NCPI WORKSHOPS

Interoperability

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WORKSHOP OUTLINE

Interoperability

Interoperability means ensuring different organisations and systems can connect and communicate as easily as possible.

This practical event covered one of the Department for Science, Innovation and Technology (DSIT) identified enablers for an effective national cyber-physical infrastructure ecosystem. Its aim was to explore and scope top-level recommendations and funding priorities for interoperability and data sharing.

The workshop brought together over 60 stakeholders to explore interoperability challenges and solutions and develop a consensus around priority recommendations to improve interoperability.

The day was framed with introductions from Justin Anderson, Connected Places Catapult, Mark Enzer, Mott MacDonald, Sarah Hayes and Richard Dobson, Energy Systems Catapult, then structured into two roundtable sessions and followed by a closing panel.

Roundtable sessions

The morning session considered physical interoperability and data interoperability, looking at key challenges and available guidance.

During the afternoon, participants grouped around tables according to area of expertise and looked at a question set built around either Data interoperability, Governance, or Legal requirements.

NCPI Workshop on Interoperability

Hosted at Connected Places Catapult, London

Agenda, 18 June 2024

10.30 NCPI programme perspectives

11.00 Roundtable session 1 (Technology themed tables – Physical interoperability and Data interoperability)

12:30 Lunch

13:30 Roundtable session 2 (Solutions – MIMs, Technical data sharing, Practical data governance and AI, Data sharing infrastructure models, Role of institutions, Interoperability legislation)

15:00 Panel discussion (see slide 3) – outcomes and next steps

WORKSHOP OUTPUT

Collective effort across NCPI stakeholders to identify recommendations

Roundtable findings were recorded digitally by a nominated person at each table, and findings across the day sorted and prioritised in readiness for the closing panel discussion.

This method enabled a clear presentation of views, insights and considerations and a top five recommendations for DSIT.

In a session chaired by Justin Anderson from the Digital Twin (DT) Hub, the recommendations formed the basis for discussion for panel guests Michelle Berti, ESO; Sarah Cameron, Pinsent Masons; Paul Clarke, Robotics Growth Partnership, and Charles Kennelly, ESRI.

In summary, the consensus from the participants representing the NCPI ecosystem, was a recognition of an urgent need for interoperability across human, physical and digital dimensions.

Interoperability as an enabler of the benefits of innovation and the potential of NCPI

- Enables systems to work together with minimum friction

- Enables communication and connectivity between humans and machines

- Allows for greater choice

- Will support the development of technologies like autonomous vehicles which need commonality

- Improved data sharing may accelerate the progression of AI

- Promotes sustainability

INTEROPERABILITY ISSUES

Why interoperability matters

Interoperability and connectivity are crucial in complex systems, requiring a multi-layered approach that considers both physical and digital connections.

Lack of technical, semantic, organisational and legal interoperability can reduce safety, create cost and inefficiency, and hinder innovation.

Lack of interoperability also increases risk of monopoly and associated loss of consumer welfare, creating potential security threats. With the rise of autonomous systems, two-way communication is needed between the physical and digital.

Issues highlighted in the roundtable sessions

- Lack of interoperability in data sharing is one of the key challenges facing industry.

- A need for common trust frameworks and agreed security processes.

- The requirement for Government leaders to address the data sharing challenge, supported by industry to develop a data sharing infrastructure. Without Government leadership and good governance, industry solutions are not scalable and adaptable as part of a data sharing infrastructure. Private sector has the technical expertise to develop solutions but requires strong governance to ensure it plays by clear and effective rules.

- The fragility of current data interoperability and need for standardisation through practical approaches like building on existing solutions and using ontologies. With a proliferation of guidance on data sharing, we should combine rulebooks and frameworks. Benefits of interoperability outweigh costs of achieving interoperability – and standardisation, ontologies and skills development are essential for seamless data integration and sharing.

- A common view was that technology exists to achieve interoperability but good governance fostering best practice methodologies and initiatives must be developed to scale interoperable solutions, and within required timelines. See slides 5 and 6 for further views and insights.

ROUNDTABLE VIEWS

"The value in interoperability is the potential to connect without obstacle."

Benefits

"Digital assets should be valued as of equal importance to physical assets."

Value of data

"Robust security frameworks ensuring data privacy and integrity."

Vision

"UK regulators network should talk to each other and recognise data infrastructure as infrastructure."

Governance

"Break all the silos at every level - industry sector, regulation, government department, ministers."

