Data Science and AI for Public Good: Lessons from cross-sectoral collaboration

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- Cross-Sectoral Collaboration

- Case 1: Catalyst project

- Case 2: California Policy Lab

- Case 3: Essex Centre for Data Analytics

Cross-sectoral partnership

The world's most innovative economy ambition

Partnership between government, industry, and academia:

- Attract and retain AI talent;

- Improve digital infrastructure;

- Conducive business climate;

- Prosperity of society through AI benefits.

£1bn + £1.7bn from the Industrial Strategy Challenge Fund

Boosting the relationship

DATA FOR POLICY 2017

Government by Algorithm?
6-7 September 2017 | London
3rd Annual International Conference
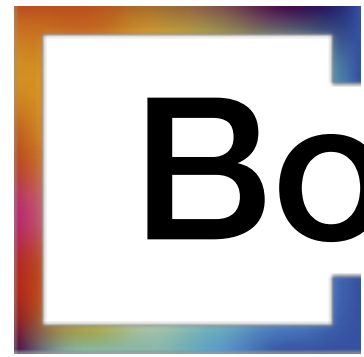
Challenge Lab

Boosting the relationship

Learning from stakeholders

20 interviews: SCC, ECC, and UoE stakeholders

3 core issues:

- Challenges to knowledge transfer;
- Challenges to cooperation;
- Leadership challenges

Learning from stakeholders

Challenges to knowledge transfer:

- Weak personal connections (10) (Van Wijk 2008)

- Lack of social cohesion (7) (Inkpen 2005; Easterby 2008)

- Multiple/conflicting priorities (8) (Cummings 2003)

- Risk aversion (4) (Gho 2002)

Learning from stakeholders

Challenges to cooperation:

- Communication (4) (O'Flynn 2018)

- Lack of shared collaborative reality (1) (Argote 2000; O'Flynn 2018)

- Institutional forces (7) (McEvily 2003)

- Lack of flexible adjustments (3) (Chen 2004)

Learning from stakeholders

Leadership/management challenges:

- Role clarity (9) (Heen 2009)

- Low middle management and bottom level buy-in (5) (Easterby 2008)

- Misalignment between research and developing project objectives (4) (Easterby 2008)

- Lack of facilitative leadership (9) (Ansell and Gash 2007)

Experience

- **Main barriers for academics:** lack of access to data, communication challenges, questions not being aligned (with government), and a publish or perish mentality;

- **Main barriers for civil servants:** data silos, lack of capacity and time, changes in leadership and strategy, political pressure, and rapid pace of decision making.

