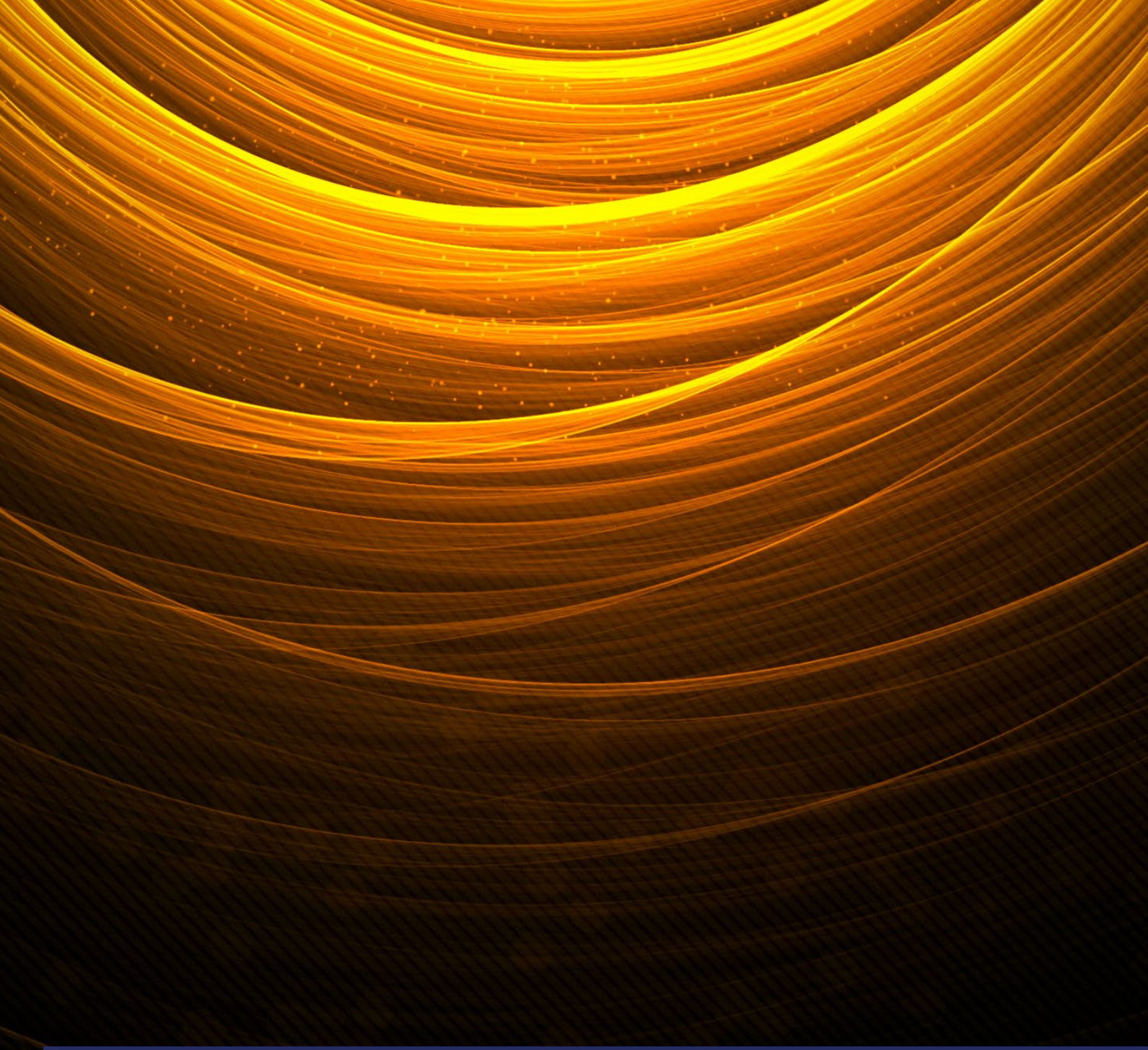

WPI ECONOMICS

splunk>

From Data Divide to Data Dividend

Harnessing the benefits of government data to solve societal challenges

A WPI Economics Report for Splunk

November 2022

Contents

About the authors

Ciara Walker – Senior Consultant

Ciara is an experienced economic advisor and consultant with a background in construction, infrastructure and innovation consultancy. Skilled in translating economic data into impactful reports and simplifying complex concepts to provide useful insight, she is dedicated to helping clients gain a deeper understanding of the economic and policy implications of world events and government decisions. Prior to her work at WPI, Ciara specialized in forecasting and economic advisory within the construction sector for eight years, delivering a range of market intelligence and strategic economic research, with a particular interest in the changing role of data and innovation in the sector. She holds an MSc in Development Economics and Emerging Markets from the University of York.

André Novas – Consultant

André Novas is an economist from the Spanish Open University, and also holds a BA (Hons) in Politics and Portuguese from University of Bristol. He is currently studying a part-time MA in International Political Economy at King's College London. Before joining WPI, André worked as an International Consultant in an innovation consultancy firm, specialising in the fields of regional development and international cooperation, particularly in Latin America, Spain and Portugal.

Matthew Oakley – Director

Matthew is a respected economist and policy analyst, having spent well over a decade working in and around policy making in Westminster. Before founding WPI Economics Matthew held a number of roles including Chief Economist and Head of Financial Services Policy at the consumer champion Which?, and Head of Economics and Social Policy at the think tank Policy Exchange. Matthew also led the Independent Review of Jobseeker's Allowance sanctions that reported to Parliament in 2014, and previously spent eight years at the Treasury. Alongside WPI, Matthew is also a Senior Researcher at the Social Market Foundation.

About Splunk:

Splunk Inc. is a technology company that provides solutions that analyze massive amounts of data from every digital interaction, connecting dots across organizations' complex environments, surfacing insights and accelerating action. Our platform helps organizations go from visibility to action, fast and at scale to solve a broad range of business challenges. Our unique approach empowers organizations to become more secure and resilient so they can innovate with speed and agility.

About WPI Economics:

WPI Economics is a consultancy that provides economics that people understand, policy consulting and data insight. We work with a range of organisations – from FTSE 100 companies, to SMEs and charities and Central and Local Government – to help them influence and deliver better outcomes through improved public policy design and delivery. Our focus is on important social and economic policy debates, such as net zero, levelling up and poverty, productivity and mental health. We are driven by a desire to make a difference, both through the work we undertake and by taking our responsibilities as a business seriously. We are an accredited Living Wage employer.

wpieconomics.com matthew@wpieconomics.com @wpi_economics

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Executive Summary

What is the data dividend?

In the last few years multiple overlapping crises, including the Covid 19 pandemic, increasingly urgent climate challenges and most recently the cost of energy crisis, have driven home to governments how essential data is for policymaking. As governments grappled with a new pandemic in the face of very limited information in 2020, the impact of the data divide was felt keenly, slowing and even stalling some countries' ability to make a rapid response. The global pandemic revolutionised public approaches to data, highlighting the huge benefits available from improved government data use, as well as the significant costs of not investing in data. And now, staring down the barrel of a challenging winter of costly energy and high inflation, those governments which recognised the data dividend available from optimising their data use during the pandemic are once again turning to data to solve the major societal challenge of the day. This report is intended to help policymakers on the journey to closing their data divide, with best practice approaches, real life examples and policy recommendations.

Historically the use of data for societal benefit has significantly lagged behind its use for commercial profits. Splunk describes this new data divide as "…the disparity between the expanding use of data to create commercial value, and the comparatively weak use of data to solve social and environmental challenges."[1] In short, governments and third sector organisations have been much slower to grasp the opportunities of data than the private sector, and have missed out on decades' worth of potential societal benefits as a result. But this also means there is a potential data dividend – the opportunity to close the divide and reap all the benefits of data and emerging technologies which the private sector is already accessing.

The scale of this data divide and potential benefits from closing it are significant. While attention has historically been focussed on the digital divide, the ever-increasing volume of data being generated means that it is no longer just important to have access to the latest technologies, but also to be able to make use of and benefit from the wealth of data being created.

In this respect, it is encouraging that things are already changing. The recent crises have pushed governments to make more effective use of data. There has also been rising scrutiny of their data use from international organisations. Governments are increasingly aware of the data divide they face and this has translated into improved focus on and funding for closing it. As such, governments are actively reaching for their data dividend – the many benefits that can be derived from closing their data divide, including economic, foresight and accuracy, improved efficiency and better societal outcomes.

Data Dividends – what can be achieved by closing the data divide

Economic Benefits	Governments stand to gain economically both directly and as a result of efficiency savings. The value of these economic benefits is hard to quantify, but it is estimated at up to 7.19% GDP improvement from open data alone.[2]
Accuracy and foresight	Better forecasts from better data and more processing power. **Example:** Machine learning forecasts are up to 30% more accurate in the US Dept. of Energy's solar forecasting than traditional methods.[3]
Efficiency	Saving government money and time through more efficient policy processes. **Example:** Individual travel data in Singapore is used to identify and inform new routes, for more efficient transport coverage.[4]
Societal outcomes	More accuracy and efficiency, and novel insights, means better societal outcomes. **Example:** Health data from Sweden's Halland region was used for predicting cardiac arrest survival rates and resulted in better patient after-care and savings.[5]

This report, and associated country reports, plot the progress that four European countries have already made in reaping this dividend and use this to show how they can speed up their journey to realising their data dividend.

How we assessed countries' progress

We based our assessment on existing guidance and best practice available to help governments on their journeys to closing the data divide. We considered Splunk's "data fabric" approach to becoming a "data-driven government" and the OECD's Digital Government Policy Framework for optimising data use in the public sector.[6] Based on these principles, we defined a framework for benchmarking the four target countries in our study (France, the UK, the Netherlands and Germany) and placing them within country typologies. We analysed this through two lenses:

- The degree of **strategic emphasis** the government places on data use within policymaking
- Whether the government has established the right **data governance** foundations

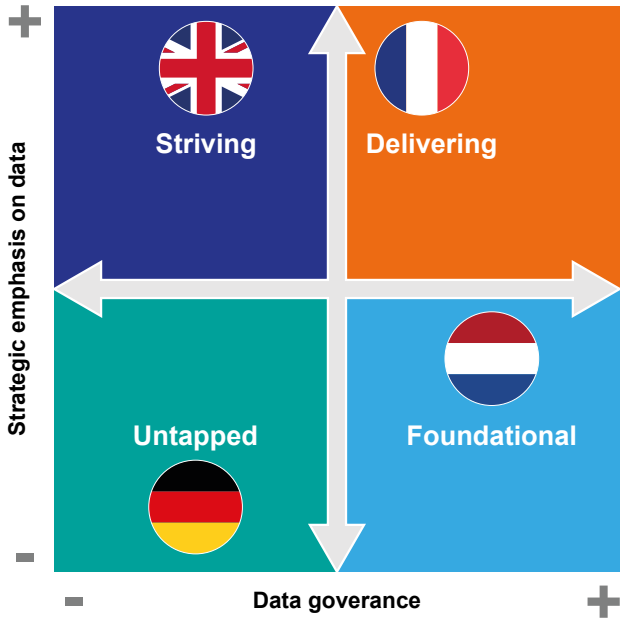
How different countries performed

There is a positive story to tell in each of the countries that we assessed. Governments are increasingly aiming to embody a data-driven approach, although these ambitions are not always translated into the necessary actions and resource commitments. All the countries in our sample are looking at how to improve data use in their public sector, though some (specifically the UK and France) are much more ambitious in their aims to put data at the very heart of government. The governments in our sample are also taking their first steps towards data innovation, with a focus on artificial intelligence over other emerging technologies.

