Our history." Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

4 "Products and services FAQs." Ordnance Survey. <http://www.ordnancesurvey.co.uk/support/products-services.html>

5 "Our history." Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

In 1990, now a fully civilian agency, Ordnance Survey began using the National Global Positioning Network (i.e., British GPS) to replace the triangulation network (a surveying method that relies on the angles in a triangle formed by three control points).⁶ OS launched its website in 1995 and digitized its remaining 230,000 maps, making Britain the “first country in the world to complete a large-scale electronic mapping program.”⁷

By the end of the 1990s, advances in computing and the use of hand-held pen computers by surveyors made OS data routinely available to customers within 24 hours of surveys being completed. With these capabilities, OS solidified its reputation as a leader in producing highly detailed, technically impressive and accurate maps. In 1999 the British government designated OS as a Trading Fund, requiring OS to cover its costs by charging for its products and giving a portion of its profits to the U.K. Treasury (although OS had always charged nongovernment users for maps and geospatial data).⁸ The effects of this self-financing requirement continue to significantly affect the culture and approach to open data at OS today.

In 2001 OS launched its flagship product, OS MasterMap.⁹ OS MasterMap is “an intelligent geospatial database offering definitive, consistent, and maintained referencing to more than 460 million manmade and natural landscape features in Britain.”¹⁰ OS MasterMap also allows external information to be integrated into the map as separate layers directly on the map, or as links to other OS map products, enabling the creation of detail-rich, interactive maps.

Importance of Geospatial Data

It is unlikely that the average citizen thinks about geospatial data very often, despite using it daily. Perhaps the most obvious reason to use spatial data is to locate a particular point of interest, yet even that activity can range from the personal (e.g., How do I get to 123 Main St?) to national government planning (e.g., Which is the best route along which to build a highway?). Other examples of use include real estate developers surveying land for purchases and construction; seismologists, geologists and climatologists analyzing environmental events and patterns; public health officials tracking disease outbreaks and identifying correlating environmental variables; local police analyzing crime patterns and statistics by neighborhood; and retailers or marketers planning a new campaign or store launch.¹¹

When asked to describe the importance of geospatial data, Alyssa Wright, president of the U.S. Board for OpenStreetMap says, “That’s like asking ‘What’s the purpose of a map?’ It’s so fundamental to understanding who people are, how they relate, where they’re going to go.” The potential impact of geospatial data is amplified when made available on the Web, and exponentially so if it is made open.¹² Citizens use spatial data on mobile devices constantly

6 “Surveying for Mapping – Section 2, Surveying Methods.” ICSM. <http://www.icsm.gov.au/mapping/surveying2.html>

7 “Our history.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

8 “Our history.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

9 <https://www.ordnancesurvey.co.uk/business-and-government/products/mastermap-products.html>

10 “Our history.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

11 Bailey, Trevor C. and Anthony C. Gatrell. *Interactive Spatial Data Analysis*. (New York: Routledge), 1995.

12 GovLab interview with Alyssa Wright, President of the U.S. Board for OpenStreetMap, September 25, 2015.

today, from locating public transportation options, hailing an Uber or reading Yelp reviews of the nearest Thai restaurant. For researchers and policymakers, integrating geospatial data with demographic and health surveys can enable analysis by spatial characteristics, such as proximity to roads, health clinics, public transportation or levels of urban development, making their services more cost-efficient and effective.¹³

As the Open Data Institute explains, geospatial data is “incredibly valuable because it is the underlying data for so much information. It’s the glue that can bind together multiple different data sets, and make the dream of a truly linked web of data come true.”¹⁴ Nigel Clifford, CEO of OS, highlights this concept, stating, “Everything happens somewhere. We can tell you where that thing is and connect lots of different pieces of information.”¹⁵ OS understands that the energy and infrastructure, land and property, financial services, and retail categories are the largest users of their data. However, particularly with the advent of open data, John Carpenter, OS director of Strategy, notes that there are likely to be “new uses, new products and industries that we hadn’t even thought of before,” illustrating the enormous potential of geospatial data.¹⁶

Open Data in the United Kingdom

Given that spatial data is used in so many contexts, it follows that many actors, across industries, want access to the best data available. Having always been a leader in spatial data, OS is now under tremendous pressure from its users, the broader open data community, and in some ways the U.K. government, to release its data publicly. Such pressure often occurs against the backdrop of a more general push by the U.K. government toward more open and transparent government. For example, in 2006, *The Guardian* began a “Free Our Data” campaign, calling upon the U.K. government to make its data open and free for download, noting that “government-funded and approved agencies such as Ordnance Survey and UK Hydrographic Office and Highways Agency are government-owned agencies; they collect data on our behalf. So why can’t we get at that data as easily as we can Google Maps or the Xtides program?”¹⁷

Open government momentum grew significantly under the Gordon Brown administration (2007-2010), which launched several acclaimed open government and open data initiatives.¹⁸ These include the open data portal data.gov.uk, which was launched in 2010 by Sir Tim Berners-Lee,

13 Fischer, Alex. “Critical Role for Geospatial Data in Advancing Sustainable Development Goals.” State of the Planet Blog, Earth Institute, Columbia University. May 8, 2015. http://blogs.ei.columbia.edu/2015/05/08/sdg_geospatial_data2015/

14 Tennison, Jeni and Stuart Harrison. “Collaborative Geospatial Data.” Open Data Institute. March 2014. http://www.w3.org/2014/03/lgd/papers/lgd14_submission_55

15 Cave, Andrew. “Why apps won’t be ousting maps any time soon as Ordnance Survey chief charts a digital future.” The Telegraph. October 18, 2015. <http://www.telegraph.co.uk/finance/11939740/Why-apps-wont-be-ousting-maps-any-time-soon-as-Ordnance-Survey-chief-charts-a-digital-future.html>

16 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

17 <http://www.freeourdata.org.uk/>

18 Butcher, Mike. “Gordon Brown launches big shift to open gov data and broadband but where’s the detail?” TechCrunch. March 22, 2010. <http://techcrunch.com/2010/03/22/gordon-brown-launches-big-shift-to-open-gov-data-and-broadband-but-where-the-detail/>

inventor of the World Wide Web.¹⁹ The U.K. portal offers almost three times the number of data sets available on the comparable U.S. site (data.gov). This dedication to being a global leader in open government continued under Prime Minister David Cameron, who pledged to make the U.K. government “the most open and transparent in the world.”²⁰ These efforts are evidenced by the U.K. being ranked as first out of 86 countries in the Open Data Barometer by the World Wide Web Foundation as of 2015,²¹ and by the U.K. being one of the eight founding members of the global Open Government Partnership.²² In a related project also commissioned by Omidyar Network, researcher Becky Hogge, who studied six cases of open data in the U.K., finds that, “the theory of change that drives government open data policy is working, and makes a strong case for continuing to pursue the policy.”²³

