Jan 2025

Sir Robert McALPINE

Data Sharing in Construction

Gareth Parkes

Head of Data & Analytics @ SRM

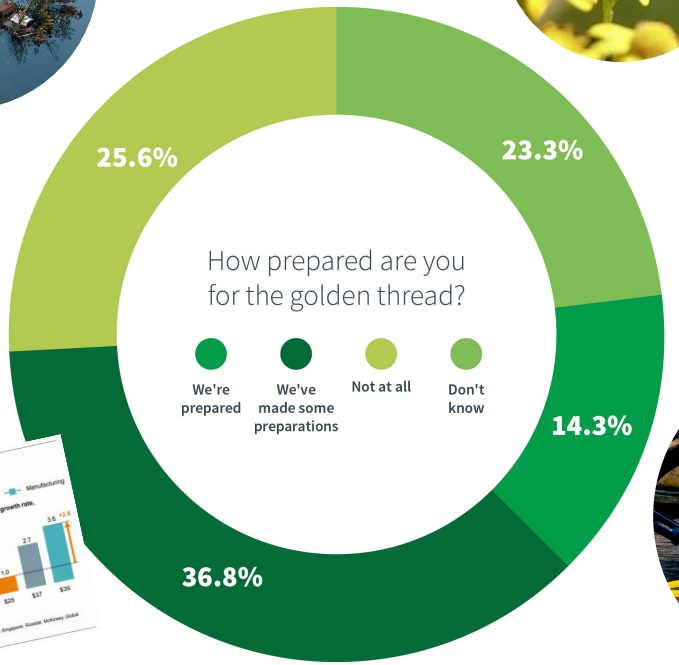
Director @ Construction Data Trust

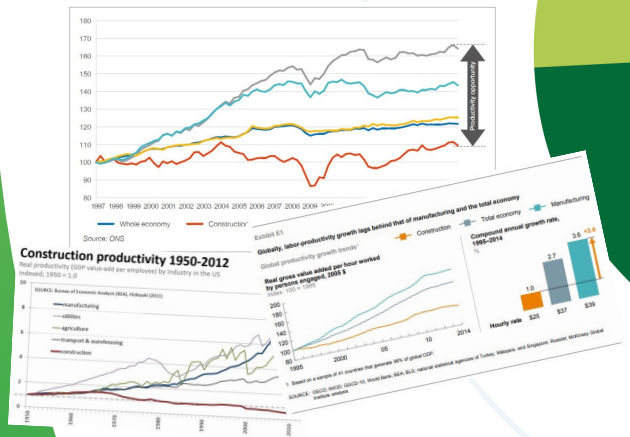
1 in 200 projects are on time, on budget and deliver planned benefits

Common datasets connect our greatest challenges

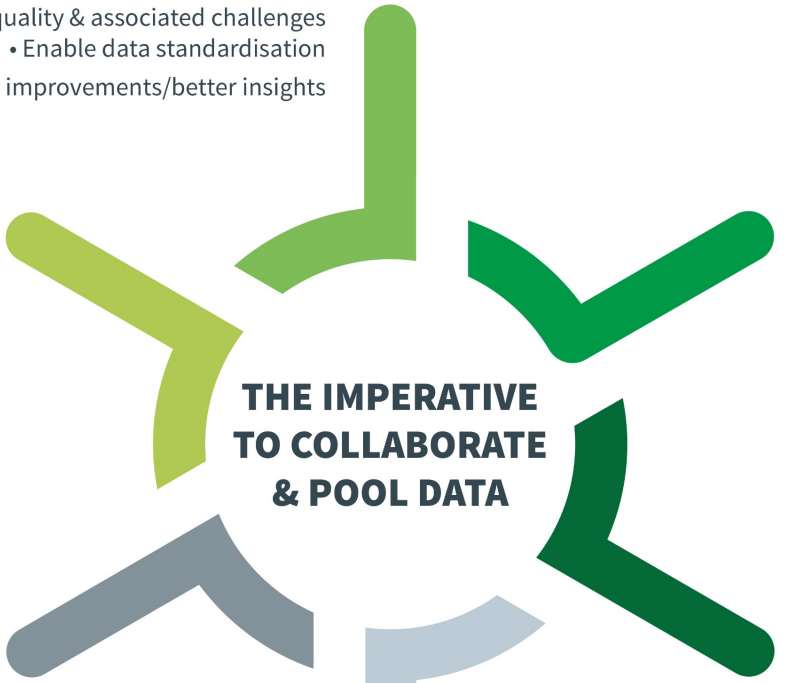
- Productivity
- Health & Wellbeing
- Sustainability

Yet we've still got a long way to go to even get the basics right
(as regularly demonstrated by surveys of the built environment)





A way to deliver value



DATA QUALITY / STANDARDS

- Surface data quality & associated challenges
- Enable data standardisation
- Drive improvements/better insights

CLIENT LED

- Increased weighting in tenders. New requirements
- Desire to leverage hard won experience
- Making projects more investable
- Carbon, SHEW, productivity improvements

SUPPLY CHAIN

- Create shareholder value: ££, new service lines & ESG
- Fear of missing out. Competitor early adopters
- Governance. Line of sight on performance/issues

BENCHMARKING

- How does my data compare to my peers?
- How does my project delivery performance compare?
- How/where can I improve?

REGULATORY AND POLICY

- Golden thread
- Transparency
- Builds trustworthiness
- Accelerated dispute resolution
- Emerging government policy/standards

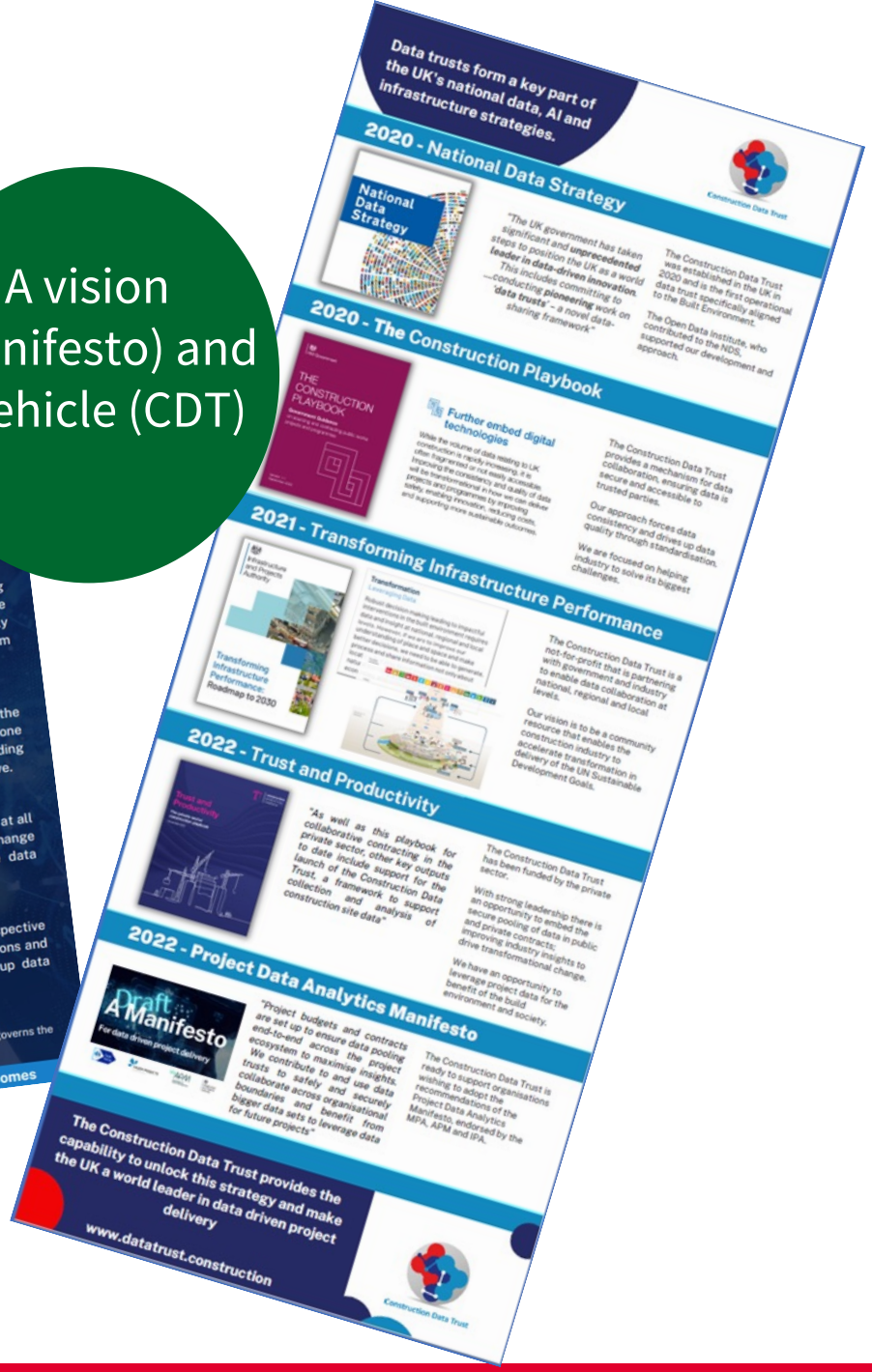
SOCIAL VALUE

- Improved social value by pooling/aggregating data
- Facilitates common, open-source tools
- Tackle shared challenges together, at pace
- Leverage public data that is otherwise hard to access

Once we have better understanding of our common problems,

it requires a common sense of purpose to get to where we want to go…

A vision (manifesto) and a vehicle (CDT)



Where we are

- Established a not-for-profit, founded in 2020 committed to transforming how construction projects are delivered.
- Demonstrated data-level collaboration across multiple Tier 1 Contractors, pooling project delivery & productivity data.
- The legal documents are first of a kind – developed in collaboration with the Open Data Institute.
- Various technical architecture options available & demonstrators of technical capability established

- Legal & technical fundamentals in place to deliver programme of use case-based works (Productivity, NZC, HSW) to drive change.

- Numerous coalitions & innovation bids
- Extensive network of like-minded individuals & organisations
- Commercial model – membership model, supplemented by use case-specific funding.

What we've learned…

- Progress is made by individuals, often with day jobs, often working against the grain of their own organisations.
- Hard to underestimate how immature data literacy is
- Data quality – is generally poor - there are pockets of great data
- Use cases – problem definition is hard – we've built a trove of great ones, but…Construction sector economics & inertia work against this kind of collaboration

Key learnings

- Short duration timeframes
- Well-defined use cases
- Committed & motivated parties (with relevant data)
- Access to funding is hard to come by for an enabling concept.

It's a matter of time before someone gets this to work – when they do, the benefits it will unlock to the organisations involved are vast – current delivery, future delivery, new service lines, supply chain efficiencies…

Bridge AI

Data Driven Approaches in the Creative Sector

A Strategic Framework for AI adoption

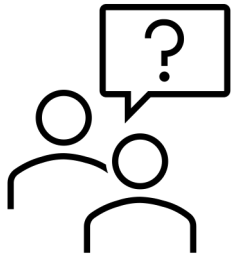
Aralia Systems Limited

January 2025 www.araliasystems.com

About us

Aralia is a technology SME based in the UK and the USA.

Founded in 1997, we create products that incorporate automated image interpretation



Who are we?

We are engineers who provide solutions for image processing tasks.

We have created 3D AI products based around smartphones for users in augmented reality, measurement and heritage sectors.

What are the Creative Industries?

The creative industries focus on innovative, artistic, and intellectual property-driven activities.

They span design, media, entertainment, advertising, publishing, heritage, architecture and technology.

From music to museums, creative industries span diverse fields powered by imagination and innovation.

They are at the forefront in applying AI to support creative processes such as the production of graphics, augmented reality and the recording and presentation of heritage information.