Most countries have made good progress in the area of data quality, albeit with varying degrees of policy commitments and implementation of open and accessible data. Data sharing on the other hand has seen less success, with ambitious plans often difficult to implement as a result of inconsistencies in the data produced by different departments, a lack of organisational capabilities and skills, as well as privacy and cultural challenges.

As per Fig. 1, our assessment placed the four countries in different typologies according to their performance across the two dimensions.

Figure 1 Benchmarked countries in country typologies



- France is a **Delivering Country - those which are actively benefiting from their data dividend**. Policy recommendations include maintaining political momentum, improving security of data and continued improvement of data sharing.
- The UK is a **Striving Country - those which are targeting their data dividend but without a robust governance in place**. Policy recommendations include strengthening public sector data capabilities, adopting an "interoperable by default" policy and launching a data-driven policymaking challenge.
- The Netherlands is a **Foundational Country – those that have strong data governance foundations but lack strategic ambition**. Policy recommendations include launching a data innovation for policymaking challenge, setting up a coordinating body for data strategy and continuing to focus on opening data.
- Germany is an **Untapped Country – those whose data dividend is significant but remains largely untapped**. Policy recommendations include boosting the central data reservoir, creating a central body responsible for data strategy and developing capabilities and a culture of data within government.

We have also made general policy recommendations for each country typology:

- Developing data governance and the basics of data strategy for **Untapped Countries**.
- Strengthening data governance and learning from best practice for **Striving Countries**
- Strategy development and encouraging innovation for **Foundational Countries**.
- Maintaining momentum and keeping up with innovation for **Delivering Countries**.

Taking these recommendations forward could have profound impacts in each of the countries. By helping them to realise the data dividend, they could yield significant social, economic and environmental benefits.

Given the enormous geopolitical and societal challenges governments are facing, now is the time to close the data divide to access all the benefits that government data can provide. As they undertake this journey, we hope that policymakers will draw on the best practice and policy recommendations presented in this report and be inspired by the examples of data innovation we have highlighted.

CHAPTER 1

Introduction: from data divide to data dividend

The project and the report

This report focusses on the importance of data analytics in solving some of the most pressing socio-economic challenges that society faces, from reducing education and health inequalities to improving economic mobility and addressing climate change.

Previous reports have shown that governments currently face a data divide – the use of data for societal benefit has significantly lagged behind its use for commercial profits. But this also means there is a potential data dividend – the opportunity to close the divide and reap all the benefits of data and emerging technologies which the private sector is already accessing. In this report we focus on four key European governments (France, the Netherlands, the UK and Germany) and their use of data, benchmarking their performance to identify best practice, and areas for development. We also consider the wider context of data use at the heart of government, and what best practice looks like according to the multinational institutions monitoring government data use and innovation, pulling out key insights and policy recommendations.

In order to showcase how better use of data can provide governments with a data dividend, including resolutions to major societal challenges, we:

- Identified best practice for the use of data at the heart of government, both in our target countries and worldwide;
- Developed a benchmark analysis of our target countries' data use and innovation within government; and
- Proposed policy recommendations for improving data use.

Methodology

In order to provide the wider context and understand existing best practice in government data use, we conducted an extensive literature review, covering many national data strategies, case studies from innovator governments, and policy recommendations from organisations interested in this field. Combined with extensive engagement with expert stakeholders across the target countries this provided the qualitative and quantitative data for the framework of assessment.

Our research focused on the intersection between data, government and societal challenges, putting policy making at the heart of our analysis. In this respect, governments that are able to realise the data dividend can deploy innovative uses of data in policy making to help tackle key societal challenges. We used the key social challenges addressed through data as a source of best practice case studies, focusing on health and wellbeing, environmental sustainability and economic prosperity outcomes of improved data use or innovation.

Out of scope

We will not be focusing on e-government in terms of the digitalisation of public services or the regulatory environment for the private sector's development and deployment of artificial intelligence and data technologies. However we have considered both as a marker of digital capabilities within a government.

Our benchmark analysis looks specifically at four European countries, (France, Germany, the Netherlands and the UK) but we also draw best practice, case studies and policy recommendations from data high performers and innovators across the world.

Defining the Data Divide

This report builds on existing work by Splunk in "Bridging the Data Divide"[7] to explore the concept of a data divide, and what it means across different industries and for government. In the 1990s the digital divide was a concept referring to the gap between those who had access to the internet, computers, skills and services of the digital age, and those who did not. Since then, available technology has advanced to an extraordinary degree, and data (and the technologies that can be used to exploit it) are taking centre stage in that development. As the volume of data generated and stored continues to grow exponentially, many believe we have entered a new Data Age. The volume of data generated and stored continues to grow exponentially; the total volume of data has grown 1,000% since 2013 and is set to double again by 2025. This means that, while attention has historically been focussed on the digital divide, the ever-increasing volume of data being generated means that it is no longer just important to have access to the latest technologies, but also to be able to make use of and benefit from the wealth of data being created.

Splunk defines this new data divide as "…the disparity between the expanding use of data to create commercial value, and the comparatively weak use of data to solve social and environmental challenges."[8] Private organisations have seized the wealth of opportunities offered by this explosion of data, leveraging data and increasingly accessible data-mining technologies to gain vast commercial benefits. The same cannot be said of government and third sector organisations, who have been much slower to grasp those same opportunities and have therefore largely missed out on the societal benefits that could have been derived from data. This is not due to a lack of access to the right technologies, as these are now widely available – it is driven by the challenges of legacy infrastructure, data governance, data culture, data literacy and data skills, all of which need to be overcome in order to achieve the available data dividends.

75% of public service leaders believe outdated technology is holding them back

There is clear evidence of this lag in government benefits from data compared to the private sector. According to research from Splunk,[9] governments underestimate the growth and importance of data - 89% of public sector respondents said they were unprepared for rapid data growth. The same study also showed governments are out of step in adopting key emerging technologies to make best use of data, with five out of six identified technologies used by fewer than 20% of public sector organisations. Existing digital and technological gaps add to this data divide, reducing governments' ability to leverage what data they have successfully.[10,11]

More than 8.6m people in the EU public sector won't have the necessary digital skills by 2023

Within this context, we defined the government data divide as the disparity between the significant private sector commercial benefits that have been derived from data and the far fewer societal benefits governments have been able to achieve from it. Closing the data divide offers the opportunity for a data dividend of improved efficiency and societal outcomes for governments and their citizens.

Defining the Data Dividend

Governments are increasingly aware of the data divide they face and have a growing interest in reaching for the data dividend which lies beyond this divide. Data innovation leaders in the private sector have a 9.5% data dividend over data beginners.[12] A similar level of public sector benefit can be derived through closing the data divide.

The events of the last two years have crystallised this awareness. Many countries realised the benefits of the data they held during the pandemic, the subsequent supply chain crisis and labour shortages, and the energy and cost of living crisis we are experiencing today. The scramble to make best use of real-time health data to inform and manage the Covid-19 pandemic is emblematic of this growing awareness, and the acceleration of data use it is driving. Across the world, Covid-19 data was being routinely analysed, and governments were adapting their policies based on this, leveraging existing data for a clear societal benefit in a way that had not previously been seen at such scale.

As this transformation in government attitudes took hold, assessment frameworks were proposed by various organisations to monitor and assess the success of digitalisation and datafication efforts. Organisations such as the OECD, the World Bank, the United Nations and Oxford Insights, have all designed frameworks in recent years to assess, amongst other things:

- The digitalisation of governments;
- The security and quality of data;
- Innovation within government; and
- The use of emerging technologies.

With the overlapping crises and rising scrutiny of data use pushing governments to use their data more effectively, countries are racing to create or develop data and emerging technology strategies. All of the countries in our sample have worked on their data strategies since the pandemic started, with many seeing more funding or political emphasis result from this increased focus. Emerging technologies to manage and work with data, such as AI and blockchain, have also seen increased focus – as of October 2021, 44 countries had published their national AI strategic plans.

Data Dividends – what can be achieved by closing the data divide

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Societal outcomes	More accuracy and efficiency, and novel insights, means better societal outcomes. **Example:** Health data from Sweden's Halland region was used for predicting cardiac arrest survival rates and resulted in better patient after-care and savings.[16]

Increasing focus on and funding of initiatives to close the data divide is providing opportunities to exploit the data dividend, and many governments are already accessing these benefits, as described above.

CHAPTER 2

What does realising the data dividend look like?

As described in the methodology, our research focused on the intersection between data, government and societal challenges, putting policy making at the heart of our analysis. In this respect, governments that are able to realise the data dividend can deploy innovative uses of data in policy making to help tackle key societal challenges.

In addition to the essential foundation of data governance, reaching for the data dividend also relies on innovative use of data, which we have defined as

- The extent of use of emerging technologies; and
- The extent to which a data-driven approach is adopted.

Emerging technologies include 5G networking, augmented and virtual reality, the internet of things (IoT), blockchain, artificial intelligence (AI) and edge computing

For the former, we have specifically looked at the use of six key emerging data technologies highlighted by Splunk as drivers of the data revolution within the private sector, and the extent to which these are being used by governments for policymaking.[17]

On the latter, the OECD defines a data-driven government as one that applies data to transform the design, delivery and monitoring of public policies and services, and one which values openness and sharing of government data.[18] A data-driven government is defined as generating public value and solving societal challenges through:

- **Anticipation and planning** – using data in the design of policies, the planning of interventions, the anticipation of possible change and the forecasting of needs;
- **Delivery** – using data to inform and improve policy implementation, the responsiveness of governments and the provision of public services; and
- **Evaluation and monitoring** – using data to measure impact, audit decisions and monitor performance

Splunk stories

The US Census Bureau used Splunk to take a data-forward approach, responding to declining response rates to this essential survey. The country's first digital census in 2020 leveraged Splunk's data collection and analysis expertise to derive key insights on the population.

We have used key case studies to demonstrate the data dividend being realised across a variety of societal challenges. Because of the wide variety of areas governments are currently innovating in, we have chosen to focus on three key broad societal challenges where we believe government data use can make the biggest impact in closing the data divide for the public good.

Health and wellbeing – the Covid-19 pandemic brought into sharp relief the importance of health data, and many governments rapidly developed new tools to harness existing data. Lessons have been learned, and the health arena is likely to see a permanently stronger data focus from governments. We have defined this societal challenge to include health, mental and societal wellbeing.[19]

In Singapore the Housing and Development Board has implemented **better home-based monitoring of the elderly with wireless sensors tracking activity and health**. It alerts caregivers to any anomalies and provides a safe and cheaper alternative to retirement homes and community-based care.

In India the Google Flood Forecasting Initiative is used to provide **accurate real-time flood forecasting information and alerts** through AI and physics-based modelling for scalable inundation models in real world settings.

Environmental Sustainability – data is going to play a key role in managing and mitigating the climate emergency, and governments are already looking at new ways data can be used to monitor and mitigate impacts. From IoT sensor technology, to forecasting and mitigating the effects of climate change, there are plenty of areas where improved government use of data will provide enormous benefit.[20]

Economic Prosperity – just as the pandemic drove adoption of data solutions, the cost-of-living crisis in Europe is now driving innovative data uses to monitor the crisis and derive new policies to address it, particularly within the energy sector. We have defined economic prosperity very loosely, as anything that improves the prosperity of a country – from reductions in crime, to more people in employment, to direct economic benefits.[21]

In New Zealand **AI was used to transform the child protection system**. A predictive model of children's future lives gives the Ministry a comprehensive view of each child and their family situation as well as avoidable fiscal costs building a business case for early intervention.

What does best practice look like, and what's getting in the way?

