Enhancing the UK's Geospatial Ecosystem

Geospatial Commission

Foreword

Location data and the insights it can bring are of immense value to the UK's economy. From providing us with real-time updates on travel disruptions and local weather, to engineering modern digital business models such as ride sharing platforms and location-based search engines. Location data permeates all areas of our lives, bringing benefits that are transforming our cities, connecting communities and contributing billions in value to the UK economy.

Nurturing the growing geospatial ecosystem is key to achieving the transformative vision for a coherent national location data framework by 2025, as set out in the UK's Geospatial Strategy. Markets have a central and essential role, with targeted interventions by the government in boosting the economic, social and environmental benefits of location data for the UK.

The Frontier Economics Geospatial Data Market Study (Market Study) has provided strong evidence for further investment in the geospatial ecosystem. Location data is widely dispersed and used throughout the UK economy by organisations of all sizes across a range of industrial sectors. The Market Study shows that geospatial activity in the UK is best viewed as an ecosystem - a range of sub-markets across the economy which produce and use location data or services. The Market Study also shows that the value of creating and using location data is not restricted to the person using the data - it spills over into wider society. Nonetheless, the Market Study found a series of barriers that are holding back innovation and hindering growth.

In light of this evidence, it's clear that more action is needed to realise the full benefits from the ecosystem. The presence of market barriers can affect how data is shared and accessed, and this can lead to a lack of awareness of the benefits that location data can bring. The Geospatial Commission believes that improving access to location data, maintaining public trust in how location data is used, and driving the adoption and use of location data are the key market priorities that are needed to secure the full potential of location data to the UK.

This report and the Market Study embody the Geospatial Commission's way of working, being evidence-led, iterative, collaborative and open. Taking a whole systems approach, this report has brought together findings from in-depth engagement with a wide range of public and private sector organisations working in multiple sectors. I would like to thank Frontier Economics, and the diverse range of organisations and individuals who contributed to the Geospatial Data Market Study and the development of this Enhancing the UK's Geospatial Ecosystem report.

The recommendations in this document should be seen as a starting point for future actions in the ecosystem. It is the Geospatial Commission's ambition that by implementing these recommendations alongside continued activity across the public and private sector, we will encourage a wave of recognition for the power of geospatial to drive growth across the UK economy.

Sir Andrew Dilnot

Chair of the Geospatial Commission

Table of contents

Introduction

At the end of 2019, we commissioned Frontier Economics to undertake a study on the state of the geospatial market in the UK. We did so in parallel to developing the UK's Geospatial Strategy, which was published in June 2020. This sets a blueprint for how the UK can best take action to maximise the increasing value of geospatial data.

During that time, the global coronavirus pandemic has transformed many aspects of our economy, society and individual lives. It has also brought into sharp focus the growing value and usefulness of location data across a range of sectors and economic activities.

This report, Enhancing the UK's Geospatial Ecosystem, builds on the UK's Geospatial Strategy. In the strategy, the vision is that 'by 2025, the UK will have a coherent national location data framework underpinning a flourishing digital society. Future technologies will be underpinned by data about events occurring at a time and place. Location data will be the unifying connection between things, systems, people and the environment.'
A crucial step to realising that vision is a thriving geospatial economy in the UK.

The UK's Geospatial Strategy identified nine location data opportunities from infrastructure to public health, and four missions:

a. **Mission 1: Promote and safeguard the use of location data:** We need to provide an evidenced view of the market value of location data, set clear guidelines on data access, privacy, ethics and security, and promote better use of location data.

b. **Mission 2: Improve access to better location data:** We will streamline, test and scale the development of new and existing location data, ensuring it is findable, accessible, interoperable, reusable and of high quality.

c. **Mission 3: Enhance capabilities, skills and awareness:** To achieve our vision, we must develop more people with the right skills and tools to work with location data across organisations and sectors to meet the UK's future needs and support global development.

d. **Mission 4: Enable innovation:** We will maximise the commercial opportunities for innovation and promote market-wide adoption of high value emerging location technologies.

The findings of the Geospatial Data Market Study by Frontier Economics (Market Study) provide crucial evidence of the current state of the UK's geospatial economy. The evidence is the foundation for the priority areas and accompanying areas for action identified in this Enhancing the UK's Geospatial Ecosystem report from the Geospatial Commission.
The areas for action are required to develop the UK geospatial economy and enable the realisation of the opportunity set out in the UK's Geospatial Strategy.

Geospatial Data Market Study findings

We welcome the findings highlighted within the Frontier Economics Market Study and extend our thanks to all organisations who contributed. This report from the Geospatial Commission is underpinned by the three identified market characteristics, namely:

a. The geospatial market is best described as an 'ecosystem'

Referring to a single geospatial market does not adequately capture the diversity in products and services that utilise location data, and their diffusion across multiple industries. Characterising the market as a 'geospatial ecosystem'[1] recognises the complexity of the integration of location data and services into many existing markets. The evidence gathered demonstrates that the 'demand' side of this geospatial ecosystem has the potential to generate a significant amount of value, through the widespread adoption of geospatial data products and services by firms across a large number of sectors.