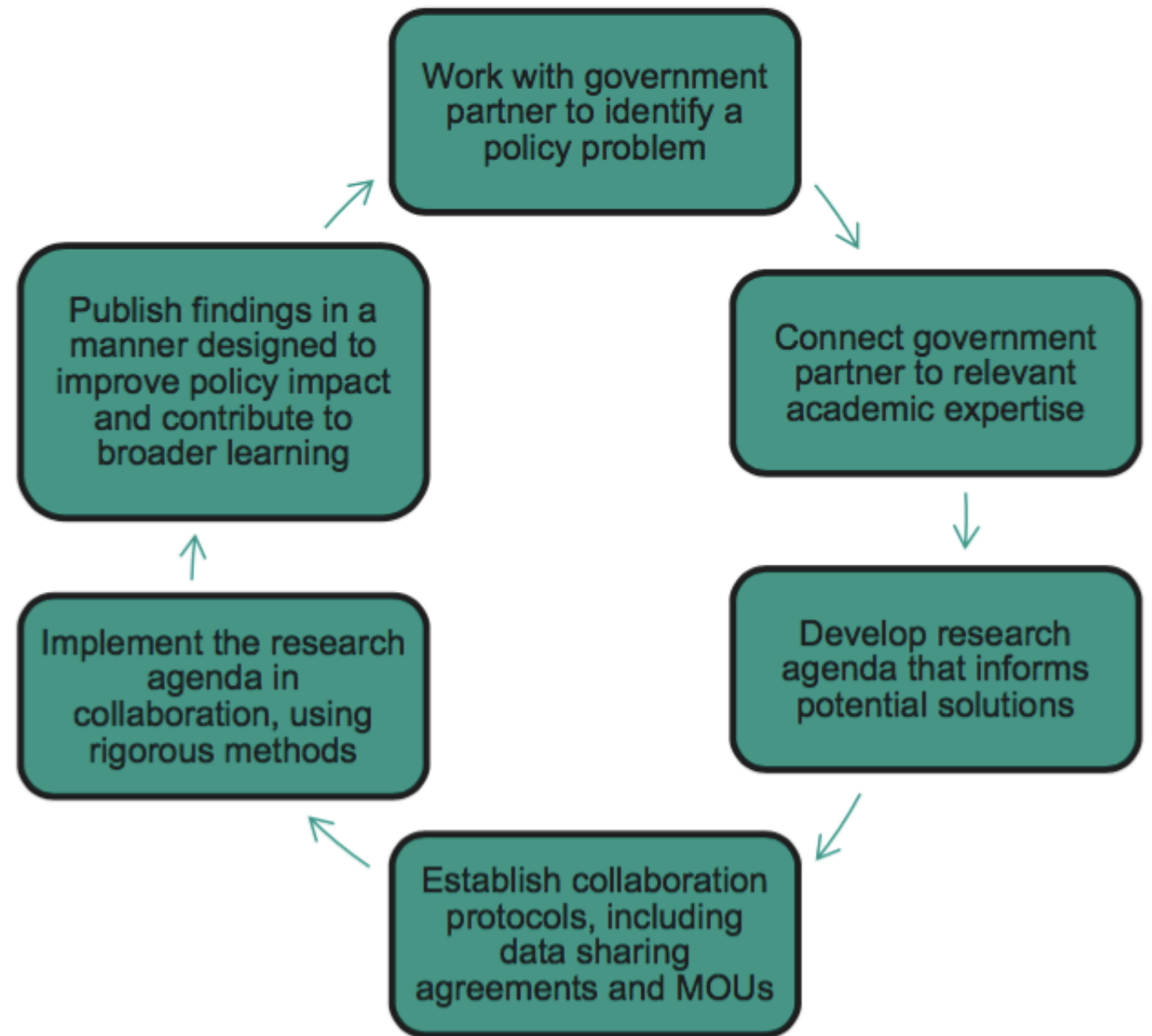- CPL solution is to **fuse unity is through diversity**

Governance

Key standards:

- Effective creation of data sharing agreements;

- Ensuring data confidentiality;

- Pairing government agencies with appropriate experts.

