



## From data trusts to AI: How advanced data analytics will transform project delivery

**ECITB/OPMSG Project Management Conference  
7 November 2019**

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CEO / Founder

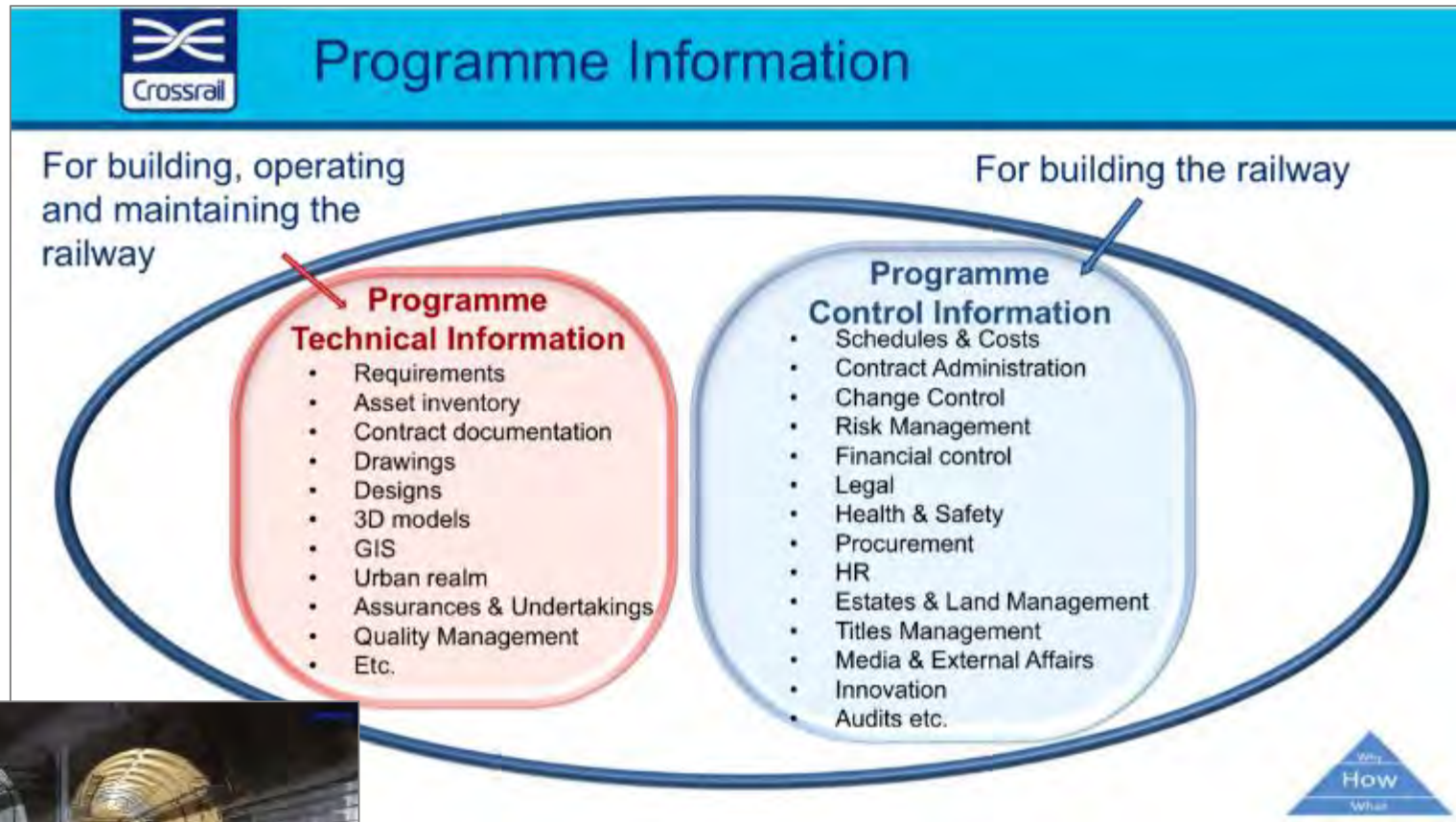
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**LinkedIn**



# An Example: Crossrail

## Programme Control Information

- Schedules & Costs
- Contract Administration
- Change Control
- Risk Management
- Financial control
- Legal
- Health & Safety
- Procurement
- HR
- Estates & Land Management
- Titles Management
- Media & External Affairs
- Innovation
- Audits etc.