b. Its value is accordingly difficult to measure

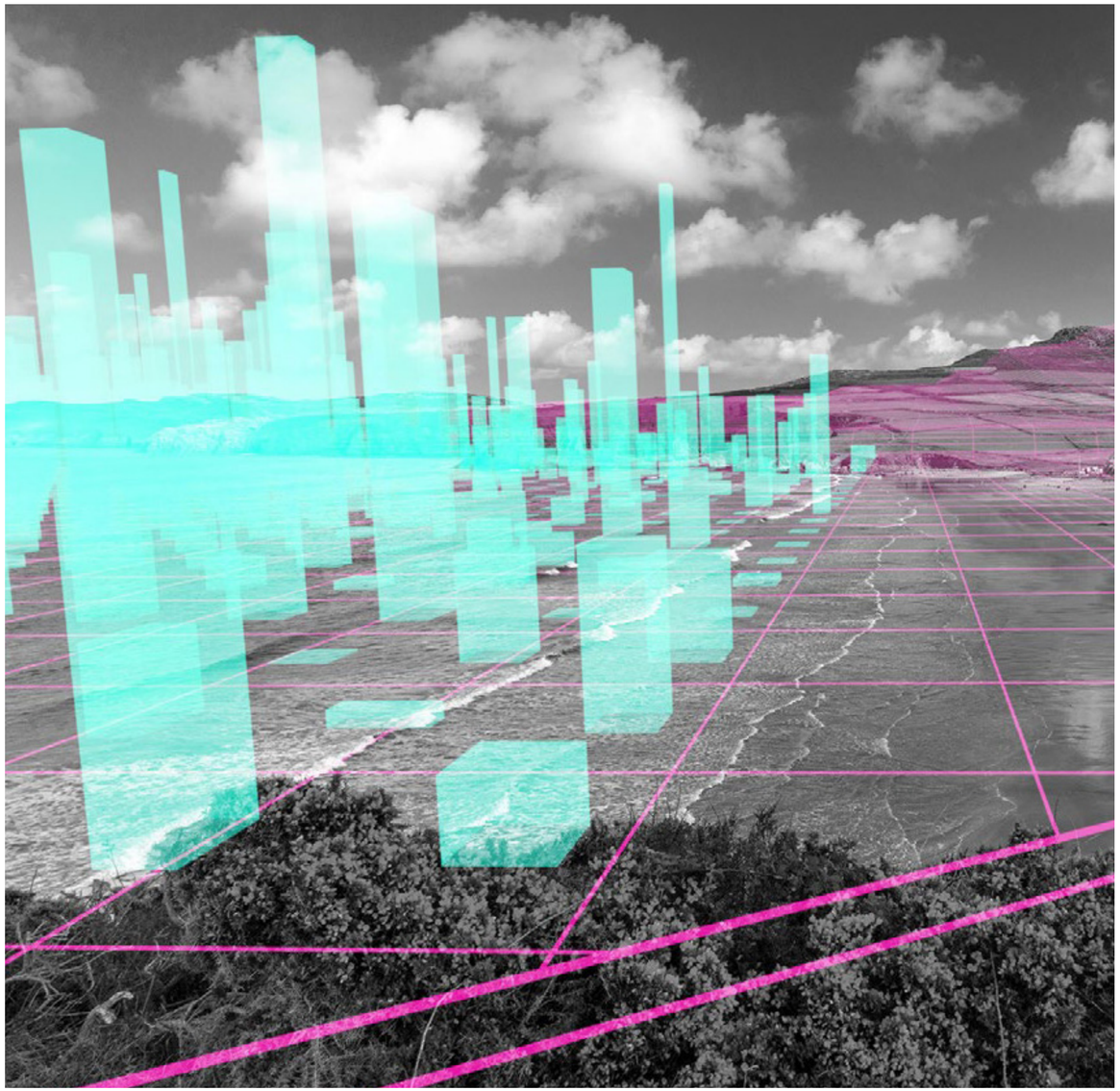
A lot of geospatial activity is undertaken by firms with business models that overlap into other markets alongside geospatial. This includes the wide-ranging product and service offerings of the largest global technology firms. It is well known that location data and technologies are a key enabler of their services, but limited information makes it difficult to identify what specific proportion of the revenue generated by these companies are attributable to geospatial data. The Market Study report notes that the £6 billion estimate of turnover underpinned by geospatial companies is a conservative figure for a subset of the wider ecosystem[2]. For example, it excludes the revenues of these larger technology firms. However, looking at trends in the location data ecosystem since 2010 has revealed a strong pattern of growth, with a 40% annual growth rate in the value of equity investment into geospatial companies, and 45% annual growth rate of employment.

c. Its benefits spillover into wider society.

Creating and using geospatial data generates wider social, environmental and economic returns, which 'spillover' across the broader economy. For example, the use of geospatial data in the design, delivery and maintenance of electric vehicle charging points can lead to greater uptake of cleaner vehicles, resulting in lower emissions and positive environmental impacts for wider society. The delivery of these environmental impacts is a key factor for driving long-term economic growth and productivity. They also demonstrate the case for greater UK investment in geospatial data and services.

The **geospatial ecosystem** refers to the range of sub-markets across the economy using geospatial data and/or services, including marketing, transport and engineering. A range of organisations play a facilitating role in this ecosystem, including private and public sector organisations, academic institutions, and innovation hubs.

The Frontier Economics Geospatial Data Market Study defined '**geospatial companies**' as companies for whom the supply and provision of geospatial data/services is a core part of their product or service offering. The full report contains further information about the specific types of companies that are included/excluded from this definition.



The Market Study also reveals an evolution in the types and variety of geospatial data within the market, from foundational location data products to dynamic movement data[3]:

a. Foundational data products have mainly been delivered by the UK's six core geospatial public sector agencies[4], which the study found are often considered world class. Identifying foundational location data as a public sector-owned asset has been critical in ensuring the development of comprehensive and authoritative UK data.

b. New and emerging types of dynamic geospatial data, for example aggregated movement data, are now being created from a variety of private (and some public) sector organisations. The landscape of movement data types and sources is still developing, ranging from mobile phone data to GPS data provided from vehicles and applications. The Covid-19 pandemic has amplified the importance of these new forms of geospatial data, particularly in managing the UK's response to the virus.

These Market Study findings underpin the significant and growing opportunity of geospatial data to support economic growth and productivity across the UK economy.

Drawing on the findings from the Frontier Economics report, the Geospatial Commission has identified two types of location data; foundational and dynamic. Each one with their own distinguishing features.

Foundational location data are the types of geospatial information that determine and express the underpinning geographic framework of a particular area. For example, geographical extents, addresses, physical infrastructure and topography.

Dynamic location data captures spatial patterns of subjects or objects of interest across a particular geographic framework and at a high temporal frequency. For example, data on pedestrian movement throughout a city collected through mobile phone data.

This comparison between foundational and dynamic geospatial data is not necessarily a neat binary distinction as there is often a continuum depending on the temporal nature of the data. The combination of these two datasets generates additional value, for example; to derive the full value from dynamic location data collected by a vehicle tracking dataset, it needs to be considered within the context of a foundational geographic framework.