Work with government partner to identify a policy problem

Connect government partner to relevant academic expertise

Develop research agenda that informs potential solutions

Establish collaboration protocols, including data sharing agreements and MOUs

Implement the research agenda in collaboration, using rigorous methods

Publish findings in a manner designed to improve policy impact and contribute to broader learning
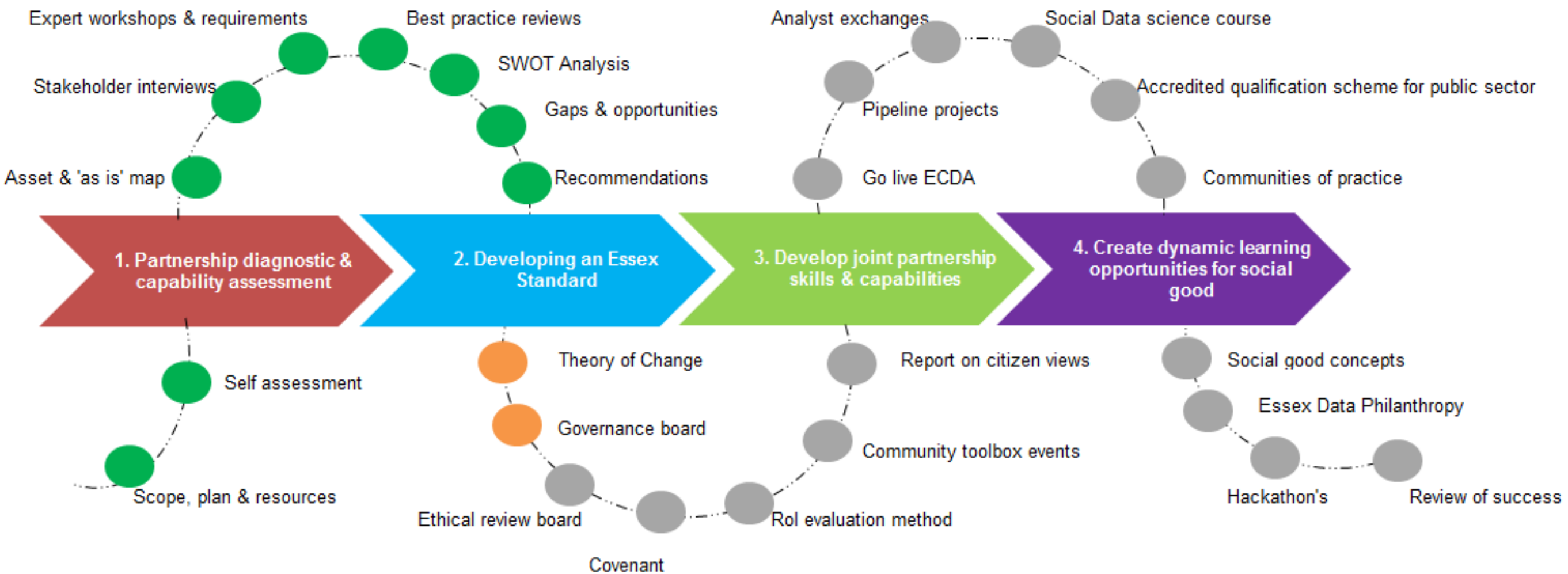
Essex Centre for Data Analytics (ECDA)

ECDA

The Vision: To make Essex national leaders using the power of data science and AI to tackle public policy challenges

The Aims:

- To make Essex a place that is an exemplar for the integration of data across public bodies.

- To have the skill, capability and technology to undertake predictive analytics based on ethical, high standards.

- To have a sustainable data infrastructure.

- To have the best data science / analytical capabilities in the UK to benefit our people and communities.
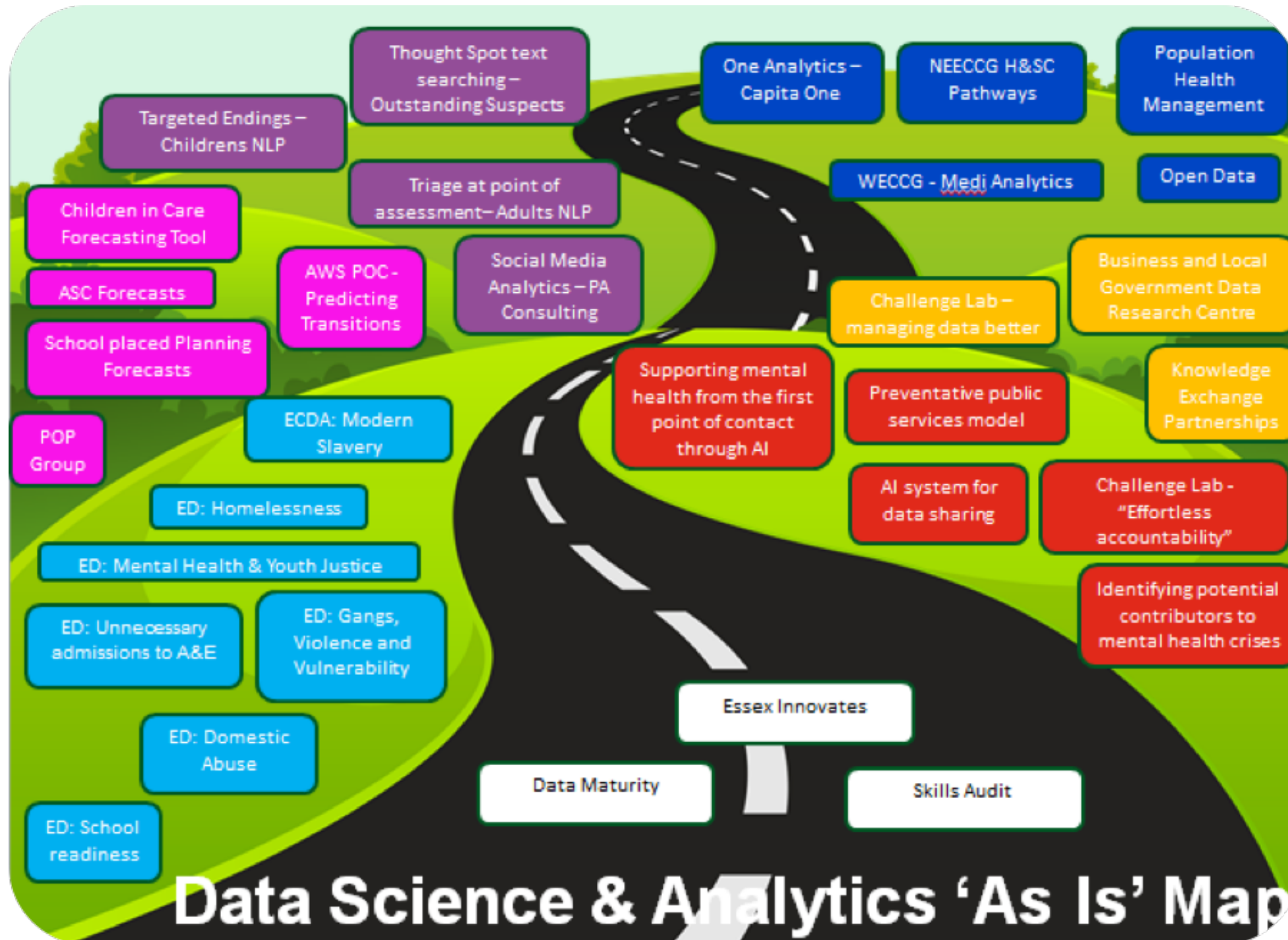
ECDA: Pipeline