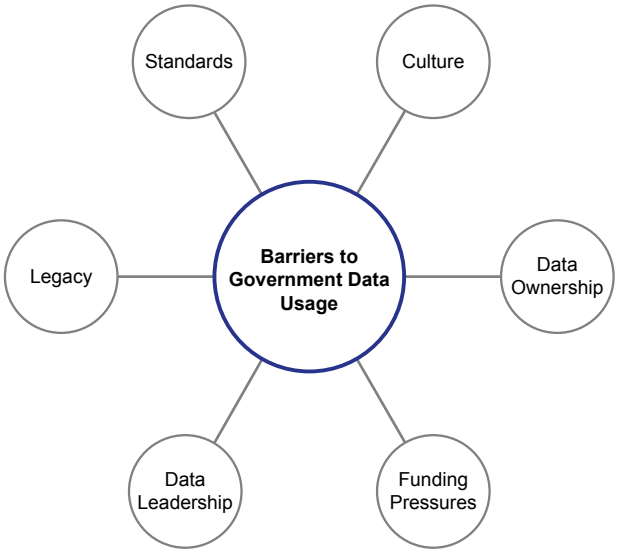
With increasing available data, and technologies to exploit that data, many organisations have developed guidance and best practices for closing the data divide. Knowledge of the barriers and potential solutions they will face has been helping governments along this journey. As government data use accelerates, the knowledge base for best practice will only grow. A brief summary of some of the key conclusions from work by Splunk, the OECD and the European Commission is outlined below and forms the basis for much of our assessment of individual countries.

Splunk stories

Working with the Norwegian Water Resources and Energy Directorate, Splunk implemented a rockslide monitoring and early warning system, using advanced sensors providing data to protect communities from geohazards.

In their "A vision for data-driven government" publication, Splunk emphasises the importance of sharing and leveraging current resources, rather than reinventing the wheel.[22] Governments looking to improve the effectiveness of their data usage can identify the challenges in their existing systems through the barriers to government data use identified by Splunk:

- Due to **internal culture**, a lack of data-sharing mindset can result in data held in silos. A lack of leadership could drive risk aversion and a fear of sharing the wrong thing.
- A **lack of common standards** means inconsistencies between departments, unsuitable standards or legacy data formats.
- Many key government systems have developed iteratively, leaving **legacy systems and processes** that are increasingly complex and not fit-for-purpose. Building legacy systems into the future of government data is essential to avoid significant improvement costs.
- Executive teams do not always have the experience with data to provide effective **data leadership**. Many governments do not recognise data experts or value their skills.



- **Funding pressures** can result in a proliferation of tactical funding initiatives, rather than a cohesive approach. This can limit flexibility and reduces efficiency.
- Governments rely on partnerships with third parties creating additional barriers to data access, visibility and coherence across departments. **Government data ownership** is not always guaranteed, making it harder for data to be leveraged.
- Overlaying all these barriers is **poor data quality**. Rapid growth of data systems and duplication of data across government has often led to inconsistent, outdated and poor data quality which impedes its' optimal use and potential insights.

In response to these barriers, Splunk have outlined a "data fabric" approach that can be taken to become a data-driven government. Data should be possible to interrogate, link and consolidate across government and different data sources. The approach aims to work in harmony with new, existing and legacy systems. The focus should be on the linking of operational, service, initiative and policy data into a common data fabric which will overlay existing systems, rather than making significant new infrastructure investments, which are often too slow to keep up with technology developments. The overall aim of a data fabric approach is to "…enable policy delivery, outcomes and decisions to be driven by up-to-date, consistent and consolidated views across all departments and regions, whilst recognising and supporting the different operational ways of working within departments."

Other organisations such as McKinsey have recommendations for best practice in line with Splunk's vision for a data-driven government.[23]

Splunk stories

The Orbis partnership relied on Splunk to create a single view of data across three councils, improving collaboration and accelerating issue resolution while maintaining information governance. Combining this data offered opportunities for new insights and policy.

But what about net zero?

Data best practice aligns with sustainability goals

Many governments are striving to meet net zero and are considering the sustainability impacts of their plans for data. The data centres which hold government data have a significant carbon footprint, with both high energy and water consumption. Luckily, best practices for data sustainability in most cases align neatly with the guidance outlined. Anything that makes data use more efficient means less data must be stored, and a lower carbon footprint. This includes eliminating storage waste, optimising networks and data transmission, and driving efficiency. Moving to the cloud is also part of that effort, as moving on-premise data centres to the cloud reduces the CO2 footprint by at least 80%. The principle of "tell us once" therefore has significant sustainability impacts, as does optimising data use and sharing.

The OECD Digital Government Policy Framework helps governments identify key themes for the transition towards digital maturity in the public sector.[24] Whilst their focus is more on the digitisation of government, the elements they emphasise are very relevant for building the foundations of a data-driven government.

The OECD Digital Government Index (DGI) benchmarks countries against the six dimensions shown below.[25] Their conclusions on the digitisation of government are also supported by other organisations such as the European Commission with the New European Interoperability Framework.[26]

The OECD framework consists of six dimensions that comprise a fully digital government:

- **Digital by design** – a government that establishes clear organisational leadership, paired with effective coordination and enforcement mechanisms where "digital" is considered not only as a technical topic, but as a mandatory transformative element of policy processes
- **Data-driven public sector** – recognises data as a key strategic asset in generating public value through public policies, and adopts principles for their trustworthy and safe reuse
- **Government as a platform** – a government which provides clear and transparent guidelines, tools, data and software that equip teams to deliver user-driven, consistent, seamless, integrated, proactive and cross-sectoral service delivery
- **Open by default** – makes government data and policy-making processes available for the public to engage with, within the limits of legislation and in balance with the public interest
- **User-driven** – awarding a central role to peoples' needs and conveniences in the shaping of processes, services and policies; and by adopting inclusive mechanisms for this to happen
- **Proactiveness** – the ability of governments to anticipate people's needs and respond to them rapidly, so that users do not have to engage with cumbersome processes

CHAPTER 3

Comparing the data dividend across countries – an assessment framework

The aim of our benchmark analysis is to compare how different governments are integrating data in policymaking, to identify best practices and inspire others as well as to provide recommendations for governments.

We have not developed a quantitative 'league table' where countries are hierarchically classified. Instead we have taken a more holistic approach, combining both available quantitative data with our own qualitative assessment of a variety of documents identified as part of our desk research. We assess the performance of different countries across two dimensions, the strategic emphasis placed on data and data governance. We combine these two dimensions to define four country typologies, representing four different approaches to realising the data dividend, and classify each country into one of the typologies. This classification illuminates where different governments' strengths may lie and where they could go further to secure a greater data dividend.

Dimension 1: Strategic emphasis on data

The starting point for our analysis is the **strategic emphasis governments put on data** and the role it plays in their activities focusing on two factors: data innovation and data-driven government.

Data-driven government - this factor considers whether governments aim for a data-driven public sector, either explicitly or indirectly.[27] Assessing this relies mostly on the analysis of a government's own policies, strategies and structures against the assessment questions and three quantitative metrics from the OECD OURdata and Digital Government Indices (detailed in Annex 1).[28],[29]

Data innovation - considers government integration of any of the six emerging technologies highlighted by Splunk as essential to optimising data use.[30] The assessment of this is mostly qualitative, analysing a government's strategies and policy documents to answer the assessment questions alongside the quantitative indicators aimed at capturing the underlying conditions needed to support innovation (detailed in Annex 1).

Dimension 2: Data Governance

While governments' strategic efforts to integrate data in their activities are important, adequate data governance provides the necessary technical foundations to enable the implementation of these strategic priorities. Our analysis of data governance encompasses two aspects: data quality and data sharing.

Data quality - as part of our literature review we identified different features government data should have in order to promote its reusability inside and outside government, namely openness, availability, transparency and security. Quantitative indicators (detailed in Annex 1) to assess these features are complemented by the qualitative information derived from the government's own data strategies.

Data sharing – considers the extent to which data is integrated across government departments and the extent to which data is actually shared. This is assessed through quantitative indicators (detailed in Annex 1) and a qualitative analysis of the government's strategies and diagnoses of its challenges.

Full details of the methodology are provided in Annex 1.

Defining the country typologies

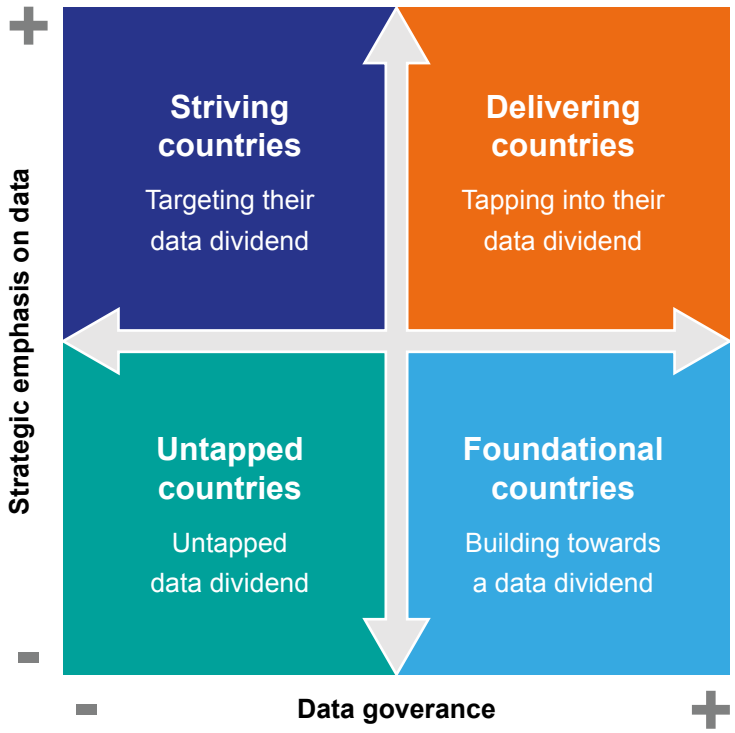
Combining these two dimensions as axes along which to compare our sample countries, we obtain four different country typologies. We assessed each country independently to place them in these categories, making this analysis an absolute assessment as opposed to a relative one.

The Delivering countries – those which are already tapping into the data dividend, with both adequate data governance and developed strategic initiatives.

The Foundational countries – those that have adequate data governance in place but are not currently showing a strategic drive to tap into the data dividend.

The Striving countries – those that are targeting their data dividend with strategic drive but without robust data governance in place.

The Untapped countries – those that have identified their data dividend but are lacking both the necessary strategic drive and data governance to achieve it.



CHAPTER 4

Benchmark Analysis – the data dividend in the UK, the Netherlands, France and Germany

We analysed the four countries in our benchmark assessment, France, the UK, the Netherlands and Germany, in order to place them into our country typologies. The sections below provide an overview of the respective performance of each of the countries against each dimension. Further detail on each country is available in a separate country report.

Dimension 1: Strategic emphasis on data

We assessed the benchmarked countries on how much strategic emphasis they put on data use within policymaking through a series of qualitative questions and quantitative indicators to ascertain the extent that the government is "data-driven" as well as their level of data innovation. All the countries in our sample are looking at how to build data into their public sector to varying degrees, though some (the UK and France) are much more ambitious in their aims to put data at the very heart of government. There are some excellent examples of data innovation to address societal challenges from all the countries but with different levels of formalisation of data innovation within national strategies.