The six Partner Bodies are: British Geological Survey, Coal Authority, UK Hydrographic Office, HM Land Registry, Ordnance Survey and Valuation Office Agency

Enhancing the Geospatial Ecosystem

Although evidence supporting the growth and widespread use of geospatial data is encouraging, there are a number of considerations for the best way to maximise its value to the UK economy. Our main observation of the current ecosystem is that **the evolving and increasingly important role of location data in supporting economic activity is not yet fully understood by all those holding or using it, nor those responsible for developing the frameworks that govern access to it.** As a result, its value is often not recognised, and it is difficult to measure. Therefore, access is uncoordinated, inconsistent or not prioritised.

The growth of dynamic and real-time geospatial data also emphasises the importance of geospatial datasets that are created by the private sector. As the ecosystem continues to adapt in this manner, the Geospatial Commission has a role to play in creating opportunities for a broad range of data suppliers.

Following the evidence from the Market Study, we have identified three areas that require action now to secure the full potential of location data to the UK.

a. Improving **access** to location data

b. Maintaining **public trust** in how location data is used

c. Driving location data **adoption**

The UK's Geospatial Strategy identified a number of key activities for which the Geospatial Commission is centrally responsible; activities which are already underway to help address these limitations of the UK's geospatial ecosystem. Those actions are necessary but not sufficient to maximise the benefits of location data to the UK economy and society.

In this report, we explore the three additional areas of action, building on the Geospatial Commission's existing activities.
And for each area we identify a central objective and further key actions for organisations that hold, use and/or regulate location data.

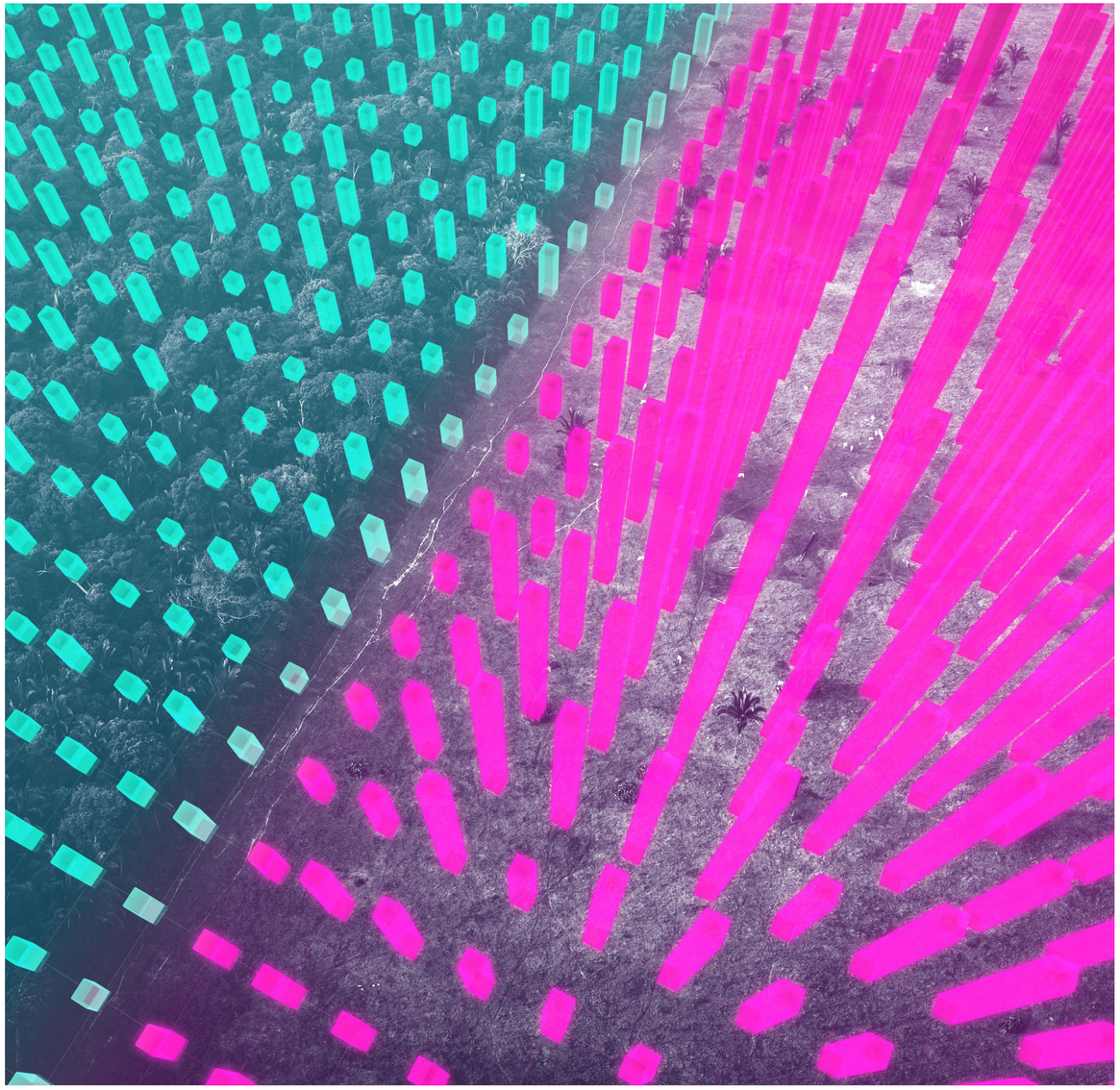
Improving access to location data - Data holders[5] should **consider the public good**[6] as a main rationale when making decisions about access to location data.

Action 1: The Geospatial Commission will include the objective that 'data holders consider the public good in decisions about access to location data' in its forthcoming guidelines for measuring the value of location data, and for the ethical use of location data and technology in both the private and public sector.

Action 2: Competition regulators, including a future Digital Markets Unit[7] and organisations within the Digital Regulation Cooperation Forum[8], consider the potential public good arising from the sharing and reuse of location data when evolving their regulatory approach for unlocking competition in digital markets.

We are using the term data holder to incorporate all organisations who exercise control over the use and access to location data. Data holders would incorporate the GDPR term '**data controller**', when referring to location data containing personal data.

Public good in this context refers to the general benefit or well-being of the public. This is distinguished from the strict economic definition of 'a public good', which refers to an item that is difficult to exclude others from using and which one person's use does not diminish the amount available for others.



Maintaining public trust in how location data is used - There should be an **informed public discourse** considering the benefits arising from use of location data and the potential risks to individual privacy.

