



The How and Why of Data Science Risk Management

EAA e-Conference on
Data Science & Data Ethics

12 May 2022

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&

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OVERVIEW OF PRESENTATION

Data Science is changing the actuarial operating model. Risk management has to keep up. We will look at new risks that machine learning brings; real life examples and best practice for identifying, managing and reporting on the 'new model risk'. We will explore how decisions could be handled in the context of our professional and ethical responsibility. We will conclude with actions teams can take to support the risk measurement and risk management of data science.

AGENDA

- Data Science Risk Management: an Introduction
- Professional, wider ethical and regulatory considerations
- Practical examples of new risks and actions to manage these

FIA, Actuary & Change Specialist

As a senior consulting actuary Valerie:

- leads large scale finance & actuarial change programmes and;
- enables clients to uncover the potential value and risk of embracing modern day data science tools & techniques.

Valerie is also the founder of Actuartech that offers hands-on training in the application of data science in a business context.

Valerie has played key industry roles to understand the value and risk of data science through her involvement in:

- the IFoA's task force on ethical guidance for practitioners working in data science and;
- the development of the IFoA Data Science Certificate.



actuartech

ABOUT ME



Valerie
du Preez

Actuartech
(Dupro Ltd)

DEFINING

- New approach relative to traditional approach in the context of actuarial work
- Machine learning, models, AI (in the context of data science), data, model risk

