



The Data Dividend in Germany

A comparative perspective on governments' usage of data to tackle key societal challenges

A WPI Economics Report for Splunk

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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.

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 wpieconomics.com

 matthew@wpieconomics.com

 [@wpi_economics](https://twitter.com/wpi_economics)

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Introduction to the project

This report focuses on the German results from a wider research project 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 tackling organised crime and enhancing the natural environment.

Governments 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.

We have assessed four key European governments (France, the Netherlands, the UK and Germany) on their use of data, benchmarking their performance to identify best practice, and areas for development. We have also considered 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.

Based on these principles of best practice, we defined a framework for benchmarking the four target countries in our study and placing them within country typologies. To do so, we analysed them against two dimensions of what makes for effective use of data for policymaking:

- How much **strategic emphasis** do governments put on data use within policymaking, with a focus on the extent to which a government is “data-driven” as well as on their level of data innovation.
- Whether governments have the right **data governance** foundations to enable a better use of data from an operational perspective, including the quality of data, security and the level of data integration within government.

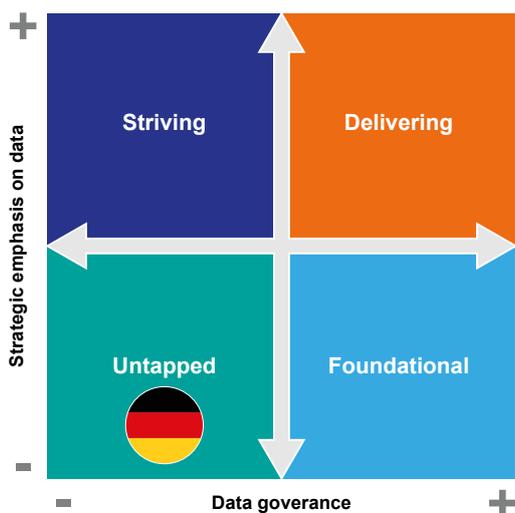
This analysis found that governments are increasingly aware of the data divide and aim to embody a data-driven approach, although these ambitions are not always translated into the necessary actions and resource commitments. All the countries in our sample are looking at how to improve data use in their 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, and a lack of organisational capabilities and skills.

The following report will consider the German findings within this context, and the implications for Germany's data use for policymaking.

Snapshot on Germany

 Data-driven government	 Data Innovation	 Data Quality	 Data Sharing
Strategy doesn't include data for policy ✗	No goal to integrate technologies ✗	Mixed openness of data -	Fragmented federal data system ✗
Focus on provision of digital services -	No tracking of potential tech applications ✗	Mixed availability of data -	eIDs need improvement ✗
No requirement for Chief Data Officers -	Strong ethical backdrop to strategies ✓	Transparency needs improving ✗	Authentic sources need improvement -
Improvement needed across all metrics ✗	Average performance on metrics -	Average security of data -	Intermittent progress on sharing -



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, with work to be done on data governance, and more strategic emphasis on data needed to tap into the benefits of the data the public sector holds.

Coping with Covid19 – How did Germany leverage data to manage the Covid19 crisis?

Data on the pandemic was collected in many different places, but district and regional level data was recorded in a central database. Near real-time information was therefore possible, but only at the regional level, not nationwide. The use of further situation-relevant data (population mobility, hospital occupancy, etc.) was inconsistent across regions as it depended on local regulation and policy for crisis situations. A crisis-independent platform approach (both in terms of technology and organisation) was therefore needed. There was an almost real-time dashboard using official case numbers to visualize and document Covid19 spread, however, use and roll out was significantly reduced due to the time lag in health reporting and subsequent inconsistencies in the data. The Gaia-X European data infrastructure project was suggested as a solution to these challenges.

The Covid19 crisis exposed the shortcomings of the decentralised federal data system, with considerable delays before nationwide, consistent and centralised information was available

Results of benchmark analysis

Strategic emphasis on data

We have assessed the benchmark countries on how much strategic emphasis they put on data use for policymaking, focusing in particular on the extent to which the government is “data-driven” as well as on their level of data innovation. Germany has the strategic intent to use data more effectively, but most of its strategies remain untapped, and there is little coordination of data innovation.

A focus on digital service improvement over data-driven policymaking

Germany published their first Data Strategy of the Federal Government in January 2021, making it the most recent initiative to improve data use for policymaking out of the countries we have considered.¹ Around 240 measures were outlined in the data strategy plan, and the strategy aims to leverage the opportunities that lie within data for the good of German society.² 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.

