

Icebreaker One identifies the barriers to overcome in order to lay the foundations for more effective data sharing

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Introduction

Icebreaker One (IB1), in collaboration with Arup, was commissioned to work with DAFNI on the data sharing project 'Data Infrastructure for National Infrastructure' (DINI), along with several other organisations. This exciting programme of work was driven by the Department for Science, Innovation and Technology (DSIT), aimed at better and safer use of data in research and funded by UK Research and Innovation (UKRI)'s [Digital Research Infrastructure \(DRI\) programme](#). The 'DRI' is a £129m initiative aimed at developing a system that's interconnected, human, FAIR and sustainable.

Based in the UK, IB1 is a public benefit non-profit company, that works to enable trusted, interoperable data sharing for private sector, public and environmental benefit. It supports the development of data infrastructure by designing and operationalising governance, trust frameworks, and policy mechanisms. Their mission is to ensure that data is leveraged as a key asset to drive economic growth, policy effectiveness and Net Zero innovation.

DAFNI commissioned Icebreaker One to explore the requirements and impact of supporting an improved sharing of national infrastructure data with publicly funded researchers, focusing on energy, water and transportation.



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Key challenges the project aimed to address

Sharing data for research is vitally important and can offer distinct advantages to organisations and society as a whole. Researchers outside an organisation where data originates can offer fresh perspectives to maximise the data's value and quality, as well as enable new forms of analysis through dataset linking. Data held by private companies can offer compelling insights into behaviour from individual to community, beyond publicly shared data. However, accessing this information can be challenging, with researchers facing common issues such as legalities and privacy.

"We were trying to enhance the understanding of the landscape, together with common practices, and what other organisations' barriers were," says Ceri Stanaway, a freelance consultant assigned to the project. **"Specifically, our focus was on the data provider, rather than the data user. This involved speaking to industry, regulators and anyone else involved in the provision of data. Our research was intended to help DAFNI solve the challenges of what needs to be done to create more effective data sharing between private companies and researchers in publicly funded organisations and in academia."**

Benefits of data sharing

Analysis uncovered the main conclusion that understanding of benefits by data providers is theoretical at present, with few organisations able to demonstrate concrete evidence or measure benefits quantitatively or qualitatively. Where benefits are measured, this tends to prioritise direct monetary outcomes for data providers.

Barriers to data sharing

Whilst the significance of barriers varied amongst organisation types, technical barriers universally presented the least concern. Security was identified as an area of growing concern, and in some cases was seen to conflict with approaches in academia (for example, cross-border sharing is a scholarly norm, but poses security risks).

Cultural barriers, including reputational and trust-based factors, were identified as strongly influential in decisions and practices governing infrastructure data sharing. Identifying such barriers can be complex as they are often diffuse and influenced by relationships and events taking place across wider sectoral networks. Nevertheless, the power of cultural concerns to block or restrict data sharing should not be underestimated.

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Key findings

Around half of the organisations who took part considered sharing infrastructure data to be 'business as usual', whilst others have never shared data. Feedback from delegates indicated that despite the rise of Open Data publishing, sharing data that is subject to access controls or licensing restrictions is dominated by bespoke, individually negotiated agreements. Portals may restrict the ability of researchers to combine datasets from different sectors. Infrastructure data providers demonstrated clear demand for standardised, interoperable, and affordable legal mechanisms and that better knowledge of the research community and researcher user needs could improve data sharing for all parties.



The main recommendations

1. Data providers and those who facilitate data sharing **must** invest in co-designing appropriate and open governance for data sharing, which would foster data accessibility and interoperability within and across sectors. Good data governance **must** be based on the principles of transparency, accountability, engagement, and responsiveness to effectively address legal, policy, security, and communications needs, as well as technical matters.

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2. Data sharing initiatives between infrastructure data providers and the research community **must** build on existing initiatives to promote interoperability, prepare for multiple data sharing, and reduce the burden on data providers and data users.
3. National data sharing initiatives **must** be designed with cohesion, flexibility, extensibility and capacity-building in mind. This requires the ability to guide less digitally mature organisations forward.
4. Research and innovation funders **should** support research that clearly advocates for the practical and strategic benefits of sharing national infrastructure data with researchers. This should explicitly account for nuance concerning the sharing of different data types, providing guidance on the translation of research outcomes and benefits to the data providers themselves.
5. Research funders **should** invest in documenting research-based and best-practice case studies for organisations to better understand what data researchers are looking for, and in what formats, to enable data providers to prioritise service development.
6. The research community **should** actively engage with data providers to embed researchers within organisations to build a collaborative approach, which will ease the administrative burden on data providers.

How could this work benefit society as a whole?

Private organisations recognise the independence of researchers, and the ability for them to take forwards ideas that they may not be able to themselves. Better data sharing can enable research that can improve efficiency and reduce infrastructure costs.

“During our research, Transport for London was often cited as a really great example of an organisation sharing their data, which has resulted in real benefits for commuters who are now able to plan their journeys more effectively,” says Ceri.

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A combined approach

Icebreaker One used a mixed methodology that reflected DAFNI's requirement to focus on effective engagement. A challenge faced early on was the availability of stakeholders. A literature review and stakeholder mapping, followed by an invitation to either attend a workshop, participate in a survey, or be interviewed allowed organisations to contribute in a way that best suited them.

When approaching potential research participants, IB1 aimed to include a representative sample of stakeholders, including:

- Commercial companies (energy/transport/water suppliers and consultancies)
- Government bodies (local and national)
- Regulators
- Arms-length public bodies
- Trade/professional bodies

The approach was designed with the same goal in mind - to gather evidence, insights, analysis and good practice examples as to both the benefits and barriers to sharing infrastructure data.

1. Literature review

The literature review was conducted between August and September 2024 and focused on literature published between 2017 and 2024. The review focused primarily on the body of work largely produced by industry, policy, and third-sector bodies, as well as documents made available to the public, without paywalls or other access barriers.

2. Survey

During October and November 2024, IB1 carried out a structured survey, which was distributed to organisations across the energy, water and transport sectors, including academia, government bodies, non-profits, and commercial enterprises.

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3. Workshops

In November 2024, IB1 held two workshops on transport and water, respectively. These events produced a wealth of qualitative data and facilitated exploration of more complex issue areas (such as political and ethical).

During each workshop, attendees were polled to gauge their current scope of data sharing with external researchers. Facilitated discussions followed, with the first aiming to identify instances when the effective sharing of data with researchers resulted in positive impact. The second focused on barriers to sharing data with researchers, and the third on possible solutions to the barriers identified.

4. Interviews

Finally, in November and December 2024, Icebreaker One held one-to-one interviews with stakeholders from the three sectors, prioritising stakeholders that had been unable to attend workshops.

The future

The literature review and the final report of Icebreaker One's DAFNI-DINI research are available alongside the full [DAFNI-DINI report](#).

Icebreaker One hopes that researchers will make full use of the report and that it will act as a spur for private organisations to share data more fully with researchers to overcome the critical barriers addressed.

Who was involved

Ceri Stanaway (Senior User Needs Researcher), Lucy Stewart (Design Researcher), Miranda Sharp (Domain Expert & Specialist Technical Input), Ewan Jarvis (Researcher), Charlotte Horler (Project Manager), Emily Judson (Head of Research), Gea Mikic (Programme Director), Caroline Fraser (Programme Manager) and Zoe Swiderski (Head of Project Management).

