

# Rebuilding a Resilient Britain: Data and Evaluation Areas of Research Interest across Government

Synthesised by:

Kathryn Oliver, Government Office for Science

Annette Boaz, Government Office for Science

Giulia Cuccato, Government Office for Science

Cameron Dashwood, Government Office for Science

December 2020

[ari.comment@go-science.gov.uk](mailto:ari.comment@go-science.gov.uk)

## Table of Contents

### Contents

1. Aim .....	3
2. Background .....	3
3. Results .....	3
3.1. Existing ARIs related to data and evaluation published by departments between 2017 and February 2020 .....	3
3.2. Existing evidence, unanswered ARIs, and research gaps identified through the Rebuilding a Resilient Britain programme .....	4
3.3. Insights from the Rebuilding a Resilient Britain programme: cross-cutting key messages and high-level research themes relating to data and evaluation .....	5
Annex 1: List of existing ARIs related to data and evaluation .....	8
Annex 2: List of ARIs for which the Working Groups presented evidence and resources .....	10
Annex 3: List of new research gaps pertaining to data and evaluation.....	12

This paper should be cited as:

Boaz A, Oliver K, Cuccato G, Dashwood C. (2021) Rebuilding a Resilient Britain: Data and Evaluation Areas of Research Interest across Government. [online] ARI Report 10.

## 1. Aim

The aim of this paper is to share learning from the Areas of Research Interest (ARIs) relating to data and evaluation, and the subsequent academic-policy engagement process hosted by the Government Office for Science (GOS) and facilitated by the Economic and Social Research Council (ESRC)/GOS ARI Fellows. It is hoped that these learnings will feed into relevant initiatives that are currently underway at, for example, Administrative Data Research UK and the ESRC.

## 2. Background

[ARIs are statements of priority research areas identified by government departments](#). As proposed by the [Nurse Review of Research Councils](#), all departments publish an annually-refreshed set of ARIs to promote more effective engagement with research communities.

In 2019, two Fellows were appointed jointly by ESRC and GOS to promote academic-policy engagement around ARIs. This involved working with departments to understand how ARIs were produced, how they were used, and what resources might be required to optimise engagement with governmental ARIs.

Analysis of existing ARIs identified cross-cutting issues and themes of importance across departments. Two themes identified as priorities across multiple departments were 1) data sharing, linkages, and ethics, and 2) evaluation and replication.

Between April-November 2020, the Fellows ran the Rebuilding a Resilient Britain programme which brought together researchers, policy officials and funders to focus on groups of ARIs identified as critical to supporting the government response to COVID-19 in the mid- to long-term.

Nine Working Groups identified existing evidence, key messages for decision-makers arising from this evidence, and gaps in the current research. Almost half of the new research gaps identified (43 out of 103) were about data and evaluation.

Analyses of reports submitted by these groups produced high-level insights on cross-cutting key messages and research themes relating to data and evaluation.

## 3. Results

### 3.1. Existing ARIs related to data and evaluation published by departments between 2017 and February 2020

These ARIs were identified by extracting from published governmental ARIs all those related to data and evaluation. The Fellows grouped the ARIs into four themes: **changing systems**, **changing services and government**, **changing behaviour**, and **understanding society**. This included re-wording ARIs where there were clear overlaps between departmental priorities. The ARIs covered a range of topics ranging from very focused questions on particular elements of measurement and classification, to high-level aspirations for more effective use of data and cross-departmental evaluation. Government officials including analysts were asked to prioritise key ARIs within each theme.

Examples include:

- Data sharing and linking (DHSC, DWP, MHCLG, DfE and MoJ)

- Monitoring and analysing threats and hazards at incident scenes in real time, including the use of multiple and non-traditional sources such as crowd sourcing and social media (CO, Defra, DfT, MoD, DHSC and HO)
- What are the different ways to define and measure labour market progression and sustainable work? How does this vary between groups and at different times in people’s lives? (DWP)

A full list of these ARIs is included in [Annex 1](#): List of existing ARIs related to data and evaluation.

### 3.2. Existing evidence, unanswered ARIs, and research gaps identified through the Rebuilding a Resilient Britain programme

As well as collating current evidence around the ARIs, each Working Group was asked to note the ARIs for which they could not find evidence. They were also asked to identify important research gaps which were not covered by the current ARIs. All the Working Groups presented evidence gaps relevant to data and evaluation, alongside key messages around building better data and evaluation processes and systems.