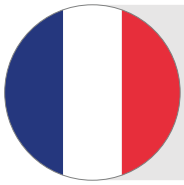
Data-Driven Government

All of the countries in our sample have recently invested in the development of a data strategy and are aiming to build data into their public sector to varying degrees.[31,32,33,34,35,36]

Figure 3 National data strategies

A journey towards a data strategy

- The Dutch Digitalisation strategy was announced in 2018
- In 2019, the Data Agenda Government was published driven by the NLDIGIbeter programme



National roadmap to digitalisation and data use

- French digitalisation strategy TECH.GOUV launched in 2019 with the aim for an acceleration of digitalisation of the public sector, including improving data use for policymaking

First steps on data strategy at the federal level

- First Data Strategy of the Federal Government published in January 2021 aiming to leverage data for the good of German society

A strategic commitment to improving data use

- National Data Strategy published in 2020
- Aims to enable policymakers to draw on the most up to date evidence and analysis to support development.

Do national data strategies aim to improve the way data is used in policymaking?

The French government's digitalisation strategy "TECH.GOUV"[37] focuses on improving the digitalisation of public services, however some elements specifically consider how data is used in policymaking. A whole pillar of the strategy is the use of data to improve the effectiveness of public action.

The roadmap is under the authority of the Ministry for Transformation of Public Action, DINUM,[38] which has collaborated in the creation of 15 ministerial roadmaps drawn up in September 2021 for the following 2-3 years. This makes France the highest performer out of the countries we have considered in terms of a data-driven government, with plans in place at both the national and ministerial levels, as well as a body in place to monitor action on those plans. Of the 500+ actions created by the collation of these roadmaps, 15% relate directly to data exploitation.[39] Data policy is championed by senior Government representatives in France, as demonstrated by the Government circular on the opening and sharing of data issued by the Prime Minister in April 2021.[40]

In the UK there is a strategic commitment to improving the way data is used by the government for policymaking. The UK's recently published National Data Strategy has committed to developing an "Integrated Data Platform", which aims to ""enable policymakers to draw on the most up-to-date evidence and analysis to support policy development" by "unlocking the potential of linked data and building up data standards".[41,42] The five priority areas of action within this strategy are

1. Unlocking the value of data across the economy – setting the right conditions to make data usable, accessible and available across the economy while protecting privacy rights
2. Securing a pro-growth and trusted data regime – ensuring data rules are not too burdensome for the average company, whilst maintain confidence and trust in how data is used
3. Transforming government's use of data to drive efficiency and improve public services – driving major improvements in the way information is shared, managed and used across government
4. Ensuring the security and resilience of the infrastructure on which data relies – the infrastructure on which data relies is a vital national asset that needs to be protected
5. Championing the international flow of data – promoting domestic best practice and working with international partners to ensure data is not inappropriately constrained by borders

The Dutch Data Agenda Government strategy explicitly aims to use data more effectively to improve policymaking and resolve social issues. Whilst the aims of this agenda are in line with the values of a data-driven government, much of the focus of the document is on the delivery of public services rather than incorporating data into policymaking. Several goals do specifically support the use of data for policymaking:

- To improve governments data management and promote the re-use of open data;
- To connect policy and data science; and
- To collect and share knowledge about data-driven approaches.

The Netherlands has two separate strategies in place: the Data Agenda Government focusing on government data use and another strategy for the private sector. Both strategies emphasise public private partnerships to deliver data strategy goals.

Germany published their first Data Strategy of the Federal Government in January 2021[43]. It aims to make Germany a pioneer in the innovative use and sharing of data in Europe, as well as using it to enforce European values, the common ideas of data protection and sovereignty and make Germany a global role model in data. They "want to make government action and communication more effective, more evidence-based, more transparent and more sustainable through better data-based foundations".

Four major fields are identified within the strategy that all actors are responsible for:

- Making data infrastructure efficient and sustainable;
- Increase the innovative and responsible use of data;
- Increase data competence and establish a data culture; and
- Make the state a pioneer.

The last point is the most relevant to our research, as it explicitly aims to reorganise itself to provide good digital services. Unlike other countries in our benchmark, the data strategy does not explicitly aim to improve data use for policymaking. There is also a lack of detail on implementation.

Is there a requirement for major government departments to have Chief Data Officers?

In France DINUM[44] acts as the Chief Data Officer for the government through the ETALAB[45] department, in charge of the TECH.GOUV programme to accelerate the digitalization of the public sector. They provide inter-ministerial coordination in achieving the goals of the roadmap, and act as a dedicated data agency within government. They also collaborated in the creation of the 15 ministerial roadmaps. The ministries also each have someone acting in a Chief Data Officer capacity in charge of their ministerial roadmap, who come together under the authority of DINUM.

In the UK some departments have started to appoint their own Chief Data Officers (e.g. the Ministry of Justice, Department for Work and Pensions). According to the National Audit Office (NAO), the largest seven customer-facing departments have "…a data governance board which provides direction and oversight of a department's data projects and data decisions".[46] Importantly, the Central Digital Data Office, which sits within Cabinet, appointed a Chief Digital Officer in September 2022 to lead the charge on data at a national level, and to deliver the digital transformation of government.[47] However levels of commitment vary, with only the Department for Digital, Culture, Media and Sports (DCMS) recognising data as a strategic asset. Only 5 of 7 departments analysed had data strategies and we consistently heard in stakeholder interviews how fragmented approaches to data across different ministries were a challenge.

Unlike France and the UK, the Netherlands has not appointed a National Chief Data Officer (CDO) and is hesitant to make creating the position compulsory across the public sector.[48] They have chosen to strengthen the Chief Information Officer at the central level of government instead, by reassessing the tasks and responsibilities of central, departmental and executive agency CIOs. Whilst more public organisations across the country are adopting the CDO position, there is no unified approach, which could hinder the implementation of the Data Agenda Government strategy.

Whilst the Germany data strategy does highlight the desire for all federal ministries to establish a chief data scientist or similar role, this is not a requirement.[49] The data strategy does not include any guidance on the mission and responsibilities of these data scientists, which has led to patchy implementation (data scientists have been slowly appointed in 2021 and 2022). Overall, this risks not having the right people in place to monitor and coordinate the implementation of the data strategy. Without effective leadership at the ministerial and national level, it may be challenging to progress the ambitions of the Data Strategy in a timely manner.

Is there a body with responsibilities for promoting and monitoring (i) the integration of data across departments; (ii) the usage of data in policy making, (iii) the implementation of the government's data strategy?

DINUM in France is responsible for promoting and monitoring the TECH.GOUV roadmap and all the ministerial roadmaps.[50] It is also in charge of implementing the Government's 2021 circular on open data and data sharing between Government services. The ministerial roadmaps have an explicit aim to integrate data across departments, and DINUM plays a coordinating role as well as monitoring these plans. Several elements of the national roadmap focus on the use of data in policy making. In its oversight role DINUM is promoting and monitoring this, as well as the implementation of the government's data strategy.

In the UK, structures are starting to be set up to implement the strategic priority of improvement of data use across departments. Since the National Data Strategy committed to establishing "a cross-departmental governance mechanism with the authority to enforce standards across government", the Central Digital Data Office (CDDO) was established within the Cabinet at the beginning of 2021. Leadership has been a shortcoming of previous attempts to improve government's digital capacities and use of data, such as the 2017 Government Transformation Strategy, which failed to build a national data infrastructure of registers by 2020 and was cancelled in 2021.[51,52] Establishing leadership at Cabinet level is therefore a very positive step to take. The CDDO has published a government digital strategy, which commits to "embed digital approaches and cross-functional teams into policy design and delivery".[53] However despite this senior level focus, several analyses report a lack of necessary skills among civil servants to implement a data-driven approach.

In the Netherlands, the Data Agenda Government is the joint responsibility of the Ministry of Economic Affairs and Climate Policy and the municipalities. The Ministry of the Interior and Kingdom Relations also plays a coordinating role. The responsibilities for promoting and monitoring the integration of data across departments, the usage of data in policymaking and the implementation of the Data Agenda therefore fall to multiple entities rather than sitting within one single body.

Germany has not yet put in place the structures to monitor the implementation and progress of the data strategy[54] and the strategy does not formally lay out how this will be done. It mentions that the federal government will monitor progress by conducting, prompt and effective evaluations but does not outline where this responsibility will sit. Movement on implementing the strategy has been slow, with over 90% of the 240 measures outlined so far untapped[55], which is perhaps unsurprising given the lack of oversight. The country's federal structure means that digital policy responsibilities are shared across multiple departments and multiple levels of government, which makes digitalisation much more challenging than in centralised countries.

Quantitative assessment of data-driven government

Table 1: Quantitative assessment of whether a government is data-driven

Variable for assessment	OECD OURdata Index "extent to which government offers data literacy programmes for its own personnel" metric[56]	OECD OURdata Index "monitoring of impact of the promotion of data reuse in government" metric	OECD Digital Government Index "Data-driven public sector" metric[57]
	Significantly improved between 2017-2019. Well above OECD average and 2nd behind France	Below the OECD average and 3rd in our benchmark, only ahead of Germany	In line with OECD average and 3rd out of benchmarked countries
	Top score, outperforming all other countries in bench-mark	Significantly outperforms the other countries in the benchmark	In line with OECD average and 2nd in our benchmark behind the UK
	Last out of benchmarked countries	Last out of benchmarked countries	Last out of benchmarked countries
	3rd in our benchmark, behind France and the Netherlands	Well below OECD average, although still above the Netherlands and Germany	Highest in benchmark, and 50% higher score than 2nd country (France)

Data Innovation

All the benchmarked countries are aiming to improve their use of Artificial Intelligence (AI), however there is a more varied approach to leveraging other emerging technologies. There are also significant differences in the private sector involvement to achieve those goals, and in how ambitious the aims for data innovation in policymaking actually are.

Do the government's data/digital strategies explicitly aim to integrate emerging technologies into public sector activities?

In France the BETA action in the TECH.GOUV[58] roadmap focuses mainly on innovation in public services, but also includes the incorporation of new technologies. ETALAB[59] plays an essential role in this, acting as a data innovation policy lab, monitoring the pilot programmes, and disseminating best practice. There is a strong emphasis throughout the strategy on developing partnerships with the AI research world to investigate the use of new technologies, including edge computing and IoT. One of the explicit aims of the TECH.GOUV roadmap is to mainstream innovation amongst public sector leaders. It calls for creating a culture of piloting by data with analysis, forecasting and dashboards emphasised as important. Part of this is the need to build a general toolbox which can be mobilised for specific needs based on the best practice of ministries.

The Dutch Data Agenda Government strategy explicitly aims to use smart applications of data and new technology to improve the quality of people's lives.[60] Of the emerging technologies we have considered, the Netherlands government is actively engaging with AI, blockchain and IoT technology. The government's interests in these technologies are frequently

formalized in public private partnerships, such as the Netherlands AI Coalition, or the Blockchain Coalition.

Part of the "make the state a pioneer" objective within the German data strategy[61] is to establish data laboratories in federal ministries. However, this is more focused on digitalization of public services, and there is no explicit aim to integrate emerging technologies and data innovation into policy making. There is an aim to use big data and AI to achieve sustainable development goals, but this is not directly applied to policymaking, monitoring or implementation. Other emerging technologies such as IoT and edge computing are also mentioned in the strategy but without an indication of how these are intended to be incorporated into public sector activities. The Data Strategy does briefly mention the need to create new processes, standards, roles and institutions and facilitate data-based and evidence-based governance for the good of society.[62]

Do the government's strategies on these emerging technologies (e.g. AI strategies) include the public sector as a priority?