Action 3: The Information Commissioner's Office (ICO) should provide further clarity on the distinction between personal and non-personal location data.

Action 4: The Geospatial Commission will lead an informed public discourse about the benefits and risks of new applications of location data, starting with a new programme of deliberative public engagement.

Driving location data adoption - Organisations should recognise the additional value that location data can deliver for their business.

Action 5: The Department for Business, Energy & Industrial Strategy (BEIS) should further incorporate location data capability as an essential component of their programmes for increasing growth, innovation and productivity within the UK economy.

Action 6: The Government Commercial Function should embed provisions within appropriate government contracts and spend approvals to require valuable location data, generated either directly or as a by-product of the provision of other goods and services, to be retained and made available for appropriate reuse by the government.

Implementation of these additional activities, alongside the actions outlined in the UK Geospatial Strategy, will be crucial in ensuring that the UK's geospatial ecosystem is operating effectively. Thus, maximising the economic, social and environmental value arising from the use of the UK's strategic location data assets.

The Geospatial Commission will support the delivery, where appropriate, of all actions where we are not leads. We will include assessment of progress of all actions in the Geospatial Commission's annual reports.

Improving access to location data

*Data holders should consider the **public good** as a main rationale when making-decisions about access to location data.*

As set out in the UK's Geospatial Strategy, improving access to location data is at the core of developing a coherent location data framework for the UK.

The Market Study findings have demonstrated fundamental frictions in how organisations can access valuable types of location data held by both the public and private sector. Better management of the UK's location data so that it is high quality and FAIR (Findable, Accessible, Interoperable and Reusable), will increase the economic, social and environmental value arising from location data use.

The Market Study documents a number of well-known barriers to data access, such as commercial sensitivities, quality, licencing, security and privacy. Some of these concerns may be legitimate, but technology and robust data governance can mitigate many of them. For instance, through facilitating secure access to data for different users.

The National Data Strategy identifies the important role for the government in removing the barriers that prevent organisations from accessing valuable data for the benefit of the economy and society[9]. To improve market outcomes from greater reuse of location data in the long run, it is important for the government to consider the appropriate incentives, alongside safeguards, that should be put in place to encourage greater access to location data from data holders for the public good.

The Geospatial Commission will include this objective in forthcoming guidelines for measuring the value of location data, and for the ethical use of location data and technology in both the private and public sector. This will allow us to make sure that the benefits which location data can bring to the urgent challenges of today are realised in a way that retains the trust of citizens.

It is clear from the Market Study that the role of the public sector, including Local Authorities, has consequences for the health of the wider geospatial ecosystem. For some public sector bodies, the creation and provision of data is not considered part of their core purpose and may therefore not be prioritised enough. Amongst others, the fast pace of technological change may mean that over time they find themselves operating in areas of the market where the rationale for government intervention has become weaker. For example, the maturation of technologies that reduce the overall cost of providing geospatial products and services may lower barriers to entry to the market. Improving access to foundational public sector location data can level the playing field, encourage wider market participation and stimulate the UK economy. The geospatial ecosystem is evolving at pace and the public sector must continue to adapt its role accordingly.

The Market Study's findings on accessing public sector geospatial data also highlight the importance of modern and flexible data access arrangements, for both start-ups and more established organisations. High upfront costs for buying and hosting geospatial data were observed as an access barrier, particularly for newer entrants to the market, and do not encourage data experimentation - a key catalyst for innovation.

The Geospatial Commission has been at the heart of improving access to location data from public sector geospatial bodies over the last two years. In that time, we have:

a. Negotiated a £1 billion investment through Public Sector Geospatial Agreement (PSGA) to give more than 5,000 public sector organisations unlimited access to Ordnance Survey data.[10]

b. Made Ordnance Survey's MasterMap available for free up to a threshold of transactions.[11]

c. Released on open terms for the first time the core location identifiers – Unique Property Reference Numbers (UPRNs),Unique Street Reference Numbers (USRN) and the Topographic Object Identifier (TOID) – that provide a golden thread to link a wide range of datasets together to provide insights that would not otherwise be possible.[12]

The Geospatial Commission will continue to drive the delivery of the commitments set out in the UK Geospatial Strategy to address issues relating to access to public sector data. We are committed to:

a. Exploring ways to rationalise the public sector's procurement of Earth Observation data and services.

b. Working with partners to invest further in location data quality and access improvements across the public sector.

c. Preparing for a national roll-out of a National Underground Assets Register (NUAR).

d. Improving access to better data that enables house building and improves the house buying and selling process across the UK.

We also need to drive access to location data, including from sources outside of the public sector, to realise greater value in the ecosystem. Dynamic location data is increasingly being created as a by-product of company activity in other markets, such as ride sharing platforms, delivery applications and online platforms with a large consumer base. There are strategic data assets being created today by public and private organisations which could drive wider benefits for the public good that are not currently being realised at this time.

Better access to location data can also promote fair and effective competition in related digital market segments. This is relevant in the example of large technology companies whose digital mapping services and online consumer platforms can facilitate the collection of their consumer's location data. As outlined in a recent Competition and Markets Authority (CMA) market study report[14], these business models rely on attracting consumers' attention and gathering data about them, which is then used to sell targeted advertising. These platforms collect a range of data types from their users, including location data, and may offer services based on your current or expected location, such as:

a. Search engines that give instant access to information, news and a wide range of goods and services.

b. Social media services that enable users to connect with friends and family around the world, keep up with news or current trends and share creative content with others.

A key feature of these online platforms is a 'network effect', which means that the value existing users get from the service grows as the total number of users increases. For example, each additional user on a platform generates more location data. The platform creator can use this to improve the experience for other customers and offer more precisely targeted advertising. These companies, realising the strategic value of their location data, may restrict wider access to it.