#### 3.2.1. Existing evidence relevant to data- and evaluation-related ARIs

An example of resources and evidence relevant to data- and evaluation-related ARIs from the Working Group on Crime Prevention:

ARI	Reference	Description
Using big data to assess criminal behaviour and trafficking	Williams, M.L., Burnap, P. & Sloan, L. (2017). Crime Sensing with Big Data: The Affordances and Limitations of Using Open-source Communications to Estimate Crime Patterns. <i>The British Journal of Criminology</i> , Volume 57, Issue 2: 320–340, 1 March 2017.	Examines the strengths and limitations of using big data to establish associations between aggregated opensource communications data and aggregated police data to estimate crime patterns
	Babuta, A. (2017). <i>Big Data and Policing: An Assessment of Law Enforcement Requirements, Expectations and Priorities</i> . The Royal United Services Institute Occasional Paper, September 2017.	Comprehensive overview of the current use of big data for crime prevention, including its current use within police forces, the future of big data and policing, and challenges.
	Kennedy, L., Caplan, J. & Piza, E. (2018). <i>Risk-Based Policing: Evidence-Based Crime Prevention with Big Data and Spatial Analytics</i> . Oakland: University of California Press.	Discusses the use of big data for evidence-based strategies for crime risk reduction, and present case studies of risk-based policing assisted by big data technologies in the US.

The ARIs for which the Working Groups presented evidence and resources are listed in Annex 2: List of ARIs for which the Working Groups presented evidence and resources. The full lists of evidence and resources relating to each of these ARIs are contained in the Working Group reports, available at [https://www.upen.ac.uk/go\\_science/](https://www.upen.ac.uk/go_science/)

#### 3.2.2. Unanswered ARIs for which no evidence or resources were identified

Working groups also considered ARIs for which they found no evidence; however relevant evidence about the following data- and evaluation-relevant ARIs may be available with a more targeted search.

- How effective are the child maintenance arrangements and wider welfare system at ensuring parents have the financial support they need to achieve the best outcomes for them and their children? How can we improve compliance, and the effectiveness and affordability of child maintenance arrangements? (HMRC and DWP)

- To what extent can we better segment claimant services to reflect both different needs and capabilities, and to improve efficiency, effectiveness and customer service through more personalised support and preventative measures? (DWP)
- Potential role of digitalisation and technology-enabled services, looking at inequalities, access, and innovative service delivery (BEIS)
- Lessons learned from investigations (HSE)
- Exploring how emergent technologies - such as AI, machine learning, distributed ledger technology, the Internet of Things, advanced data technologies - deliver tangible transport benefits (DfT)

### *3.2.3. New research gaps pertaining to data and evaluation*

Examples of new research gaps pertaining to data and evaluation identified by the working groups, and specific research activities which could be used to address the gaps, include:

- Evidence collection on the impact of the changes on access to, and quality of, adapted/digital and hybrid provision of services to children and families (focussing especially on the complex and interacting web of support offered)
- Using labour market analysis, vacancy trends, and employer surveys to understand the effectiveness of apprenticeships and traineeships in improving youth employment post-COVID
- Development of an international system for tracking migration (legal and illegal, intra- and international) using Border Force data, satellite data, and AI.

A full list of research gaps from the Working Groups can be found in Annex 3: List of new research gaps pertaining to data and evaluation.

### *3.3. Insights from the Rebuilding a Resilient Britain programme: cross-cutting key messages and high-level research themes relating to data and evaluation*

A review of all nine Working Group reports surfaced three cross-cutting themes around data and evaluation:

- Better data sharing through open platforms and integrated systems
- Ethical use of big data and emerging technologies (AI, IoT, etc.)
- A stronger focus on evaluation and replication studies of policy interventions

#### *3.3.1. Data sharing*

The need for better data sharing and integration of systems was raised in five ARIs (from across CO, DfE, DHSC, DWP, HO, MHCLG, and MoJ), and was discussed in eight of the Working Group reports (1-8).