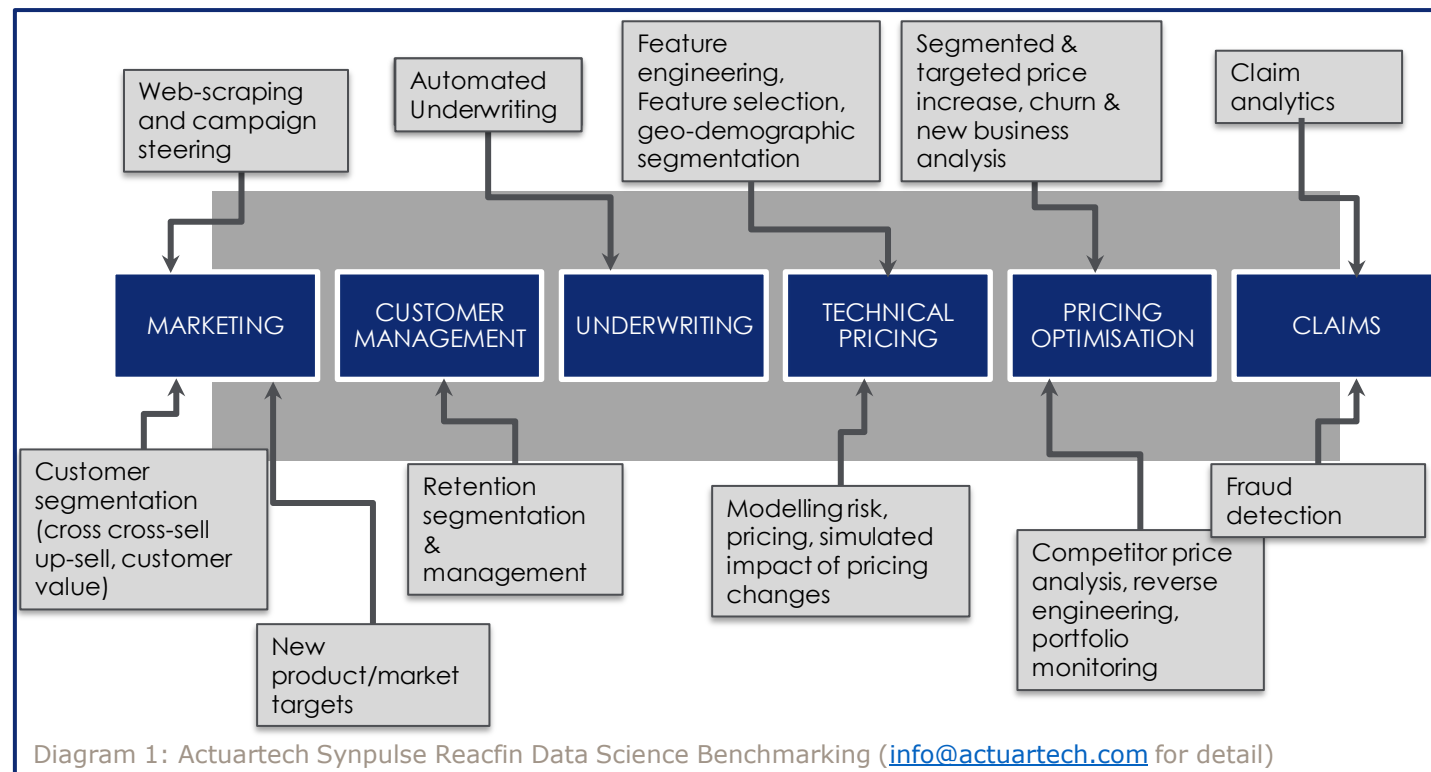
NEW RISKS THAT MACHINE LEARNING BRINGS

- The “black box” problem
 - Explainability
 - Overconfidence in models
 - Ethics
- The novelty of the discipline
- The technical issues
 - Transitioning
 - Responsibilities
 - Resource requirements

KEY TAKEAWAYS FROM RECENT BENCHMARKING:

• Overview

- Majority of actuarial teams surveyed started to use **R** or **Python** to some extent despite lack of skills in programming languages being mentioned as a key limitation and/or barrier
- Some starting to explore with machine learning techniques
- Crucial **criteria** for applying new techniques
 - **High quality and quantity** of internal and external **data**
 - **Predictability vs interpretability** of model (fit and interpret models with better predictive power)
 - Costs vs effort and frequency of use (higher **benefit-versus-effort** outcome)
 - Significant **improvement** expected compared to models currently used
 - The **objective** of the data science exercise
 - Being able to **identify and justify** the appropriate **use cases** and necessary order of **prioritisation**.



APPROPRIATE ADOPTION OF DATA SCIENCE TECHNIQUES IN ACTUARIAL TEAMS

Examples from **recent benchmarking** of how actuaries could **update methods** and **use emerging technological** advances in efficient and appropriately risk-controlled way **to tackle traditional or non-traditional activities**.

Examples of opportunities to implement new tools, techniques and skills across the data science pipeline	
Business technical skills	Optimise identifying and solving business problems, with a modern-day toolkit
Specialist data management and storage techniques	Storing, accessing and integrating relevant data and model outputs securely and effectively.
Model building, machine learning and artificial intelligence techniques	Ensuring model is appropriate, and that the model's output, impact and decisions can be validated, interpreted and communicated.
Visualisation and reporting skills	Preparing powerful visuals and reports for effective communication with stakeholders.
Modern DevOps solutions	Controlled model deployment and maintenance to ensure model is useful in future, and that future teams using or taking ownership of the model understands how to maintain it.
Advanced data science risk management techniques	Model review, challenge and validation; identification and management of risks related to new techniques, and the ability to use data legally and securely. FURTHER DETAIL ON LATER SLIDES

Actuaries will be required to sufficiently upskill when **choosing, justifying, interpreting, validating and communicating** the **decisions and implications of a particular technique, model, tool or system**.

FIA, Head of Actuarial Function

Matthew Byrne is an actuary with over 20 years' experience in Insurance. In his current role as Head of Actuarial Function for NFU Mutual, Matthew leads a team delivering second line risk assurance across both Life and GI areas of the business.

Matthew has been involved in a large number of actuarial profession working parties, including most recently Risk Management in a Digital World and the Data Science Managing Committee, where he chairs the Professionalism, Regulation and Ethics workstream.

ABOUT ME

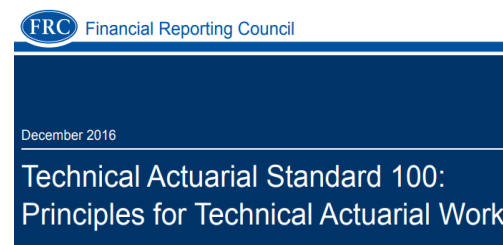
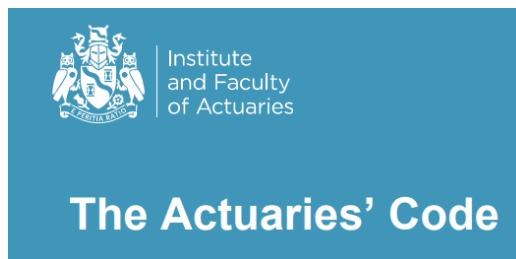