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

- Making data infrastructure efficient and sustainable
- Increasing the innovative and responsible use of data
- Increasing data competence and establishing a data culture
- Making the state a pioneer

The last point is the most relevant to our research, as the strategy explicitly aims for the administration to reorganise itself to provide good digital services. They identify the need to update state data infrastructure and improve the data skills of state employees in order to do so. The main goals are to have more public data, more transparent work and more citizen-friendly services. Unlike the other countries we have considered, the data strategy does not explicitly aim to improve data use for policymaking, focusing more on implementing digital services for citizens and improving existing data infrastructure. There is also a lack of details on implementation.³

Case study – Environmental Sustainability

Context: In Berlin, an online tool has been developed by Technologiestiftung Berlin (TSB) to predict water quality in public lakes

Action: The tool draws data from rainfall, sewage levels and the speed of flow in the city's waterways and is mapped onto an online plan of Berlin

Benefit: The model gives daily information on the public water quality of Berlin's lakes, and demonstrates the combined work of tech experts, scientists and public servants

The strategy highlights the desire for all federal ministries to establish a chief data scientist or similar role, but this is not a requirement. This risks not having the right people in place to monitor and coordinate the implementation of the data strategy. In addition to not requiring this position, the Data Strategy also does not formally lay out the means by which the implementation will be monitored. It mentions that they will “monitor progress made on implementing the Data Strategy by conducting, (...) prompt and effective evaluations”, but does not outline where this responsibility will sit. Implementation

of the strategy has been slow; over 90% of the 240 measures remain untapped.⁴ Chief Data Scientists have been slowly appointed in 2021 and 2022, but without central guidance on their exact role, functions or objectives. This has led to a patchy implementation of Government strategic directions.

Through its 2021 Data Strategy and its 2022 Digital Strategy, the German government demonstrates a real ambition to make a more strategic use of data. However, the implementation of these strategies is made difficult by the absence of a central government structure in charge of data.

Our qualitative analysis also finds that Germany is behind compared to the other countries we have considered – Germany is ranked last in all of the variables considered:

- Extent to which the government offers data literacy programs for its own personnel (OECD OURdata Index)⁵
- Monitoring of the impact of data reuse in government (OECD OURdata Index)
- OECD Digital Government Index “data driven public sector” variable.⁶

Minimal explicit interest in integrating data innovation

Part of the “make the state a pioneer” objective within the Data Strategy of the Federal Government is to establish data laboratories in federal ministries.⁷ However, this is more focused on digitalisation 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 Federal Government’s National Strategy for Artificial Intelligence was adopted in November 2018, and as such predates the Data Strategy.⁸ The main aims of the strategy are:

- To safeguard Germany’s outstanding position as a research centre
- To build up the competitiveness of German industry
- To promote the many ways to use AI in all parts of society⁹

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 strategies are more interested in facilitating research in emerging technologies than in integrating them into policymaking. However, the Data Strategy does briefly mention that “ideally, with reference to existing best practice models, resources and networks, we need to create new processes, standards, roles and institutions and facilitate data-based and evidence-based governance for the good of society.”¹⁰ No system has been put in place to track these potential applications.

The Federal Environment Agency is setting up an “Application laboratory for artificial intelligence and big data” with the aim of developing data-based applications for achieving sustainable development goals and thus reinforcing cooperation between the Federal Government and the federal states on environmental issues. If this is done through policymaking, then this would be a great example for other ministries to follow, however at this time there are no further details.

There is significant cultural importance placed on the ethics of data use in Germany, and this is reflected in the Data Strategy. It incorporates the recommendations of the Digital Council, the Data Ethics Commission, and the Commission of Experts on Competition Law 4.0. 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.

Germany performs relatively poorly within our benchmark countries across the quantitative indicators we considered from the OURdata Index of the OECD:¹¹

- Germany ranked near the bottom in the “stakeholder engagement from data release” metric, as well as sliding backwards between 2017 and 2019
- The “data promotion initiatives” variable saw some backwards movement between 2017 and 2019, and Germany is second to last in our benchmark
- However, significant improvement between 2017 and 2019 in the “stakeholder engagement for data quality and completeness” brought it up the rankings, to just behind France.

Case study – Economic prosperity

Context: Munich, Hamburg and Leipzig are developing urban data platforms and digital twins, which consist of digital copies of the city to form virtual and interactive 3D-city models

Action: The data platforms and digital twins model will be integrated with sensor data for local urban development

Benefit: It is expected these could help address urban challenges such as mobility, air quality management and land-use management

Given the lack of an explicit aim 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 digitalisation of the state.¹² Even within this limited frame, the federal government has struggled to achieve its goals. For example, as part of the Onlinezugangsgesetz (OZG), there was an aim to digitalise 575 public services by 2022, and only 54 were achieved by mid-2021.¹³ A federal advisory agency, the National Regulatory Control Council, has determined that despite recent momentum the program will not meet its target deadline of the end of 2022.¹⁴ Since then, the Government announced in its Digital Strategy that it would give itself until 2025 to learn from the experience of implementing the OZG.¹⁵ This delay is regrettable, given that our quantitative analysis would suggest Germany is well placed to grasp the benefits of AI in particular. Germany scored highly on data and infrastructure in the Government AI Readiness Index of Oxford Insights, just above France, but behind the UK.¹⁶

Data governance

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

Strengths in data availability, but challenges elsewhere

Given there is little measurement of government data use in policymaking, we have used some metrics which apply to overall government data, citizen data and government website security as proxies.