The French AI strategy emphasises public policy based on data and that public authorities must introduce new ways of producing, sharing and governing data by making data a common good.[63] The strategy explicitly mentions the public sector's role, both in using emerging technologies and in coordinating between the private and public sector in key areas, such as healthcare, transport mobility, defence and the environment. These sectors align neatly with the key societal challenges we have identified. The government itself emphasises a data divide that needs to be bridged, outlining in the AI strategy how the private sector has made enormous profits and dividends from data and the use of AI, whereas the wider benefit to the people and the government has not yet been achieved. The French government is clearly cognizant of the significant societal benefits available to France and the wider EU from closing their data divide, and they are working to deliver them. Since 2019, ETALAB also has its own AI Lab, helping administrations deploy AI projects across Government ministries. Several projects have already been supported in various government departments and public bodies, for example to fight online tobacco fraud or to detect divergences in the applications of the law.

The public sector has a large role to play in the UK's National AI Strategy, which includes specific actions to identify where using AI can provide a catalytic contribution to strategic challenges.[64] Accordingly, there are several initiatives in place that evidence the UK government's efforts to integrate emerging technologies in its activities. In 2018, for instance, the "Government technology innovation strategy", described the foundations that each government organisation would need to best use emerging technologies.[65] This was complemented with more specific guidance such as a guide to using AI in the public sector.[66] More recently, the government digital and data strategy committed to continue identifying and capturing opportunities arising from emerging technologies, such as AI, blockchain and quantum computing".[67]

In the Netherlands, the AiNed National Growth Fund Investment Programme 2021-2027[68] is the long-term programme drawn up by the Netherlands AI Coalition. A public-private partnership, it aims to strengthen the Netherlands' position in the AI sector and make the most of the opportunities available. Whilst much of this programme is focused on private sector endeavours, investment is also available for government projects. The Coalition highlights that the development of innovative AI applications in government is too slow and will be accelerated, and they aim to improve the knowledge base for AI in government bodies.

The German Federal Government's National Strategy for Artificial Intelligence[69] was adopted in November 2018, and as such predates the Data Strategy. The main aims include:

- To safeguard Germany's outstanding position as a research centre;
- To build up the competitiveness of German industry; and
- To promote the many ways to use AI in all parts of society.[70]

As such there is no particular focus on the public sector in the strategy, though it does mention the promotion of a variety of uses of AI. Both the German data strategy and the AI strategy are more concerned with facilitating research by the private sector and academics in emerging technologies than in integrating them into policymaking. No system has been put in place to track these potential applications, however.

Has the government published any analysis on the integration of these technologies in the public sector, including current status, potential applications, barriers and challenges to their integration?

One of the many roles of ETALAB in France is to monitor innovation efforts, as well as sharing best practice on potential applications.[71] In their role as innovation lab, they also track numerous projects seeking to improve the use of data for policymaking in the public sector. An update to the TECH.GOUV roadmap highlights the current status and barriers of the strategy, which includes the goal to adopt emerging technologies and become more innovative.

In the UK, the Government Digital Service published a "Technology innovation in government survey", which aimed to understand current activity across government in what might be termed new or emerging technologies. This mapping exercise also provided some insights into some of the barriers for their applications, including inadequate underlying data infrastructure, ethical concerns and institutional and cultural barriers.[72]

The Dutch AiNed National Growth Fund Investment Programme 2021-2027[73] is focusing on the potential applications of AI, and the barriers and challenges to their integration, but they have not yet set up a monitoring system. However it is early days, and yearly reports may be forthcoming from the end of this year. The Blockchain Coalition acts similarly for the applications of and barriers to the use of blockchain. Neither of these focus specifically on government use of these technologies, so there is a gap in oversight on the integration of emerging technologies in government.

Given the lack of focus on the use of emerging technologies for policymaking in the German AI[74] and data[75] strategies, there has understandably not been a body set up to monitor the implementation and progress of this.

Does a specific plan, strategy or legislative initiative exist to integrate emerging technologies in the activities of the public sector?

As outlined above, the French AI strategy explicitly aims to integrate AI into the activities of the French public sector.[76] Whilst this is part of a wider plan and doesn't focus exclusively on the activities of the public sector, government does make up a significant part of the strategy. Similarly, France's digitalisation strategy also suggests the use of emerging technologies, including IoT, AI and blockchain.

There are several specific government plans for integrating emerging technologies into public sector activities in the UK, which is unique amongst our benchmark countries. Whilst other countries make mention of the benefit of and need to leverage emerging technologies to use data more effectively within public policy only the UK has pulled together action plans in order to specifically do this. These include the aforementioned "Government technology innovation strategy".

As part of its collaboration with the Dutch government, the TNO Policy Lab[77] is working with government agencies to set out a framework for and the potential of using AI to improve decision-making. The Data Agenda Government strategy[78] highlights the opportunities AI presents to obtain new insights and identify societal threats, risks and opportunities at early stages. Whilst the AiNed National Growth Fund Investment Programme in the Netherlands does focus on the potential applications of AI within the government, it has not laid out a specific plan to integrate AI. The same can also be said of the Dutch Blockchain coalition's plans for the use of blockchain. As such there is no explicit plan for integration of emerging technologies into Dutch policymaking – however, there are plenty of elements which could be developed into one.

There is no plan to integrate emerging technologies into the government for improved policymaking in Germany. Whilst there is an AI strategy[79], this is much more focused on industrial policy and strengthening Germany's leading position in research in this field than on leveraging AI for policymaking.

Do any of the national strategies give consideration to the potential ethical challenges of integrating these emerging technologies in the public sector?

One of six pillars of the French AI strategy[80] specifically focuses on the ethical challenges of advanced data use, with another pillar looking at the diversity and equality considerations that need to go into an ethical AI system. This means a whole third of France's AI strategy is dedicated to the ethics of AI. There is emphasis in both the TECH.GOUV and AI

strategies on the sovereignty of data. Whilst the emphasis on sovereignty may involve some barriers to rapid adoption, such as the resistance to using foreign clouds, it also means a lot of investment is being poured into innovation.

Ethical questions associated with the integration of emerging technologies in the public sector feature heavily in the UK's strategies. For instance, the National AI strategy has the long-term key action of working "with The Alan Turing Institute to upgrade guidance on AI ethics and safety in the public sector".[81,82] The guide to using AI in the public sector contains specific advice about "understanding artificial intelligence and safety" and the Central Digital and Data Office has published one of the first "algorithmic transparency standard for government departments and public sector bodies" in the world.[83,84] However these privacy questions have perhaps crowded out some beneficial collaboration with the private sector which could have expanded the range of data that the government has access to and could gain valuable insights for policy from.

There is some reticence about the use of algorithms in the Netherlands after a scandal involving many thousands of families being wrongly identified as fraudulent over child benefits. This has resulted in a very strong emphasis on the ethics of AI use. There are areas of caution highlighted in the Dutch Digitalisation Strategy, and the government is actively intervening to manipulate data sets to prevent unwanted biases in AI algorithms, and placing emphasis on fair, transparent and trustworthy AI systems.[85]

There is significant cultural importance placed on the ethics of data use in Germany, and this is reflected in the Data Strategy.[86] It will incorporate the recommendations on ethics of the Digital Council, the Data Ethics Commission, and the Commission of Experts on Competition Law 4.0 into federal policy. Our conversations with German data experts also confirmed that ethics is a key concern, with Germany often leading the charge at the EU level in the development of ethical data legislation.

Is there a specific body/department within government responsible for promoting/advising/ implementing the integration of emerging technologies within government?

In France ETALAB, acts as an innovation lab for policymaking. They track pilot projects using data innovatively, through machine learning/ AI applications, new sources of data such as satellite tracking, or other forms of innovation. Whilst they are not responsible for implementing these projects, they do act in an advisory capacity, and are also sharing best practice from these initial case studies and highlighting where they have been successful.

In the UK the monitoring of the implementation of the AI strategy is being done through the Centre for Data Ethics and Innovation's AI Barometer and the "AI for government review", jointly conducted by the Government Digital Survey and Office for AI, seeking "to identify new opportunities for using AI in the public sector to drive public sector productivity".[87,88] The initiatives referenced above have analysed not only the current state of play and future opportunities but also some of the challenges this might pose, including "flawed underlying data used in training algorithms; accountability and transparency of decision making algorithms; liability of vendors selling AI algorithms used in government services; fairness, bias and anonymity of personal data".[89]

The TNO Policy Lab in the Netherlands is an independent research institution that collaborates closely with the Dutch government to explore strategies and research the impact of the digitization of society on policy.[90] Multidisciplinary experts cooperate and use new technologies to produce policy, set up policy models and methodologies for producing policy. They aim to develop innovative methods for spotting new technologies, monitor developments, clarify their relevance for policymakers and subsequently prototype and assist with rapid implementation. The TNO has a clear focus on data innovation for policymaking. However, this sits outside of government.

There is no specific body in Germany responsible for the integration of emerging technologies into government use for policymaking. Given the lack of explicit aims to integrate data innovation into policymaking, the monitoring, evaluation and analysis of barriers to integration that have been set up are mainly for tracking the digitalization of the state. In 2017, the OZG law had required 575 services to be digitalised by the end of 2022. The Government announced in its recent Digital Strategy that it would give itself until 2025 to learn from the experience of implementing the OZG.[91] This delay is regrettable, given that our quantitative analysis would suggest Germany is well placed to grasp the benefits of AI.[92]

Quantitative Assessment of data innovation within government

Variable for assessment	OECD OURdata Index "government engagement on data release" metric[93]	OECD OURdata Index "data quality and completeness" metric	OECD OURdata Index "existence of data promotion initiatives and partnerships" metric	Oxford Insights AI Readiness Index[94]
	2nd in our country set behind only France	Above OECD average. Poor score compared to other benchmark countries	2nd in our country set behind only France	5th globally, and 2nd in our country set
	Top performer in our benchmark	Top performer in our benchmark	Top performer in our benchmark	In the middle range with Germany and the Netherlands, trailing the UK
	Near the bottom of the index and worst in benchmark. Recent backslide	Improvement 2017-2019 to 2nd of benchmarked countries	Some backwards movement 2017-2019, and 3rd in our benchmark	Scored highly on data and infrastructure above France
	Declining performance 2017-2019 and below OECD average	2nd in our benchmark but far behind France. Significant decline 2017-2019	Significant decline 2017-2019, from top in our benchmark to bottom	3rd globally and strongest out of our benchmark

Dimension 2: Data Governance

The second element of our analysis focused on whether the governments had the right data governance foundations to enable a better use of data from an operational perspective. We looked at the quality of data, including its security, as well as the level of data integration within government.

Data Quality

Given there is little measurement of government data use in policymaking, we have used some proxies.

Assessment element	Openness Content and implementation of the open by default policy metrics in the OECD OURdata Index[95]	Availability Content and implementation of the unrestricted access to data policy metrics of the OECD OURdata Index.	Transparency "Transparency of personal data" variable of the EC eGovernment benchmark[96]	Security "Security" variable of the EC eGovernment benchmark.
	2nd last in the benchmark in both variables. In line with OECD average	Strong performance across both variables	Very strong performance, scoring highest of the benchmark	By far outperforms other countries in the benchmark
	Highest out of our benchmark countries	Slid backwards in content, but still high and highest in implementation	Strong performance, second only to the Netherlands	Area of weakness: worst out of our benchmark countries
	Last in benchmark in content but 2nd in implementation after 2017-2019 improvements	Content improvements 2017-2019. Worst in benchmark on implementation	Last of benchmark countries and significantly behind EU average	3rd of benchmark beating only France. But on par with EU average
	Fell from top performer in 2017 to just above OECD average in 2019	Above OECD average in content but in line with average in implementation	In line with EU average (above Germany but below France).	Just above EU average and above Germany and France

France has the best data quality out of the benchmark countries according to the metrics we considered. There are also lots of measures in place in the TECH.GOUV strategy[97] to further improve data quality over the coming years. Many of the challenges laid out in the strategy directly address data quality. In addition a whole pillar of the strategy, the DATA objective, is about the provision of quality data, leveraging the open by default principle and facilitated by the use of APIs.