ECDA: Self-assessment

✓ What we do well

- Highly skilled workforce & availability of training
- Predictive analytics experience and application
- Leadership Buy in
- Credibility & reputation

⚠ What we need to do better

- Sustainability & operational ability
- Citizen voice & transparency
- Infrastructure
- Impact

Opportunities

- Strategic Alignment & place shaping
- Data expeditions
- Connectivity
- Speciality dishes

Considerations

- Infrastructure & data sharing platform
- Governance
- Ethical review & assurance

ECDA: Roadmap

ECDA: Opportunities

Evidence Based Decision Making: Making Data Accessible; Single View of Customer

Place Shaping: Geo-Spatial Analysis; Mapping; Hot-spot Analysis

Effective Targeting of Resources: Risk Stratification; Predictive Risk Modelling; Segmentation

PERFORMANCE REPORTING*   SCENARIO TESTING

DATA VISUALISATION   KEY DRIVER ANALYSIS

DEEP DIVES   EXPLORATORY DATA ANALYSIS

FORECASTING & DEMAND MANAGEMENT*

STRATEGIC NEED ASSESSMENTS   EVALUATION

PERFORMANCE BENCHMARKING   BEST PRACTICE REVIEWS

GEO-SPATIAL ANALYSIS & MAPPING*

MACHINE LEARNING   ARTIFICIAL INTELLIGENCE

PROJECT SCOPING   STATISTICAL SIGNIFICANCE TESTING

RISK STRATIFICATION*   PATHWAY MODELLING

DATA MANAGEMENT   DASHBOARD DESIGN

DATA INTEGRATION   REPORT WRITING (PROGRAMMING)