A key message across the Working Groups was that the data already exists to answer many ARIs of importance to departments – the issue is that it is not available to, or in an appropriate format for, those that need it. The repurposing of existing datasets to answer new questions can yield large time and cost savings.

Opportunities for better sharing of data were identified at many levels:

- between countries (e.g. around migration)
- between local and national government (e.g. around land use)
- between different government departments (e.g. around unemployment)
- between the public, private, and third sectors (e.g. around supporting health and social care services)

- between policy officials, research funders, and academia (e.g. to see which research projects are a priority and which are already being funded)
- between all the above and the general public (e.g. to enhance trust).

As an example: enhanced access to local data by national government could allow locally-relevant policy and personalised service provision to be implemented. Such tailored interventions were identified as key to tackling inequalities and achieving a successful recovery from COVID-19.

Two routes to achieving better data accessibility were proposed: the agreement of common data formats, and the development of open platforms and integrated systems (such as that provided by [Administrative Data Research UK](#)).

Making data accessible and readable is the first step – to achieve its maximum potential it must be fully understood by those analysing it, including its gaps and limitations. The Rebuilding a Resilient Britain programme has shown how this can be achieved through ongoing dialogue across discipline boundaries.

### *3.3.2. Data ethics*

Issues around data ethics were mentioned in eight ARIs (from BEIS and DfT, among others) and discussed in eight of the Working Group reports (1-6, 8-9).

While an increased sharing of data holds great promise for tackling the issues facing government, the Working Groups were clear that a focus must always be kept on issues of ethics and privacy.

There is a shortage of data on vulnerable populations, who are at risk of the greatest effects of the pandemic. This systematically biases datasets, making it difficult to effectively design and evaluate interventions to support these groups. At the same time, there is huge opportunity to help these groups through the targeted collection and analysis of data (e.g. around homelessness). This will require bringing together domain experts, who understand what the data *means*, with the data scientists who can analyse it.

Ensuring that marginalised communities are represented in the data is important for their trust in the government, in public institutions, and in science more widely. In turn, this trust is essential to their participation in data collection activities and engagement with service providers. If done right, this can become a virtuous cycle. Enhancing trust requires openness, transparency and independent oversight around the collection, analysis and interpretation of data, and the policy decisions that stem from it. The work that has been done to make the health data around COVID-19 available and understandable to the public serves as a good example of this approach.

As well as potential bias in datasets, differing access to technology among communities has the potential to exacerbate inequalities. At the local level, the move to online provision of many services will result in access to technology becoming an important differentiating factor in social/economic opportunity. At the national/global level, an increase in digitisation and automation of jobs is likely to lead to productivity disparities based on ability to invest in new technologies, which in turn can affect urban-rural and international migration.

While data and digital technologies have typically been the domain of the hard sciences, the output of our Working Groups show that the social sciences have a vital role to play in the continuing discussions around the utilisation of data.

### 3.3.3. Evaluation

The importance of evaluation was raised in six ARIs (from across MHCLG, DWP, HMRC, HO, DHSC, CO, HSE and DIT) and discussed in all nine of the Working Group reports.

Many Working Groups reflected that most of the current research focusses on understanding the *causes* of a particular issue, but less emphasis is placed on the difficult activity of designing *solutions*. A particular gap exists around *evaluating* the effectiveness of solutions that have been implemented.

One-off evaluations that are location- and context-specific do not ensure the success of interventions if reproduced elsewhere – replication studies are essential to establish the generalisability of interventions. This is especially important for many of the complex issues currently facing government, where multiple interventions are being implemented simultaneously.

Ensuring that evaluation of policy interventions becomes standard practice requires greater investment by government and Research Councils. The Working Groups proposed that specific funding streams be created for evaluation and replication studies. Such evaluations will be hugely aided by the data sharing and open platforms discussed above.