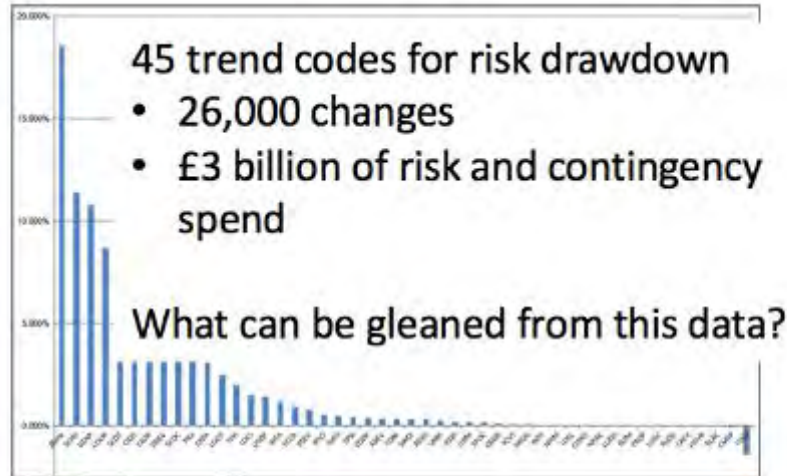


Exhaust plume  
from project  
delivery

# What Happens to the Data?



Exhaust plume  
from project  
delivery



Risk drawdown



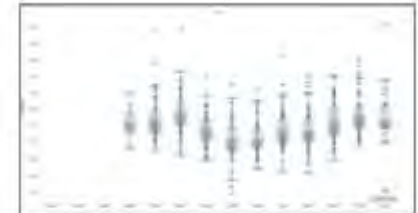
Installation  
reports



Observations reports



KPI  
reports



Cost data



Earned value data

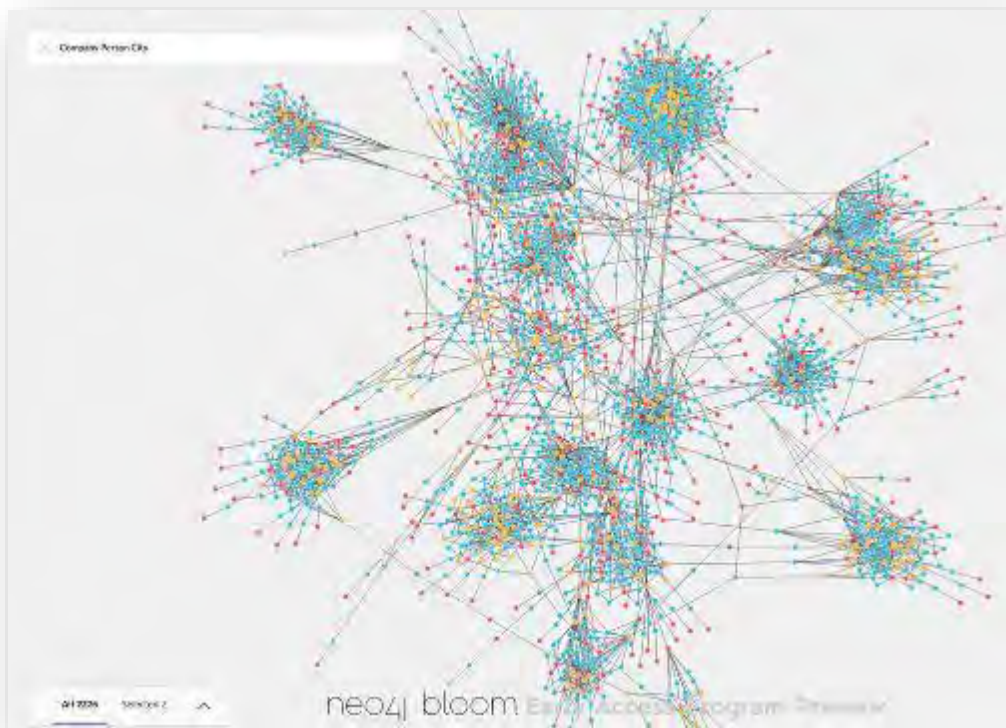


Dashboards and  
progress reports



Images courtesy of Crossrail

**We take this.....**



**And abstract it to this.....**

Undertaking a portfolio of work (client projects) improves productivity and reduces costs and schedule uncertainty

New technologies can have significant and unexpected impact on cost and schedule; include for this in contingencies

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## PROJECT MANAGEMENT LESSONS LEARNED

*"THE ELEPHANT IN THE ROOM"*

**ABSTRACT:** A significant challenge for government and business project delivery organisations is to ensure that lessons are learned and that mistakes of the past are not repeated. This study has established that project, programme and portfolio management lessons learned methods vary significantly, implementation is inconsistent and fails to deliver results. The study used a prominent inductive, qualitative multiple case study approach representing the phenomenological paradigm of realism. Research data was collected from participating organisations, open sources and via the freedom of information process. There is a significant amount of literature published on lessons learned, and refinement of the methods to date has failed to deliver the step change that is required. A decision now exists for the PPM community on whether to accept this direction of travel or assess whether a change in approach can deliver a measurable benefit that enables investment in a new framework. The study proposes a Leveraging Experience conceptual framework as a viable alternative approach.

**Keywords:** Lessons Learned, Project Management, Knowledge Management, Organizational Learning, PPM, Leveraging Experience

### AUTHORS

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**Dr Stephen Duffield, MPM, FAIPM, AFALARA, CIPD.**

### 1 Introduction

The study is concerned with the effectiveness of lessons learned systems within a project, programme and portfolio management (PPM) delivery environment. The need to learn and apply lessons from project delivery is well recognised. The project management literature pays little attention to the effectiveness of the lessons learned process (Duffield & Wilby, 2015; Patten, 2001). Instinctively, it is evident that future projects will benefit from leveraging the experience of the past (Burr, 2009; Shergold, 2005). Yet it remains a major impediment for the PPM profession, where organisational learning from projects rarely happens, and when it does it fails to deliver the intended results (Atkinson et al., 2008; Kegan & Turner, 2009; Kemmer, 2009; Klakberg et al., 2000; Milton, 2010; Schraeder & Egger, 2005; Shergold, 2015; Williams, 2000). In project management, lessons learned is the 'elephant in the room', that needs to be acknowledged and discussed. The lessons learned 'elephant', is reinforced by project management literature. Milton (2010) highlights a significant dissatisfaction with project lessons learned processes. Lessons from projects might be identified, but not many are learned when it comes to picking up on early warning signs in problem projects (Klakberg et al., 2000). Out of 74 organisations that attempted lessons learned processes, 60 per cent were dissatisfied (Milton, 2010). In another study, 62 per cent of 542 project practitioners responded that they had a process for learning lessons, and of that only 11.7 per cent followed the process (Williams, 2000). Furthermore, while the lessons learned process is accessible, it fails to deliver the intended results as lessons are identified and are often not followed through and integrated into the organisation (Crisis & Hubert, 2014). Following this introduction, the remainder of the paper is organised as follows. We commence with identifying the research problem, review the literature, discuss and reflect the current practice of the research problem. We then identify the research gaps, revisit the research problem, develop the research proposition and associated research issues. The next few sections describe the research methodology, develop an initial conceptual framework and describes the research cycle. The results and findings based on the initial conceptual framework are provided followed by a discussion section that answers the research issues. The conceptual framework is revised in line with the results and findings. Finally, the last sections outline the limitations and challenges, future research and conclusions.