Matthew
Byrne

NFU Mutual

PROFESSIONALISM CONSIDERATIONS

- Actuarial Profession Standards
 - The Actuaries Code
 - TAS
 - APSX2



APS X2: Review of Actuarial Work

WIDER ETHICAL AND REGULATORY CONSIDERATIONS

- Statutes
 - Gender Directive
 - GDPR
 - EU Artificial Intelligence Act (draft)
- Regulatory Requirements
 - FCA Fair Treatment of Customers

COUNCIL DIRECTIVE 2004/113/EC
of 13 December 2004

implementing the principle of equal treatment between men and women in the access to and supply of goods and services

REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 27 April 2016

on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

LAYING DOWN HARMONISED RULES ON ARTIFICIAL INTELLIGENCE (ARTIFICIAL INTELLIGENCE ACT) AND AMENDING CERTAIN UNION LEGISLATIVE ACTS



Fair treatment of customers

Actions to get on top of Data Science Risks

- Identify weaknesses and make improvements
- Data Science implementation mindset
- Governance and frameworks
- Collaboration between actuaries and data scientists

Maximising the value of Data Science appropriately

- Invest in Skills and secure collaborative environments to develop these skills
- Beneficial to society
- Beneficial to customer and organisation
- Business environment modelling

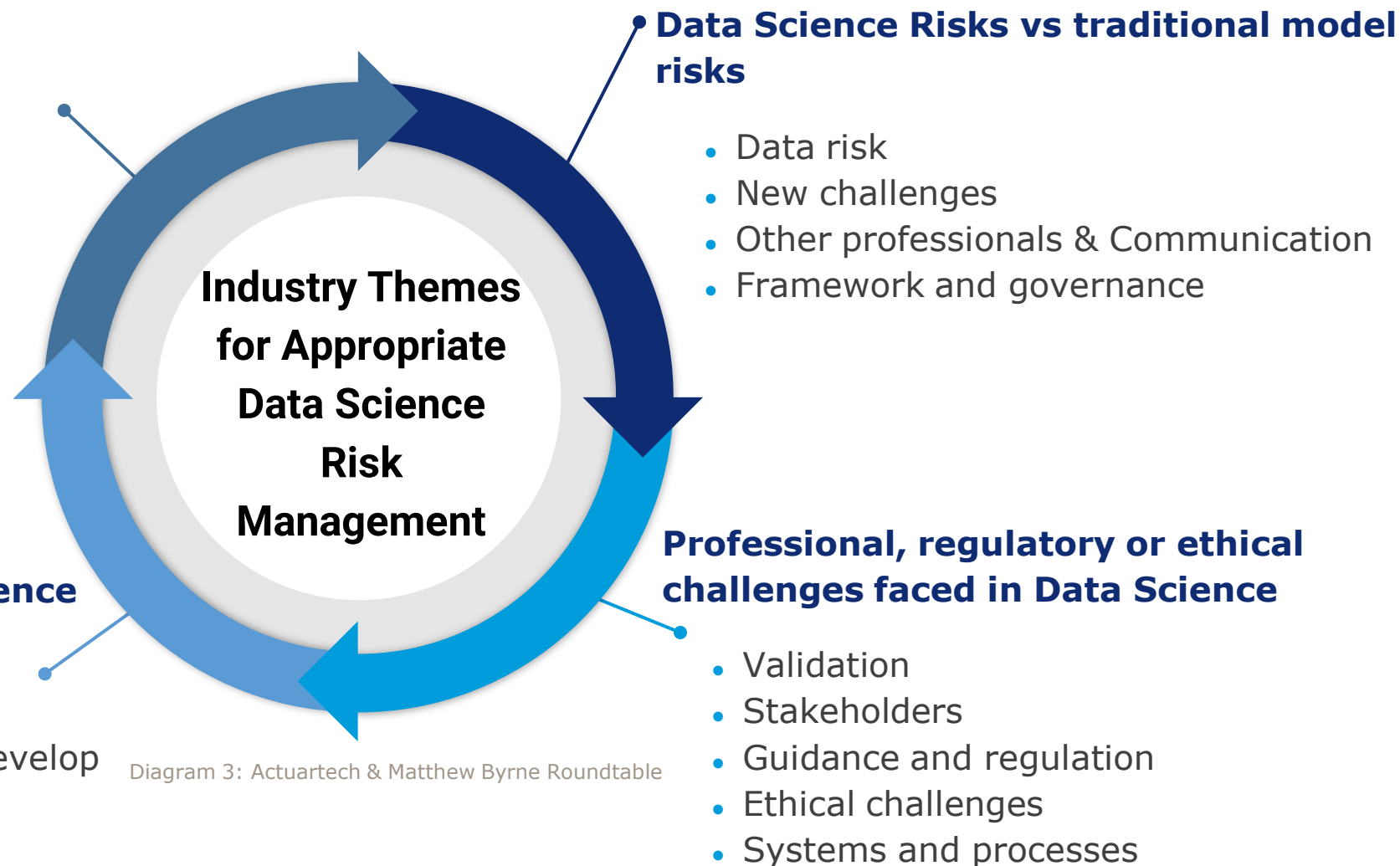
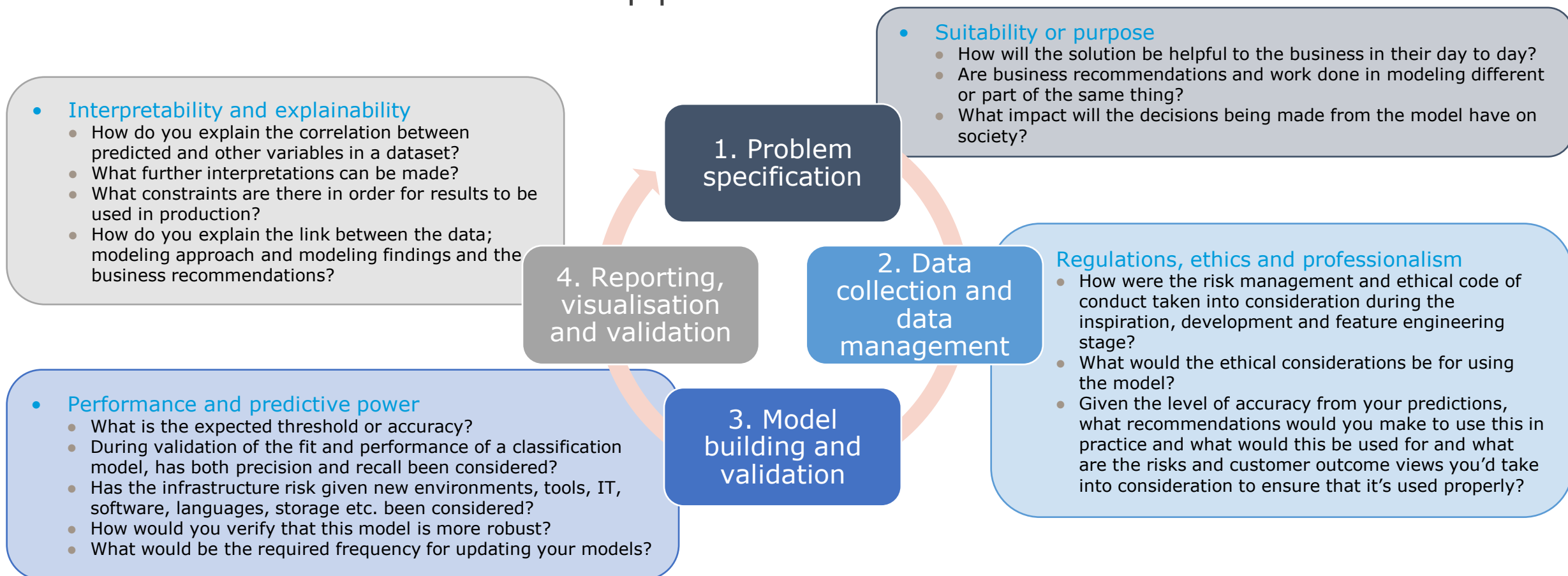


Diagram 3: Actuartech & Matthew Byrne Roundtable

BEST PRACTICES FOR IDENTIFYING, MANAGING AND REPORTING ON THE 'NEW MODEL RISK'

Considerations in the data science pipeline:



QUESTIONS

& COMMENTS

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Thank you for your time!

Contact

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