- **Openness** – in the OECD OURdata Index variable “content of the open by default policy” Germany scores last out of our benchmark countries, however it is ahead of both the UK and the Netherlands after recent improvements in the “implementation of the open by default policy” variable.¹⁷
- **Availability** – Also from the OECD OURdata Index, the “content of the unrestricted access to data policy” metric improved significantly, reaching the top score, above France and the UK. The OECD reports that Germany made one of the most noticeable improvements to data accessibility between 2017 and 2019. This is despite the worst performance in the “implementation of the unrestricted access to data policy” amongst our benchmarked countries.

- **Transparency** – Germany performs the worst out of our benchmark and significantly behind the EU average in the “transparency of personal data” variable of the European Commission eGovernment benchmark.¹⁸ There is a lot of work to do if the ambitions of the Data Strategy are going to be achieved in this arena.
- **Security** – In the security variable of the European Commission eGovernment benchmark Germany is second to last, beating only France out of our benchmark, however it is on par with the EU average.¹⁹

The 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.^{20 21} 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. 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. It means that specialist information systems, for example environmental data, are highly fragmented due to the distribution of expertise. A lot of public data is only available in differing formats or is very hard to find.²²

Case study – Economic prosperity

Context: The Hamburg Port Authority (HPA) is collaborating with Here Technologies to better manage truck traffic in the port

Action: The platform can display exact travel times in the port and give concrete route recommendations

Benefit: The system helps avoid traffic jams around short-term openings of the movable bridges. HPA claim traffic jams in front of the bridges now hardly ever occur

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, which could accelerate existing efforts.²³ The German Government plans to further encourage Open Data policies in the public sector through a new Data Law announced in the recent Digital Strategy of the Federal Government, but little detail has been shared about specific plans.

Ongoing efforts needed in data sharing

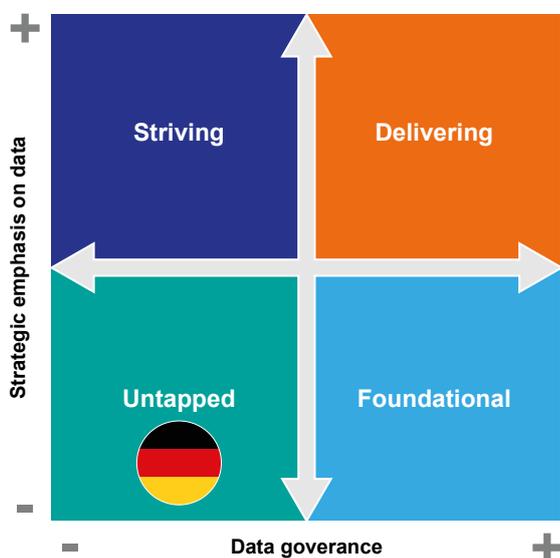
Similarly to data quality, there are no direct measures of government data sharing for policymaking, however there are some useful proxies which we have used to consider Germany's performance. These include metrics designed to capture:

- How integrated government data use is (digital by design, government as a platform from the OECD Digital Government Index)²⁴
- How extensively eIDs are used for citizen's data (EC eGovernment benchmark for eIDs)²⁵
- The extent to which personal data is pre-filled by online services (Authentic sources from the EC eGovernment benchmark)

Germany is the lowest of our benchmark countries across all the variables we considered in our quantitative analysis. In terms of **data integration**, the scores are quite low for both the “digital by design” and “government as a platform” metrics, which is to be expected within the context of the challenges around data quality, and the difficulty of sharing data effectively across a fragmented federal system of government. Fragmentation also explains the very poor scores in **citizens' data** - the “extent to which eIDs are used” metric and “authentic sources” variables are both far below the EU average.

According to the 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.²⁶ 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 on 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, a key challenge for the federal system.

Conclusion and recommendations



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, with work to be done on data governance, and more strategic emphasis on data needed to 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. However, the inclusion of more elements specifically addressing data use for policymaking could have boosted the benefits gained from data and AI strategies.

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 this system, data sharing has been impacted, as well as effective coordination of data. Moves have been made in recent years to open public data, and this can be seen in improvements in the quantitative metrics.

Based on our analysis, the most important areas to focus on are improving the pooling and coordination of data use across government. An additional target of integrating data into policymaking alongside the digitalisation aims in the strategy would 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.

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

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