<https://bit.ly/2T7yKnL>

## Lessons Learned

We've been trying it for 40 years  
Lesson are not learned just repeated  
Projects are still late and over budget



## Learning from Experience

The purpose of machine learning  
But also implies human learning

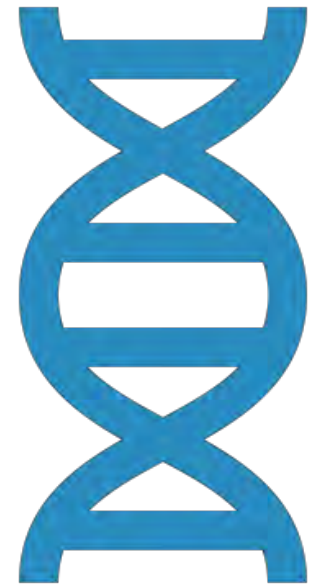


## Leveraging Experience



- What is the **predisposition** of the work to variance?
- Can we **predict** it?
- How do we **test** for it?
- How do we **treat** it and change the future?

Evidence based, tempering against bias.



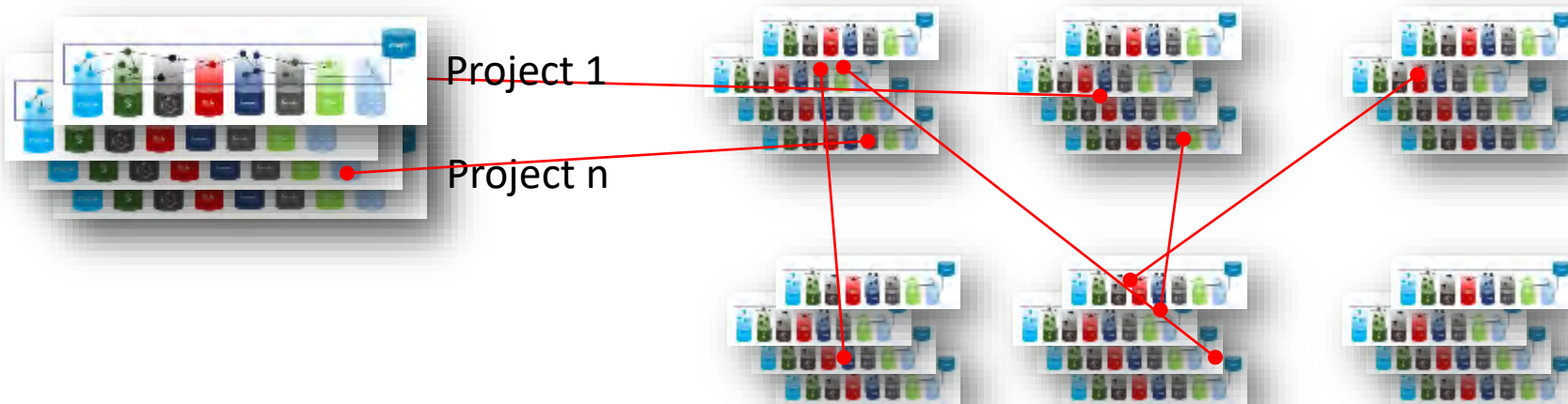
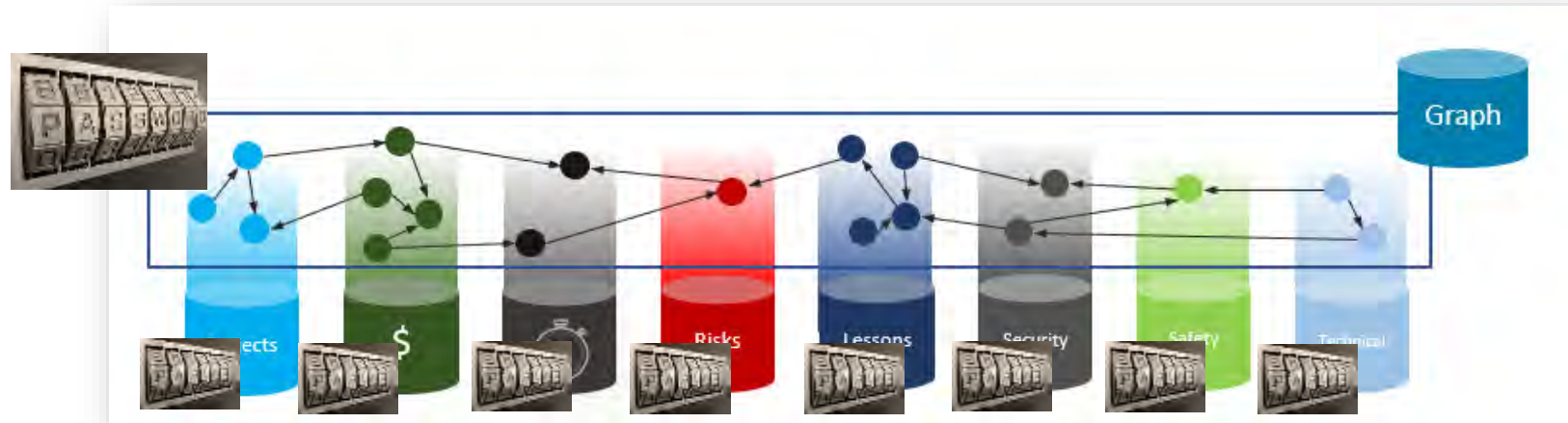
**Project DNA**

| <u>amazon.com</u>                            | Projects  |
|--|---|
| Billions of data points updated every second | Hundreds or thousands of data points updated daily or monthly |
| High quality consistent data                 | Variable quality  |
| Data lakes                                   | Siloed data   |
| Use case driven                              | Legacy data   |
| Data driven business                         | Data as an exhaust plume                                      |
| Predictive/Prescriptive                      | Largely Descriptive   |

In projects, we have to infer insights from connections, not just data volumes

But we have siloed and unconnected data....