The control section of the TECH.GOUV roadmap has some specific security implications, highlighting the need to be assured of control over any information systems and assets used by the state. The state aims to be digitally autonomous and for digitalization to reinforce national sovereignty. "The Cloud au Centre" strategy outlines the need to keep some sensitive government data secure on 'trusted clouds' (cloud de confiance). It remains to be seen if the implementation of the French Cloud Strategy can address the data security issues highlighted in the international indices.

Overall the Netherlands performs quite strongly across data quality. Even where they aren't performing as strongly, such as openness, there are measures in place within the Data Agenda Government[98] strategy to improve. One of the specific aims of the strategy is to improve the quality of government data and use it more efficiently. They highlight how the government has been making more open data available, and the next steps will be improving the quality, usability and findability of the data. This is driven in part by the European directive for better re-use of government data, which the Netherlands is implementing.[99]

The Dutch Ministry of the Interior and Kingdom Relations is proactively improving the quality and use of citizens' data. The Association of Netherlands Municipalities is also working to provide a smoother transition for converting data from municipalities into nationwide data sets. There is ongoing work to improve the quality, traceability, findability and usability of the national open data register.

The UK government's strategic emphasis on data may have diverted attention and resources from improving its data governance foundation. In fact, the OECD OURdata index report argues that the UK's deteriorating performance is a result of a "change of policy priorities from open data to analytical capacity within the public sector (e.g. targeting the adoption of AI practices)".[100] Notwithstanding evidence of recent decline, the UK still performs above average in terms of data quality and the CDDO aims to ensure that 50% of high priority data quality issues are resolved within the period defined by a cross-government framework.

According to the National Audit Office, the lack of a "central body with cross-government accountability for identifying datasets that are critical for government as a whole" represents a barrier for data accessibility, since "previous attempts to map the data landscape ha[ve] stalled because of its fragmented nature and the burden of detail", meaning there is not a complete catalogue of all the data held by government, who is responsible for it and how and where it can be accessed.[101] The CDDO is aiming to create a data marketplace (including a data catalogue, standards and governance models) to rival best practice across public and private sectors. Data appears at the core of the Government's new cybersecurity strategy.[102]

The German Data Strategy indicates that the GovData.de platform of the Federal Government and federal states, which provides an overview of existing open data, is not being developed ambitiously enough.[103,104] Federal, state and local metadata is compiled here, and at the time of the publication of the strategy there were only 38,000 data records. Only 12 out of the 16 federal states are contributing to this data portal, and many of the highest federal authorities and state administrations are only involved to a very limited degree. Only isolated independent open data portals exist at the federal state level – from a total of around 11,000 local authorities, there are approximately 90 local open data portals. The federal system is a significant barrier to national efforts to coordinate improvements in data quality. Many fragmented sources of data need to be brought in line with each other, which is challenging. As a result of this, a lot of public data is only available in differing formats or is very hard to find.

However, in February 2021 Germany passed the second Open Data Act, which expands the obligations of public authorities to make their data available to the general public. The energy crisis is also likely to add pressure to the need to coordinate certain types of data and improve the overall quality.[105]

Data sharing

Similarly to data quality, there are no direct measures of government data sharing for policymaking, however there are some useful proxies which we have used. These include metrics designed to capture:

- how integrated government data use is (digital by design, government as a platform from OECD Digital Government Index);[106]
- how extensively eIDs are used for citizen's data access (EC eGovernment benchmark for eIDs); and [107]
- the extent to which personal data is pre-filled by online services (Authentic sources from the EC eGovernment benchmark).

Assessment element	Integration of government data use	Use of eIDs for citizens' data access	Extent to which personal data is pre-filled by online services
	Highest score in "digital by design", and above the OECD average in both	By far the top performer, and above the EU average	By far the top performer, and above the EU average
	Middling performance in both metrics	Strong performance, behind only the Netherlands	Within the average, middling performance
	Lowest of benchmark countries. Quite low in both metrics	Lowest of benchmark. Score significantly below EU average	Lowest of benchmark. Score significantly below EU average
	Strong performance in both metrics, joint top in digital by design, top for government as a platform	One of the lowest scores in Europe, and lowest in our benchmark. Worse at local than central administrative level	One of the lowest scores, bottom of benchmark and well below EU average

France is not quite as strong in the data sharing metrics as in data quality. There is still some work to do in data sharing and integration, however this is recognized within the TECH.GOUV strategy, which mentions some fragmentation between ministries.[108] In his report on "Public Policy on Data, Algorithms and Source Codes" handed to the Prime Minister in December 2020, Eric Bothorel MP even mentions that "the sharing of data between State administrations is scandalously weak".[109] As such this is actively being worked on, and a central resource has been set up where data can be collected in the same format, with help available from DINUM for the ministries to achieve a more cohesive data environment.[110]

The French ministerial roadmaps also have the specific mission to integrate data better across government, with DINUM monitoring this integration. Part of their targets include the improvement of data sharing, as well as encouragement to add their data to a central resource, however this is not an obligation, which could be hindering progress being made in this arena.

Despite strong performance in some quantitative indicators, data sharing in the UK government is held back by inconsistent use of metadata, a lack of standards, inconsistent identification of individuals across government data sets and the impact of heterogeneous legacy systems. The UK government's own National Data Strategy reports that varying standards for data and the inconsistent use of metadata is a key barrier to better integration of government data.[111] The Office for Statistics Regulation argues UK data to be "poorly documented so their full potential lies untapped".[112]

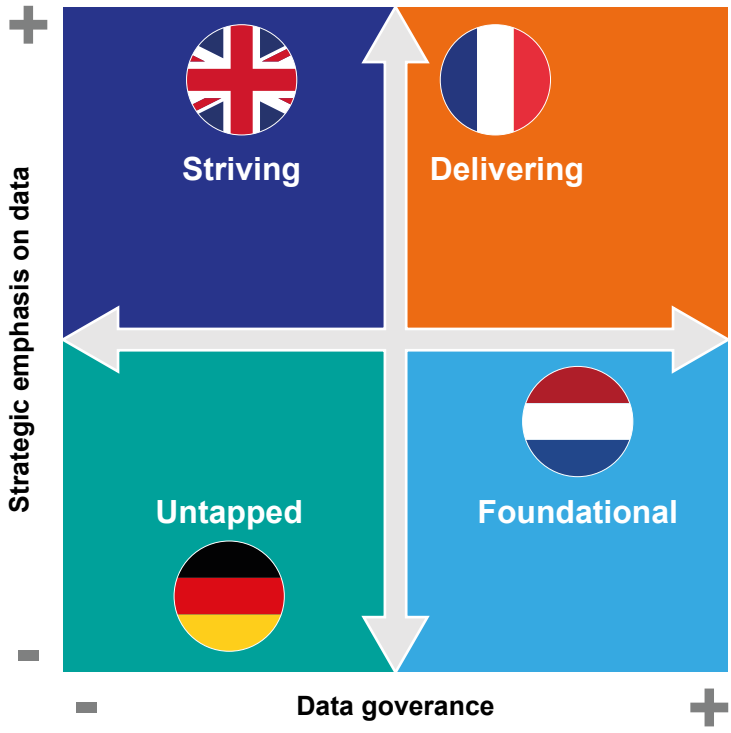
Some senior public sector stakeholders argued that the limitations actually posed by lack of unique identifiers and consistent standards across departments are sometimes overstated. In fact, the UK government is supporting the development of technical expertise around data linkage, aiming to overcome these barriers, building on the lessons learnt by the many initiatives across different departments that have successfully integrated inconsistent data.[113,114] The Office for Statistics Regulations pointed at the lack of capabilities, both from an organisation and a human resource perspective, as a key barrier for data sharing within the public sector.[115]

Despite the strong performance of the Netherlands, they have still identified room for improvement within the Data Agenda.[116] In addition to the target to improve the quality and use of open data there is also an aim to collect and share knowledge about a data-driven approach. Within the Data Agenda, potential blockers for data integration are highlighted, including the differing ways in which data is collected and used. The Dutch government hopes to develop not just a library of good examples, but a living network of data and best practice sharing.

According to the German Data Strategy there is not yet a shared internal data pool in public administration where different authorities can compile and use data in a standardised, consistent format.[117] There is not even an overview of which data is available, in which format and at which authority, for ministries or for the federal administration as a whole. Data exchange between the Federal Government, the states and the local authorities only takes place selectively, and sometimes only by request. Whilst the strategy does commit to some improvements in data sharing, this is mostly about opening data for use by the public, rather than sharing across departments, which is a big challenge for the fragmented federal system. Sharing is a key priority to be addressed if Germany is going to make the most out of its data use for policymaking.

Country typologies

According to our analysis of the countries against the two dimensions, we have placed each in a country typology, which defines where they are on their journey towards their data dividend. This helps us to identify where the gaps are in policy and performance, and what their next steps should be.



Our analysis of the French government's performance in the use of data for policymaking places it in the **Delivering Country category, those which are actively tapping into their data dividend**. Strong performance in both the dimensions places it in the top right category. Based on our assessment we believe France to be delivering on the promise of its data dividend, and that it will continue to discover new benefits.

France is the top performer in the **strategic emphasis on data** dimension, alongside the UK. With roadmaps in place at the national and ministerial level driving the adoption of a data-driven government model, as well as a well-developed AI strategy, it is clear that importance is being placed on data and its use for policymaking at the heart of the administration.

Much work has already been done on the quality of data, and there are further action points on this within the TECH. GOUV strategy,[118] which pushes France into the higher part of the **data governance** axis, despite poorer performance around security. Data sharing has a more middling performance meaning France only just makes it into the Delivering category but we expect to see improvement in the coming years should the ministerial roadmaps be followed.

The UK government's performance in our assessment leads to its classification as a **Striving Country - those which are targeting their data dividend with strategic drive but without the necessary data governance in place**.

The UK is one of the top performers in the **strategic emphasis on data** dimension. They are making efforts to adopt a data-driven approach to policymaking, revealing a strategic commitment that is also reflected in its organic structures. They also have multiple strategies planning to increase the adoption of emerging technologies in the public sector, built upon a diagnosis of the current level of use, potential for further integration and barriers for their adoption.

Their **data governance** performance is more mixed. Notwithstanding evidence of recent decline, the UK still performs well in terms of data quality. However, despite recent initiatives demonstrating better sharing within the UK government is possible, systematic integration of data is held back by inconsistent use of metadata, a lack of standards and inconsistent identification of individuals across government datasets and the impact of heterogeneous legacy systems.

Our analysis of the Netherlands would indicate that it is a **Foundational Country – one that has strong data governance foundations and can use that as a base for building towards a data dividend but lacks strategic ambitions for data**. They are one of the top performers in the **data governance** dimension. With strong performance in all the metrics we considered apart from openness, and measures in place within the strategy to continue to improve these elements, they have a solid foundation to build upon.

Whilst there is plenty of evidence that the Netherlands has the ambition to be a data-driven government, with a national strategy in place and a variety of organisations dedicated to innovation, there is a lot of fragmentation in the approach, and a relative neglect of applications in the public sector in favour of the private sector. Data innovation for policymaking is also largely driven through public private partnerships, and there is no facility to coordinate and direct the national government's activities in this area. Due to this fragmentation and focus on private sector initiatives, the Netherlands doesn't quite have enough **strategic emphasis on data** to make it into the Delivering Country category.