**The GOS ARI Team (Annette Boaz, Kathryn Oliver, Giulia Cuccato and Cameron Dashwood)**

**For further information please contact: [ari.comment@go-science.gov.uk](mailto:ari.comment@go-science.gov.uk)**

**1<sup>st</sup> December 2020**

## Annex 1: List of existing ARIs related to data and evaluation

Theme	ARI (those marked with * were identified as priorities)
<b>Data sharing, linkages, and ethics</b>	
Changing systems	<ol style="list-style-type: none"> <li>1. Use of Earth Observation data (most departments)</li> <li>2. Data sharing and linking (DHSC, DWP, MHCLG, DfE and MoJ) *</li> <li>3. How do we use data more effectively? (HO) *</li> <li>4. Data science and digital technologies (all departments) *</li> <li>5. What is the best practice in developing an international classification which underpins trade measurement, including produce codes for goods, classification for services and digital trade, and their relationship to industry? (DIT)</li> <li>6. The right evidence for the future (HSE)</li> <li>7. Live and big data – explore the benefits of this data and develop transport-specific use cases including to understand the frameworks and standards “info-structure” required; public attitudes towards big data; and the use of digital technologies (DfT)</li> </ol>
Changing services and government	<ol style="list-style-type: none"> <li>1. Exploitation of robust data sources (all departments)</li> <li>2. What are the benefits of investment in innovative technologies such as AI, automation and decarbonisation, and how best can we unlock these benefits? What role does international collaboration have to play? (BEIS) *</li> <li>3. Operational research, evidence gathering (including surveillance and monitoring) and impact assessment (FSA)</li> <li>4. Techniques to identify prohibited and restricted articles (for example, people, money, drugs, tobacco, counterfeit goods and species that require a permit under the Convention on International Trade in Endangered Species of Wild Fauna and Flora) (CO, Defra, HMRC, MoD, BEIS and HO)</li> <li>5. Monitoring and analysing threats and hazards at incident scenes in real time, including the use of multiple and non-traditional sources such as crowd sourcing and social media (CO, Defra, DfT, MoD, DHSC and HO)</li> </ol>
Changing behaviour	<ol style="list-style-type: none"> <li>1. Coping with the large number of devices and sheer volume of data, especially considering human factors (all departments)</li> <li>2. Real world threat detection and mitigation capability ensuring minimal impact on privacy rights, including: the exploitation of the electromagnetic spectrum; compressive sensing; connectivity; use of video analytics; the internet of things; wider use of smart technologies including tracking and remote systems; advanced materials; informatics (CO, MoD and HO)</li> </ol>
<b>Evaluation and replication</b>	
Changing systems	<ol style="list-style-type: none"> <li>1. Operational research and evidence gathering, including surveillance and impact assessments (all departments) *</li> <li>2. Which methods enable evaluation of a country’s sectors and regions of dynamic comparative advantage? (DIT)</li> <li>3. How can we best measure the impact of non-tariff, regulatory barriers to trade? (DIT)</li> <li>4. What is best practice in developing the international classification which underpin trade measurement, including product codes and foods, classifications for services and digital trade and their relationship to industries? (DIT)</li> </ol>

	<ol style="list-style-type: none"> <li>5. Use of Earth Observation data (most departments)</li> <li>6. How do we use data more effectively? (HO) *</li> <li>7. Social science (BEIS, DCMS, Defra, HSE and FSA)</li> <li>8. The right evidence for the future (HSE)</li> <li>9. Exploitation of robust data sources (all departments)</li> <li>10. Data science and digital technologies (all departments) *</li> <li>11. Data sharing and linking (DHSC, DWP, MHCLG, DfE and MOJ) *</li> <li>12. Develop and evaluate science and technology approaches to mitigate transport security risks, including consideration of processes, systems and people (DfT)</li> </ol>
Changing services and government	<ol style="list-style-type: none"> <li>1. Lessons learned from investigations (many departments)</li> <li>2. Cross-departmental evaluation (DHSC, DWP, MHCLG, DfE and MoJ)</li> <li>3. How effective are the child maintenance arrangements and wider welfare system at ensuring parents have the financial support they need to achieve the best outcomes for them and their children? How can we improve compliance and the effectiveness and affordability of child maintenance arrangements? (HMRC and DWP)</li> <li>4. To what extent can we better segment claimant services to reflect both different needs and capabilities, and to improve efficiency, effectiveness and customer service through more personalised support and preventative measures? (DWP) *</li> <li>5. Understanding the contribution of forensic techniques to the Criminal Justice System, within investigations and in court, including issues such as attrition of cases in the system (HO and MoJ)</li> <li>6. The right intervention strategy for the British industrial asset base (HSE)</li> <li>7. Evaluate investments and policy decisions – continue to develop a strong evidence base to guide our activities, and reduce the risk of poor decision making and inefficient delivery (DfT)</li> </ol>
Changing behaviour	<ol style="list-style-type: none"> <li>1. Coping with the large number of devices and sheer volume of data, especially considering human factors (all departments)</li> <li>2. The elements of preventative programmes that are most effective, with whom, when and why (DO, MoJ, DCMS and HO)</li> <li>3. Interventions, particularly early interventions (DHSC, DWP, MHCLG, DfE and MoJ) *</li> </ol>
Understanding society	<ol style="list-style-type: none"> <li>1. Monitoring and analysing threats and hazards at incident scenes in real time, including the use of multiple and non-traditional sources such as crowd sourcing and social media (CO, Defra, DfT, MoD, DHSC and HO)</li> <li>2. What are the different ways to define and measure labour market progression and sustainable work? How does this vary between groups and at different times in people's lives? (DWP)</li> </ol>