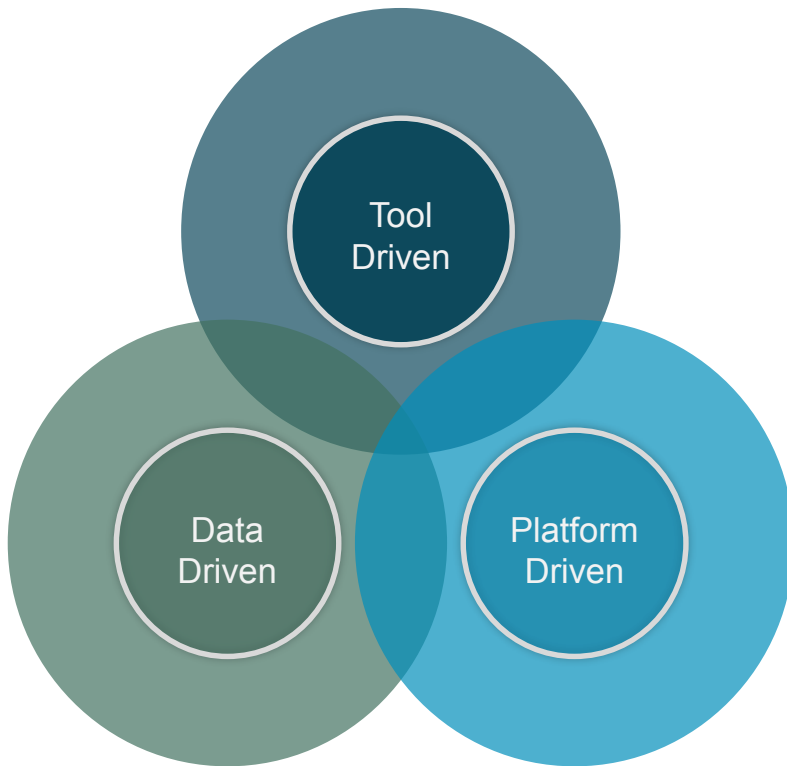
# Data Trust: Architecture





Enabling organisations to securely pool data for the benefit of the collective

# Data in Separate Tools or Pooled Data?



Plus integration with other corporate tools and data

## Tool Driven

Implementation strategy driven by tool selection.

Primavera/ASTA, Risk Tool, BIM etc.

Considerable tool integration challenge.

## Platform Driven

A platform that integrates multiple tools. A one stop shop that integrates database and tools for a project management or BIM centred use case. Vendor lock in.

## Data Driven

Connected data is at the core of the solution.

Tools and platforms are used to capture, ingest, process, visualise and provide insights.

## Briefs, Reports and Dashboards



Auto-reporting  
Auto-dashboards  
Predictive analysis

## Tracking Contract Deliverables



Tracking receipt  
Compliance and quality assessment  
Deliverable graphs

## Meeting Admin, Minutes, Actions



Gotomeeting – Transcript  
Extract actions into Flow  
Use Flow to progress actions

## Resource Utilisation



Automatic review of timesheets  
Workflows chasing timesheets  
KPIs on resource performance