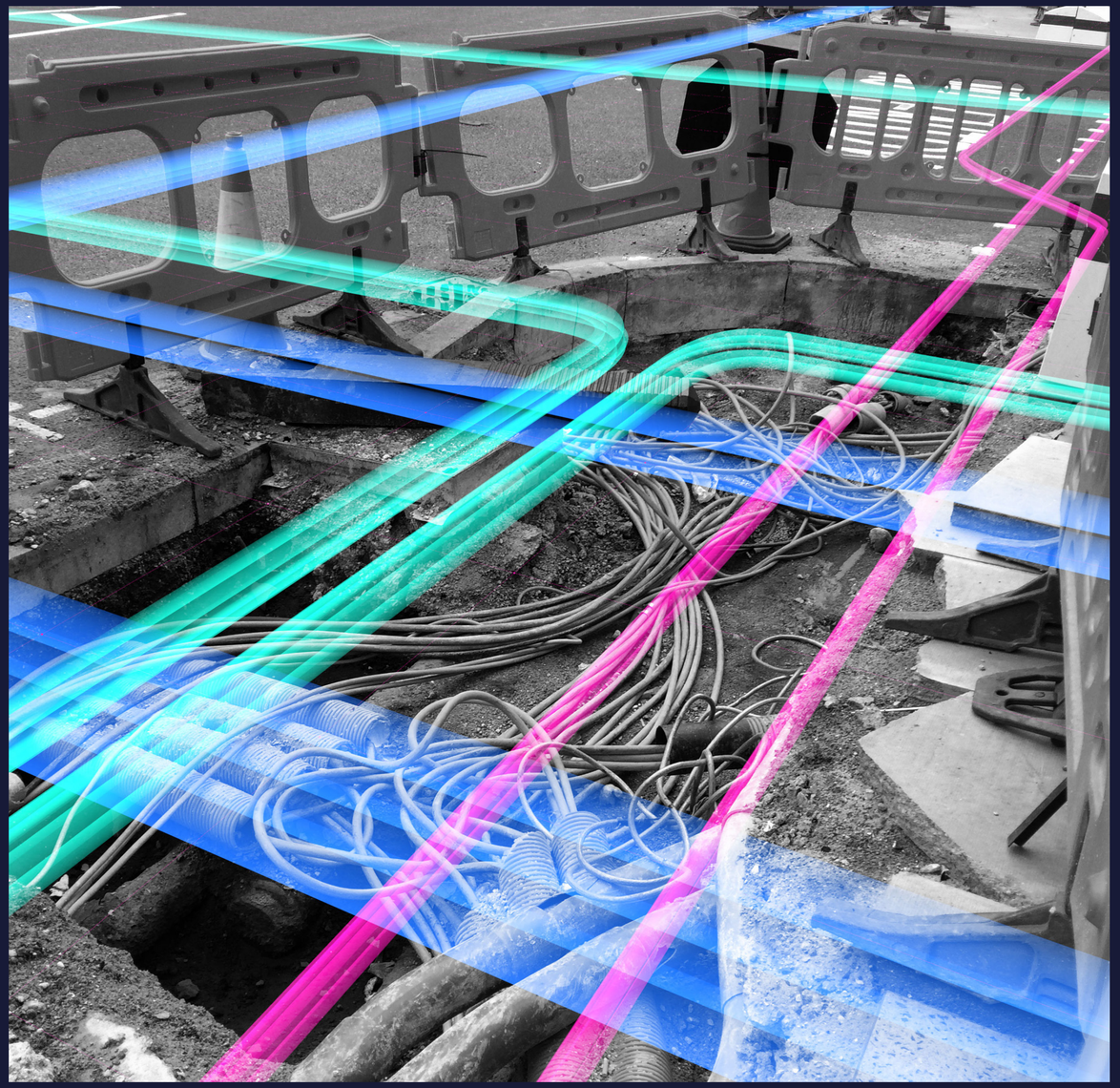
The CMA market study highlighted how practices by these online platform providers can allow them to operate more effectively in other related digital markets, such as advertising[15]. This practice raises competition concerns, as it can potentially consolidate the market advantage of these businesses and act as an additional barrier to expansion for other providers.

A number of UK and international institutions have taken steps to determine what changes to competition frameworks and regulations are needed to address the challenges posed by the growth of digital markets. This includes the UK Digital Competition Expert Panel[16], chaired by Professor Jason Furman; the EU's report on Competition policy for the digital era[17]; and a US House Judiciary Committee report following an investigation into competition in digital markets[18].

The Geospatial Commission does not hold specific regulatory powers for digital markets. However, the use of appropriate measures by competition regulators can deliver better market outcomes for the geospatial ecosystem and support better quality products and services available for use by both commercial users and the public.

The main strategic recommendation of the UK Digital Competition Expert Panel ('the Furman Review') was for the Government to establish a 'Digital Markets Unit' to promote competition in digital markets[19]. This recommendation was accepted alongside the Budget in March 2020. In March, Government established a cross-regulator Digital Markets Taskforce to advise on the potential design and implementation of pro-competition measures for digital platform markets[20]. The CMA, the Information Commissioner's Office (ICO) and Ofcom have also formed a Digital Regulation Cooperation Forum (DRCF), to support regulatory coordination in digital markets and cooperation on areas of mutual importance.

Given the growing primacy, value and market advantage of location data to digital business models, **we recommend that competition regulators, including a future Digital Markets Unit and the organisations within the Digital Regulation Cooperation Forum[21], consider the potential public good arising from the sharing and reuse of location data when evolving their regulatory approach for unlocking competition in digital markets**.



Case study: National Underground Asset Register

The National Underground Asset Register (NUAR) pilots have successfully delivered reliable and secure sharing of underground asset data, overcoming a number of barriers to data access[13].

Each year, accidental strikes on utility pipes and cables incur economic costs of £1.2bn and puts lives at risk. Avoiding accidental strikes is made more complex due to data on underground assets being held by a multitude of private and public stakeholders. As there is no single asset owner who bears the wider societal costs from utility strikes, government facilitation of location data access was needed to overcome these barriers to data sharing and deliver benefits in the interest of the public good.

The NUAR programme has been designed to bring these stakeholders together to create one single register to make detecting underground assets easier, and therefore reducing both economic disruption and risk of life.

To date, the Geospatial Commission has completed two successful pilots, in the North East of England and in London. The National Underground Asset Register will continue to be a core part of the Geospatial Commission's strategy. Additional work is being concluded with utility providers and local authorities in the North East of England and London to help refine our requirements for a national platform, in preparation for regional and national rollout.