## Annex 2: List of ARIs for which the Working Groups presented evidence and resources

### *Working Group on Vulnerable Communities*

- What is the most effective and efficient way to provide support, across government and with third parties, to separated families? (MHCLG and DWP)

### *Working Group on Supporting Services*

- Supporting children and young people who have had disrupted education, particularly looking at the inequalities in impact of COVID-19 and access to technology
- Improving integration between services (e.g. rehabilitation and justice; health and education around SEND) (DfE)

### *Working Group on Trust in Public Institutions*

- Improved knowledge management systems

### *Working Group on Crime Prevention*

- Using big data to assess criminal behaviour and trafficking
- Enabling sharing of data, evaluation and monitoring to enable better joint working (HO, DHSC and CO)
- Monitoring and analysing threats and hazards at incident scenes in real time, including the use of multiple and non-traditional sources such as crowd sourcing and social media (CO, Defra, DFT, MoD, DH, PHE and HO)
- Increased exposure to cyber harms and use of online platforms to facilitate extremism (NSA and HO)
- Supporting integration of services around rehabilitation and prevention of re-offending (MoJ, DfE and DHSC)

### *Working Group on Supporting Lower-Carbon Local Economies*

- Charging infrastructure – understand the requirements for Electric Vehicle charging, and how effective the policies are to support this, including the Electric Vehicle Homecharge Scheme, the Workplace Charge Scheme, and the On-street Residential Scheme
- Role of investment in emerging technologies to support economic regeneration
- Scope for digital platforms to support commercial activity
- How to encourage the uptake of smart construction and support the use of robotic, off-site, and modular construction (DfT)
- What are the benefits of investment in innovative technologies such as AI, automation and decarbonisation, and how best can we unlock these benefits? What role does international collaboration have to play? (BEIS)

### *Working Group on The Future of Work*

- What new and better approaches are there for delivering joined-up, tailored and personalised health and work support? How can we effectively engage employers, health professionals and other stakeholders to improve work and health outcomes? (DWP)
- Identifying populations at risk of joblessness and poverty, and intervening and evaluating successfully to prevent poor outcomes

### *Working Group on Local and National Growth*

- How will COVID-19 impact on international cooperation on emerging technologies?
- What are the effects of the UK's approach to business regulation, and how can the system develop to meet the economy's needs in the future? (BEIS)

- Unlocking the benefits of investment in skills and entrepreneurship (DfE and BEIS)
- Is COVID-19 accelerating trends in emerging technologies? How might these trends affect global employment and immigration patterns?

*Working Group on Trade and Aid*

- What methods enable evaluation of a country's sectors and regions of dynamic comparative advantage? (DIT)

## Annex 3: List of new research gaps pertaining to data and evaluation

### *Working Group on Vulnerable Communities*

- Collection of quantitative evidence on the effectiveness (cost and long-term impact) of interventions to protect and serve vulnerable populations
- More fine-grained recording of ethnicity data (e.g. in death registrations, benefit support applications) and linkage to other factors such as age, occupation, housing, etc.
- How to keep young people engaged with virtual interventions
- Evidence on the most effective interventions to support separated families, especially during COVID-19
- Development of systems to enable better data sharing across local and national government, social care and healthcare providers, and researchers