II. PROJECT DESCRIPTION AND INCEPTION

OS Today

Today Ordnance Survey's Public Task Statement includes:

- To maintain and develop the underlying physical infrastructure which is needed to support mapping applications; To create, maintain and provide governance for the National Geographic Database made up of geographic information datasets with coverage of all of Great Britain to a consistent specification; To make the content of the relevant datasets widely available as products which can be used by customers of all types for a wide range of purposes; To provide advice and support to the UK Government on all aspects of survey, mapping and geographic information.²⁴

To support this public task, OS collects and records: the topography and topology of natural and manmade features of the landscape; descriptive annotations and distinctive names/postal numbers of buildings, places and features; the connectivity of water and communication networks including the routing attribution of roads, tracks and paths; the alignment of administrative and electoral boundaries; and the extent and classification of certain types of land cover and use.²⁵

Ordnance Survey invests significantly in collecting, maintaining, and improving its geospatial data and mapping products, which helps to uphold its status as a leader in geospatial data, even against the rise of other mapping entities developed by the private sector, like Google Maps, and through

19 Anderson, Kevin. “Tim Berners-Lee launches UK public data website.” The Guardian. January 21, 2010. <http://www.theguardian.com/technology/blog/2010/jan/21/timbernerslee-government-data>

20 <http://www.opengovpartnership.org/country/united-kingdom>

21 <http://barometer.opendataresearch.org/report/analysis/rankings.html>

22 <http://www.opengovpartnership.org/country/united-kingdom>

23 Hogge, Becky. “Open Data: Six Stories About Impact in the UK.” Omidyar Network. November 2015. https://www.omidyar.com/sites/default/files/file_archive/insights/Open%20Data_Six%20Stories%20About%20Impact%20in%20the%20UK/OpenData_CaseStudies_Report_complete_DIGITAL_102715.pdf

24 “Our public task.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/governance/public-task.html>

25 “Our public task.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/governance/public-task.html>

crowdsourcing, such as OpenStreetMap. As OS Commercial Director Andrew Loveless describes, “The journey that we’ve been on, [as] an organization that’s been in existence for 224 years, we have been through the complete transformation from almost the calligraphy pen, to analog, to digital, and I think that’s a journey that’s probably about 900 million pounds of investment. We spend tens of millions of pounds in our refresh capability in terms of capturing change.”²⁶

Specifically, OS has a team of almost 300 field surveyors and seven aircraft²⁷ (two OS aircraft supported by five contracted aerial imagery companies) surveying all 243,241 square kilometers of Great Britain. OS’s team of surveyors produce 10,000 updates a day into the database which supplies OS MasterMap, resulting in a vast yet granular geospatial dataset.²⁸ OS states on its website, “We’ve mapped the location of every fixed physical object in Great Britain, from the ground upwards, to within one metre accuracy.” In total, OS has logged 460 million individual geographical features, including over 35 million buildings and over 27 million residential addresses.²⁹

OS OpenData

Following the broader shift toward open data across government culture in the U.K., and to comply with a direct mandate from the Brown administration, OS launched its first open data platform, OS OpenData, in 2010, giving the public free access to more OS mapping than ever before.³⁰ The data, “made available via the website for viewing, download or order, had almost 50,000 orders placed in 2013 alone.”³¹ These data sets and open maps have scales as detailed as 1:10,000 inches,³² which is usually adequate for the average citizen’s or mapping enthusiast’s needs.³³ The OS OpenData platform includes an open data map viewer, downloadable CSV files, the OS OpenSpace API to embed and annotate maps, downloadable software to help users manipulate the data, along with an OS community forum and support center to provide guidance and answer questions.³⁴ As of 2015, OS OpenData has had over a million downloads.³⁵

The range of OS OpenData products includes 16 data sets covering various spatial data: street-level and vector mapping; place names, road numbers and postcodes; water networks; road networks; U.K. administrative and electoral boundaries. In addition, OS OpenData provides customizable vector, terrain and environmental data, which allows users to layer multiple data sets onto maps and conduct their own spatial analysis.³⁶

26 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

27 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

28 “We’re all about location.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/what-we-do.html>

29 “We’re all about location.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/what-we-do.html>

30 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

31 “Our history.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/overview/history.html>

32 Wainwright, Martin. “Ordnance Survey maps are worth paying for.” The Guardian. April 3, 2010. <http://www.theguardian.com/commentisfree/2010/apr/03/ordnance-survey-maps-online>

33 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

34 <https://www.ordnancesurvey.co.uk/business-and-government/products/opendata-products-grid.html>

35 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

36 “OS OpenData.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/business-and-government/products/opendata-products.html>

However, not all OS data or mapping products are accessible as open data products in OS OpenData. For instance, OS' flagship product, OS MasterMap, is conspicuously absent. The data sets provided for free are less detailed than the data sets available for purchase or licensing. It is worth noting that, prior to OS OpenData, OS did allow developers to access some data for free in order to create or test new products, provided that they did not commercialize them. Otherwise, users would have to pay for access and to license the data.³⁷ The reason for the disparity begins with OS' roots as a Trading Fund and OS' self-financing requirement. Having historically met this requirement by selling access to its cutting-edge geospatial data and products, Neil Ackroyd, the OS chief operating officer, argues that it would be difficult to generate revenue if OS made all its data truly open, especially given recent austerity measures in the U.K.³⁸

Beginning in April 2015, OS has operated as a government-owned limited company. The Secretary of State for Business, Innovation and Skills (BIS) fully owns OS, and OS must follow a Crown Rights Agreement regarding copyright and licensing of OS data, in addition to its previously established self-financing requirement.³⁹ OS' status as a government-owned company also requires OS to pay tax, "as well as the annual dividend of about £20m that it returns to the Government."⁴⁰ To help balance the opposing forces of an open data mandate and a self-financing mandate, OS applies a "freemium model" to its products. That is, any data or products included in the OS OpenData portal are free to all users, but there is a fee to "upgrade" access and license OS' most accurate, advanced mapping data and products.⁴¹