Maintaining public trust in how location data is used

*There should be an **informed public discourse** considering the benefits arising from use of location data and the potential risks to individual privacy.*

Many new scientific and technological advancements have early moments where a lack of informed discussion and understanding about the benefits and risks of the technologies could stifle advancement. As location technology develops, so too does its ability to gather more insights about people and their interactions with their surroundings. There are significant opportunities for citizens to benefit from the services that this location data enables, but it is crucial that they are realised in ways that mitigate concerns and retain public trust.

The collection and use of foundational geospatial data about natural (rivers and mountains) or manmade features (roads and buildings) by the public and private sector is widely accepted with limited ethical concerns. However, the Market Study revealed the increasing importance of more dynamic geospatial data. The increased collection and more visible use of this type of data is raising ethical concerns, particularly in relation to privacy. This is specifically evident for mobile network data and related forms of movement data.

It is important that we bring the consumers and the public with us on the journey to maximise the economic, social and environmental value of location data, by listening to and appropriately addressing their concerns. This challenge, in relation to public sector data use, has also been identified by the Centre for Data Ethics and Innovation (CDEI) in their report Addressing trust in public sector data use[22]. The CDEI found that low public awareness of data sharing and an absence of a developed understanding of public acceptability, can give rise to an environment of 'tenuous trust', which can hinder progression of projects that could be of huge societal benefit.

The use of aggregated and anonymised movement data has grown in recent years, and the increasing penetration of smartphone usage has boosted the value of these insights. The Market Study identified an increasing trend for location data to be collected via mobile phone applications and non-traditional mechanisms, such as online platforms and exercise tracking applications. Whilst for some of these businesses, their core purpose may not be to gather large amounts of location data, the technology consumers use to access these services means it can be collected as a by-product.

Some organisational holders of geospatial movement data are cautious about utilising and sharing the aggregated and anonymised data. This is due to public perception concerns that data about people's location is being used for purposes of which they are unaware and/or without appropriate consent. The Market Study also found similar concerns with businesses who are looking to purchase this data but have decided against using it, despite assurances that doing so is compliant with current privacy laws. In the long-term, this perception could prevent the growth in adoption of location data and the value to the economy that comes with it.

The use of movement data during the response to the Covid-19 pandemic has demonstrated the significant value it can bring in supporting the wellbeing of society. There are a wider set of potential applications of this data in addition to Covid-19, but greater transparency in the safeguards that are applied to protect individual privacy are needed to mitigate concerns and retain public trust.

In the UK Geospatial Strategy, the Geospatial Commission committed to develop and maintain guidance on how to unlock value from location data while mitigating ethical and privacy risks, ensuring compliance with legal principles and retaining the trust of citizens. For example, ways for data holders to increase transparency about their location data use through explaining simply and clearly the purpose for the location data use, and the safeguards they put in place to reduce risks to privacy.

In support of the ethical framework, **we recommend that the Information Commissioner's Office (ICO) provide further clarity on the distinction between personal and non-personal location data.**

Greater clarity between personal and non-personal location data can be reinforced by common domestic and international location data standards. For example, the Data Standards Authority can support the public sector in a common approach to anonymising data.

However, the issue of public trust will not be solved solely through guidance alone. Public understanding through greater engagement and transparency will also be required. **The Geospatial Commission plans to lead an informed public discourse about the benefits and risks of new applications of location data, starting with a new programme of deliberative public engagement.**

Case study: Use of genomic data

New forms of data present huge benefits to society, but also challenges to ensure they are used in ways that preserve public trust.

For example, as scientific understanding of the human genome develops, more effective treatments will become available, particularly for some cancers and for rare diseases. However, genomic medicine also raises challenges regarding the use and ownership of an individual's genomic data. From July 2018 to May 2019, Genomics England, with support from Sciencewise, ran a public dialogue to explore public views on how genomic medicine should be used in the NHS[23].

The dialogue brought together 97 members of the public and 30 experts in a series of workshops in Coventry, Edinburgh, Leeds and London, to discuss their views on the use of genomic medicine in the NHS. Participants explored their aspirations and concerns for genomic medicine; set out their red lines for the use of their data; and explored the nature of a 'social contract' between the public and the NHS.

Overall, participants were enthusiastic about the potential benefits of genomic medicine, on the condition that clear boundaries and rules are in place to mitigate the acknowledged risks. These include the possibility of unequal access increasing health inequalities and the misuse of data by third parties. Three core values were identified - reciprocity, altruism and solidarity - which form the basis of a framework to enable the public to benefit from the use of genomic medicine whilst mitigating any risks.

Geospatial data is different in many ways from genomic data, but it is still crucial to engage the public when setting policy about its ethical use. The Geospatial Commission plans to lead an informed public discourse about the benefits and risks of new applications of location data, starting with a new programme of deliberative public engagement. This will feed into the development of new guidelines on how to unlock value from location data while mitigating ethical and privacy risks.

Driving location data adoption

*Organisations should **recognise the additional value** that location data can deliver for their business*

Appropriately and transparently managed, location data is a strategic asset that can improve organisational effectiveness across all sectors of the economy, from executive decision-making and day-to-day operations to enabling innovation in products and services. Businesses, the public sector and wider society will all benefit from greater take-up and use of these geospatial capabilities, and the recognition that location data is a strategic asset. However, at the moment not all sectors and organisations fully recognise the important role of location data in supporting economic activity, both domestically and internationally.

The core finding from the Market Study showed that the geospatial market is best described as an ecosystem, rather than a traditional singular market. This finding opens the potential for the widespread adoption of geospatial data to improve economic outcomes such as productivity, growth and employment. The creation and use of geospatial data also generates wider social, environmental and economic returns, which 'spillover' across the broader economy. As geospatial data creators and users are not always aware of these wider benefits, targeted action to increase location data adoption is needed.

Separately to location data technical access issues, the Market Study identified a number of barriers across the public and private sector limiting the full adoption and use of location data, including a lack of skills and knowledge to utilise the higher-quality insights location data can provide and initial transition costs of moving from legacy systems.

The Geospatial Commission is undertaking a number of key activities to drive adoption and address these barriers:

a. Establishment of a Skills Forum to bring together industry, academia and the public sector to tackle specific capability challenges in a coordinated way;

b. Commissioning discovery work to inform the development of geospatial apprenticeships for the public and private sectors by 2021;

c. Launch of a £2 million Transport Location Data Innovation Competition, in partnership with Innovate UK that brings together businesses and public sector organisations to spark innovations that address transport and mobility challenges.

d. Establishment of a Scottish Geospatial Network Integrator in partnership with the Scottish Government and Scottish Enterprise, to accelerate the development of an emerging geospatial cluster with a view to extend the initiative into other parts of the UK.