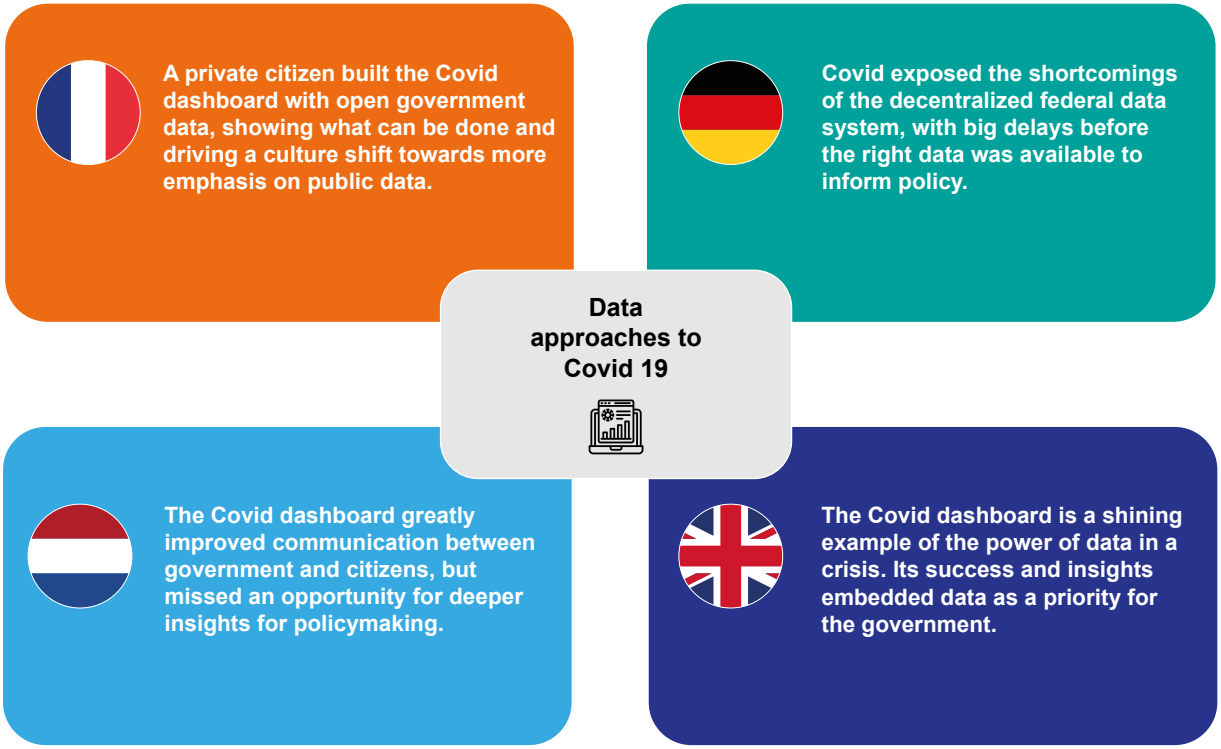
Our analysis of the German public sector's use of data for policymaking places it in the **Untapped Country category, those whose data dividend remains largely untapped**. Relatively weak performance in both the dimensions places it in the bottom left category, with work to be done on data governance, and more strategic emphasis on data needed to really tap into the benefits of the data the public sector holds.

Whilst the German federal administration is making plans around data use, they are more focused on digitisation than a **strategic emphasis on data**. Given Germany is at the beginning of its journey to close the data divide, the development of a data strategy is a good first step, along with the decisions to set up data labs and appoint Chief Data Scientists in every government department. However, the inclusion of more elements specifically addressing data use for policymaking would boost benefits.

There are some significant barriers to improvement on the **data governance** dimension, mainly due to the fragmented nature of government under the federal system. With independence between states and the federal government an important feature of the system of government, data sharing in particular has been impacted, as well as effective coordination of data. Moves have been made in recent years to open public data. Targeting the pooling of data in a coordinated and accessible format at the state and federal levels would be a positive next step towards Germany tapping into their potential data dividend.

Mobilising data in a crisis

Each country leveraged data in a unique way during the pandemic, demonstrating their relative strengths and weaknesses. The lessons learnt from the pandemic have fed into current and future approaches to data across all the countries, as well as driving home the need to close the data divide. Our target countries' experiences with data around Covid 19 are summarised below:



Policy recommendations

A snapshot of the main policy recommendations for the four countries in our benchmark is provided below, with more detail provided in the country-specific reports.

For **France**, ongoing work to avoid silos and fragmentation is essential, and the role of ETALAB[119] in monitoring progress in the use of data for policymaking will be of utmost importance, especially as political priorities shift. The infrastructure and strategy are in place for achieving France's data dividend, but there are some recommendations to keep France delivering on this promise:

- **To invest in cybersecurity** – a lot is being done on data and cloud sovereignty, however France is still performing poorly on security. Looking at partnerships which could boost capabilities in this area may be the most effective way to improve in the short term.
- **Continued improvement of data sharing** – it is important to ensure that the ambitions of the ministerial roadmaps to improve the integration of data across government are upheld and monitored. Instilling an obligation to share certain data could be a next step, though may also be politically challenging.
- **Maintain political momentum** – the French government has shown exceptional leadership in promoting and thinking about making best use of data, however, there has been a slowdown in momentum in 2022. Our final recommendation is to maintain that momentum through continued funding and emphasis on the role of ETALAB – without this essential coordinating role France may start to backslide in its digital and data maturity.

The **UK** government needs to focus its efforts on building the necessary data governance foundations that would enable the implementation of its strategic ambitions on the use of data. We would make the following recommendations for the UK government to improve:

- **Continue to strengthen public sector's data capabilities** to turn the government's strategic ambitions into an operational reality. This includes continuing existing work in improving data skills within the public sector, both in terms of specialist teams across departments and the general understanding of the importance of data among all civil servants. It also requires the development of its organisational capabilities, by consolidating recent progress providing strategic leadership to the integration of data in government activities and ensuring the treatment of data as an asset across governments.
- **Adopt and implement an "interoperable by default" policy** to ensure all public sector data, can be re-used and shared across governments. While the adoption of the policy is an important strategic step, its implementation will require significant technical, regulatory and organisational changes, needing to be complemented with well-resourced action plan. These changes are expected to be particularly large in those public services dependent on legacy systems, where investment to update software and hardware infrastructure may be needed.
- **Launch a "Data-driven policy making challenge"**. In mission-oriented innovation policies the government identifies challenges that need cooperation from different sector and organises competitions for innovators to secure funding. Departments could be called to collaborate to provide solutions for government-wide priorities (e.g. related to levelling up, climate change, etc.), based on innovative uses of data. In addition to the direct benefit of the policies suggested, this initiative would also help disseminate the importance of data-driven policy making, build capabilities within and collaboration links across departments and generate best practices and lessons future initiatives might learn from.

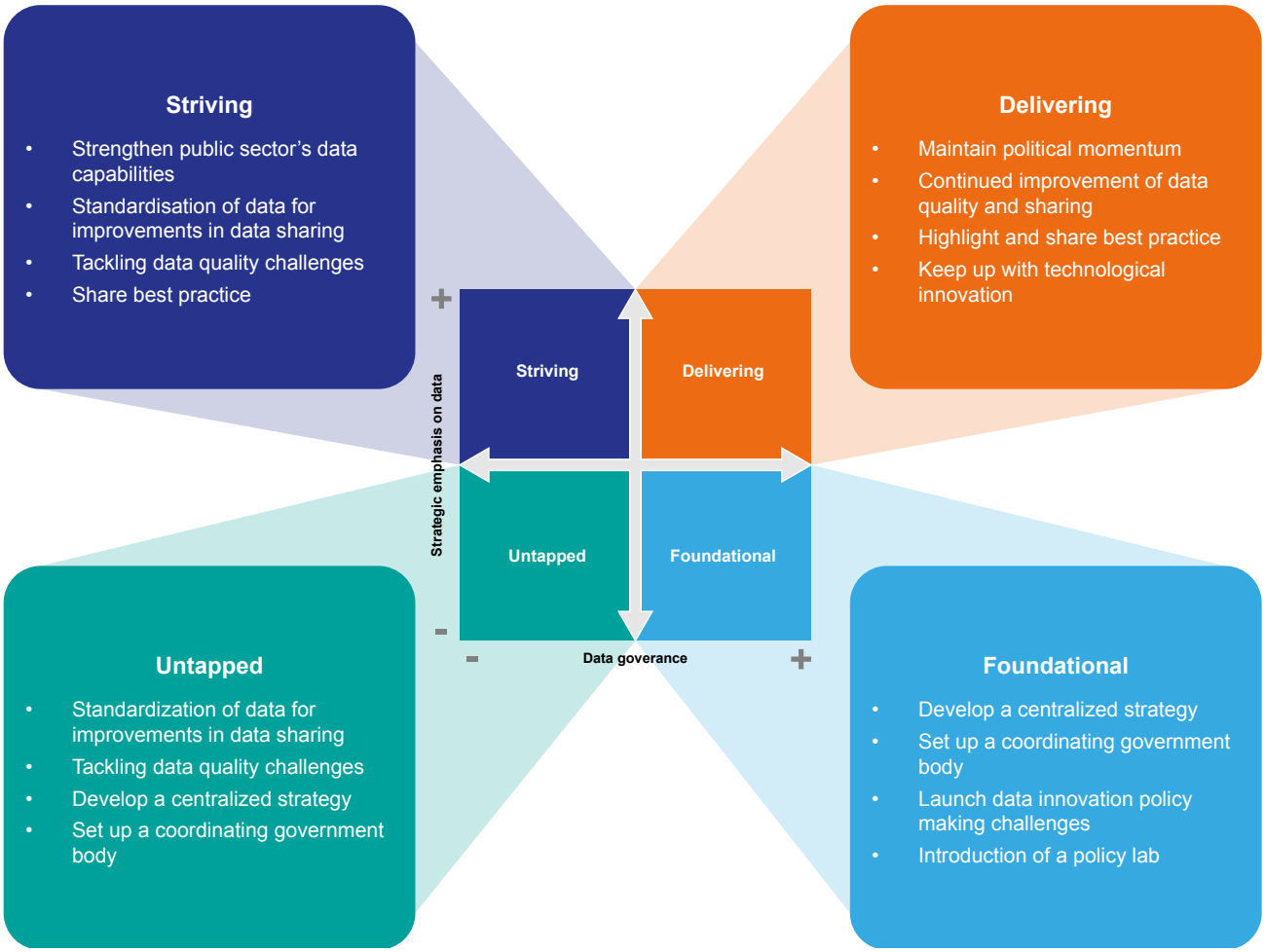
Based on our assessment we suggest that the **Netherlands** government would benefit from a stronger emphasis on central coordination of data strategy and innovation. Efforts to coordinate and guide innovation in data use would boost existing willingness to share best practice and knowledge. Our findings lead us to the following recommendations for the Netherlands:

- **Launch a "Data innovation for policy making challenge"**. In mission-oriented innovation policies the government identifies challenges that need cooperation from different sectors and organises competitions for innovators. The Netherlands government could launch a challenge calling for solutions to key issues the government is facing, such as the cost of energy crisis, climate change, health and wellbeing etc. based on innovative use of data, providing funding for the best proposals. In addition to the direct benefit from the selected innovations, this initiative would also emphasise the importance of data innovation in policy making and build capabilities within and collaboration links across departments.
- **Set up a coordinating body for data innovation** with the responsibility to monitor, encourage and share best practice in the use of data for policy making. Whilst the Netherlands has chosen not to have a national Chief Data Officer function, this body could provide some of the benefits of that function. There is some excellent innovation happening in Dutch government bodies such as the Rijkswaterstaat Datalab. Tracking and sharing those actions could help the Netherlands take the next steps to closing their data divide.
- **Continue to focus on the openness of data**. This is the only area of data governance which needed some work according to our quantitative analysis. However, this is already a significant focus of the Data Agenda Government, and we expect to see the metrics improving accordingly. A slight tweak in emphasis towards the sharing of public sector data, to complement the current emphasis on the private sector would allow the government to build further on their existing strong data governance foundations.