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Scope

AI has a broad range of applications within the Creative Industries

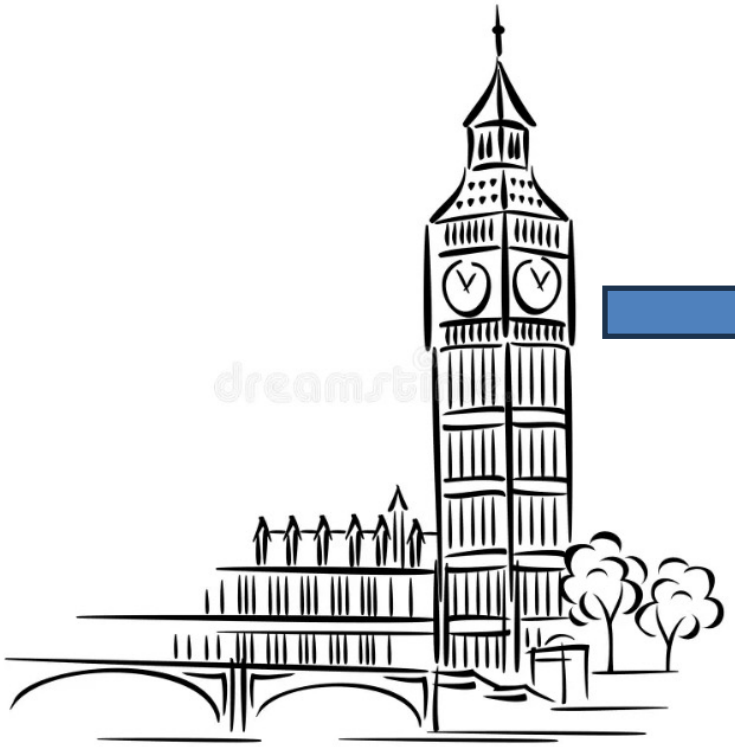
We discuss ways that creators can establish a competitive advantage with AI

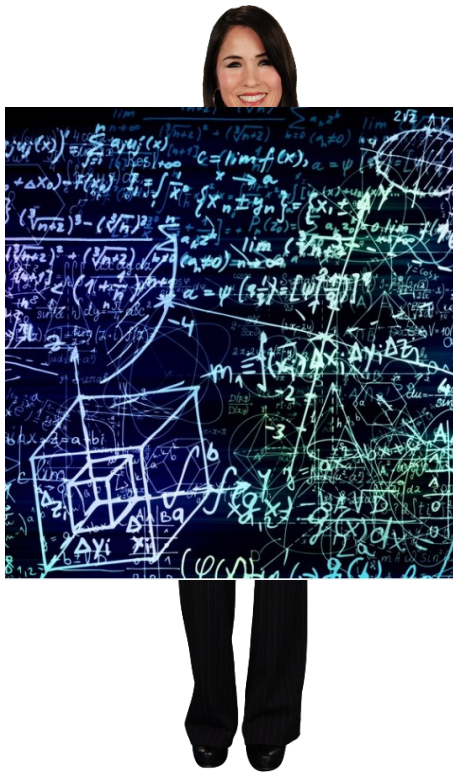
Presentation Content

- The concept of Data Driven AI
- Technology Development Milestones
- The Current Commercial Model
- AI Development Strategies for SMEs
- The future of AI in the Creative Sector

Concept

Training Set





2D Images

Process Model

3D image

What is Data Driven AI?

Data Driven AI is a group of numerical methods that enables the equations that define a process to be recovered by observing the outputs of the process

Kiyosi Ito (1940)

Ito (1951) demonstrated that classical calculus is mirrored in random processes by stochastic calculus. M H A Davis (1978) showed complex processes can be modelled from fuzzy data using stochastic calculus.

A mathematical model of a process can be formulated by using feedback from the output data of the process, even if the data contains a degree of uncertainty.

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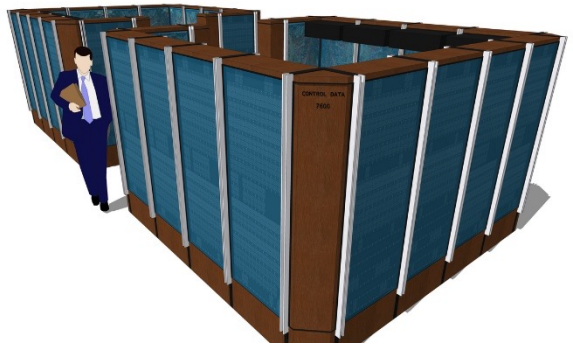
Computing Costs

Computing costs have fallen by a factor of 100,000,000,000,000

	Floating point operations per second	Cost per MFLOP ($)
1975 CDC CYBER 7600 	**3.6×10^{7}**	**2.7×10^{6}**
2025 NVIDIA RTX 4090 	**1×10^{14}**	**2×10^{-5}**

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The complexity of strategies to capture content from the training set to create a process model has increased in step with reduced computational costs

Methods to capture underlying Process Models from training sets:

- 1990 Support Vector Machines (SVM)
- 2012 Deep Neural Networks (DNN)
- 2014 Generative Adversarial Networks (GAN)
- 2017 Transformer Neural Networks (TNN)

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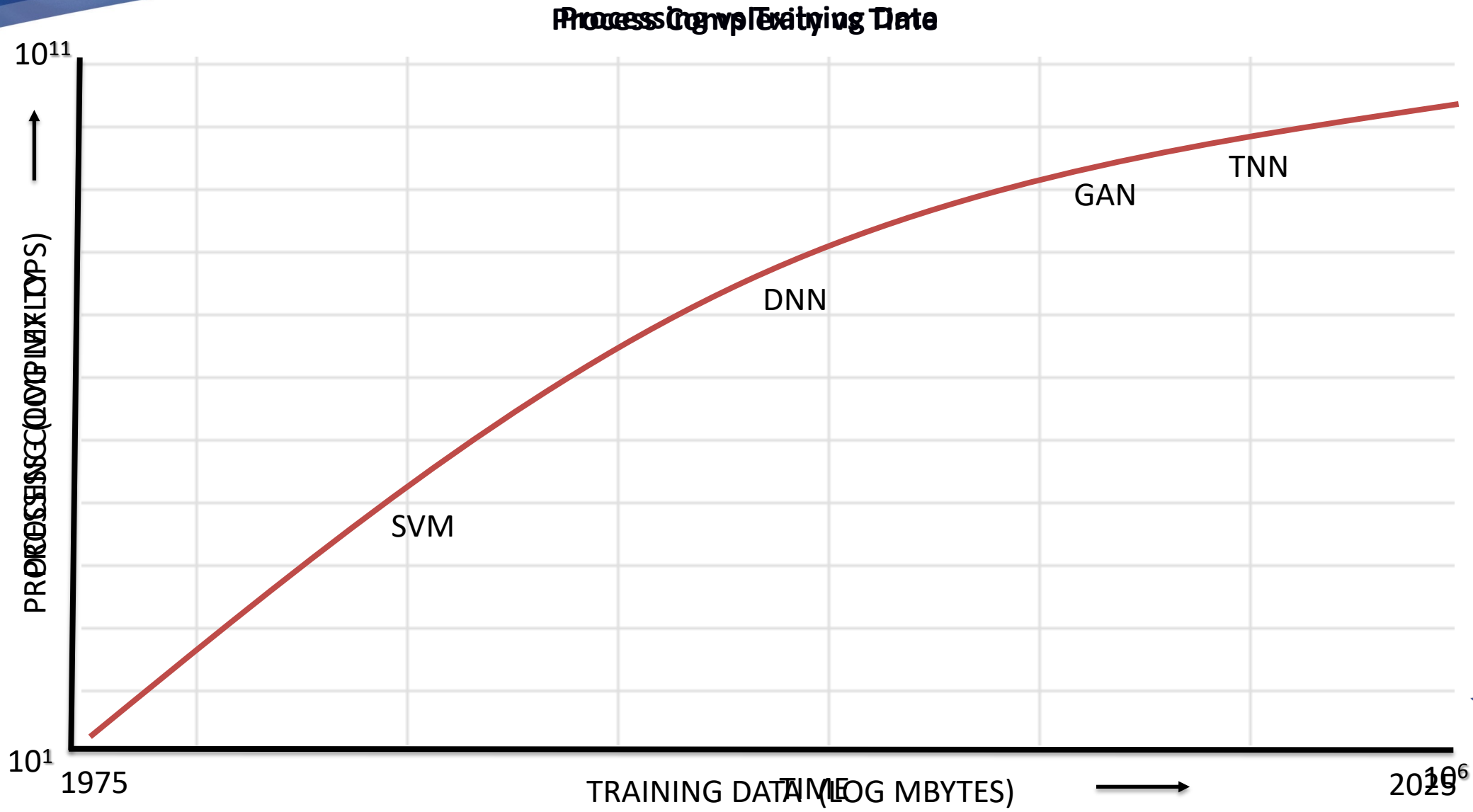
Processing vs Training Data
10^{11}
10^{1}
PROCESSING COMPLEXITY (LOG TOPS)
SVM
DNN
GAN
TNN
1975
2025
TRAINING DATA VOLUME (LOG MBYTES)
10^{6}

Legal Checklist

Training sets are created from open source, licenced and appropriated information

Discussion documents to regulate the use of IPR material within training sets have been circulated

- Copyrighted data or precomputed neural networks

- GDPR considerations will apply to training data

- The training set may be biased to one group of solutions

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BUILDING PROCESS MODELS

Generic AI solutions offered by providers are a quick route to market, but offer little competitive advantage

Plan to double or treble the time allocated for personal development of your AI team

- The pace of new developments requires substantial effort to stay current

Have you fully explored all relevant technologies?

- Mainstream providers use solutions that make no effort to reduce the dependency on training sets or minimise processing time. Their commercial interests are best served by raising market barriers to competitors.

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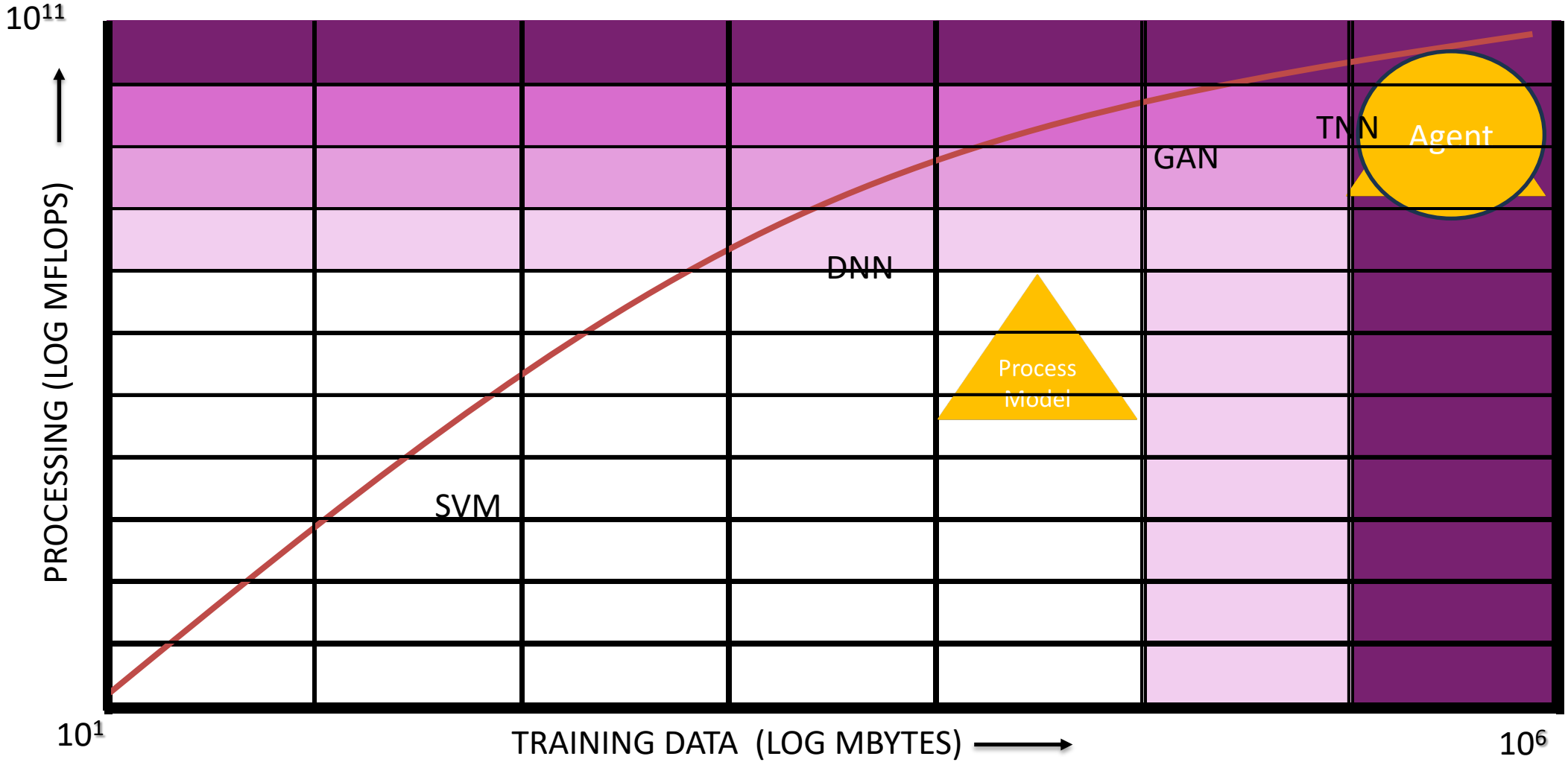
Processing vs Training Data



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Training Set Technical Checklist

Lack of quality metrics is the most significant currently unresolved problem for data driven AI

- ✘ The quality of data generated by the Process Model is not quantified.
- ✘ The data may contain few, or no, examples of specific use cases
- ✘ Convergence to an optimal model during training is not guaranteed

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Commonsense Solutions

Commonsense methods add basic rules to the AI process.