OS came to this model by working with government stakeholders, who also helped identify which data would be the most valuable to users based on user analytics such as downloads and page visits,⁴² with an understanding that the new data ecosystem would have to be "quite sophisticated, driven by use cases and recognizing user value."⁴³ OS was and remains strategic in determining which data to open and in developing new products specifically for the open data platform – for instance, if a gap in the commercial market is identified.⁴⁴ OS also commissioned studies to assess the cost of releasing these data sets to the public for free, and whether releasing the data sets would still create value through other means, such as promoting innovation (discussed further below).⁴⁵ Based on these discussions and assessments, the U.K. government agreed to a 10-year deal to compensate OS for this data,

37 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

38 GovLab interview with Neil Ackroyd, Chief Operating Officer, Ordnance Survey, September 14, 2015.

39 "Governance and legal status." Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/governance/index.html>

40 Cave, Andrew. "Why apps won't be ousting maps any time soon as Ordnance Survey chief charts a digital future." The Telegraph. October 18, 2015. <http://www.telegraph.co.uk/finance/11939740/Why-apps-wont-be-ousting-maps-any-time-soon-as-Ordnance-Survey-chief-charts-a-digital-future.html>

41 "Our public task." Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/governance/public-task.html>

42 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

43 GovLab interview with Neil Ackroyd, Chief Operating Officer, Ordnance Survey, September 14, 2015.

44 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

45 GovLab interview with Neil Ackroyd, Chief Operating Officer, Ordnance Survey, September 14, 2015.

which was estimated to be worth £20m a year in lost sales and data management costs.⁴⁶

While the advanced data in premium products such as OS MasterMap is not typically used by average citizens, it is used heavily by many private sector entities (e.g., utilities, finance, real estate, etc.), other government agencies and scientists.⁴⁷ Therefore, since the launch of OS OpenData and this mixed-cost model, OS has focused on growing revenue from the private sector, rather than from taxpayers or other government agencies. At launch time, about 50 percent of revenue came from the private sector. Today, it is closer to 60 percent of revenue.⁴⁸ For public sector customers in England and Wales OS has a collective agreement called the Public Sector Mapping Agreement (PSMA).⁴⁹ On behalf of the nearly 4,000 members of the PSMA, as of October 2015, the British government funds OS (about £55m a year) to supply mapping data to nearly all England and Wales government agencies, national and local.⁵⁰ A similar collective agreement, known as the One Scotland Mapping Agreement is in place in Scotland..⁵¹

John Carpenter, OS director of Strategy, describes the policy question behind the mixed model: “Is there a happy medium where those who have big pockets and will profit ... pay for it, but those who won’t profit, or are just starting out, don’t have to pay, or pay very little?”⁵² OS argues that since its fees are an “incidental cost for most big businesses”⁵³ and high volume users, such as a large utility company, there is not a strong argument for providing such advanced, highly maintained (and therefore costly) data for free.⁵⁴

As an example of this model, one of the most popular open OS products is Code-Point Open, which includes 1.7 million postcode units with an average of 15 adjoining addresses.⁵⁵ This enables users to integrate postcode searches onto their own maps to add features such as route-planning or simple “find my nearest” searches. However, data sets providing a higher level of detail and additional features, such as PO Box indicators, are only available through the paid version, Code

46 Ballard, Mark. “Ordnance Survey accused of stifling competition in open data row.” ComputerWeekly. November 14, 2014. <http://www.computerweekly.com/news/2240234712/Ordnance-Survey-accused-of-stifling-competition-in-open-data-row>; GovLab interview with James Norris, Policy Analyst, Ordnance Survey, February 3, 2015.

47 It is worth noting, however, that academics and researchers usually have an OS use contract for “almost free,” if not free. GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

48 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

49 “Who can join the PSMA?” Ordnance Survey. <https://www.ordnancesurvey.co.uk/business-and-government/public-sector/mapping-agreements/psma-who-can-join.html>

50 Ballard, Mark. “Ordnance Survey accused of stifling competition in open data row.” ComputerWeekly. November 14, 2014. <http://www.computerweekly.com/news/2240234712/Ordnance-Survey-accused-of-stifling-competition-in-open-data-row>; GovLab interview with James Norris, Policy Analyst, Ordnance Survey, February 3, 2015.

51 “One Scotland Mapping Agreement: Licensing.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/business-and-government/public-sector/mapping-agreements/osma-licensing.html>

52 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

53 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

54 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

55 “Code-Point Open: Benefits and key features.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/business-and-government/products/code-point-open.html#Benefits-and-key-features>

Point.⁵⁶ As described in following sections, this mixed model arrangement helps OS meet its self-financing requirement, but it creates significant tension between OS and the broader open data community – tensions that OS hopes will be mitigated by recent efforts outlined in detail below.

This tension with the open data community does not, however, extend to the vast majority of OS customers and partners. Despite customers having to pay to “upgrade” their data access, OS has over 350 business partners, and Loveless notes that OS consistently scores “very, very highly in our customer surveys,” based on their range of customer service analytics and evaluations, including scoring, random sampling or advisory groups and panels to learn specifics about customer experiences, perceptions and areas for improvement. For example, a March 2015 report finds that OS meets or exceeds customer service target levels in areas such as answering phone calls to Customer Services within 15 seconds (98.8 percent), responding to all written enquiries or responding to written complaints within 10 working days (99.9 percent and 99.7 percent), and fulfilling digital data orders from business partners within five days (98.9 percent).⁵⁷ Loveless further notes: “As an organization, [customer relationships and feedback] is something we are continually improving and we’re pretty restless in thinking through and improving at every opportunity we can.”⁵⁸

III. IMPACT

Economic Impact

From March 2011 - March 2012, OS commissioned a study to assess the broader economic impact of releasing OS data through the new OS OpenData platform. The study, conducted by firms ConsultingWhere and ACIL Tasman, uses the Computable General Equilibrium model, chosen because it “overcomes problems with simple benefit/multiplier approaches” and allows “analysis of changes in macroeconomic aggregates and in potential changes to government revenues.”⁵⁹ The report focuses on the costs and savings at Ordnance Survey related to releasing and disseminating open data; costs and benefits among users in accessing and using the products; and the wider economic and social impacts resulting from the release of OS OpenData. The report was independently reviewed by members of the Advisory Panel on Public Sector Information to confirm its validity.⁶⁰

56 “Code-Point Open: Benefits and key features.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/business-and-government/products/code-point-open.html#Benefits-and-key-features>

57 “Our customer service performance.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/governance/customer-service-performance.html>

58 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

59 Carpenter, John and Phil Watts. “Assessing the Value of OS OpenData to the Economy of Great Britain – Synopsis.” 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207692/bis-13-950-assessing-value-of-opendata-to-economy-of-great-britain.pdf