The most important areas for **Germany** to focus on are improving the pooling and coordination of data use across government. An additional strategic aim of integrating data into policymaking to go alongside the digitalisation aims would also allow the German public sector to access previously unseen opportunities and insights. Recommendations from our findings include:

- **To boost the centralised data reservoir** – this is a challenging task due to the fragmented nature of data across the many entities of the federal government. However, the massive benefits to be derived from improved sharing, visibility and coordination of data means it is a challenge worth taking on.
- **Create a central body responsible for optimising data use for policymaking** – This new body should have authority to deliver clear guidelines and roadmaps to Government departments and federal agencies. Guidelines should be developed on 1) responsibilities of department data labs and Chief Data Scientists, 2) Open Data policy and 3) data-sharing models in the administration. This could easily be built into the aims of the data strategy, since there are already some mentions of optimising data use for societal benefit.
- **Develop skills and understanding for a culture of data within government** – As Germany takes its first steps along the journey to closing its data divide, education and capacity building are essential. Offering civil servants and political leaders the opportunity to improve their data skills and instilling a culture of appreciation for the power of data from the top down, will strengthen the foundations from which to reach for the data dividend.

Policy recommendations by country typology



Policy lessons can be learned from best practice in our target countries

France – success in the centralisation and coordination of data strategy across government can be a model for countries with low strategic emphasis on data to follow, aligning with Splunk's data-fabric approach.

UK – dedication to understanding the gaps in data for policymaking capabilities has allowed the UK to develop strategies that suit the UK context. Those struggling with strategic emphasis on data would do well to leverage surveys and research to understand their baseline context as the UK did.

Netherlands – showcasing the benefits of leveraging existing private sector resources, particularly with regards to driving innovation and improving the sharing of data. Those struggling with legacy systems should check where private sector involvement could speed up processes and drive efficiencies.

Germany – Emphasis on privacy and regulation meets the concerns and cultural expectations of citizens, improving understanding and adoption. Building in the cultural sensitivities of the national context from the start improves civil service adoption, as well as public reception

CHAPTER 5 Conclusion

Governments across Europe, and the rest of the world, are facing a data divide – the use of data for societal benefit has significantly lagged behind its use for commercial profits. This report highlights a potential data dividend – the opportunity to close the divide and reap the benefits of data and emerging technologies which the private sector is already accessing.

To realise this potential dividend, different countries need to understand where they are on their journey to bridging the data divide and what areas they can build on to progress that journey. Governments can also learn from each other, creating repeatable solutions and drawing on the experiences of others as they undertake the journey to closing the data divide as a global community, rather than alone. This report has shown that each of the countries assessed are increasingly aware of the data divide and aim to embody a data-driven approach, but that these ambitions are not always translated into the necessary actions and resource commitments to deliver them. It highlights a set of recommendations for each country which, if taken forward, would support the realisation of their data dividend.

If successful, each country stands to reap significant benefits. In short, realising the data dividend will lead to deeper understanding and real time insights that can improve policy making and delivery. In turn this will help to tackle some of the most pressing socio-economic challenges that society faces, from tackling education and health inequalities to reducing organised crime and enhancing the natural environment.

Annex 1 – Methodology

We have combined available quantitative data with our own qualitative assessment of a variety of documents identified as part of our desk research (legislation, governments' strategies, secondary literature, etc.) to assess the performance of different countries across two dimensions, the strategic emphasis placed on data and data governance. We combine these two dimensions to define four country typologies, representing four different approaches to realising the data dividend, and classify each country into one of the typologies.

Assessment dimensions

Dimension 1: Strategic emphasis on data

The starting point for our analysis is the emphasis governments are putting on data and the role it plays in their activities focusing on two factors: data innovation and data-driven government.

Data-driven government

The OECD's Observatory for Public Sector Innovation notes that "…in hierarchical organisational structures such as those often found in government administrations, leadership plays a significant role in creating space for adaptive innovation".[120] We consider this through this assessment dimension, focusing on what the OECD refer to as the "strategic layer" of a data-driven public sector, covering "leadership and vision". Accordingly, this variable aims to assess whether governments aim for a data-driven public sector, either explicitly or indirectly.[121] Assessing this relies mostly on the analysis of a government's own policies, strategies and structures, to determine:

- Whether a government's data strategies explicitly aim to improve the way data is used in policymaking;
- Whether there is a requirement for major government departments to have Chief Data Officers; and
- Whether there is a body with responsibility for promoting and monitoring (i) the integration of data across departments; (ii) the usage of data in policy making; and (iii) the implementation of the government's data strategy.

This qualitative assessment is complemented with three quantitative elements:

1. The variable within OECD'S OURdata Index that assesses the extent to which government offers data literacy programmes for its own personnel;[122]
2. The variable within OECD's OURdata index that assesses whether governments monitor the impact of the promotion of data reuse in government; and
3. The "Data-driven public sector" dimensions within the OECD'S Digital Government Index.[123]

Data innovation

In assessing data innovation we focus on the integration within government activities of any of the six emerging technologies highlighted by Splunk as drivers of the data age.[124]

The assessment of this is mostly qualitative, analysing a government's strategies and policy documents to assess:

- Whether the government's data/digital strategies explicitly aim to integrate any of these technologies into public sector activities;
- Whether the government's strategies on these emerging technologies (e.g. AI strategies) include the public sector as a priority for the development of these technologies;

- Whether the governments have published any analysis about the integration of these technologies in the public sector, including current status, potential applications, and barriers and challenges to their integration;
- Whether a specific plan, strategy or legislative initiative exists to integrate emerging technologies in the activities of the public sector;
- Whether any of the documents above give considerations to the potential ethical challenges of integrating these emerging technologies in the public sector; and
- Whether there exists a specific body/department within government responsible for promoting/advising/implementing the integration of emerging technologies within government.

This qualitative assessment is complemented by quantitative indicators aimed at capturing the underlying conditions needed to support innovation in terms of skills, technologies, partnerships with other sectors, etc:

- Oxford Insight's AI readiness index, which analyses how ready governments are to implement AI in the delivery of public services, by analysing conditions in government and the wider technology sector in each country, and the availability of necessary data and infrastructure;[125] and
- Three variables within the OECD's OURdata Index looking at the government's engagement with the private sector around data release, data quality and completeness and the existence of data promotion initiatives and partnerships.[126]

Dimension 2: Data Governance

While governments' strategic efforts to integrate data in their activities are important, it is clear from our previous discussion of best practice and principles (in particular the OECD's guidance around digital government) that adequate data governance provides the necessary technical foundations to enable the implementation of these strategic priorities. Our analysis of data governance encompasses two aspects: data quality and data sharing.

Data quality

As part of our literature review we identified different features government data should have in order to promote its reusability inside and outside government:

Data quality feature	Source for assessment
Openness	"Content of the open by default policy" variable in the OECD OURdata index.[127] "Implementation of the open by default policy" variable in the OECD OURdata index.
Availability	"Content of the unrestricted access to data policy" variable in the OECD OURdata index "Implementation of the unrestricted access to data policy" variable in the OECD OURdata index.
Transparency	"Transparency of personal data" variable in the European Commission eGovernment benchmark.[128]
Security	Security variable in the European Commission eGovernment benchmark.

These quantitative indicators are complemented by the qualitative information derived from the government's own data strategies (and other similar documents), which often provide their own diagnosis of these and other qualities of government data (such as readability for both humans and machines, how consistently data is structured across departments, etc.).

Data sharing

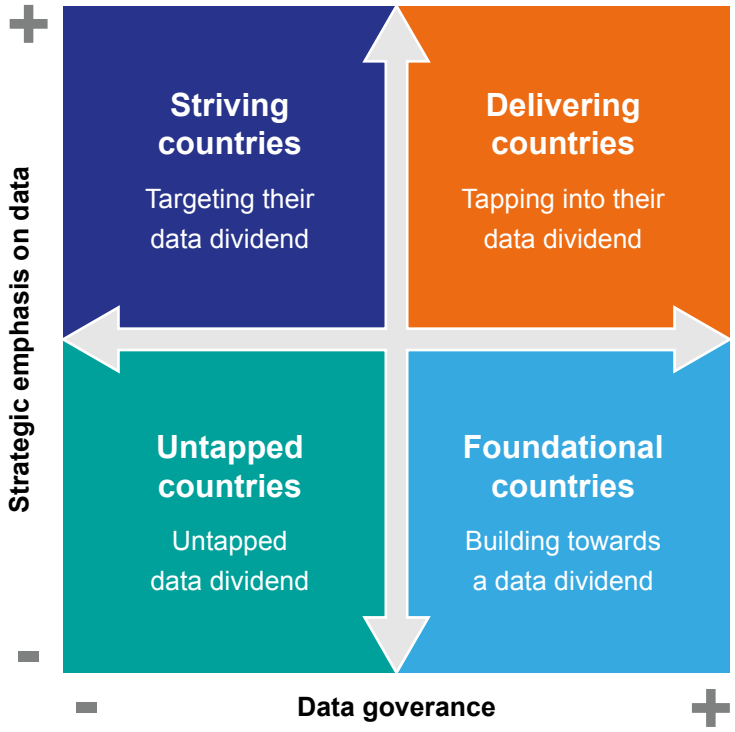
In addition to data quality, the data governance dimension also assesses the extent to which data governance facilitates the integration of data across government departments and the extent to which data is actually shared.

This is assessed through quantitative indicators (detailed and explained below) and a qualitative analysis of the government's own diagnoses.

Source for assessment	Contribution
"Digital by design" variable within OECD's Digital Government Index[129]	It summarises the assessment of the extent to which data governance may facilitate data integration, such as whether there are "Enabling frameworks in place (e.g. common interoperability, base registries, shared ICT infrastructure and services, open-source software, common data architecture/infrastructure)".
"Government as a platform" variable within OECD's Digital Government Index	It also considers the extent to which data governance may facilitate data integration, such as the usage of digital platforms to open up government data and fostering re-use, the extent to which national data strategies foresee the usage of cloud computing, or the use of consistent ICT standards in the public sector.
Analysis of the extent to which eIDs are accepted/ used in eGovernment services in the European Commission eGovernment benchmark	According to McKinsey, a key component of governments' adequate data governance for the digital age must be the provision of consistent "unique identifiers" across all government data and services.[130] We use electronic IDs as a proxy for the existence of unique identifiers.
"Authentic sources" variable in the European Commission eGovernment benchmark[131]	This variable assesses the extent to which personal data is pre-filled by the service provided (based on data from authentic sources such as national register, tax registers, company registers, etc.). This is in itself an example of data sharing within government and relates to the "once-only" principle which aims for citizens to only need to provide their data once for all services.

Defining the country typologies

Combining these two dimensions as axes along which to compare our sample countries, we obtain four different country typologies. We assessed each country independently to place them in these categories, making this analysis an absolute assessment as opposed to a relative one.



The Delivering countries – those which are already tapping into the data dividend, with both adequate data governance and developed strategic initiatives.

The Foundational countries – those that have adequate data governance in place but are not currently showing a strategic drive to tap into the data dividend.

The Striving countries – those that are targeting their data dividend with strategic drive but without robust data governance in place.

The Untapped countries – those that have identified their data dividend but are lacking both the necessary strategic drive and data governance to achieve it.

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WPI Economics Limited
11 Tufton Street
London
SW1P 3QB
@WPI_Economics
wpieconomics.com

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