The rules may include physical and logical constraints

Some training methods create Process Models that consume excessive amounts of energy

- Commonsense Models that combine classical solutions with AI components are far more efficient
- Commonsense Models may only require training data that is in the public domain, eliminating copyright concerns
- Commonsense Models can incorporate user feedback to enhance performance and reduce copyright material

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AI Energy Use

Reconstructing the 3D model of an electric kettle using current Multiview AI algorithms requires the same amount of energy as a 3kW kettle consumes when operating continuously for an hour.

A Commonsense algorithm can achieve a more accurate 3D reconstruction using less energy than is required to heat the contents of the kettle.

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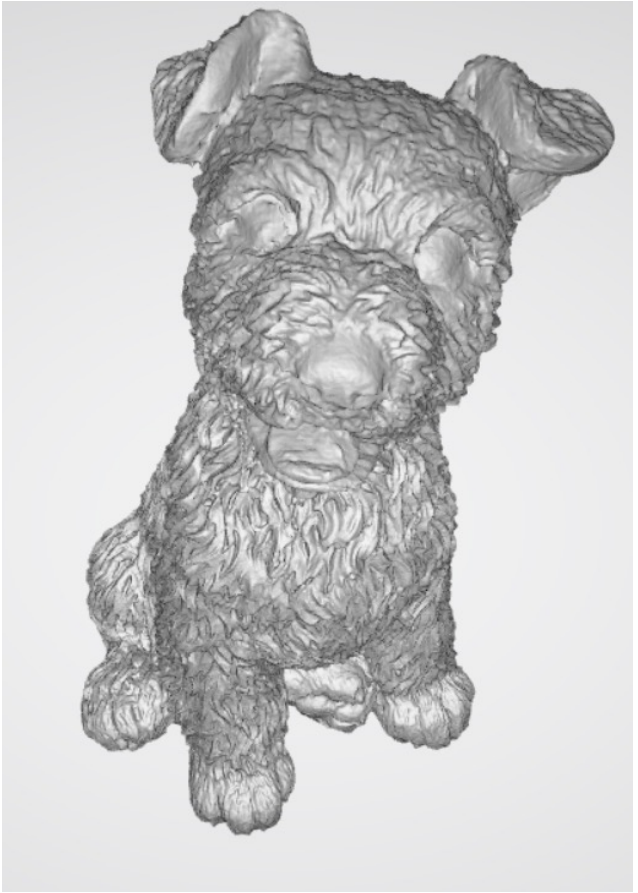
Rendering of a PINN Derived 3D Model

3D Rendering from Multiview PINN Algorithm



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Certificate of Conformance and Error Map

Surface Error Model for Each Pixel

UID:	5yZhnhysWWQ
Creation Date:	01/01/2025
Training Set:	DTU Rev: 3.1
Energy Used:	39kJ

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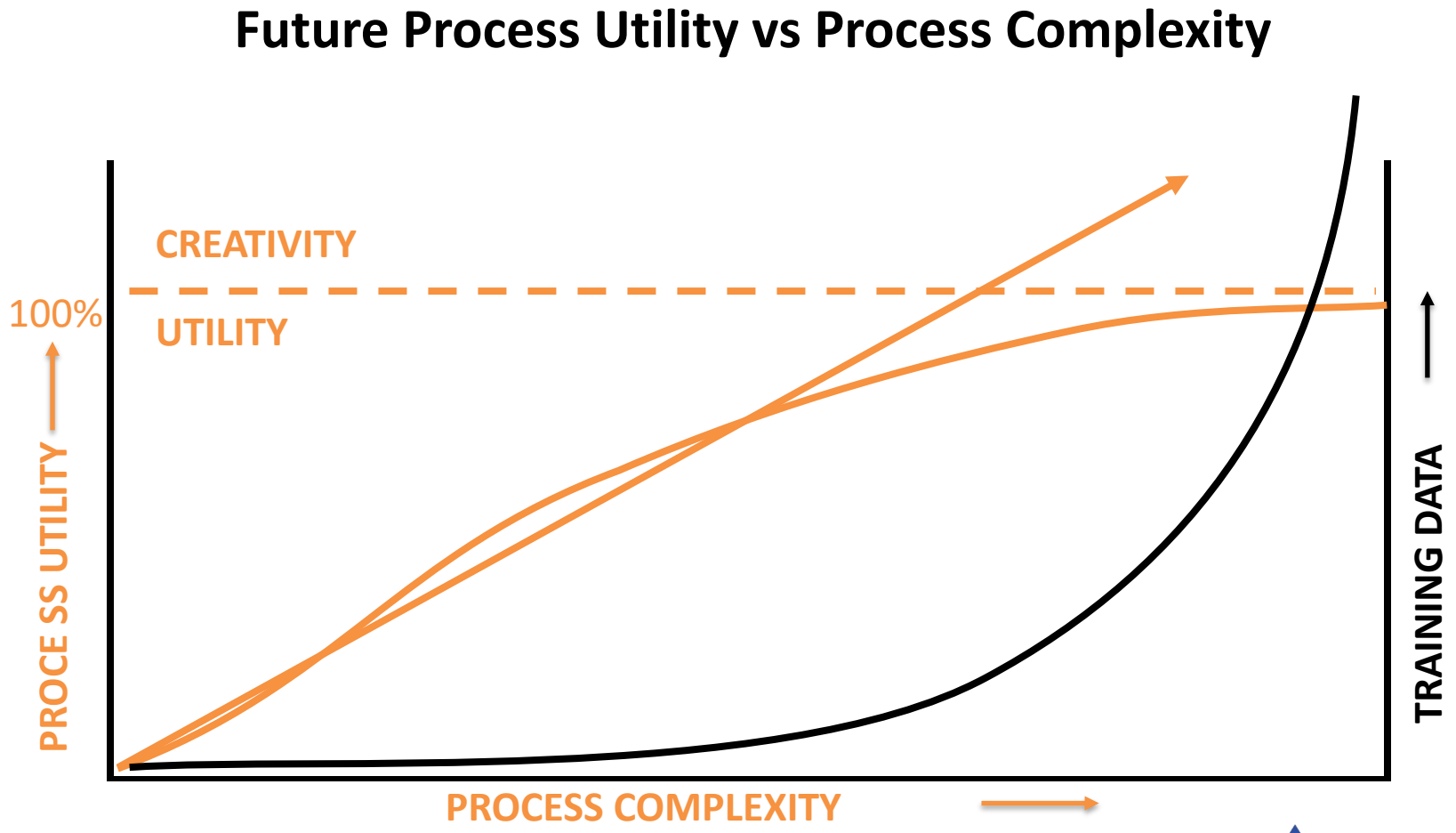
Data Driven AI Limitations

Current results achieved by data driven AI lack excellence

Training sets do not generate creativity and innovation

Data Driven AI is running out of training data



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SME Strategy

Data Driven AI Algorithms are the Machine Tools of Creative Industries

Aim for a Commonsense solution

- Plan flexibility into your hosting strategy
- Secure your IPR
- Stress your socially responsible approach to efficient AI.

Generate quality metrics

- Include a certificate of conformance
- Identify your data sources

ARALIA

Thank you.

www.araliasystems.com

Aralia R&D Headquarters
Aralia Systems
Future Space,
UWE North Gate,
Filton Road, Stoke
Gifford, Bristol
BS34 8RB

Aralia US Office
Aralia Systems
One North Charles Street
Suite 302
Baltimore MD
21201

ATERA ANALYTICS

Bridge AI Webinar: Overcoming data challenges in AI adoption

Data for Operational and Energy Optimisation in Transportation

DATE

15 January 2025

Company Purpose

Our company is becoming a top innovator on the field of Planning Energy Infrastructure for Electric Vehicles and optimising the resources around this ecosystem. Our technology approach merging network planning, AI and energy planning capabilities have been awarded grants through Innovate UK and Private Companies Support. We got strong interest of further developing our data analytics capabilities from 3 different industry participants:

1. Multi-modal Transport Provider covering the entire UK transport network and EVs.
2. Strategic NetZero finance partner working with leading car rental and retailer companies.
3. Remotely Controlled and Semi Autonomous Electric Vehicles Operator.

Problem - NetZero for the EV Charging Infrastructure

EV wide adoption in UK is constrained by power charging and navigation experience

30 Million EVs

In UK by 2030, 20x at least for rest of the world

80% in 2030

Of vehicles to be Free from Fossils Fuels Power Engine

35% Global Average

Annual increase on sales of EVs and infrastructure

85% of drivers

Find EVs charging and mileage as key constraints

Unstructured Data

Real time sensor, user content is a challenge.

Atera Analytics

Problem

Under the UK Zero Emissions Mandate there is an unprecedented growth of demand of ZEVs (Zero Emission Vehicles) and the infrastructure to provide them of electricity through charging points. At +20% annual growth rate of ZEVs registrations according to the Department of Transport, there are clear constraints to reach the 2035 goals of 100% of non carbon emission vehicles in UK.

Currently the information about vehicle performance, reliability, location of charging points, carbon emissions reduction and driver trends is highly sparse preventing consumers and organisations to reach the vehicle adoption proposed by 2035 targets same for UK, Europe and USA. Moreover this is a trend that can be replicated in 50M vehicles Global EV market in the upcoming 2 years.

Aggressive Net Zero Targets

2035 goals of 100% of non carbon emission vehicles in UK and leading countries in Mainland Europe.

IMPACT ON BUSINESSES

Automaker industry spends billions of dollars each customising and improving net Zero Vehicles Technology and Data.

IMPACT ON CONSUMERS

Vehicle consumers need further education and advice towards which is the right vehicle to rent or purchase. 70% of consumers are unaware of long term savings and benefits these vehicles represent.

Approach

Combine advanced AI & APIs for dynamic data modelling, transfer and interoperability.

Gen AI
+
Machine Learning

- **Focused** on providing explainable insights on netZero energy usage and navigation.

Application Programming Interface

- The Interface is designed to **facilitate integration with client data.**

The Key reasons for selecting these technologies:

- AI allow us to evaluate the data quality and predict issues.
- APIs facilitate the standardisation of different data sources.