## Quality Audits, Maturity Reviews

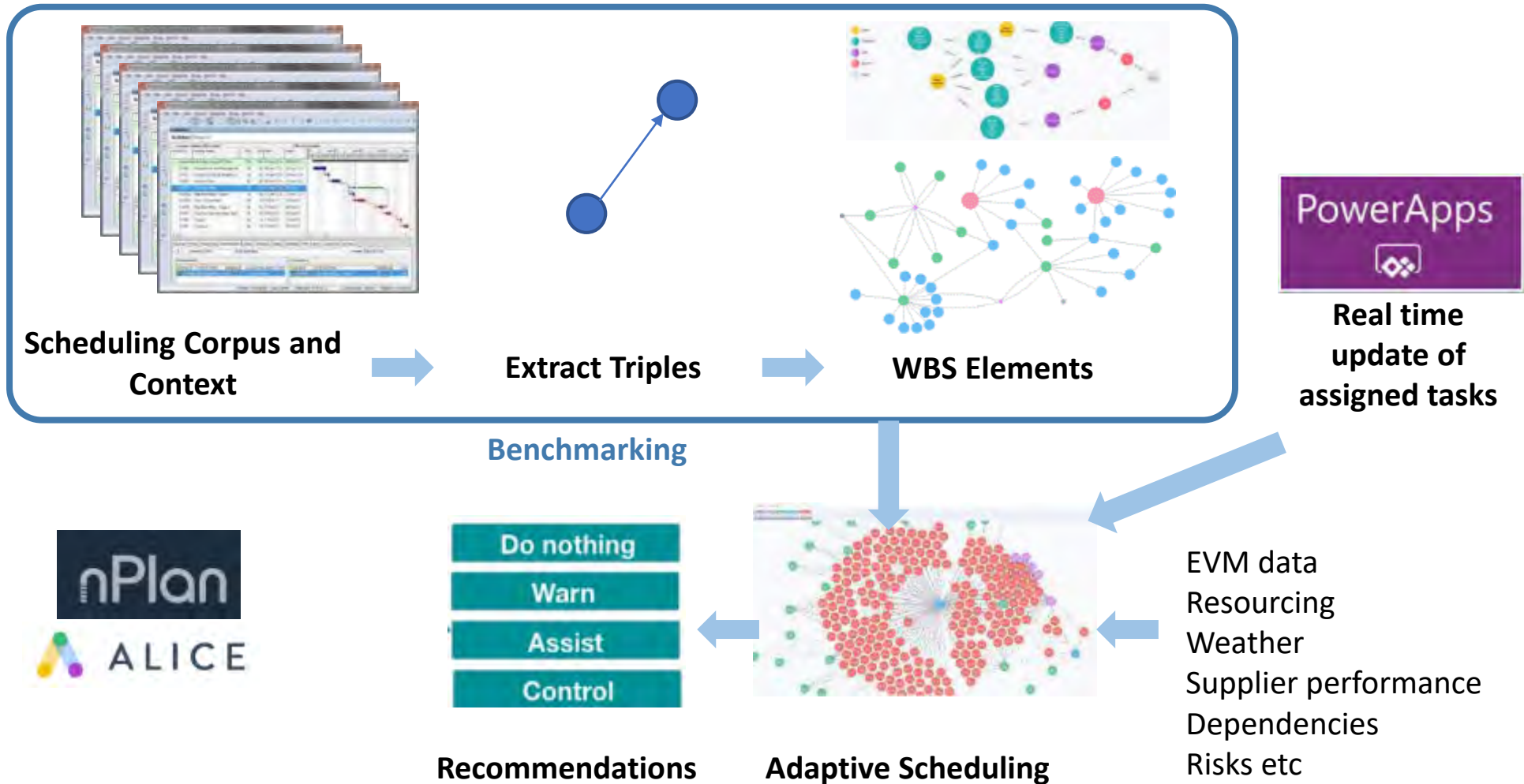


Data quality/completeness analysis  
Frequency of updates  
Comparison against good practice

## Forecasting, Budgeting

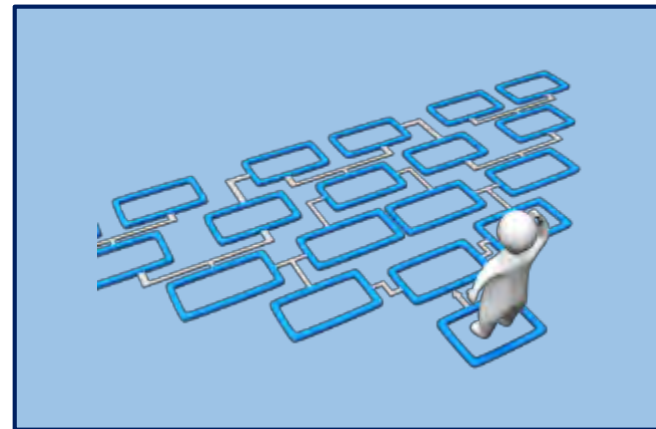


Improved benchmarking  
Variance analysis  
Early warnings

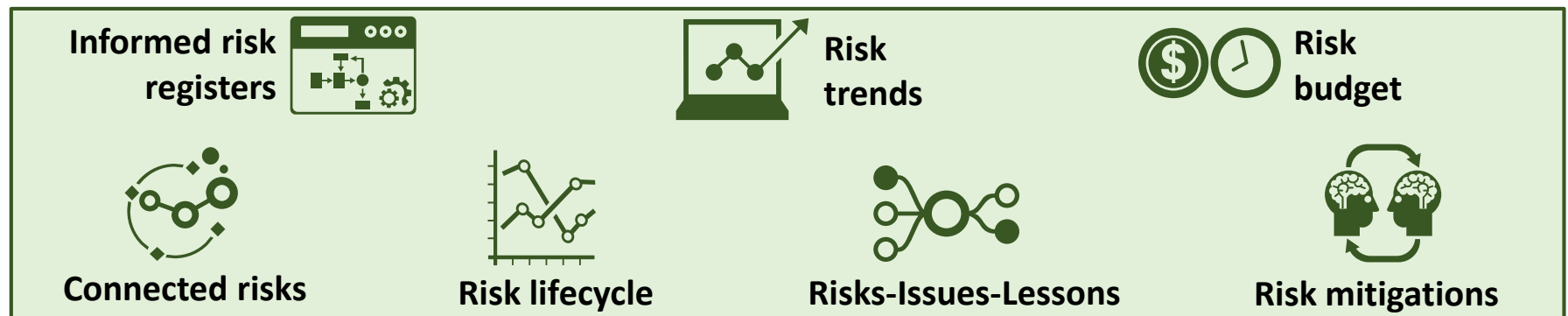




A once through process



Systemic Risk



Leveraging Risk Experience

# Stakeholder Management

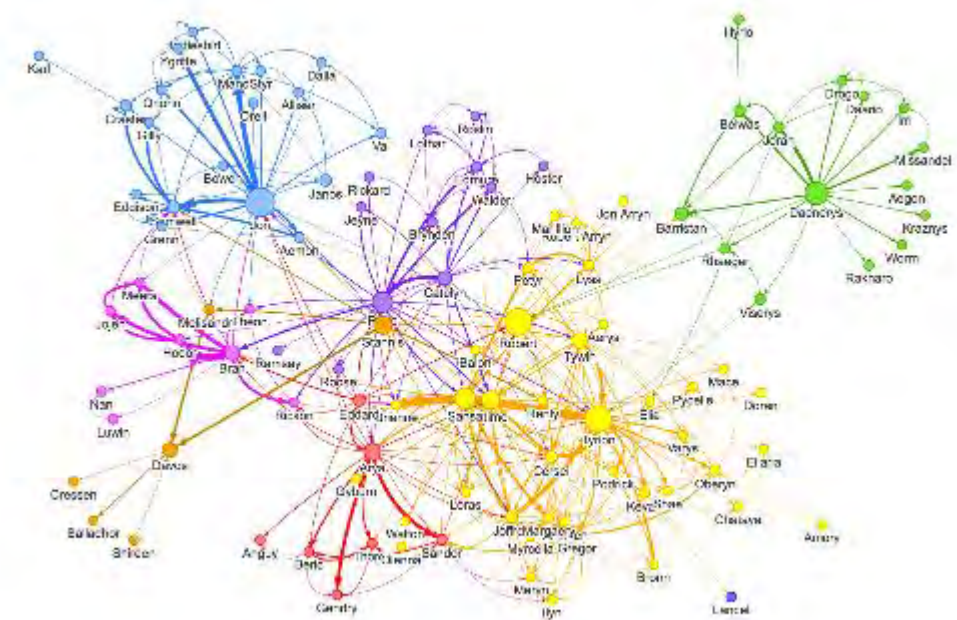
|           |        | For      |        |     | Ambivalent | Against |        |      |
|-----------|--------|----------|--------|-----|------------|---------|--------|------|
| Influence | High   |          |        |     |            |         |        |      |
|           | Medium |          |        |     |            |         |        |      |
|           | Low    |          |        |     |            |         |        |      |
|           |        | High     | Medium | Low |            | Low     | Medium | High |
|           |        | Interest |        |     |            |         |        |      |

