Data Analytics at the National Audit Office (UK)
NAO data analytics strategy has focused on adding value, reducing costs

**Insight**
Creating new insights & value through linking together data and mining for patterns and anomalies. Recognising best practice in government. More robust audit opinions

**Productivity**
Drive out cost from our processes through automation and speeding up time to insight

**Quality**
Maintaining focus on avoiding error and taking opportunities to add greater value.

*_Innovation in external client focused assurance work*_
Three key areas of NAO data analytics

- Cleaning, linking, and storing data
- Applying big data techniques to audit - statistics, machine learning and text mining
- Presenting and disseminating findings in a clear and concise way using data visualisation

All supported by greater use of automation, coding, software and hardware
NAO Data Service

- Takes a range of client datasets, stores them in an NAO data warehouse and links them together for easy consumption…

Thereby realising these benefits…

- Efficiency
- Insight
- Risk

Client datasets as published - insular and often hard to use

Client data within service - linked and analytics ready

NAO DATA SERVICE
NAO Data Service

Entry point to service is through dedicated Share Point site…
NAO Data Service

Access to data is via cube icon…

…providing access to data in pivot table form

…with the ability to easily customise & link to other data in service.

Alternatively, advanced users can connect to the SQL database directly.
Automating our approach to analyzing our past reports

In the case of the site at Blackburn Heath, Seven Social Housing noted that although GLA and Tower Hamlets have taken steps to acquire the relevant files prior to sending the development, there is a delay in the release of the relevant files. This delay will be needed in the final phase of the project. Similarly, the site on Leamington Spa is owned by several governmental bodies. During the procurement process, it has been indicated that there was an agreement between all the landowners committing them to support the development. However, the developer later discovered that this was only a memorandum of understanding. It has since encountered difficulties in negotiating with landowners. Case study 2.

The land is owned by several governmental bodies. During the procurement process, HCA indicated that there was an agreement between all the landowners committing them to support the development. However, after Partnership Homes later discovered that this was no more than a memorandum of understanding and that some of the landowners seemed to be reluctant participants, leading to some difficulties in the negotiation process, which significantly delayed the development. This partnership has recommended that the agreement should be better defined to align the interest of all the third-party landowners. Additionally, there should be a single public body empowered to represent all the public sector landowners.

1.1 Procurement and development of the system took place during 2013 and 2014. The Programme was working towards invariable deadlines; the service had to be ready to accept EPS claims by 10 May 2013 and to make EPS payments to customers between 1 December 2013 and 30 June 2014. Failure to meet these deadlines would incur disbursement penalties. Figure 9 sets out the key events.

3.2 In GDS5, committed to reducing overall costs and improving delivery confidence. However, no formal evaluations of cost reductions were provided and the Help Project Authority’s delivery confidence assessments did not improve. This highlights the need for more work.
Webscraping – Ofsted (inspection body) to harvest data on pupil premium

1. Programmatically navigate to school page

2. Identify link to latest inspection report within HTML and download

3. Search text for refs to pupil premium

4. Copy all paragraphs out for further analysis

...then simply repeat (7,000 times!)
### Income Tax

1. Overview
   - money you earn from employment
   - profits you make if you’re self-employed - including from services you sell through websites or apps

2. How you pay Income Tax

3. Tax-free and taxable state benefits

4. Work out if you need to pay Income Tax

5. Check you’re paying the right amount

---

**1. Overview**

Income Tax is a tax you pay on your income. You don’t have to pay tax on all types of income.

You pay tax on things like:

- money you earn from employment
- profits you make if you’re self-employed - including from services you sell through websites or apps
Questions from PAC members

Number of results per PAC member:

10

This page may take a few seconds to load - please be patient!

The table below lists the most recent results for PAC members, as listed on data.parliament.uk. Refine your results using the filters in the column headers.
Interactive data visualisations – Whole of Government Accounts

Our most popular data visualisation, with a combined total of 25,000 views over a two year period. This visualises the consolidated financial data of the UK Government, and allows users to explore the detail for 5 years.

Interactive data visualisations – Housing In England

One of our latest data visualisations, with 2,500 views in three months.

Designed so that a member of the public can look at house prices in their local area, a topic of much interest in the UK.

Interactive mapping

Journey time accessibility of job centres

Being developed through combination of R shiny & leaflet
Interactive data visualisations – What we have learnt so far

- There is an appetite for data presented in an engaging way. Some visualisations attract almost as much interest as the reports they support.

- Topics attract different levels of interest, however reaching the right people can be as important as reaching a large number.

- Visualisations increases the amount of activity for the reports they support.

- Activity around the launch is crucial to securing awareness and ongoing interest.

- Social media is particularly effective form of promotion. Going forward we will be giving more thought to ‘share ability’.
The 8 key enablers…

1. We leveraged senior sponsorship

2. We built on our existing analytical community of practice
   • Structures and roles
   • Awareness/profile

3. We secured dedicated expert resources
   • Recruited a new manager to develop the data service
   • Carved out 50% of another Manager’s time to build the network

4. We reached out to junior staff
   • Identify and nurture a network of people with inquisitive and can-do mindset.
   • Help them to help each other.
The 8 key enablers…

5. We focused on what audit teams want, making basic tasks easier and quicker, eg
   • Webscraping
   • Back catalogue analyser
   • Visualisation tools

6. We developed a portfolio of examples that have delivered results
   • with quantified time/cost savings.

7. We have developed a structured L&D offer
   • Enthusiast, Doer, Expert
   • Specific skills defined
     • core vs specialist
     • Data gathering/manipulation vs analysis and presentation