Enabling a full EV connected ecosystem

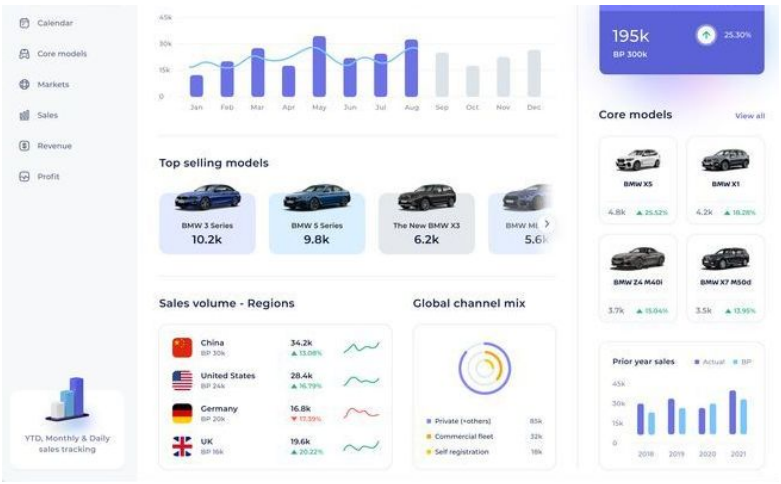
Technology

Our Solution AteraEV is focused on Developing an End to End Real Time Software Application. This is focused on EV Route Planning and Infrastructure Development. We have integrated the AI, API and Network

Current Solution on EV Route Planning and Infrastructure

Kia Niro EV with Several Sensors previously, used for autonomous driving to be setup with all tools

Sensing Equipment For Data Collection equipment for EV performance and Geo Data



Front End Showing Benchmarking of EVs wrt to Routes and Overall Cost of Operation

Atera Analytics

Data Strategy

Geolocation

Data sources such as Satellite Imagery, Maps APIs and DAFNI UK Infrastructure databased have been sued for geolocation of charging points, critical for understanding demand and forecast areas of opportunity for energy companies.

API Data from Google

Through available credits and support from Google we can use their API to enrich travel information including forecasting travel times, ranges, suggested parking locations and relevant recommendations on what to do and where to drive.

Data on Cybersecurity

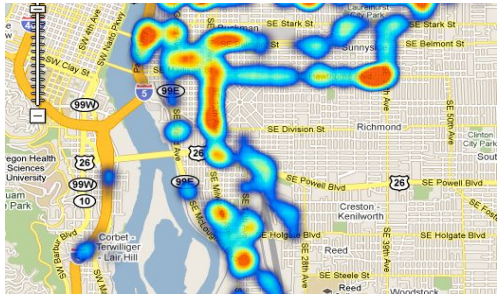
Strong security standards for remote teleoperation of the EVs has been required. Data about the security protocols, user authentication and teleoperation.

Atera Analytics

Key Data and Usage for insight generation.

Our approach is focused on integrating complex and diverse data around ZEVs (Zero-emissions vehicles) to increase the adoption of these vehicles. We are using NetZero guidelines for Data Sharing in order to educate the public and private organisations towards NetZero vehicle infrastructure and usage. We got a grant from the Innovate UK Net Zero Living Digital Programme.

Some of the key insights we have generated are listed below.



Energy Demand Performance

- Collected Information about EV performance.
- Key trends to be considered for EV Grid Planning and Development.
- Evaluate traffic patterns for assessment of demand of charging points and adequate positioning of related infrastructure.

Driver Analytics

- Collected Data on How Drivers execute their journeys from picking up the vehicle, stop at different locations, search for charging points and parking.
- Information about different trends on peak times for using the vehicles, demand for remote delivery of vehicle, driver behavior wrt to regulations, awareness of mileage range and vehicle performance.

Data Integration

Approach to integrating complex and diverse data surrounding Zero-Emissions Vehicles (ZEVs) to encourage adoption:

- Used open data formats and APIs to facilitate seamless data exchange;
- Ensured real-time updates on vehicle performance, charging infrastructure, incentives, and policies;
- Applied machine learning models or statistical methods to detect anomalies;
- Utilised GIS to visualise ZEV adoption trends, charging station locations, and infrastructure gaps;
- Ensured compatibility with major platforms such as Google Maps, Apple Maps, and in-house automotive GPS systems;
- Latency: Tracked data latency to ensure real-time accuracy and identified delays in data streams.

GIS Data

Enables spatial analysis, mapping, and real-world visualisation of data layers.

Data Validation

Use structured schema for incoming data, including required fields, data types, and formats.

Visualisation

Enablement of reporting tools and dashboards to render content to be analysed in real time

Net Zero Guidelines

Use common terms within Data Assets, Metadata and supporting information.

We have built several Data Dictionaries to speak under the same terms.

Describe data accurately using industry standard Metadata.

Followed methodologies and terms from the IEEE and UK Energy guidelines.

Enable potential Data Users to understand Data Assets by providing supporting information.

Set up the relevant content and documentation according to data analysts and engineers.

Treat all Data Assets, their associated Metadata and Scripts used to process Data Assets as Open.

Worked with Open guidelines on metadata and software development.

Source: https://www.ukri.org/publications/innovate-uk-net-zero-living-data-guidance/

NZ Data Users

Identify the roles of stakeholders of Data Assets.

We have identified our present stakeholders as ZEVs rental services, energy planners and their IT managers.

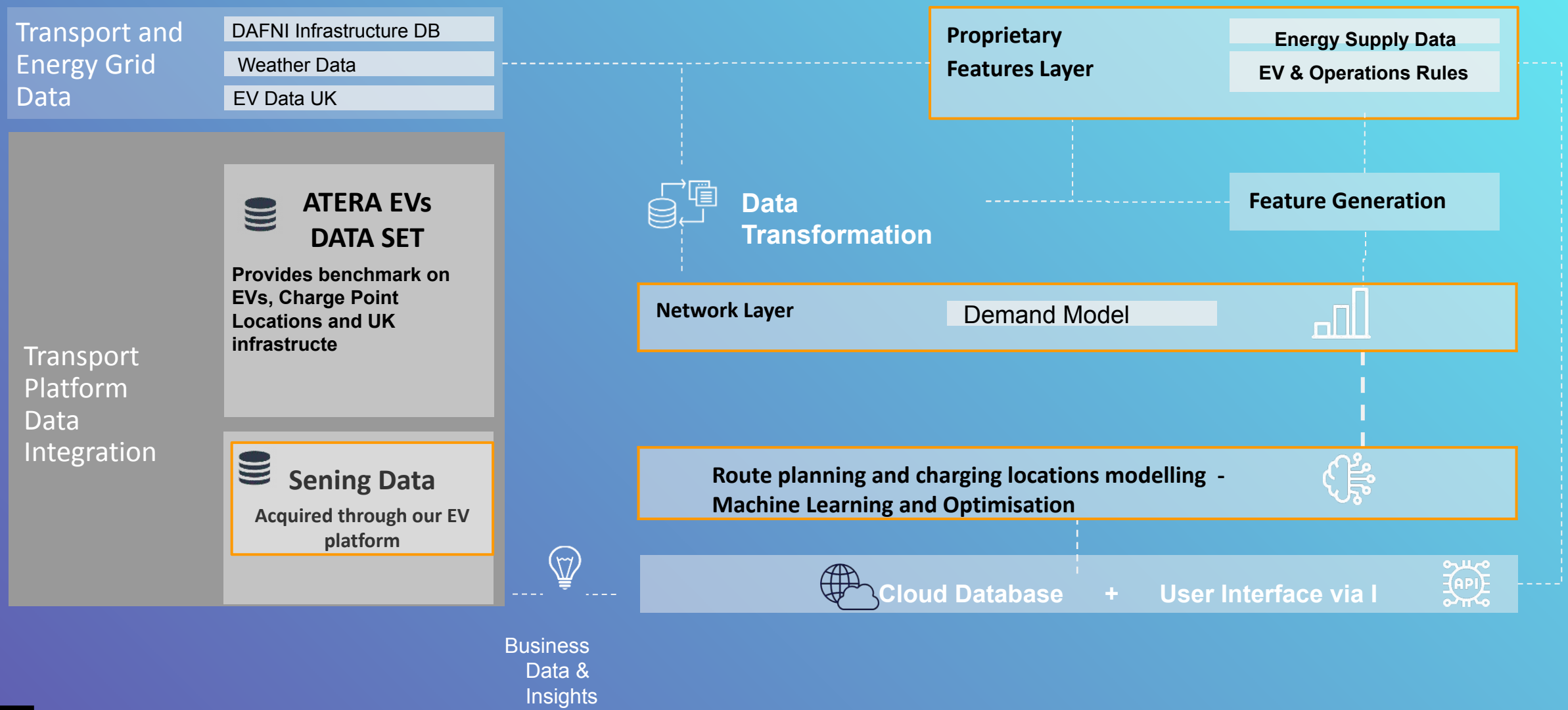
Learn and deliver to the needs of current and prospective Data Users

Structured project's requirements based on user stories.

APIs - *Make Data Assets discoverable for potential Data Users.*

Fully Documented API and guidelines for different users to come.

Simplified Architecture



Best Data Practices

Insights on pitfalls to avoid and opportunities to leverage for early AI adopters in your sector could add significant value to the discussion:

1. Use GenAI as a tool to complement your data gathering, be aware that ghosting happens, and how to avoid fake/biased content.
2. Always validate the sources of the data you use, and look if possible for certified sources such as DAFNI, APIs from commercial and government entities, etc.
3. Less is More - Focus on the key user needs, what is the main data you need, instead of aiming to ingest everything and then deal with complexity and wasting resources on cleaning all the data.
4. Be aware of AI Act, effective from 1 August 2024. Is the world's first comprehensive AI regulation. It aims to ensure AI systems are safe, transparent, and respect fundamental rights

Validate user stories

Ensure that the data user stories are consistent with the Net Zero Guidelines.

Comply with Standards

ISO 27018: Protects personally identifiable information (PII) in public clouds.

Cyber-Security

While using cloud storage: compliance with GDPR and EU regulation. ISO 27017: Guidelines for securing cloud-based environments.

Atera Analytics

Q&A + Call to Action

Let’s transform together the EV and Transport Ecosystem with Data & AI!

Support

We are keen to get your support and advice for commercialisation of AI solutions in Transport and Energy.

Investment

We are looking for funding to hire additional team members, and scale up our tools.