Credit: Praxis Framework

## Static Analysis

Or

Adaptive, **dynamic** networks, reflecting real time feedback and historical performance of specific groups/individuals



Credit: Neo4J

# Deleting Repetitive Processes

### UiPath Process

- Open live smc file in BIMcoll and update models
- Save smc file to archive and "IVE" folder
- Send email to team



- Navigate to the live SMC file
- Open the file within the BIMcoll software
- Potentially massed loading times have to be dealt with
- Save two versions of the process

### UiPath Process

**71** step process. Key steps are detailed below:

- Log into BIMXtra
- Download updated models
- Import the model into BIMcoll
- Update the model with the latest data
- The model navigates through BIMXtra to the project location
- A report can be added to download the model that has been updated




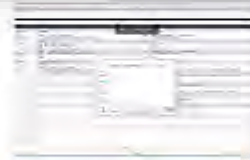
• Over 6 projects, **624** hours per year is spent on this process



- **2 hours** each week spent updating models per project
- **~ 2 weeks** every year per project

**71** step process automated.

- Save smc file to archive and "IVE" folder
- Send email to team



- Save two versions of the process
- Even the automation of the emailing of the team can be completed

## PWin

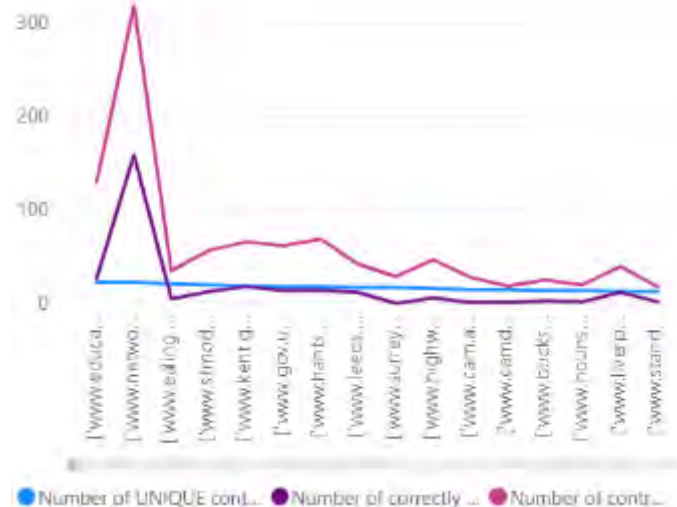
**Aim** – to use existing contract data to **predict future bid outcomes**

**Data** - using **~10,000** contracts from construction industry

1. We can predict bid outcomes to an **accuracy of 30%.**



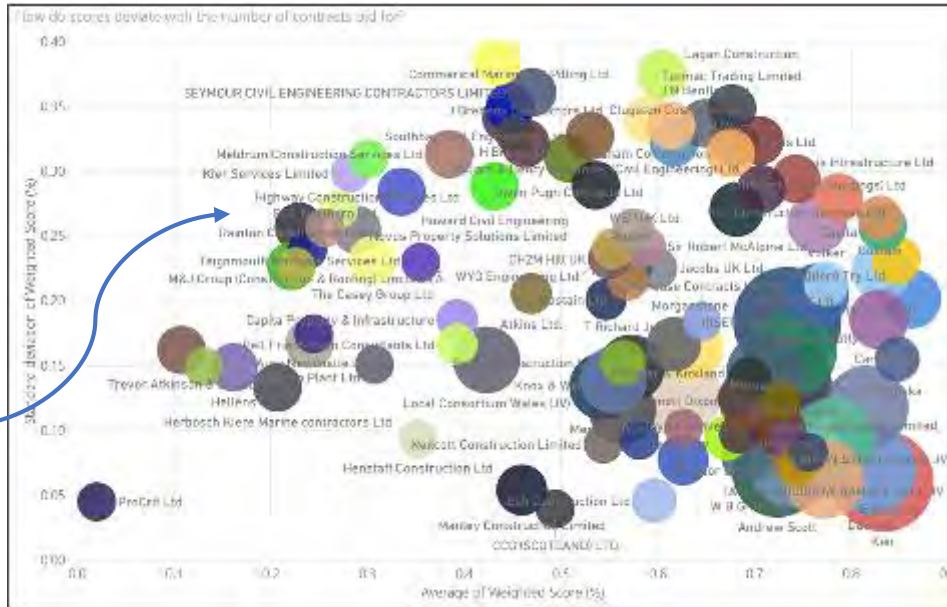
2. This increases where there is a greater amount of unique data, such as from Network Rail (50%) and North Tyneside (91%)