The Geospatial Commission welcomes a collaborative and system-wide approach to all our activities. We see great potential for leveraging location capability to support the government's key priorities, including major infrastructure programmes, digital skills development and activities within the Government Major Projects Portfolio (GMPP). Action is required across the whole of government and in alignment with the National Data Strategy. The Geospatial Commission will continue to work with organisations such as the Infrastructure and Projects Authority (IPA), DfT and DCMS to promote the adoption of location data. In support of the Industrial Strategy **we recommend that the Department for Business, Energy and Industrial Strategy (BEIS) should further incorporate location data capabilities as essential components of their programmes for increasing growth, innovation and productivity within the UK economy.**

The Market Study also identified the thin segments[24] of the geospatial data ecosystem as a crucial blocker to effective operation of the ecosystem. Organisations who may be able to make use of location data are unsure of the price they should pay for it. Data suppliers can also find it difficult to set a suitable price due to lack of similar product offerings to benchmark against.

It is natural for markets to be thinner where new products and services are at an earlier stage of the technology adoption life cycle. However, accelerating the removal of these barriers will enable organisations to make the most of the location data opportunity, which is crucial to generating value and improving productivity for the benefit of the broader economy.

The Geospatial Commission believes that government procurement levers can play a key role in overcoming these barriers in the ecosystem to drive adoption. By leveraging its own buying power, the government can coordinate public sector organisations as intelligent customers of location data and services. This can lead to greater transparency in pricing and service offerings, creating a more dynamic market for novel types of location data within and beyond the public sector.

Public sector programmes and investments can also generate valuable location data assets, which if appropriately retained and reused, can support better decision making and the delivery of more efficient public services. Such assets are prominent examples of valuable intangibles or 'knowledge assets'. For example intellectual property, R&D, data, expertise and other intellectual resources of which there are an estimated £150 billion held in the UK public sector[25].

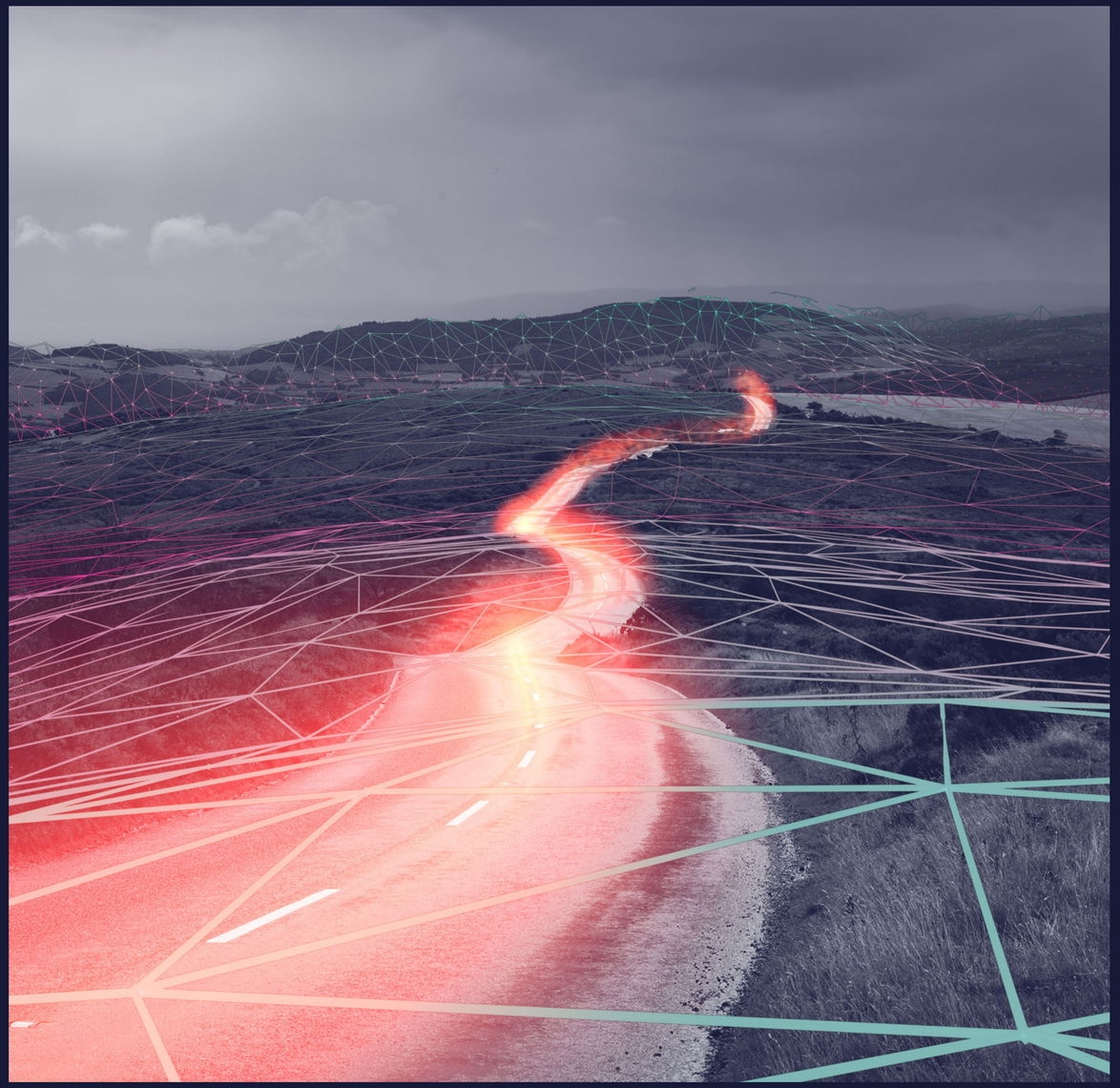
The Geospatial Commission is already undertaking a number of key activities to build on the success of the 'buy once, use many times' approach outlined in the UK's Geospatial Strategy:

a. Exploring the use of centrally funded, collective purchase arrangements for core geospatial data sets and services to deliver public sector wide access. For example, geology data that is critical for infrastructure delivery and planning.

b. Scoping a geospatial procurement framework with Crown Commercial Services, to support the public sector and gain easier access to emerging technologies and datasets.