Contact us

joseph.zr@atera-analytics.co.uk
admin@atera-analytics.co.uk

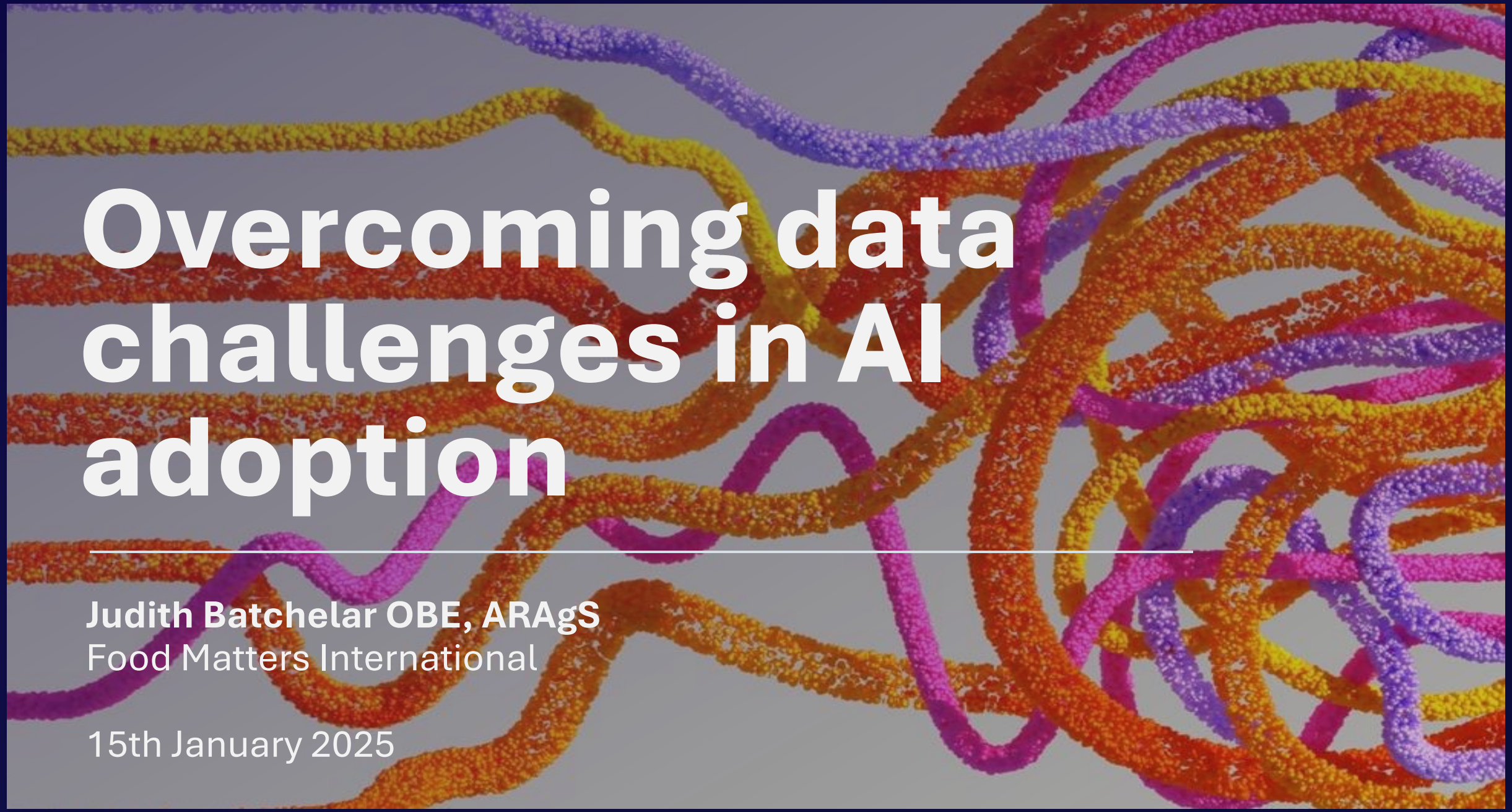
www.atera-analytics.co.uk

ATERA ANALYTICS

Thank You

DATE

January 2025



Overcoming data challenges in AI adoption

Judith Batchelar OBE, ARAgS
Food Matters International

15th January 2025

Agriculture and food

Understand data governance

Learn how to build a strong foundation for AI success with ethical and effective data governance practices.

Overcome data challenges

Gain insights into addressing data-sharing and availability issues in your sector.

Drive AI innovation

Discover how data strategies can unlock AI's potential to optimise operations, improve productivity, and drive creativity.

The system is both fragmented and consolidated

500m
Smallholder households globally

Mostly small-scale farmers, cultivating less than
5 acres

Living on below
$2
a day

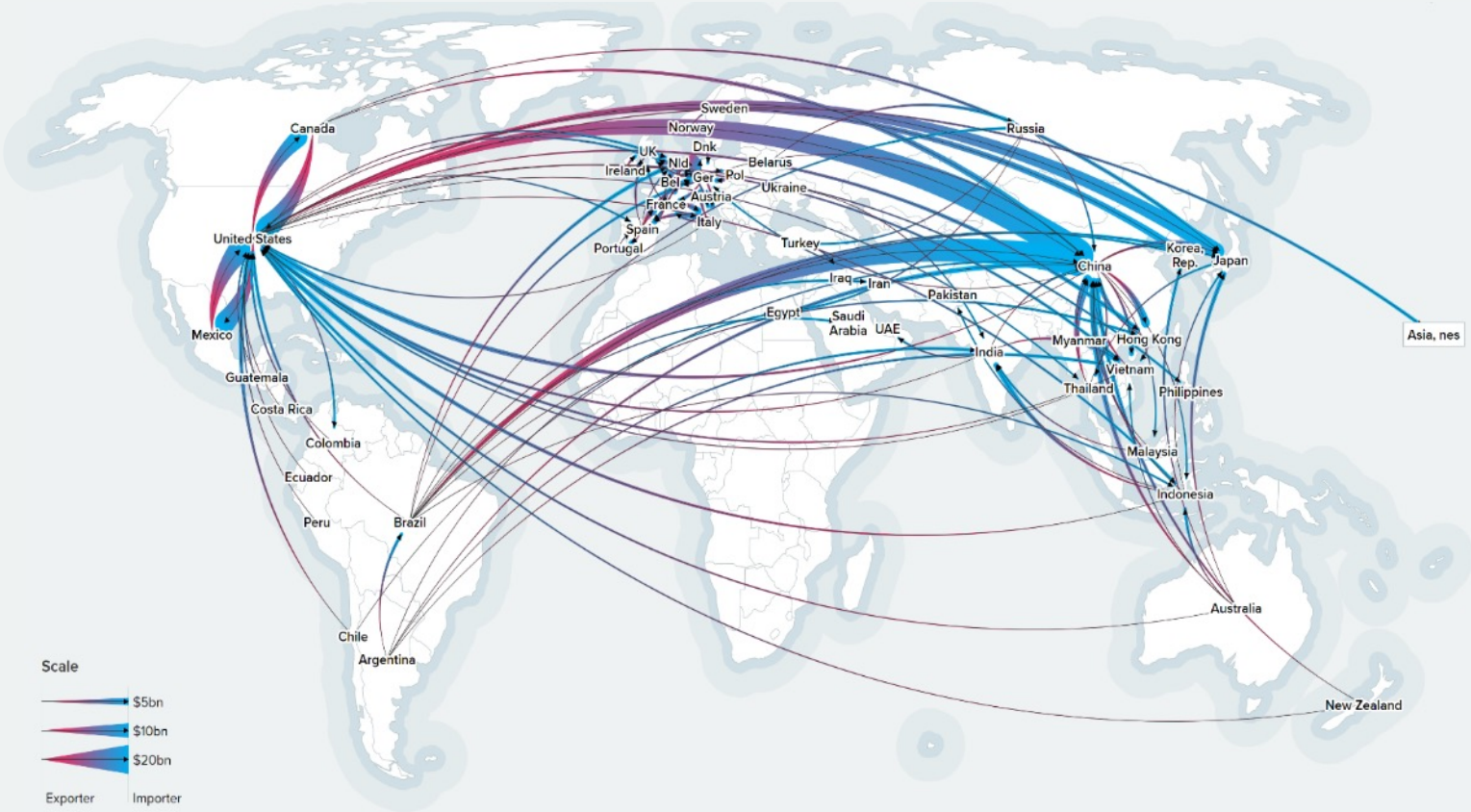
Providing around
35%
of the worlds food

Source: Capitaloneshopping.com

Global to local

We are part of a global food system where every location is a unique combination of geography, politics, climate, nature and people and so tailored solutions are required, which in turn requires us to understand the interdependencies and the risks

This system is controlled by a few large global agricultural traders that are largely privately owned and invisible to consumers




Cyclical changes
Structural risks and opportunities
Resilience & food security

Data and digital technologies are a part of the answer

- Earth Observation Technologies
- Digital twin supply chain
- A.I.
- Digital Imaging
- Data Sync
- Internet of Things
- Machine Learning
- Automation & Robotic Tech

Source: https://www.shipmap.org/

The biggest impact that any supply network has on human and planetary health is in the agricultural part of the supply chain

- *Soil health*
- *Water*
- *Plant health*
- *Pollution*
- *Animal health*
- *Deforestation*
- *Greenhouse Gas Emissions*
- *Biodiversity loss*
- *Human health*

The exam question

"How do we make it easy for farmers and growers to collect and share data and to see the value in doing so"

The considerations and context are global and local, ethical and practical, the cost of the investment, the return, and the management of risk