| Client   | Pwin | Number of contracts | Number of contracts predicted correctly | Number of UNIQUE contractors |
|--|------|---------------------|---|------------------------------|
| [www.networkrail.co.uk]  | 0.50 | 319                 | 159                                     | 23                           |
| [www.education.gov.uk]   | 0.21 | 130                 | 27                                      | 23                           |
| [www.cornwall.gov.uk]  | 0.71 | 35                  | 25                                      | 7                            |
| [www.northtyneside.gov.uk]                                     | 0.91 | 23                  | 21                                      | 4                            |
| [www.glasgow.gov.uk]   | 0.36 | 21                  | 18                                      | 3                            |
| [www.kent.gov.uk]  | 0.27 | 65                  | 18                                      | 19                           |
| [www.edinburgh.gov.uk]   | 0.40 | 42                  | 17                                      | 12                           |
| [www.leics.gov.uk]   | 0.31 | 21                  | 17                                      | 3                            |
| [www.westlothian.gov.uk]                                       | 0.50 | 32                  | 16                                      | 8                            |
| [www.manchester.gov.uk]  | 0.34 | 44                  | 15                                      | 12                           |
| [www.cambridgeshire.gov.uk]                                    | 0.30 | 47                  | 14                                      | 9                            |
| [www.gov.uk/government/organisations/department-for-education] | 0.23 | 62                  | 14                                      | 18                           |
| [www.nants.gov.uk]   | 0.20 | 69                  | 14                                      | 18                           |
| [www.grosrail.co.uk]   | 0.42 | 31                  | 13                                      | 7                            |
| [www.norfolk.gov.uk]   | 0.65 | 20                  | 13                                      | 4                            |
| [www.croydon.gov.uk]   | 0.57 | 21                  | 12                                      | 8                            |
| [www.essex.gov.uk]   | 0.25 | 49                  | 12                                      | 10                           |
| [www.leeds.gov.uk]   | 0.29 | 42                  | 12                                      | 17                           |
| [www.liverpool.gov.uk]   | 0.30 | 40                  | 12                                      | 13                           |
| [www.milton-keynes.gov.uk]                                     | 0.57 | 21                  | 12                                      | 5                            |
| [www.oxfordshire.gov.uk]                                       | 0.48 | 25                  | 12                                      | 6                            |
| [www.birmingham.gov.uk]  | 0.29 | 38                  | 11                                      | 12                           |
| [www.lincolnshire.gov.uk]                                      | 0.35 | 31                  | 11                                      | 9                            |
| [www.telford.gov.uk]   | 0.73 | 15                  | 11                                      | 6                            |
| [www.cumbria.gov.uk]   | 0.43 | 23                  | 10                                      | 7                            |
| [www.greeneking.co.uk]   | 0.50 | 20                  | 10                                      | 5                            |
| [www.slough.gov.uk]  | 0.67 | 15                  | 10                                      | 5                            |
| [www.tfl.gov.uk]   | 0.37 | 27                  | 10                                      | 13                           |
| [www.wiltshire.gov.uk]   | 0.33 | 30                  | 10                                      | 10                           |
| [www.kingston.gov.uk]  | 0.75 | 12                  | 9                                       | 4                            |
| [www.newham.gov.uk]  | 0.43 | 21                  | 9                                       | 6                            |

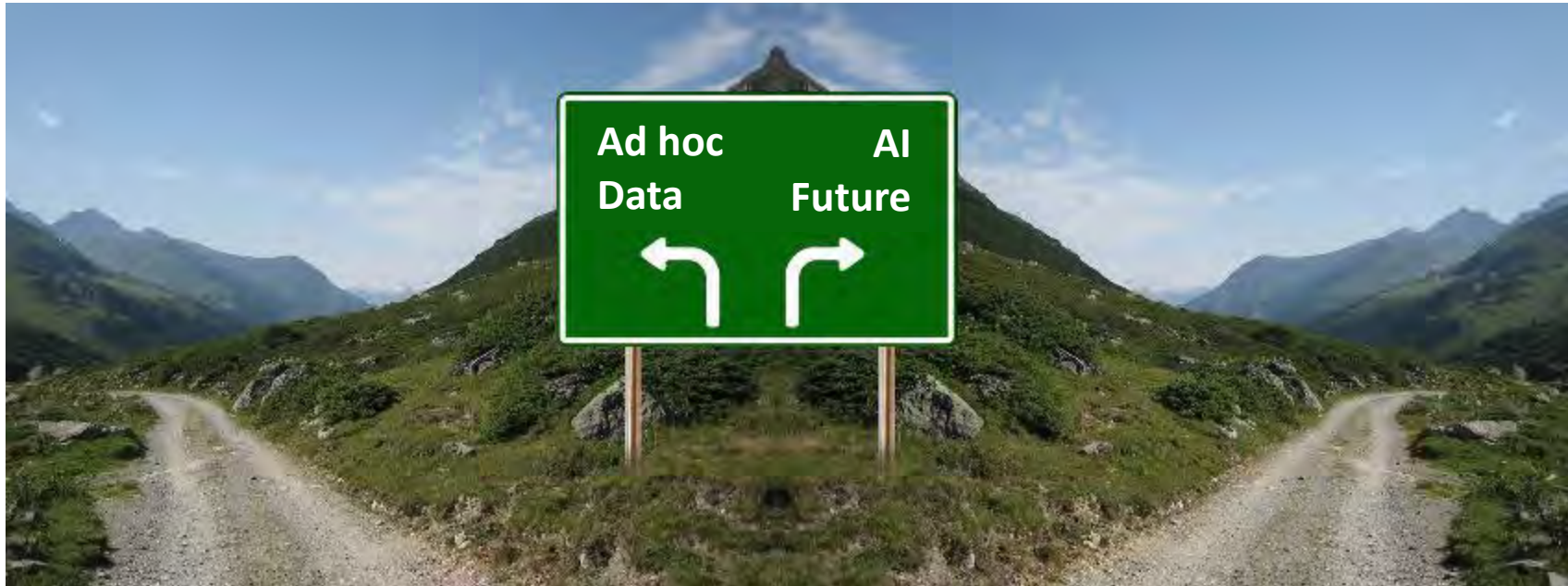
3. Will increase significantly as bid feedback is added.