To leverage the ability of public sector contracts to drive awareness of the importance of location data as a strategic asset throughout the ecosystem, we recommend that **the Government Commercial Function should embed provisions within appropriate government contracts and spend approvals to require valuable location data, generated either directly or as a by-product of the provision of other goods and services, to be collected and made available for appropriate reuse by government.**

A 'thin' market segment refers to emerging products and services in the geospatial market that have relatively few suppliers and buyers. More detail can be found in the Geospatial Data Market Study report



Case study: Transport Location Data Competition

The Future of Mobility: Urban strategy[26], as part of the Industrial Strategy[27], highlighted the significant industrial opportunities of innovation in the transport sector that could deliver high quality jobs and productivity growth in the UK. The Geospatial Commission recognises these immense opportunities, and how better use of geospatial data by the transport sector could unlock up to £2bn per annum of value to the UK economy[28].

However, public sector organisations face a number of barriers in adopting new geospatial technologies to address transport challenges. These include a lack of awareness about the merits of different innovations and the risks of investing in new technology.

To support public sector organisations to overcome these challenges, the Geospatial Commission launched a £2m transport location data competition with Innovate UK[29] in September 2020. This Small Business Research Initiative (SBRI) competition facilitates the development of innovative geospatial solutions to address a range of transport challenges that include: enabling mobility as a service, promoting active travel, managing supply chains and increasing capacity.

As well as committing to fully funding up to 30 feasibility studies, we have invested in a digital matchmaking and networking platform, bringing together prospective public sector customers and private sector innovators. This represents one way in which to overcome a lack of awareness between potential buyers and sellers of geospatial services, and drive location data adoption.

Conclusion

This report, Enhancing the UK's Geospatial Ecosystem, builds on the UK's Geospatial Strategy and continues to embody the Geospatial Commission's way of working, being evidence-led, iterative, collaborative and open. We recognise the collective effort needed to achieve the three central objectives and corresponding six actions set out in this report.

The Geospatial Commission will, where appropriate, work with the identified organisations to support the delivery of the recommendations and maximise the value of geospatial data to the UK economy. The Geospatial Commission will publish a formal annual update in mid-2021 summarising progress made in meeting commitments in the UK's Geospatial Strategy, and also this report.

Endnotes

1. The geospatial ecosystem refers to the range of sub-markets across the economy using geospatial data and/or services, including marketing, transport and engineering. A range of organisations play a facilitating role in this ecosystem, including private and public sector organisations, academic institutions, and innovation hubs.

2. The Frontier Economics Geospatial Data Market Study defined 'geospatial companies' as companies for whom the supply and provision of geospatial data/services is a core part of their product or service offering. The full report contains further information about the specific types of companies that are included/excluded from this definition.

3. Drawing on the findings from the Frontier Economics report, the Geospatial Commission has identified two types of location data, foundational and dynamic, with their own distinguishing features.

   Foundational location data are the types of geospatial information that determine and express the underpinning geographic framework of a particular area. For example, geographical extents, addresses, physical infrastructure and topography.

   Dynamic location data captures spatial patterns of subjects or objects of interest across a particular geographic framework, at a high temporal frequency. For example, data on pedestrian movement throughout a city collected through mobile phone data.

   This comparison between foundational and dynamic geospatial data is not necessarily a neat binary distinction, as there is often a continuum depending on the temporal nature of the data. The combination of these two datasets generates additional value; for example, to derive the full value from dynamic location data collected by a vehicle tracking dataset, it needs to be considered within the context of a foundational geographic framework.

4. The six Partner Bodies are: British Geological Survey, Coal Authority, UK Hydrographic Office, HM Land Registry, Ordnance Survey and Valuation Office Agency.

5. We are using the term data holder to incorporate all organisations who exercise control over the use and access to location data. Data holders would incorporate the GDPR term 'data controller', when referring to location data containing personal data.

6. Public good in this context refers to the general benefit or well-being of the public. This is distinguished from the strict economic definition of 'a public good', which refers to an item that is difficult to exclude others from using and which one person's use does not diminish the amount available for others.

7. https://www.gov.uk/government/publications/digital-markets-taskforce-terms-of-reference/digital-markets-taskforce-terms-of-reference--3

8. https://www.gov.uk/government/publications/digital-regulation-cooperation-forum

9. https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy

10. https://www.gov.uk/government/news/government-announces-new-10-year-public-sector-geospatial-agreement-with-ordnance-survey

11. https://www.gov.uk/government/news/improved-access-to-mastermap-data-and-core-location-identifiers

12. https://www.gov.uk/government/news/geospatial-commission-to-release-core-identifiers-under-open-government-licence

13. https://www.gov.uk/government/publications/national-underground-asset-register-project-update

14. CMA (2020): Online platforms and digital advertising market study: https://assets.publishing.service.gov.uk/media/5efc57ed3a6f4023d242ed56/Final_report_1_July_2020_.pdf

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16. Unlocking digital competition, Report of the Digital Competition Expert Panel: https://www.gov.uk/government/publications/unlocking-digital-competition-report-of-the-digital-competition-expert-panel

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18. https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf

19. https://www.gov.uk/government/publications/unlocking-digital-competition-report-of-the-digital-competition-expert-panel

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22. https://www.gov.uk/government/publications/cdei-publishes-its-first-report-on-public-sector-data-sharing/addressing-trust-in-public-sector-data-use

23. https://sciencewise.org.uk/projects/genomics-medicine/

24. A 'thin' market segment refers to emerging products and services in the geospatial ecosystem that have relatively few suppliers and buyers. More detail can be found in the Geospatial Data Market Study report

25. https://www.gov.uk/government/publications/getting-smart-about-intellectual-property-and-intangible-assets

26. https://www.gov.uk/government/publications/future-of-mobility-urban-strategy

27. https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges

28. An Initial Analysis of the Potential Geospatial Economic Opportunity: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733864/Initial_Analysis_of_the_Potential_Geospatial_Economic_Opportunity.pdf

29. https://www.gov.uk/government/news/government-launches-2-million-transport-location-data-competition

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