Collecting data

Data standards

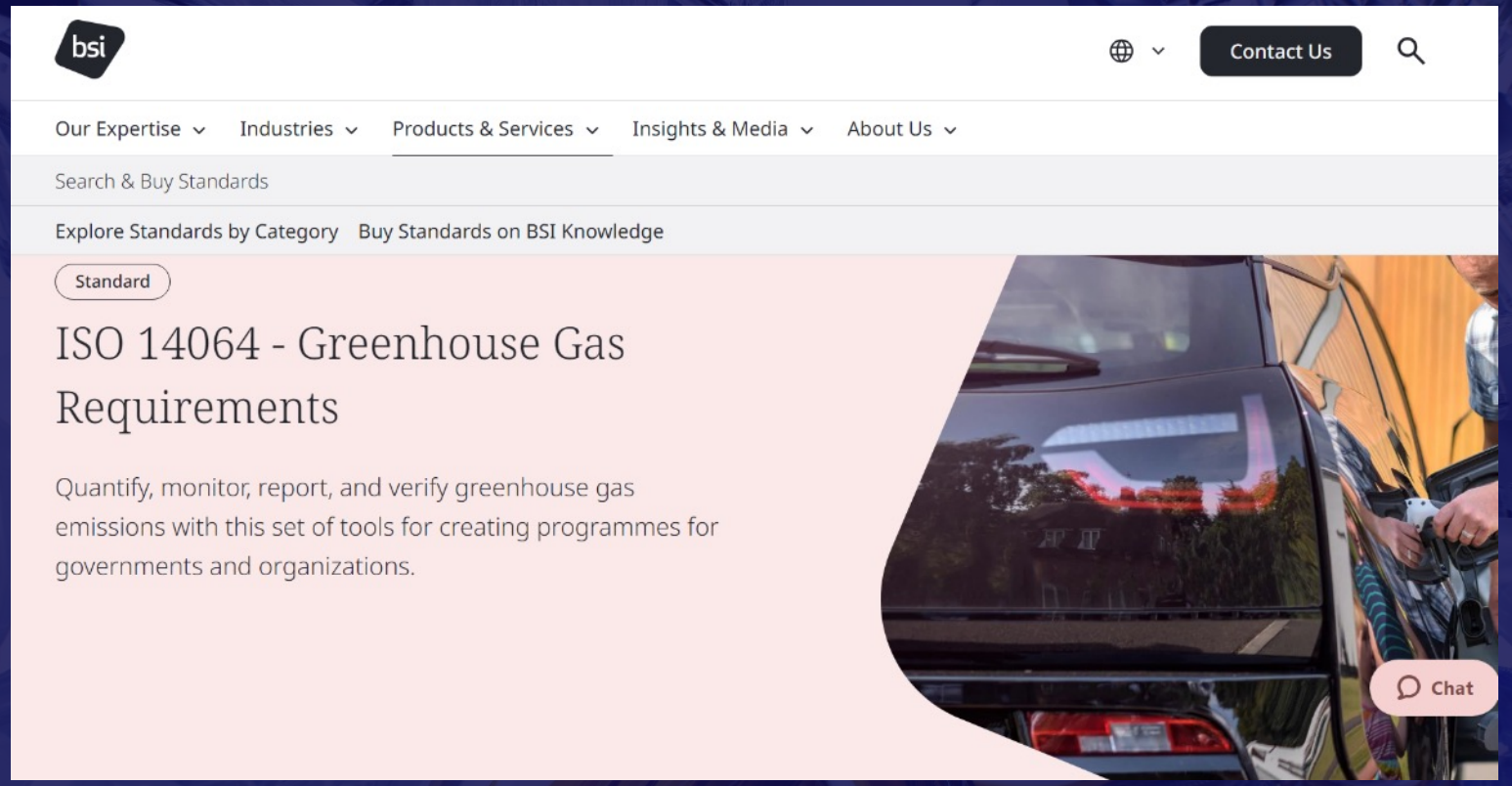
Consolidated asks

Automated data feeds

Harmonised methodologies

Reporting mechanisms

Governance



Sharing data

With who

For what specific purpose

Data formats for interoperability

Data architecture

Data security

Governance

Reducing costs through improved cattle health

Seeing the value in data

Regulatory compliance

Data insights

Management information

Cost controls

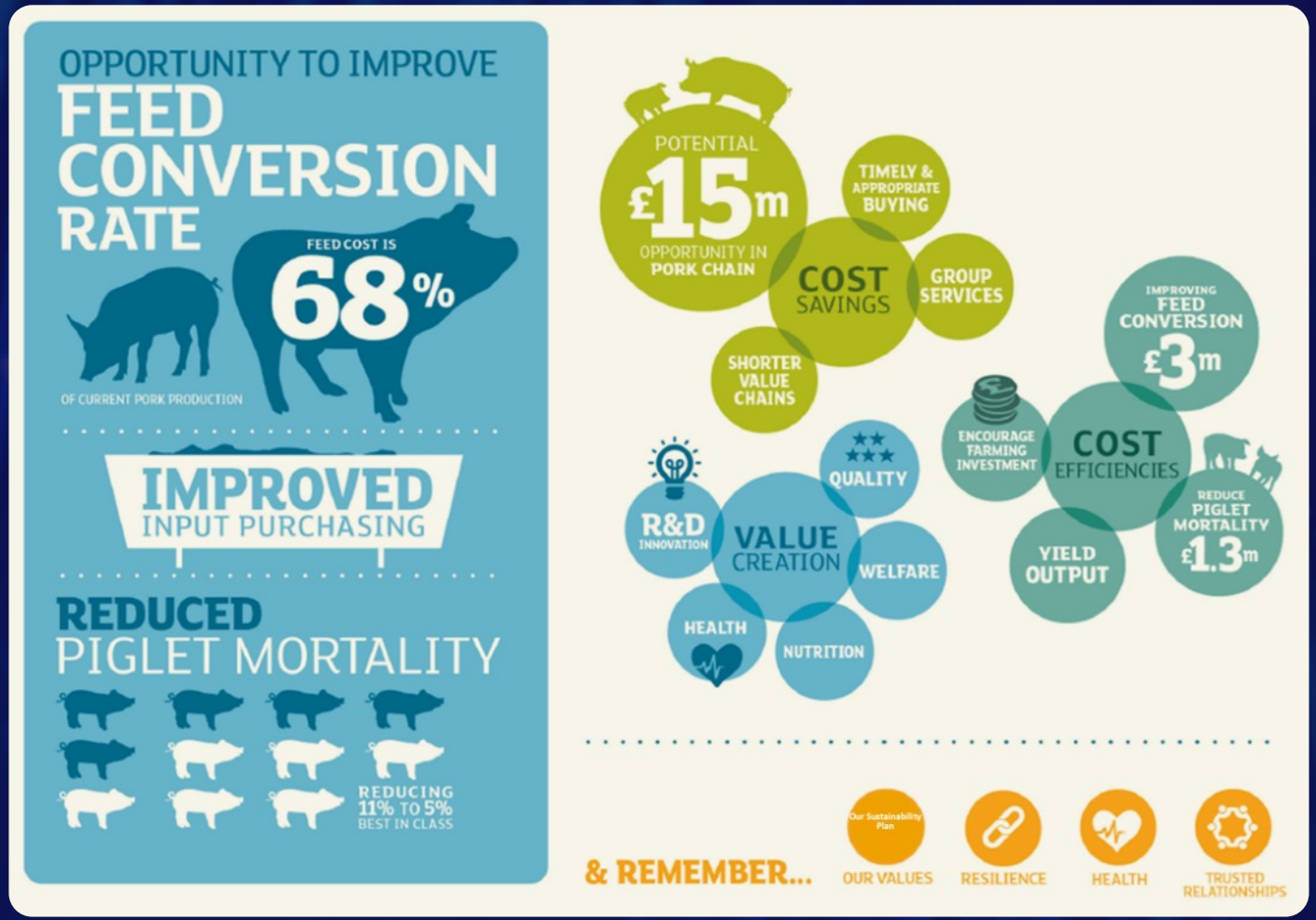
Performance and productivity

Timely interventions

Innovation priorities

Historic learnings v future modelling and scenarios

Creating a more cost effective value chain in pig production



UN Transparency Protocol

Supporting governments and industry on practical measures to counter greenwashing by implementing supply chain traceability and transparency at the scale needed to achieve meaningful impacts on global sustainability outcomes.

Join our chat channel

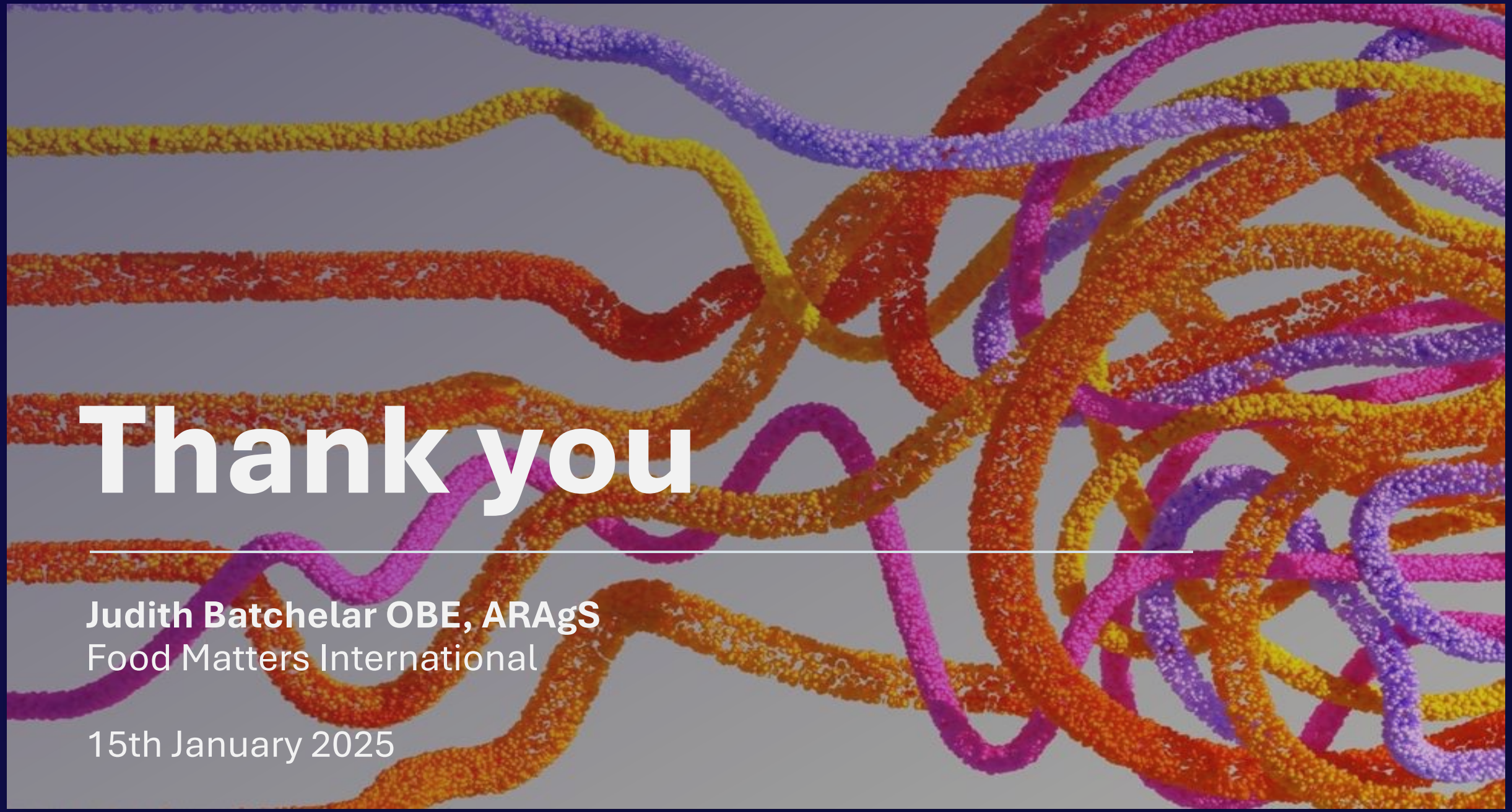
UN Transparency Protocol

The UNTP also aims to address challenges such as the risk that too much of the available ESG incentive is spent on demonstrating compliance and too little is left for implementing more sustainable practices.

In summary

The big learning is start with Governance

Co create that Governance model with stakeholders before you do anything else



Thank you

Judith Batchelar OBE, ARAgS
Food Matters International

15th January 2025

DATA SHARING INFRASTRUCTURE

Sarah Hayes, Chair, Data Sharing Working Group

Ambassador, Connected Places Catapult

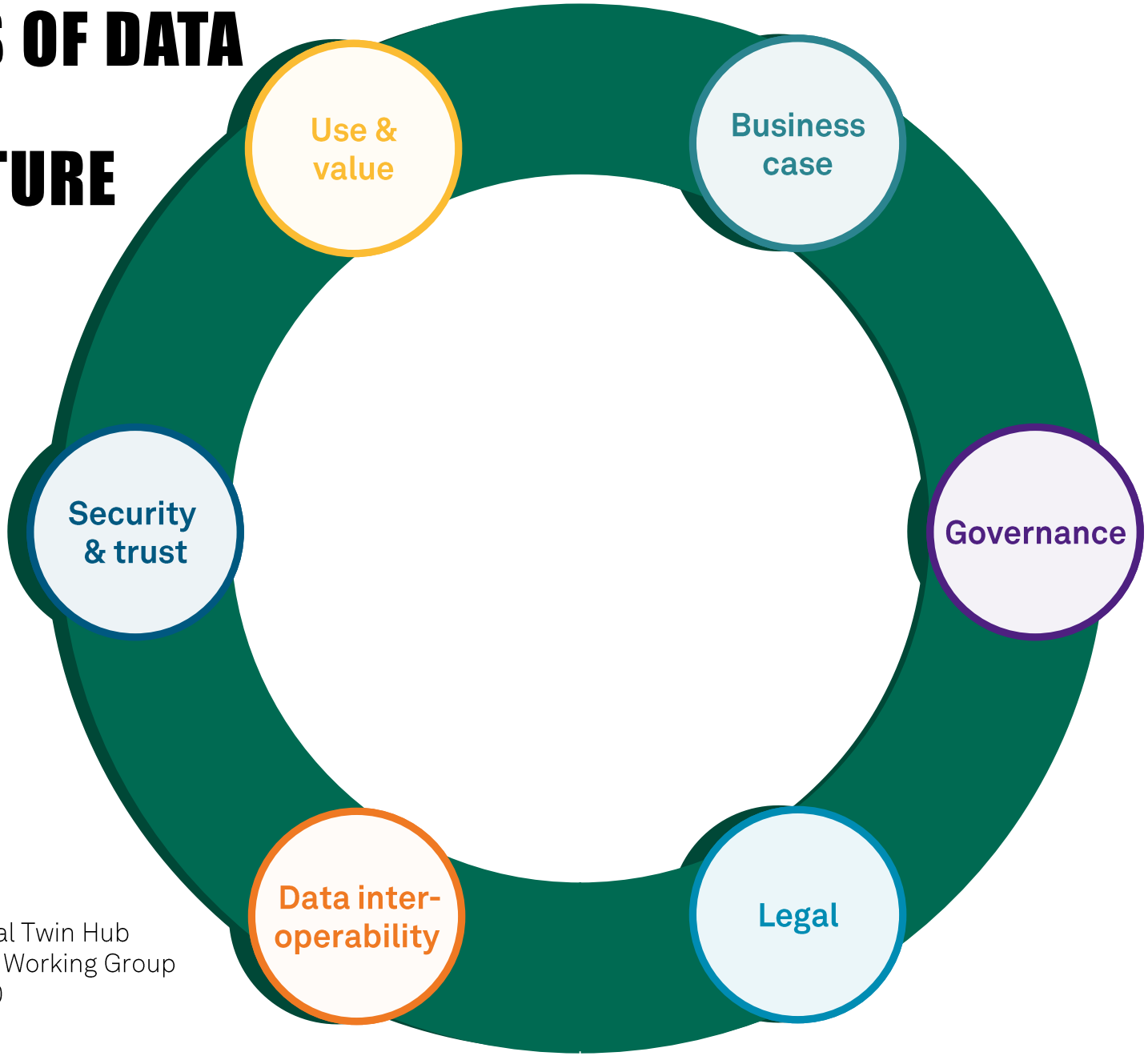
OVERVIEW

- An overview of the Cross-Sector Data Sharing Infrastructure snapshot report
- What is the potential of a UK-wide cross-sector data sharing infrastructure and how will this benefit UK PLC?
- Where next for the Data Sharing Working Group?