NATURAL LANGUAGE PROCESSING*

POPULATION HEALTH MANAGEMENT

Demand Management: Forecasting; Pathway Modelling; Scenario testing/Simulation

Key Added-Value Skills for Development

Improving Productivity and Practice: Qualitative Analysis; Sentiment Analysis; Natural Language Processing
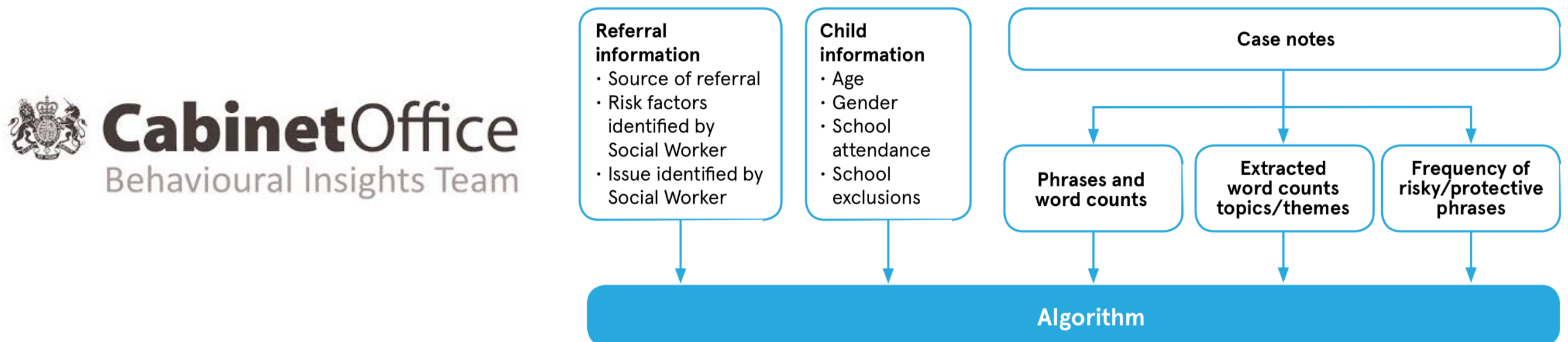
ECDA: NLP in policy

- Children's social care

- Given the text of the initial referral and assessment, and structured data relating to the case, could we predict whether the case would be re-referred and escalated if it were closed?

- ML and NLP

Figure 5: The inputs of the machine learning algorithm used to detect escalated closed cases.

Referral information	Child information	Case notes		
· Source of referral	· Age			
· Risk factors identified by Social Worker	· Gender			
	· School attendance	Phrases and word counts	Extracted word counts topics/themes	Frequency of risky/protective phrases
· Issue identified by Social Worker	· School exclusions			

Algorithm

ECDA: Risk stratification

- Hackney & Thurrock councils and tech company Xantura developed a predictive system to identify vulnerable families in need of additional council support.

- Brent and IBM developed a risk model to identify children at risk of criminal exploitation.

Child protection

Councils use 377,000 people's data in efforts to predict child abuse

Exclusive: Use of algorithms to identify families for attention raises stereotyping and privacy fears

Niamh McIntyre *and* **David Pegg**
Sun 16 Sep 2018 16.00 BST

f t ✉   < 1,378

⊙ This article is over **2 months old**

▲ At least five councils have developed or implemented a predictive analytics system to safeguard children. Photograph: Alamy Stock Photo

Vast quantities of data on hundreds of thousands of people is being used to construct computer models in an effort to predict child abuse and intervene before it can happen, the Guardian has learned.

Amid mounting financial pressure, local councils are developing "predictive analytics" systems to algorithmically identify families for attention from child services, allowing them to focus resources more effectively.

But while the new algorithmic profiling could be one way of helping social

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Child protection

Data on thousands of children used to predict risk of gang exploitation

Brent and Essex councils work with IBM on system to try to identify problems before they arise

Niamh McIntyre *and* **David Pegg**
Mon 17 Sep 2018 19.29 BST

f t ✉   < 87

⊙ This article is over **2 months old**

▲ The system is also being used to profile children living in Basildon to identify those who might be unable to read or write. Photograph: David Jones/PA

Predictive software has been assessing data on the lives of thousands of children, from their potential exploitation by gangs to their risk of not being ready for primary school.

The technology company IBM has been working with Brent council to try to predict which children were at risk of gang exploitation, while Essex county council has profiled all of the children living in one of the wards of Basildon to try to identify those that might be unable to read or write.

On Sunday, the Guardian revealed how local authorities have been using machine learning and predictive technologies to intervene before children were referred to social services.

However, the programmes being run by Brent and Essex illustrate how advocates of predictive analytics believe the technology can be adapted

Councils use 377,000 people's data in efforts to predict child abuse

➡ Read more

ECDA: Essex Standard

Openness, transparency, and ethics underpin ECDA work

Thank you!
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