60 Carpenter, John and Phil Watts. “Assessing the Value of OS OpenData to the Economy of Great Britain – Synopsis.” 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207692/bis-13-950-assessing-value-of-opendata-to-economy-of-great-britain.pdf

The report concluded that making the nine OS OpenData products available in 2012 free at the point of entry would directly improve the level of productivity in the economy and higher overall levels of output. Specific estimates calculated throughout the report include:⁶¹

- OS OpenData will directly deliver a net £13 million - £28.5 million increase in GDP by 2016. The main components of this increase are net productivity gains (£8.1 million - £18.2 million) and additional tax revenues (£4.4 million - £8.3 million).
- The GDP increase is net of £3.7 million per year, applied as a negative to U.K. exports to account for OS OpenData being integrated into products of companies paying taxes abroad. Despite this loss of export income, overall the value of exports to the economy increases by £6.1 million - £10.3 million as other sectors of the economy expand.
- The increased exports will enable U.K. residents to purchase more foreign goods, increasing real imports by £3.6 million - £7.1 million.
- Real national disposable income (real GNP) will increase £10.2 million - £24.1 million by 2016, indicating an increase in the economic welfare for British society as a whole.
- Real consumption will increase £8.1 million - £20.3 million and real investment will increase by £2.3 million - £5.1 million as result of OS OpenData.

OS is currently determining how best to measure economic impacts in more specific terms, for example based on each data set or product. However, quantifying the impact of open data, particularly geospatial data, is challenging because spatial data typically is embedded within larger applications, products or business processes. As Ed Parsons, geospatial technologist of Google and former CTO of OS puts it, "I often characterize it as it's being like a gene in the DNA sequence. Lots of organisms might well have this gene and it might well be quite important but it's just facing all elements of lots of other things. It often is quite hard to measure the incremental benefit of making this data openly accessible."⁶² John Carpenter, OS director of Strategy, echoes this sentiment by explaining, "We know there are a lot of people using [our data] – we don't know exactly how, or how they are profiting from it – but they acknowledge that they're using it, and a lot are not paying for it."⁶³

OS Minecraft

In 2013, OS aimed to build excitement and promote learning tools around OS OpenData by tapping into one of the most active and popular video game communities around, Minecraft, a mapping game set in custom-built worlds comprising blocks that can be mined for raw materials.⁶⁴ The OS Minecraft

61 Carpenter, John and Phil Watts. "Assessing the Value of OS OpenData to the Economy of Great Britain – Synopsis." 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207692/bis-13-950-assessing-value-of-opendata-to-economy-of-great-britain.pdf

62 GovLab interview with Ed Parsons, Geospatial Technologist, Google, former CTO of Ordnance Survey, September 25, 2015.

63 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

64 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

map of Great Britain, made with 22 billion blocks representing all 224,000 square kilometers of the U.K., was downloaded over 100,000 times within months of release,⁶⁵ going on to win a Guinness World Record as the largest real-world place represented in Minecraft.⁶⁶ Following the launch of OS Minecraft, demand indicators for other OS data increased significantly. OS views the surprising success of this initiative as a positive indicator of the enthusiasm surrounding mapping and data among the general public, and as a creative example of how it can continue building interest in its products and services, particularly among those who may be new to spatial data manipulation.⁶⁷

GeoVation Program

To more directly support innovation, in 2010 OS launched its GeoVation program, which runs challenges to “address specific problems within communities which may be satisfied, in part, through the use of geography.”⁶⁸ OS collaborates with the data and information innovation companies and organizations, Open Geospatial Consortium, Springwise, Nominet and Esri, to run and promote the GeoVation program. Since launching, GeoVation Challenges have awarded £718,000 in funding 31 new ventures,⁶⁹ and addressed varied social impact questions such as “How can Britain feed itself? How can we improve transport in Britain? How can we help British business improve environmental performance?” Winners include:

- **Carbon Profit:** which combines soil testing and OS mapping data to enable farmers to monitor carbon levels in their soil.⁷⁰
- **The Green Alchemist:** uses OS mapping to show the location of businesses, local waste carrier services and reprocessing companies to improve recycling and waste management.⁷¹
- **Growing Routes:** helps businesses map and identify opportunities on the Wales Coast Path, bringing new jobs and opportunities to local residents.⁷²
- **Democratising Development:** uses OS and Land Registry data to identify small-scale disused/unmanaged sites that can be brought into the housing market.⁷³
- **MyHome Energy Planner:** allows homeowners to measure current house energy usage and prescribe a set of costed retrofit measures to reduce this usage.⁷⁴

65 Ward, Mark. “Minecraft map of the UK upgraded to include houses.” BBC News. September 24, 2014. <http://www.bbc.com/news/technology-29330265>

66 “Largest real-world place created in Minecraft.” Guinness World Records. September 23, 2014. <http://www.guinness-worldrecords.com/world-records/117557-largest-real-world-place-created-in-minecraft>

67 GovLab interview with Neil Ackroyd, Chief Operating Officer, Ordnance Survey, September 14, 2015.

68 <https://www.ordnancesurvey.co.uk/innovate/geovation/>

69 <https://theodi.org/blog/guest-post-five-years-and-1-million-downloads-the-os-opensource-journey>

70 <http://www.arcarbon.co.uk/about-arcarbon/>

71 “Page, Richard. “Using the GeoVation Hub as a GeoVation winner.” Geovation. July 20, 2015. <https://www.geovation.org.uk/using-geovation-hub-geovation-winner/#more-11068>

72 “Growing Routes for business.” Geovation. July 22, 2014. <https://www.geovation.org.uk/growing-routes-for-business/>

73 “Winners of the GeoVation Housing Challenge.” Geovation. March 12, 2015. <https://www.geovation.org.uk/winners-of-the-geovation-housing-challenge/>

74 “Winners of the GeoVation Housing Challenge.” Geovation. March 12, 2015. <https://www.geovation.org.uk/winners-of-the-geovation-housing-challenge/>

Other Impacts

Since launching, OS OpenData has received over a million downloads.⁷⁵ OS collects user analytics such as number of downloads, volume of downloads, number of data sets accessed and number of users on API downloads. This user behavior information, in addition to its customer satisfaction analytics, drives future strategy and product development.⁷⁶

While more precise impact measures are under consideration, there are broader, albeit less tangible, social, process or human indicators of OS OpenData's impact. Some examples, which indicate the wide variety of uses (and impacts) resulting from OS' using open data, include:

- IDC Consulting, an environment and sustainable energy consulting firm, uses OS OpenData to identify optimal locations and terrain for renewable energy sites such as wind and solar farms.⁷⁷ For such energy sites, location is critical to success, and by integrating OS data into its process, IDC can more quickly and accurately identify potential sites at a wide scale.⁷⁸
- Local fire department West Midlands Fire Service used OS OpenData (and other OS mapping) to develop an integrated open-source solution to manage all its mapping data holdings, reducing the cost, and increasing the efficiency and ease of mapping, to offer live-mapping capabilities to assist in decision-making directly at an incident.⁷⁹
- Engineering company CH2M HILL used OS OpenData to create a cost-effective automated tool to draw a multimodal bus network from any part of Great Britain, reducing the time taken to analyze an entire county bus network by 90 percent.⁸⁰
- Citrus Analytics, a customer and marketing analytics firm, used OS OpenData to improve its data, offering the ability to visualize customers on a map and to be used as the basis of qualitative research groups, for example, accurately and efficiently identifying if there are geographic clusters of certain types of customers.⁸¹
- Rubicon Heritage Services Ltd, an archeology firm, used OS OpenData to enable background mapping in their survey equipment, providing real-time verification that the primary data is being collected correctly, consistently and accessibly.⁸²

75 Henderson, David. "Guest post: Five years and 1 million downloads – Ordnance Survey's open data journey." Open Data Institute. March 26, 2015. <https://theodi.org/blog/guest-post-five-years-and-1-million-downloads-the-os-opendata-journey>

76 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

77 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

78 "Open for Business?" IDC Consulting. March 24, 2015. <http://idconsulting.net/2015/03/open-for-business/>

79 "OS mapping 'makes huge impact' on fire safety." Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/west-midlands-fire-service-psma-os-opendata.html>

80 "Unlocking the potential of open data in transport planning." Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/halcrow-ch2mhill-unlocking-opendata-transport.html>

81 "Visualising customer data to provide valuable insights." Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/citrus-analytics-visualising-customer-data-valuable-insights.html>

82 "OS OpenData mapping significantly improves cost and time efficiency." Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/rubicon-heritage-opendata-mapping-improves-efficiency.html>

- UIA, a mutual insurance company, used OS OpenData to set more accurate prices, drilling down to individual buildings rather than zip codes, making the underwriting process quicker and more accurate, thereby saving the company money.⁸³
- T4 Media, an advertising firm, used OS OpenData to automate the process of identifying suitable outdoor advertising spaces, allowing employees to analyzing multiple points from their desks.⁸⁴
- Local county council for Warwickshire used OS OpenData and other OS products to develop an open-source solution for internal Web geographical information system (GIS), allowing the GIS team to make department-specific projects, saving over 65 percent in license and maintenance costs, improving control over data performance issues, and an up-front saving of £15 - £20,000 by developing a custom in-house system.⁸⁵
- Many health care providers use OS OpenData, with other OS products, to better pinpoint patient locations and routes, enabling more accurate evidence-based analysis and decision-making to deliver efficiency savings and improved services.⁸⁶
- OS is celebrated for supporting outdoors enthusiasts by providing accurate, detailed maps, for example, recently promoting an OS Photo Contest for users to submit photos taken on their adventures, helping others find some of the most beautiful spots.⁸⁷

IV. CHALLENGES

Cost

The greatest challenge to scaling OS OpenData is cost. As Andrew Loveless, OS commercial director, explains: “Someone has to pay for data at some stage, and as we see in the marketplace, it’s not actually the release of data, it’s the maintenance of data,” as in regularly updating, cleaning and running quality assurance tests, particularly at the high levels of OS’ current standards, that is costly. Since measuring the impact of open data is so difficult, “How does that value get realized? Open knows no global boundaries – is the beneficiary, from an OS perspective, is it a U.K. entrepreneur? Is it the U.K. system? Or is it international

83 “UIA: Reducing poor risks and improving customer service.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/ui-a-reducing-poor-risks.html>

84 “Putting the local into location-based advertising to target specific audiences.” Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/t4-media-putting-the-local-into-location.html>

85 “Warwickshire County Council’s new web GIS increases users with no extra cost.” Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/warwickshire-county-council-new-web-gis.html>

86 “Pinpointing patients and practice areas to improve services and efficiency.” Ordnance Survey. 2015. <https://www.ordnancesurvey.co.uk/business-and-government/case-studies/nhs-swcs-pinpointing-patients-practice-areas.html>

87 “Using OS OpenData to explore top Peak District photo spots.” Ordnance Survey Blog. September 7, 2015. <http://www.ordnancesurvey.co.uk/blog/2015/09/using-os-opendata-to-explore-top-peak-district-photo-spots/>

organizations? I think the concept of a full open data model needs to be fully thought through and then obviously fully funded.”⁸⁸

OS views the current mixed model, as justified by the 2011 - 12 economic impact study, as the best option for balancing the conflicting demands of opening data and self-financing. OS argues that the freemium model offers a sustainable way of dealing with the economic realities it operates in, and that it is designed to “meet the needs of various customer segments including the public, businesses and government,” and that startup businesses in particular are supported by their innovation activities.⁸⁹ More stakeholder assessments and impact studies should be conducted in order to continually reassess whether this remains the best option, particularly as other mapping services such as Google Maps and OpenStreetMap (described below) continue to grow and offer a free or possibly less expensive alternative to currently paying OS customers. Still, it is important to note that Google Maps and some other mapping and satellite navigation companies also use OS OpenData to some extent.⁹⁰

OS would also have to assess whether it would be able to provide such quality data in the first place if it lost such revenue. The U.S. for example, historically has always offered geospatial data for free, albeit with less funding. The quality and scope of that data, however, may not realistically be up to par with OS, which updates a third of the country, minimum, every year, in a highly detailed, near real-time database – i.e., the factors that likely create such a high demand for OS data in the first place.⁹¹

Addressing Open Data Principles

To many of those active in the geospatial and open data communities, OS is claiming rights to “the ultimate public good” of *where we are* by claiming copyright on spatial information. This raises the question asked by Peter Rabley of Omidyar Network: “What is your unique position here? How on earth can you copyright that, the actual coordinates, which is the mathematical measurement from the center of the earth?”⁹² [Disclosure: Omidyar Network funded this case study.] *The Guardian's* “Free Our Data Campaign” specifically calls out OS for asking taxpayers to pay for access to data that OS, being a government agency, already collected directly on their behalf through taxes, arguing that besides being unfair, this “stifles innovation, enterprise and the creativity that should be the lifeblood of new business.”⁹³ However, as discussed further below, the ongoing fees for OS data go toward addressing needs like maintenance and dissemination, not the actual geospatial data collection.⁹⁴