DATA SHARING WORKING GROUP

- Set up in 2022
- The purpose of DSWG is to bring people together to discuss and develop data sharing best practice in a collaborative way that builds upon existing work and avoids duplication
- Recognise challenges to sharing data
- Our motto is “Do it once and share it many times”
- Cross sector: across government, industry and academia
- Open and collaborative with other groups eg DT Hub Working Groups
- Agree on need for data sharing infrastructure but might describe it in different ways

COMPONENTS OF DATA SHARING INFRASTRUCTURE



Source: Digital Twin Hub Data Sharing Working Group

DSI SNAPSHOT REPORT

The table below sets out a snapshot of data sharing initiatives using this framework, showing that by using these categories it is possible to describe different data sharing initiatives alongside each other in summarised form.

The detail in this table comes from the Data Sharing Working Group and is open to further refinement. A full landscape review could take this approach and use it as the basis of a survey questionnaire.

Initiative	Business case	Governance	Legal	Data interoperability	Security and Trust	Use and Value
Apollo Protocol	An initiative to unlock the benefits of connected digital twins delivering a mechanism for formalising communication between sectors	Executive Board and Advisory Board supporting Apollo Forums	Open initiative currently chaired by The Alan Turing Institute and the Advanced Manufacturing Research Centre	Focused on information management practices	Focus on security and privacy	Articulating the value of connected digital twins across domains for sharing ideas and proven best practices
CReDo	Climate change adaptation digital twin platform to improve system-wide resilience across infrastructure networks. Current use cases include strategic resilience planning use case. Business case to reduce cost of disruptions, regulatory use case	Led by Connected Places Catapult, alongside partners Anglian Water, BT Group and UK Power Networks, funded by Innovate UK, Ofgem SIF, Ofwat Breakthrough	Bespoke data licence based on energy data exploration licence and Partnership Agreement	Application-level ontologies were developed to create a knowledge graph that integrates data across energy, water, telecoms	Use of central secure host originally and shift to distributed architecture	£4.4bn Net Present Value of CReDo cross-sector digital twin for extreme heat and flooding scenarios at Great Britain level to 2080 (£2.6bn to 2055)[8]
Earth Observation (EO) Data Hub	Increase use of EO Data to new markets and improve ease of access to all EO data sources. Minimise duplication and transfer of large datasets	EO Data Hub Board, EO Data Hub end user and stakeholder forum	Licensing: Open access for open data. Individual data licences between supplier and end user	Suppliers using industry standards for EO data and geospatial data sharing	OAuth (Open Authorisation Standard) used across distributed architecture. Supplier-end user access to be enabled	Focus on climate and land use change monitoring. Open-source code, offering both open and commercial data
Energy Data Sharing Infrastructure	Net zero and resilience, multiple use cases	Ofgem consulting on interim Data Sharing Infrastructure coordinator, Ofgem Data Best Practice. NESO pilot (requested by DESNZ) under Virtual Energy System programme governance	For pilot and minimum viable product use case leveraging existing energy grid codes (license obligation to share data with NESO). In long run, legal framework to leverage Trust Framework	Pilot and minimum viable product are exchanging data using Common Information Model. Review of standards planned	Trust Framework to be developed as part of Data Sharing Infrastructure pilot and minimum viable product	Use across energy system

DSI SNAPSHOT REPORT

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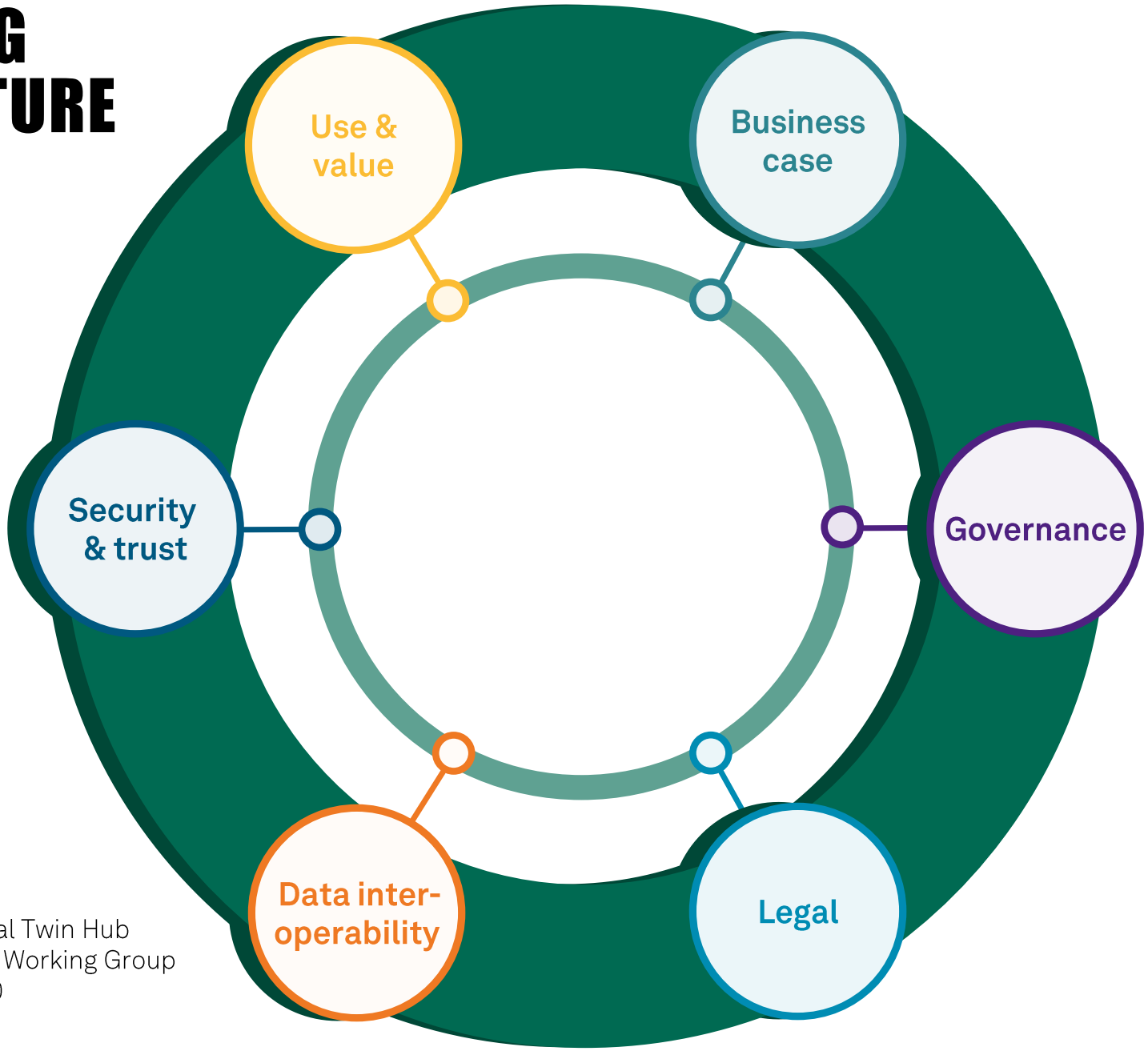
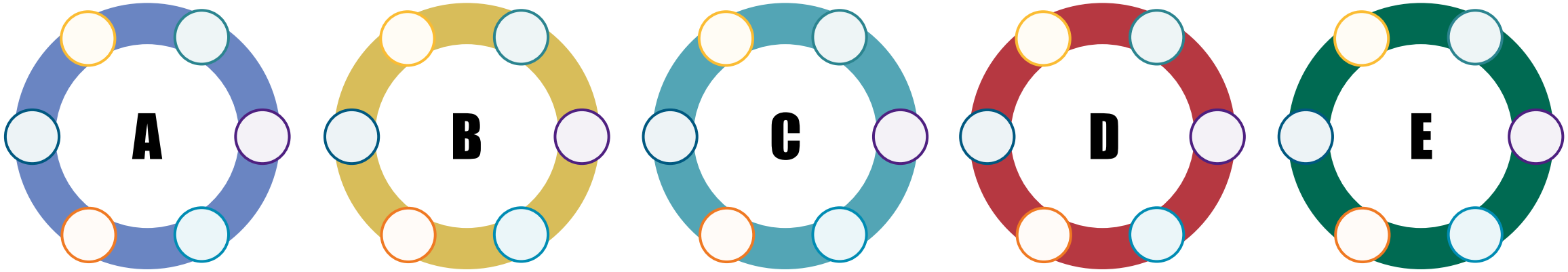
Interoperability Flagship	Reduction in time to map data models between systems. Use case: carbon measurement and reporting within construction	Led by Digital Catapult		Automated semantic mapping between different but related data models in different systems. Translation from data generator systems into an adaptive universal language and translation into a consumer data model	Provide an indication of data gaps, completeness and confidence across use cases	Creating carbon reporting data models
NDTP[9]	Develop standards, frameworks, guidelines, methodologies, and tools that are foundational to a functioning market in digital twins	HMG Programme funded and managed by DBT, with cross-Whitehall contributions (e.g.,DfT, MoD)	Open-source software (OSS) available to all under an Apache 2.0 License. Multiple MoUs across government and industry (e.g., NESO, Stream, MoD etc.)	Developing open-source software, called the Integration Architecture (IA), to serve as a distributed Data Sharing Infrastructure. This enables seamless data exchange and supports interoperability by mapping data to a common 4D ontology, known as the Information Exchange Standard (IES)[10](IES). IES spans multiple sectors and gaining widespread adoption.	Developed using Secure by Design principles (also covered in Secure by Design Policy, authored by CDDO and Cabinet Office). Is a Zero Trust Architecture as defined by NCSC. Employs ABAC (attribute-based access control) and currently working on developing PBAC (policy-based access control)	Multi-million-pound open-source software, accessible to all, and already adopted by NESO and MOD. Includes four (4) data-exploitation demonstrators, such as IRIS, which accelerates the EC04 eligibility and identification process by over 20%
NUAR[11]	Digital map of underground pipes and cables for authorised users in England, Wales, NI, accelerating data sharing process from six days (currently) down to 60 seconds (with NUAR)[12]	Geospatial Commission funded the development of NUAR. OS as future operator of the service while Government remain accountable for the register and policy oversight	Minimum viable product is initially accessible to asset owners who operate in England, Wales or Northern Ireland and have signed the NUAR Data Distribution Agreement and agreed a Data Ingestion Specification	Harmonised data model. Use of OGC MUDDI schema for harmonisation. Centralised data sharing architecture in pilot phase	Role based access – based upon role and approved purposes. All access is audited and sensitive assets have 'enhanced' security measures attached	NUAR is envisaged to deliver over £400m per year of economic growth through increased efficiency, reduced accidental damage and reduced disruption for citizens and businesses. The service is transitioning to Public beta in Spring 2025
Rail Data Marketplace	The central platform for finding and sharing data across the rail sector	DfT funded. Cross-industry steering group. Delivered and run by Rail Delivery Group	License builder or default provided https://raildata.org.uk/helpAndInformation/policies/data-sharing-agreement	Supports APIs, flat files and pub/sub technologies. Common Meta data (RSSB standard)	Full role-based access. Full security model followed	Currently 149 data products published across: Open data, shared (limited use) and monetised. Aim to be commercially neutral
Stream	Data sharing across water sector. Use case agnostic	Independent governance framework including partners, observers and advisors, Data triage and identify rules to put in place to govern who can use the data for what purpose	Overarching legal framework with scheme specific terms for use cases where data sharing is a factor. For open data, agreement over standardisation on open data terms/licensing	Standards defined and documented for what and how the data needs to be shared – agreed among members of the scheme. Adoption of existing standards where these exist is a key principle	Technical enactment of the rules including validation/verification of publisher, user and data as appropriate	Stream's role is to enable the creation of value and to capture and share/spotlight stories of value generation to demonstrate ROI
4D SIG	A network of information management enthusiasts exploring the organisational, technical and theoretical challenges within and between information systems	Independent with a leadership team led by Dame Wendy Hall	Network managed out of the University of Southampton	Focuses on 4-dimensionalism (4D) that is a key characteristic of the foundation data model used by the National Digital Twin Programme	Dedicated working group investigating future security models utilising this approach	Dedicated working group investigating the value in 4D approaches sharing examples where possible