Systems approach

"We need to undertake fundamental research in the use of AI to automate interoperability between systems. This will require new architectures and appropriate training data."

Research

ROUNDTABLE INSIGHTS

"AI can monitor and improve data quality by identifying and correcting errors and inconsistencies."

Data Quality Assurance

"Common wrapper needed for real-time data that travels with the data and is trusted e.g. through encryption so that the source doesn't lose control and the source can trust that the conditions for that data are going to be met."

Technical requirements

"Have good definitions. Heavy weight ontologies can hinder interoperability so lightweight are the golden enablers for interoperability (core vocabulary)."

Ontologies

"Real-time synchronisation and collaboration between smart machines."

Machine interoperability

"Common APIs don't exist in all cities to enable multimodal transport systems in cities."

Technical requirements

"Offer training programmes to build expertise in data governance and AI among stakeholders. Best practice and peer-to-peer learning forums for diverse stakeholders."

Skills

CONSIDERATIONS

Workshop speakers and roundtable participants emphasised the importance of leadership, governance, and standardisation to enable industry to drive progress towards greater interoperability. Strong leadership will allow industry to move in a consolidated, informed direction, and while it is industry that develops and implements technical solutions, strong governance is needed to set direction for interoperability. In summary, the workshop considerations were:

- **Legal requirements** Whilst participants did not advocate for a UK version of the Interoperable Europe Act, they suggested that incorporating interoperability requirements into Government procurement processes would achieve the same effect across public services for the UK.

- **Technical expertise.** Participants demonstrated that much of this expertise lies within industry and academia but must be convened, enabling collaboration to achieve full potential through the development of a centre of excellence and the prevalence of systems thinking through public and private sectors.

- **Regulatory requirements.** Participants discussed the need for a 'regulatory glue' to bring regulators together to address interoperability requirements across sectors, rather than the current siloed approach. They identified the need for regulators to think about the rules for using and sharing data and AI across the economy, and discussed how even though at the practical level, this may need a sector-based approach, that needs to be joined up as data and digital governance across the whole economy.

- **Research requirements.** Participants discussed how interoperability can aid the development of AI, and how AI could be used to automate interoperability between systems. Further research is required to investigate this.

- Participants discussed different elements of a **data sharing infrastructure** as the infrastructure to overcome data sharing challenges and enable data interoperability.

RECOMMENDATIONS

Outline recommendations from the workshop to the Department for Science, Innovation and Technology (DSIT), for further consideration through interviews

Industry will drive forward interoperability but only with a clear steer from Government.

DSIT is in a unique position to drive leadership across the UK innovation ecosystem, championing digital and **data as national infrastructure** and aligning regulatory direction.

Government to lead on interoperability

1. Incorporate interoperability requirements into Government procurement processes (aligning with Interoperable Europe Act which has been adopted by the European Commission to improve levels of interoperability across the public sector in Europe). Improving interoperability across the public sector will have a ripple effect of improving interoperability across the economy. The work can be approached in phases and should be further scoped and explored.

2. DSIT to provide funding and governance commitment to develop data sharing infrastructure for both public and private sectors across the economy. Mapping current best practice will form a key part of the work.

RECOMMENDATIONS

The importance of interoperability in building a connected world

Outline recommendations from the workshop to the Department for Science, Innovation and Technology (DSIT), for further consideration through interviews

There exists a strong technical community in the UK who understand interoperability requirements but need support to connect human, digital and physical dimensions as part of the national cyber-physical infrastructure.

It is essential to harness these capabilities now to drive a data sharing infrastructure that breaks down the barriers to sharing data and makes better use of these data to tackle enduring problems.

Government to co-ordinate interoperability best practice

3. Create pro-innovation regulatory framework – set up a cross-sector digitalisation body to govern data sharing infrastructure and the application of common data rules across sectors. There is also a need to put greater effort and resource into coordinating the approach of existing economic regulators to data and AI.

4. Set up a UK Centre of Excellence or Data Sharing Hub (led by Catapults) to lead and convene across industry, including SMEs, and academia to combine frameworks, share learnings, collaborate internationally and promote best practice and skills across public and private sectors. Establish existing models and reports that support this through research or interviews.

5. Fund research on how interoperability can support AI, for example, how data interoperability is a key enabler to accessing data for AI. Fund research on how AI can support interoperability, for example, how AI can help to automate interoperability between systems, initially using training data.