88 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

89 GovLab interview with Robert Andrews, Head of Corporate Communications, Ordnance Survey, October 28, 2015.

90 Cave, Andrew. “Why apps won’t be ousting maps any time soon as Ordnance Survey chief charts a digital future.” *The Telegraph*. October 18, 2015. <http://www.telegraph.co.uk/finance/11939740/Why-apps-wont-be-ousting-maps-any-time-soon-as-Ordnance-Survey-chief-charts-a-digital-future.html>

91 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

92 GovLab interview with Peter Rabley, Director, Investments, Omidyar Network, September 23, 2015.

93 Arthur, Charles and Michael Cross. “Give us back our crown jewels.” *The Guardian*. March 9, 2006. <http://www.theguardian.com/technology/2006/mar/09/education.epublic>

94 GovLab interview with Andrew Loveless, Commercial Director, Ordnance Survey, October 1, 2015.

One illustration of the community's frustration with OS licensing and copyright hurdles is the rise of OpenStreetMap (OSM), a volunteer-driven, crowdsourced mapping initiative founded in the U.K. in 2004 originally as a direct response to OS' lack of open data.⁹⁵ According to a report from *National Geographic*, OSM adheres to true open innovation and open data principles, being a "Web-based project that aggregates hundreds of users' personally collected GPS data into master files that trace out thousands of streets and byways."⁹⁶ The OpenStreetMap Foundation, founded in 2006, focuses its services on public sector, nonprofit and humanitarian uses without profit.⁹⁷ It is worth noting, again, that OSM incorporates OS OpenData into its data sets in some instances.

OSM exemplifies the demand for freely available, accurate mapping for all users, regardless of ability to pay. As Alyssa Wright of OSM explains, location data represents "a shared experience" that is "so fundamental to understanding who people are, how they relate, where they're going to go. ... Mapping is universal need."⁹⁸ Therefore, many in the open data community believe that geospatial data should be treated no differently than other government data. For example, OSM and open innovation supporters argue that, "When programmers can read, redistribute and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, people fix bugs. And this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing."⁹⁹ OSM attempts to replicate this same kind of open innovation process in geospatial data by freely offering its mapping data through an open license and encouraging users to add and manipulate spatial data.¹⁰⁰

Furthermore, Charles Arthur and Michael Cross of *The Guardian* point to the U.S. as a positive example for always offering its spatial data as free and open, noting that "It is no accident that it is also the country that has seen the rise of multiple mapping services (such as Google Maps, Microsoft's MapPoint and Yahoo Maps) and other services – mashups – that mesh government-generated data with information created by the companies."¹⁰¹ Given that OS' own economic impact study found that releasing some data would be positive for the economy, it naturally raises the question as to whether releasing more data would be even more beneficial to the economy, and to spurring innovation.

In response to these critiques, OS argues that the existence of intellectual property rights in OS geospatial data (via copyright and database rights in U.K. law), is "accepted by the HMSO [Her Majesty's Stationary Office] Controller from who we take delegation to licence the data. The open data community also would appear to implicitly accept this by promoting open licences."¹⁰² Furthermore, in October 2015, the Court of Justice of the European Union

95 "History of OpenStreetMap." OpenStreetMap. http://wiki.openstreetmap.org/wiki/History_of_OpenStreetMap

96 Anderson, Mark. "Global Positioning Tech Inspires Do-It-Yourself Mapping Project." *National Geographic News*. October 18, 2006. <http://news.nationalgeographic.com/news/2006/10/061018-street-maps.html>

97 GovLab interview with Alyssa Wright, President of the U.S. Board for OpenStreetMap, September 25, 2015.

98 GovLab interview with Alyssa Wright, President of the U.S. Board for OpenStreetMap, September 25, 2015.

99 Anderson, Mark. "Global Positioning Tech Inspires Do-It-Yourself Mapping Project." *National Geographic News*. October 18, 2006. <http://news.nationalgeographic.com/news/2006/10/061018-street-maps.html>

100 https://wiki.openstreetmap.org/wiki/Main_Page

101 Arthur, Charles and Michael Cross. "Give us back our crown jewels." *The Guardian*. March 9, 2006. <http://www.theguardian.com/technology/2006/mar/09/education.epublic>

102 GovLab interview with Robert Andrews, Head of Corporate Communications, Ordnance Survey, October 28, 2015.

(CJEU) supported this position in a similar case between Verlag Esterbauer, an Austrian publishing company specializing in tour map books, concerning an application for a cease-and-desist order under the German Law on copyright and related rights.¹⁰³ The CJEU found that “geographical information extracted from a topographic map, used by a third party to produce and market another map, retains sufficient informative value, which in turn constitutes ‘independent materials’ of a database.”^{104,105}

OS also contends that these open data principles – i.e., public data should be universally and readily accessed, used and redistributed free of charge – apply to data sets, not organizations or business models, and that OS’ open data (e.g., in OS OpenData) scores highly against these principles. Furthermore, in the nine years since the “Free Our Data” campaign launched, many of the campaign’s grievances have been addressed with the release of OS OpenData, licensing simplification and amendments to the GeoVation program.¹⁰⁶

Private Sector Competition

The tension between OS and the open data community carries over to the private sector, as many businesses believe that they could reduce costs and grow even more quickly if the data in OS MasterMap, for example, and not just OS OpenData were free. Although OS OpenData offers data on a scale of 1:10,000, Ed Parsons of Google says that the “real juice is in the 1:5,000, 1:2,500, 1:1,000 or 1:500 [scales]. The larger the scale gets, the smaller the area, and the more valuable the data sets.”¹⁰⁷ Critics describe OS as a monopoly, as there is no competitor to offer larger scales, lower pricing or greater efficiency, which allows OS to set their own prices while making it easier to claim they only charge exactly what their services cost.¹⁰⁸ They complain that, currently, trying to access certain OS data sets and embed OS products within your own programs can mean entering into a very bureaucratic process, with a lot of forms to fill, followed by licensing fees.¹⁰⁹ However, it is important to note that as a public sector body, all OS accounts are fully audited.