DATA SHARING INFRASTRUCTURE



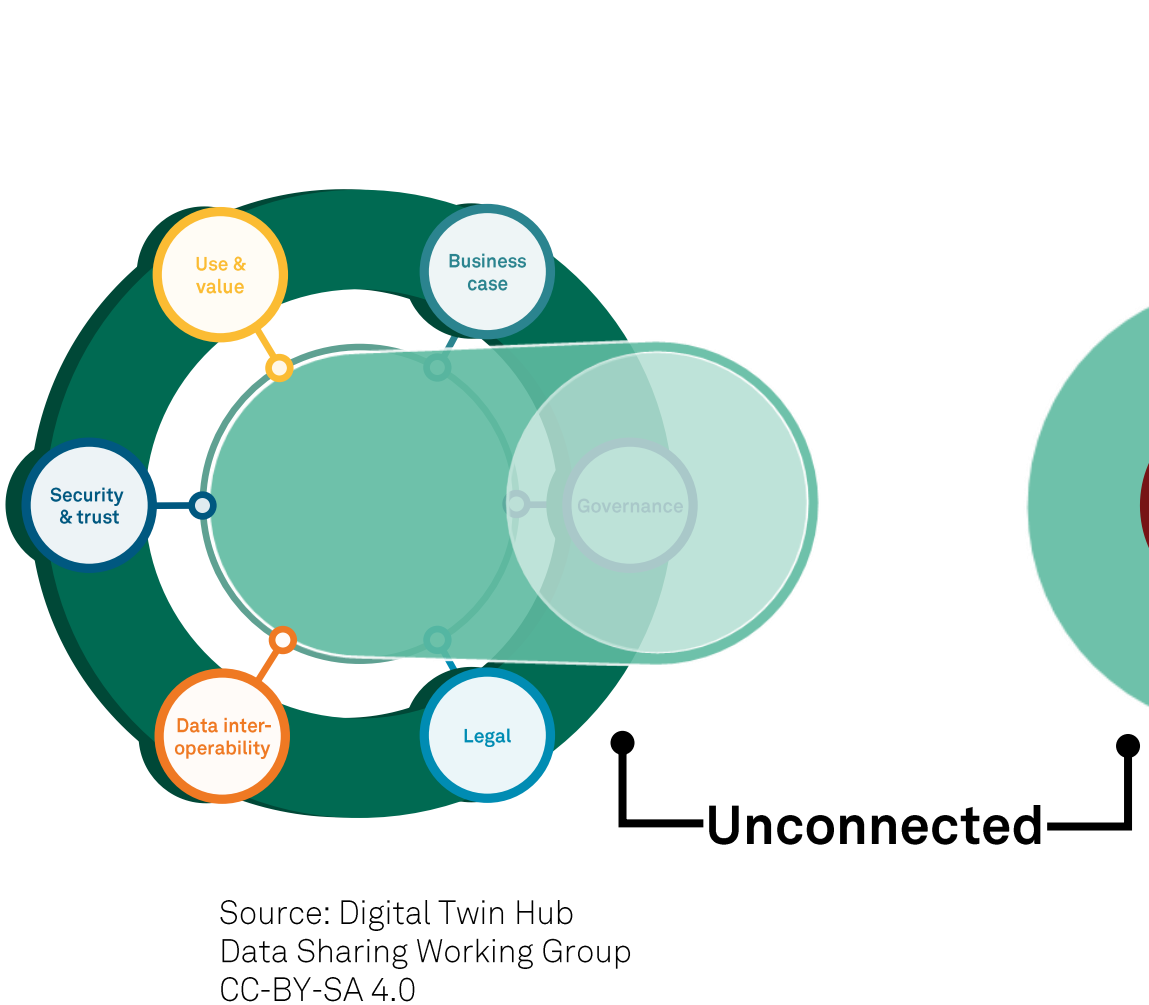
Source: Digital Twin Hub
Data Sharing Working Group

MANY DIFFERENT DATA SHARING INITIATIVES



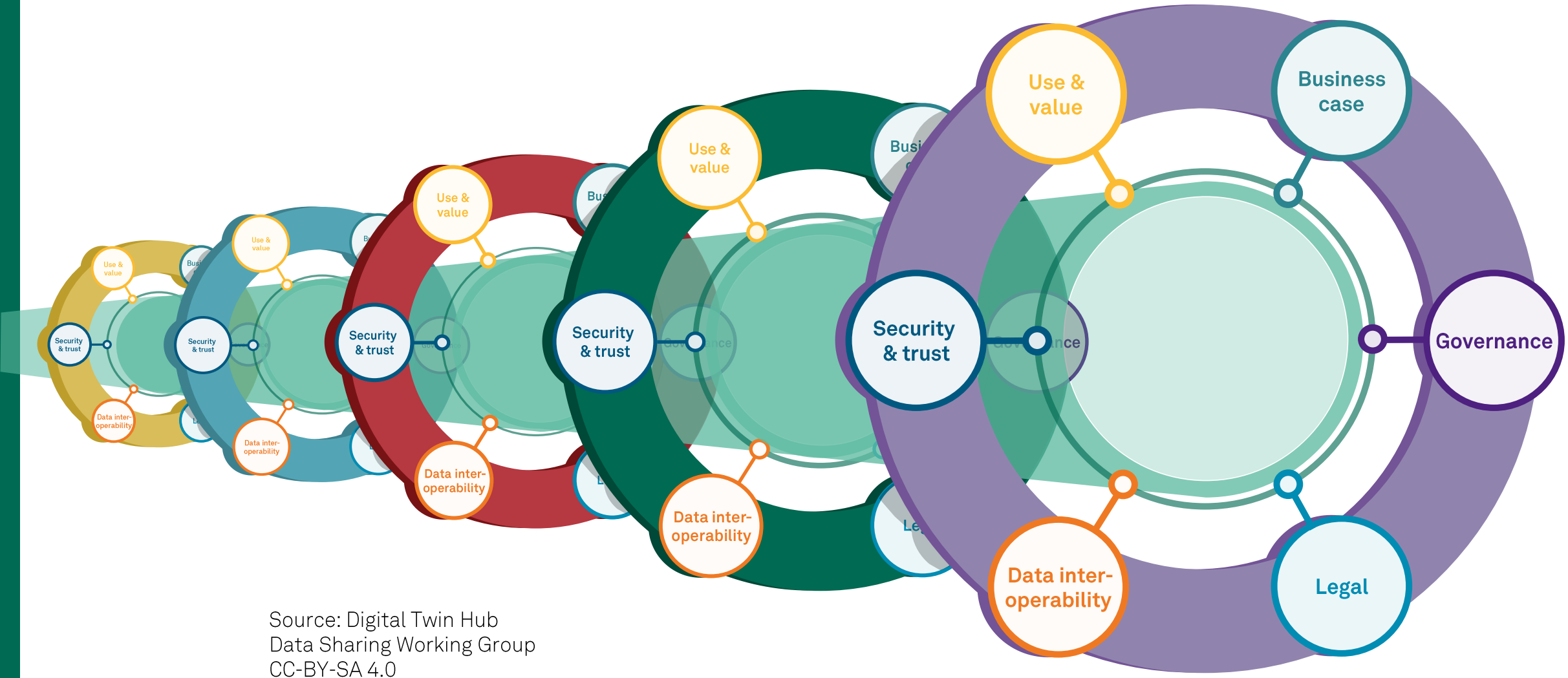
Source: Digital Twin Hub
Data Sharing Working Group

DATA SHARING INITIATIVES UNCONNECTED



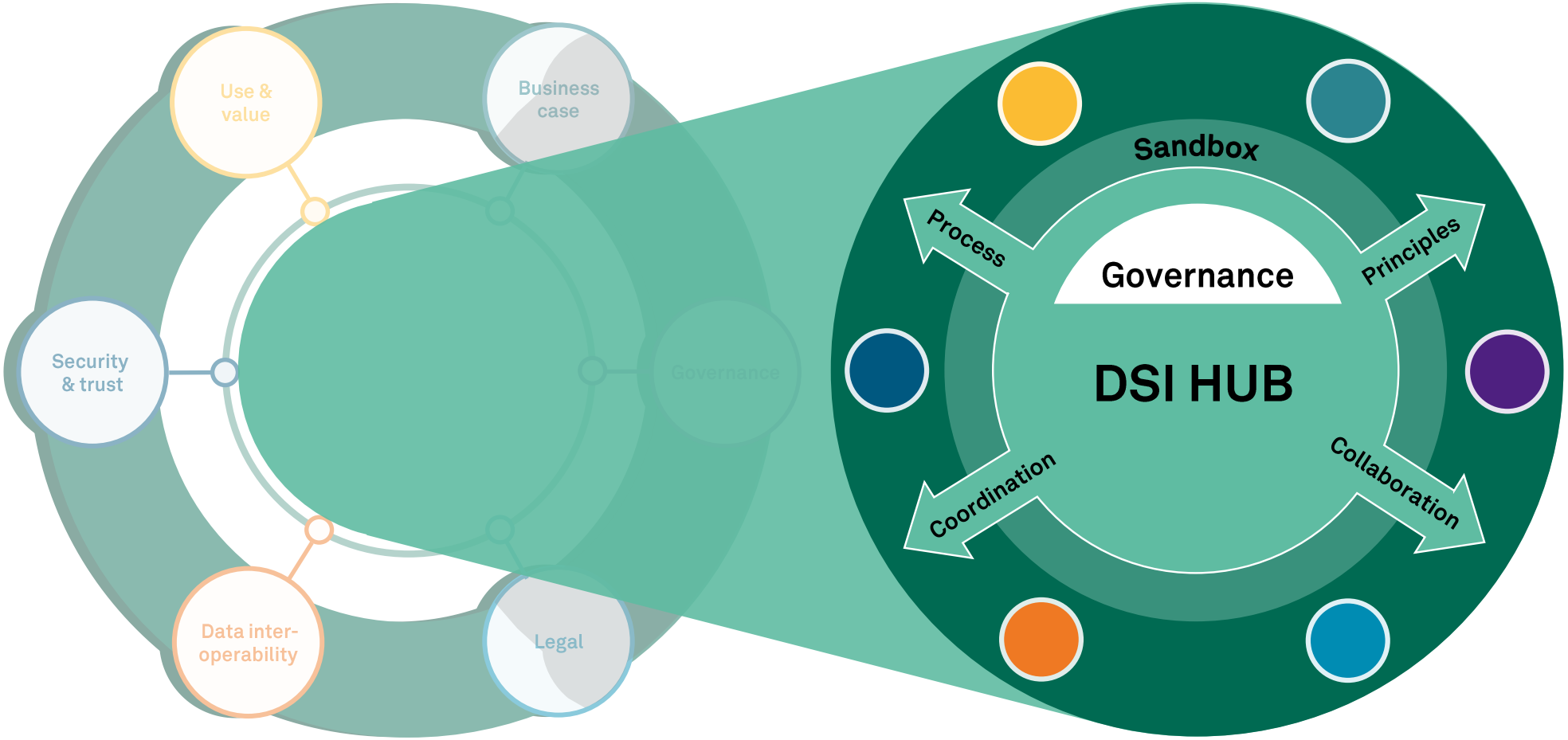
Source: Digital Twin Hub
Data Sharing Working Group

DATA SHARING INFRASTRUCTURE



Source: Digital Twin Hub
Data Sharing Working Group

DATA SHARING INFRASTRUCTURE HUB (DSIH)



Source: Digital Twin Hub
Data Sharing Working Group

DO IT ONCE AND SHARE IT MANY TIMES

Data Sharing Working Group

sarah.hayes@cp.catapult.org.uk.