# What Insights Can be Derived from Data



\*Bubble size = number of contracts bid for

# A Critical T-Junction

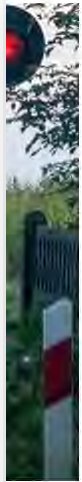


- We accept that our data is patchy
  - We acknowledge that its not a priority
  - We implement ad hoc improvements
  - Data remains an exhaust plume
  - Not really 'invested'
- We believe in the vision
  - We develop a roadmap to get there
  - We begin to lay the foundations
  - We upskill, attend hacks, reshape
  - We are 'invested'



## Its not on the corporate 'to do' list

- Lack of a shared vision
- Lack of evidence to support the vision
- Understanding the investment case
- Lack of skilled horsepower
- Lack of data
  - Siloed
  - Poor quality



## Its not on the corporate 'to do' list

- Lack of a shared vision
- Lack of evidence to support the vision
- Understanding the investment case
- Lack of skilled horsepower
- Lack of data
  - Siloed
  - Poor quality

- White Paper

- Steering Boards

- Innovation

- Meetups

- Apprenticeship

- Hackathons

- Masterclasses

- Robotic Process Automation

- Data Trusts

# Project Data Analytics Community

The UK's biggest Project Data Analytics Community

## NATIONAL EVENTS

Project:Hack

Conferences

Product Demos

Masterclasses

>4,000 members

## REGIONAL EVENTS



Founded Dec 2017



Founded April 2019



Founded April 2019

<https://projectdataanalytics.uk/event-page>

## Expanding to Aberdeen and Leeds

**Book Now**

**HOW DATA ANALYTICS  
WILL TRANSFORM HOW  
WE DELIVER PROJECTS:  
How will you engage?**

Speakers: Martin Paver & Giorgio Locatelli

  
Project Data  
Analytics

Wed 23rd Oct  
18:00 - 20:30  
Leeds University,  
School of Civil  
Engineering

Free entry, pizza & refreshments

   **LEEDS  
meetup**

**Book Now**

**HOW DATA ANALYTICS  
WILL TRANSFORM HOW  
WE DELIVER PROJECTS:  
How will you engage?**

Speakers: Martin Paver & Stephen Ashley

  
Project Data  
Analytics

Thurs 31st Oct  
18:00 - 20:30  
Oil & Gas Tech Centre  
Aberdeen  
AB15 4ZT

Free entry, pizza & refreshments


   **ABERDEEN  
meetup**

<https://projectdataanalytics.uk/event-page>

## Level 4 [Project] Data Analyst

- Developed as a consequence of community engagement
- Building critical capacity and capability
- Hands on, practical experience
- Get in on something BIG.... On the ground floor
- 15 month scheme
- Starting in January 2020

Be part of something special. Call us now.



**Projecting Success**

**Learner Information**

**[Project] Data Analyst Apprenticeship Level 4**

**Duration**  
Target for completion of 15-18 months

**Delivery**  
80% workplace learning / 20% classroom-based & online training

By 2030, £600bn will be invested in infrastructure projects, and yet we struggle to leverage experience from one project and apply it to the next. Organisations are turning to advanced analytics to extract deeper insights from project data.

However, there is a shortage of people who have the skills to apply data science in a project delivery environment, which will be exacerbated as organisational demands for data insights grows. This apprenticeship will teach you the skills to bridge the gap between data scientist and project manager through a combination of on the job work experience, classroom-based learning, hackathons and online training.

**Job Profile**

The primary role of a Data Analyst is to collect, organise and study data to provide business insights. Data Analysts are typically involved with managing, cleansing, abstracting, aggregating and analysing data. They work across a variety of projects providing solutions to a range of customer / stakeholder issues. They then make recommendations to improve business performance.

Project Managers apply knowledge, skills, tools and techniques to project activities with the objective of fulfilling the project requirements on-time and within budget.

This apprenticeship will give you the skills to identify business challenges, extract and manipulate data to provides insights into these challenges, begin to develop predictive analytics and optimise project performance.

**Typical Job Roles:** Data Analyst, Data Manager, Data Scientist, Data Modeller, Data Architect, Data Engineer.

**Candidate Profile**

**Entry Qualifications:** Either / Or

- Minimum of 2 A-Levels (including Maths).
- Level 3 Apprenticeship Qualification.
- Level 3 BTEC (or equivalent).
- A good grasp of Statistics is also desirable.

These are a guideline and ultimately employers will assess suitability of staff for training.

**Personal Qualities:**

- You will be an enthusiastic team player, with a strong desire to learn and share knowledge.
- You will be able to work unsupervised for periods of time to complete project-based training.

**Technical Experience:**

- You will be comfortable with a range of IT systems and software and ideally have some experience of retrieving, collating, manipulating and presenting data for analysis and reporting purposes.
- Some programming and coding experience would be advantageous.

**INSTITUTE FOR APPRENTICESHIPS**

**Apprenticeships**  
National Apprenticeship Service

Projecting Success work in partnership with employers to upskill or retrain existing staff.

[www.projectingsuccess.co.uk](http://www.projectingsuccess.co.uk)  
contact@projectingsuccess.co.uk | +44 (0)7775 704044

- This is progressing at pace in other sectors
- Project delivery is a late adopter, but ripe for disruption
- The capabilities are being demonstrated on a daily basis
- Some starting small, others more visionary
- When it moves it will be difficult to catch up
- Project management will be transformed

It isn't  
hype

Please find me on LinkedIn:



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CEO / Founder

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Martin Paver

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Community