Some businesses also accuse OS of stifling innovation and actively trying to prevent private sector competitors from succeeding. Exemplifying this sentiment is a 2014 complaint filed by aerial photography and mapping company Getmapping. The complaint argues that through its contracts with the U.K. government (the Public Sector Mapping Agreement and the compensation agreement at initial release), OS illegally uses £800m of government contracts to stifle competition.¹¹⁰ Getmapping chairman Tristram Cary has called these contracts a

103 “Case C-490/14, Verlag Esterbauer – a map is not a database.” EU Law Radar. July 8, 2015. <http://eulawradar.com/case-c-49014-verlag-esterbauer-a-map-is-not-a-database/>

104 GovLab interview with Robert Andrews, Head of Corporate Communications, Ordnance Survey, October 28, 2015.

105 “Case C-490/14, Verlag Esterbauer – a map is not a database.” EU Law Radar. July 8, 2015. <http://eulawradar.com/case-c-49014-verlag-esterbauer-a-map-is-not-a-database/>

106 GovLab interview with Robert Andrews, Head of Corporate Communications, Ordnance Survey, October 28, 2015.

107 GovLab interview with Ed Parsons, Geospatial Technologist, Google, former CTO of Ordnance Survey, September 25, 2015.

108 GovLab interview with Peter Rabley, Director, Investments, Omidyar Network, September 23, 2015.

109 GovLab interview with Ed Parsons, Geospatial Technologist, Google, former CTO of Ordnance Survey, September 25, 2015.

110 Milmo, Cahal. “Has the Ordnance Survey lost its moral compass?” The Independent. November 28, 2014. <http://www.independent.co.uk/travel/news-and-advice/has-the-ordnance-survey-lost-its-moral-compass-9891770.html>

“national scandal” because “Ordnance Survey has been granted these contracts, which has made it highly profitable – much more profitable than most industry companies. It is using its state aid to compete with the rest of the partner network. Ordnance Survey is a serial abuser of its partners. And the government knows it.”¹¹¹ Cary, who has seen previous legal complaints against OS rejected, still argues that by investing in its own research and development, OS has become “far too big and is competing with British technology companies instead of, as they are supposed to do, promoting them. It is also hopelessly inefficient.”¹¹² OS refutes Cary’s claims and, as of November 2015, there has been no judgment in this case. Also, as noted above, the CJEU recently ruled that there can be intellectual property rights in geospatial data.¹¹³

In *The Guardian*’s “Free Our Data” campaign, Cary argues that OS being an “almost monopoly” in the provision of large-scale maps allows OS to aggressively enforce copyright fees, even on derived products.¹¹⁴ For example, if a utility uses an OS map to draw its pipeline map, OS will indefinitely enforce a fee unless the utility re-creates their own data. This “acts as an effective barrier to the creation of a truly competitive market” because customers, such as the utility in this case, are locked in, and because other map suppliers cannot obtain any derived data without also paying OS a fee and negotiating licensing terms.¹¹⁵

Critics also argue that being an effective monopoly inherently discourages OS from investing in new research and development, new technologies or in new processes with the same vigor as private businesses. Although OS invests in research and development, by being a closed organization, it can be argued that these efforts do not match the kind of innovation that occurs through more competitive or crowdsourced models. They argue that this disadvantage will only increase, as advances in geospatial technology give rise to other sources of equally accurate and timely spatial data, at a lower cost than OS. Rabley offers that OS needs to be careful and ask, “What’s our core value to the U.K. taxpayer?”¹¹⁶ That is, OS shouldn’t be trying to own a market and compete with businesses with new products and services, but rather OS should focus on how it enables businesses to be innovative, which is through its impressive geospatial data. Therefore, Rabley argues, more data should be opened, and **then** businesses will be their “biggest support in ensuring that Ordnance Survey continues, whereas right now, the complete opposite is the case. The businesses want to get rid of and shut down Ordnance Survey.”¹¹⁷

These challenges of cost, adhering to open data principles and navigating private sector

111 Milmo, Cahal. “Has the Ordnance Survey lost its moral compass?” *The Independent*. November 28, 2014. <http://www.independent.co.uk/travel/news-and-advice/has-the-ordnance-survey-lost-its-moral-compass-9891770.html>

112 Milmo, Cahal. “Has the Ordnance Survey lost its moral compass?” *The Independent*. November 28, 2014. <http://www.independent.co.uk/travel/news-and-advice/has-the-ordnance-survey-lost-its-moral-compass-9891770.html>

113 GovLab interview with Robert Andrews, Head of Corporate Communications, Ordnance Survey, October 28, 2015.

114 “Tristram Cary of Getmapping responds on the OS consultation: ‘British mapping is fundamentally flawed.’” *The Guardian Free Our Data Blog*. March 2013. <http://www.freeourdata.org.uk/blog/2010/03/tristram-cary-of-getmapping-responds-on-the-os-consultation-british-mapping-is-fundamentally-flawed/>

115 “Tristram Cary of Getmapping responds on the OS consultation: ‘British mapping is fundamentally flawed.’” *The Guardian Free Our Data Blog*. March 2013. <http://www.freeourdata.org.uk/blog/2010/03/tristram-cary-of-getmapping-responds-on-the-os-consultation-british-mapping-is-fundamentally-flawed/>

116 GovLab interview with Peter Rabley, Director, Investments, Omidyar Network, September 23, 2015.

117 GovLab interview with Peter Rabley, Director, Investments, Omidyar Network, September 23, 2015.

competition highlight the larger policy issue as to whether or not taxpayers should be funding government agencies to build developer resources, or if OS should focus more on supporting outside experts to build their own products, using OS data, as needed.¹¹⁸ OS therefore, should consider what its relationship should be with the open data community and with the private sector, particularly as potential competitors continue to emerge with rivaling technology, and whether aggressively enforcing licensing fees is worth the risk to its relationships, and whether its actions do in fact stifle innovation and competition. In response, OS argues that it does prioritize these considerations, and that as a member of the Open Data Institute (ODI), OS regularly engages with the open data community on policy issues.¹¹⁹ Moreover, OS has been accredited to the Information Fair Traders Scheme since 2003.¹²⁰

Measuring Impact and User Demands

As described, OS is working toward developing more precise impact and use indicators in the future, in addition to its current sophisticated user surveys and analytics. Through these efforts, John Carpenter, OS director of Strategy, described two key learning points: 1) it is challenging for some users to discover what data is available in the first place; and 2) simply publishing the data is not enough. As Carpenter puts it: “It has to be discoverable, usable, and in our case, mapping data is not terribly easy to use. We’ve had to put a lot of effort to make it easier to use, and have to invest to get people to use it.”¹²¹

The future priorities of OS are “going to be much more about getting what’s out there **now** used vs. getting **more** data out there to be used” as OS continues to progress beyond the mindset of “if you put it out there, they will come.”¹²² While customer service teams and user forums help address these issues, OS has also launched several larger initiatives to not only help users learn more about using and navigating the data, but also to spur engagement among existing and new users, including open data classes, blogs, wikis and the development of open standards, among others. For example, OS also sponsored an Open Data Camp in February 2015 for 200 developers, innovators and entrepreneurs to test new OS data to create fresh insights and innovative products and services.¹²³ Carpenter describes the approach to promoting innovation as, “This is for life, not just Christmas. [We] have to go big or don’t bother; a half-hearted approach is a waste of time for everybody.”¹²⁴

118 GovLab interview with Ed Parsons, Geospatial Technologist, Google, former CTO of Ordnance Survey, September 25, 2015.