### *Working Group on Supporting Services*

- Evidence collection on the impact of the changes on access to, and quality of, adapted/digital and hybrid provision of services to children and families (focussing especially on the complex and interacting web of support offered)
- Investigating problems in multi-agency response, including what interventions can be put in place, in what circumstances they work and what are the barriers
- Identifying the elements of sustainable recruitment strategies
- Research into the use of technology (e.g. health apps) to support health and social care services
- Analysis of how service delivery for specific vulnerable groups has changed during this pandemic, whether these changes have been effective, and how that knowledge can be used to prepare for future crises
- How to develop an effective approach to place-based working, including the powers needed by local areas, and what outcomes this could have for the cost-effectiveness of services
- Explore the ethical sharing of data across services through the creation of standards and platforms

### *Working Group on Trust in Public Institutions*

- Considering the policy interventions that can be created by bringing together a wealth of ONS data on wellbeing
- A review of the way that research is commissioned, and alternatives to the current publishing model, to incentivise currently neglected research such as analysis of effectiveness

### *Working Group on Crime Prevention*

- Research on how online vs. offline interventions work in under-researched areas like organised crime and terrorism
- Research the direct and indirect impacts of COVID-19 on crime (potentially using existing data) coordinating with the NPCC Operation Talla Recovery and Reform programme
- Research sources of bias and error in data collection and develop ethical methods to reduce them
- Development of open platforms so that data can be shared across departments and local authorities, and easily accessed by academics

### *Working Group on Supporting Lower-Carbon Local Economies*

- Publication of usage data of electric car charging infrastructure to enable better roll-out
- Study into the best ways to mitigate the impacts of battery disposal, including enhanced regulation, promotion and improving the ease of battery recycling, etc.

- Most efficient ways to decarbonise existing housing stock
- Enabling easier access and better sharing of emissions data through the creation of common formats and central data repositories

#### *Working Group on Land Use*

- Developing systems to enable access to and integration of data from public, private and charity sectors

#### *Working Group on The Future of Work*

- Evaluating the (cost) effectiveness of mental-physical health adjustments that employers make for employees (such as flexible working)
- Investigation of possible routes to occupational health reform to better support people with physical/mental health conditions, focussing on joining up support from employees, local authorities and healthcare providers

#### *Working Group on Local and National Growth*

- Review of UK and international programmes that encourage enhanced productivity (e.g. through the adoption of new technologies or improved management practices)
- Multi-arm randomised controlled trials on the effectiveness of different employment training delivery models
- Analysing the impacts of investments from the Towns Fund and Future High Street Fund, including whether they are creating new jobs or simply displacing jobs from elsewhere
- Research into the local economic benefits of investment in cultural events and infrastructure (including displacement effects)
- Reviewing the effects (intended and unintended) of road building projects (including displacement effects)
- Evaluation of the impacts of Enterprise Zones and freeports (including displacement effects)
- Using labour market analysis, vacancy trends, and employer surveys to understand the effectiveness of apprenticeships and traineeships in improving youth employment post-COVID
- Research on the effect of the Youth Hubs model on youth employment
- Analysis of which practices make the biggest difference to workplace health
- Understand the role of regulation, ethics, and standards in supporting the development and diffusion of emerging technologies
- Development of an international system for tracking migration (legal and illegal, intra- and international) using Border Force data, satellite data, and AI

#### *Working Group on Trade and Aid*

- Monitoring of the effectiveness of government measures to avoid insolvency and support COVID-19 recovery, especially around how the legal regime impacts small businesses (data on corporate insolvencies available through the Companies House Beta Service)
- Compare across counties, industries, portions of the supply chain, and types of worker, how COVID-19, and government responses to it, is impacting patterns of modern slavery and child labour
- Study the social, political and ethical dimensions of increased use of surveillance and AI to track the illegal wildlife trade
- Assessment of the viability and political/public response to EU policies to tackle the COVID-19 pandemic, and their wider geopolitical context
- Assess which of the existing and new support offered to small business are used most and that their impacts are, comparing this to the international picture

- Considering the impact of UK and international trade policy on decarbonisation efforts and the protection of endangered ecosystems
- Considering the combined impacts of COVID-19 and Brexit, and the new legal regimes that emerge from them, on companies in the UK and comparable foreign countries