119 GovLab interview with Clare Hadley, Policy and Engagement Manager, and James Norris, Policy Analyst, Ordnance Survey, October 23, 2015.

120 GovLab interview with James Norris, Policy Analyst, Ordnance Survey, February 3, 2015; “IFTS members.” The National Archives. <http://www.nationalarchives.gov.uk/information-management/re-using-public-sector-information/ifts-and-regulation/ifts-members/>

121 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

122 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

123 Scott, Anna. “X marks the spot: Ordnance Survey and Esri open up more geospatial data.” Open Data Institute. February 21, 2015. <https://theodi.org/blog/broadening-horizons-ordnance-survey-esri-put-open-data-on-their-maps>

124 GovLab interview with John Carpenter, Director of Strategy and Robert Andrews, Head of Corporate Communications, Ordnance Survey, September 16, 2015.

V. LOOKING FORWARD

Evolving GeoVation Hub

To continue scaling excitement and impact of the GeoVation program, in March 2015, OS opened a new GeoVation Hub in London. Cathrine Armour of OS' Innovation Programme, described, "One of the biggest challenges facing the geospatial industry and all those operating in it is: Innovating. ... To increase the relevance of our industry we need to expose ourselves to new thinking, to undertake thought leadership and share this in a way that as an industry we lift our gaze. The Hub will enable OS and its partners to work collaboratively with fringe industries, new media, digital and emerging technologies."¹²⁵

OS OpenData Additions

In 2015, OS also announced additions to its OS OpenData platform, including:

- OS OpenMap: "a 'street level' vector dataset designed to be the most detailed open data mapping product available, providing a backdrop for integrating and visualising analytical data."¹²⁶
- A new Open Water Network: "a generalised network product covering Great Britain's rivers which will deliver a national view of our watercourses."¹²⁷
- A new and improved Gazetteer: for use by people who need the most up-to-date place names, road names, road numbers and postcodes for use in location searches for both mobile and online uses."¹²⁸

Looking Beyond the U.K.

OS has been expanding the marketplace for its data services outside of the U.K. For example, in 2013, OS International LLP, a subsidiary of Ordnance Survey, provided geospatial services and strategy consulting to the Kingdom of Bahrain.¹²⁹ OS created the first 3D-enabled national spatial data model of the Kingdom of Bahrain to provide government and industry stakeholders with consistent, intelligent and reliable 2D and 3D data to support "data sharing, analysis and decision-making" using "intelligent geospatial data."¹³⁰ In April 2015, OS developed a GIS

¹²⁵ "Ordnance Survey to open hub dedicated to innovation." Ordnance Survey. February 27, 2015. <http://www.ordnancesurvey.co.uk/about/news/2015/geospatial-innovation-hub-announced.html>

¹²⁶ "Britain leads the way as Ordnance Survey helps to drive economic growth and digital innovation through open data." Ordnance Survey. February 21, 2015. <http://www.ordnancesurvey.co.uk/about/news/2015/os-drives-economic-growth-and-digital-innovation-through-open-data.html>

¹²⁷ "Britain leads the way as Ordnance Survey helps to drive economic growth and digital innovation through open data." Ordnance Survey. February 21, 2015. <http://www.ordnancesurvey.co.uk/about/news/2015/os-drives-economic-growth-and-digital-innovation-through-open-data.html>

¹²⁸ "Britain leads the way as Ordnance Survey helps to drive economic growth and digital innovation through open data." Ordnance Survey. February 21, 2015. <http://www.ordnancesurvey.co.uk/about/news/2015/os-drives-economic-growth-and-digital-innovation-through-open-data.html>

¹²⁹ "About OS International." Ordnance Survey. <https://www.ordnancesurvey.co.uk/international/about/index.html>

¹³⁰ "Creating a 3D data model for the Kingdom of Bahrain." Ordnance Survey. <https://www.ordnancesurvey.co.uk/international/case-studies/creating-3d-data-model.html>

Roadmap Framework for The Environment Agency of Abu Dhabi to help the agency establish and manage a “single source of accurate, reliable environmental information,” share geospatial information with stakeholders, set goals and improve the “consistency and quality of geospatial data capture, processing, analysis and dissemination” of its environmental and spatial data.¹³¹

Supporting Smart Cities

With the rise of smart cities – cities that use innovative technology (i.e., sensors, meters, applications) to create more efficient and interactive infrastructure and information systems – OS is examining the role of geospatial data and products in driving the continued development of smart cities, including: providing connectivity between assets, networks and sensor data; sharing and integrating data services; data analytics in smart energy, water and transport management; and data visualizations and public engagement.¹³² Recently, OS has been working with Glasgow to deliver a new trial license so that data produced using OS' maps will be made available through a new open data portal for Glasgow's “Future City/Glasgow” initiative. In particular, OS is focusing on opportunities in smart grids, health/assisted living, intelligent transport, smart water management and smart water management for Future City/Glasgow.¹³³

Additionally, OS is supporting the Digital Greenwich initiative by, among other things, enabling the borough's greater use of predictive analytics and “providing support for machine-to-machine data services” to allow Internet of Things (IoT) devices to more efficiently connect to each other.¹³⁴

These recent efforts illustrate that OS values innovation, and suggests that in addition to maintaining high-quality data and impressive service levels for its current customers and government partners, OS may be able to mitigate concerns voiced by members of the open data community by focusing more on supporting outside actors in their own development and growth. However, the challenges to scaling, particularly the self-funding requirement, and the strong criticisms of its mixed model and its fierce copyright protections, will need to be reassessed, particularly if OS, as an organization, hopes someday to embody the principles of open data fully.

131 “Using geospatial support to safeguard the environment for future generations.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/international/case-studies/using-geospatial-support-to-safeguard-environment.html>

132 “Smart Cities.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/thinking/smart-cities/>

133 “Smart Cities.” Ordnance Survey. <https://www.ordnancesurvey.co.uk/about/thinking/smart-cities/>

134 “Greenwich Smart City Strategy.” Digital Greenwich. 2014.