**Institute
and Faculty
of Actuaries**

Capital Modelling:
Challenging the Norm

Gavin Dunkerley
Peter Dyson

17 January 2018

Overview

The way we use models is evolving

- Many have been built with regulation in mind
- Businesses are realising the value of the information they can provide

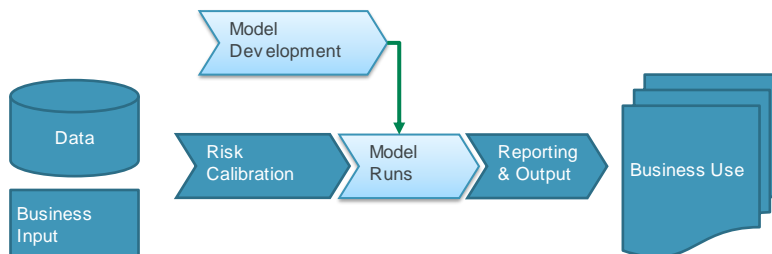Increased demands on modelling teams

- Increased business demands
- Regular use
  - Regulation, RI purchase, asset allocation, risk reporting
- Ad hoc use
  - Management questions, economic response

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Agenda

- Introduction
- Challenging the way we communicate
- Challenging the process
- Next generation

Introduction

Modelling teams need to evolve to stay ahead:

- Effective and efficient communication with the business
- Faster, more efficient processes
- Improved accuracy

Aim:
- More time thinking about risk solutions
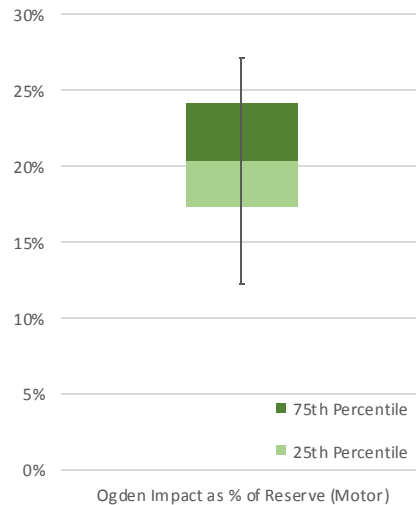- Better decision making

Case Study

2017's Surprise – Ogden

- Systemic risk

- Average of 20% hit on Motor reserves*

- Event description
  - Systemic change to settlement of claim awards
  - In response to poor economic environment

- Are similar events lurking elsewhere?

- How can we spend more time looking for them?

Ogden Impact as % of Reserve (Motor)

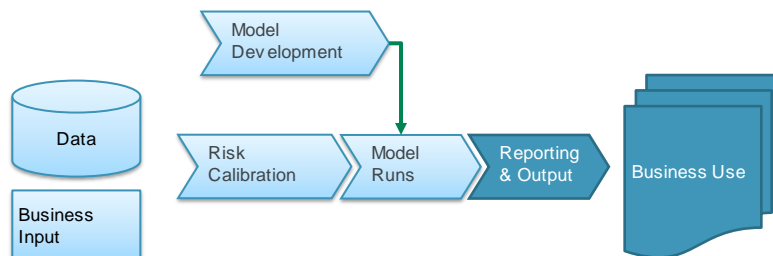- 75th Percentile
- 25th Percentile

* KPMG benchmarking

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Communication

- Focus on the output of the process
- Can we better meet business users demands?
 - Most desire a top-down storyboard

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Communication

- Analytics options
  - Existing Excel-based reporting
  - Dynamic Dashboards
    - The rise of business intelligence solutions: Qlikview, Tableau, etc.
  - Static, but automated, dashboards
    - R, Python, etc.
- How/why can they help?
  - Consistency of reporting for users
  - Ability to explore data and drivers
  - Designed to raise questions from the consumers of information and promote understanding

Images from https://bokeh.pydata.org/en/latest/
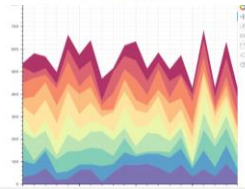
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Model Output - Analytics
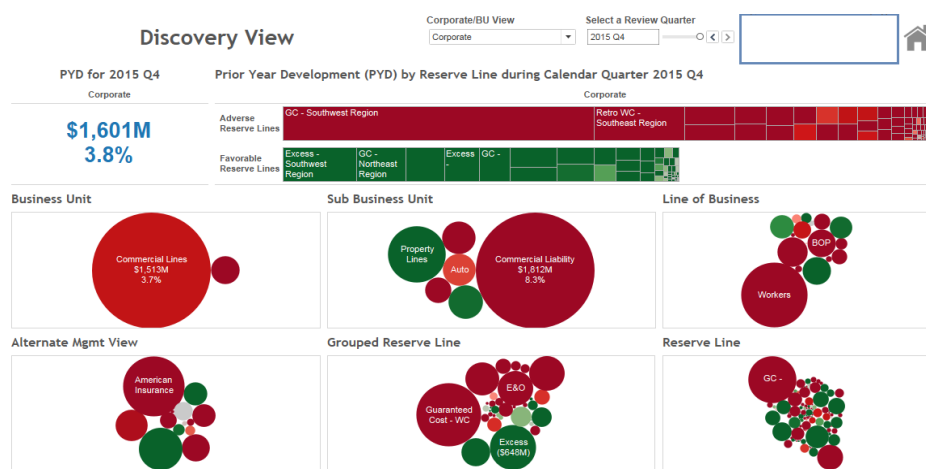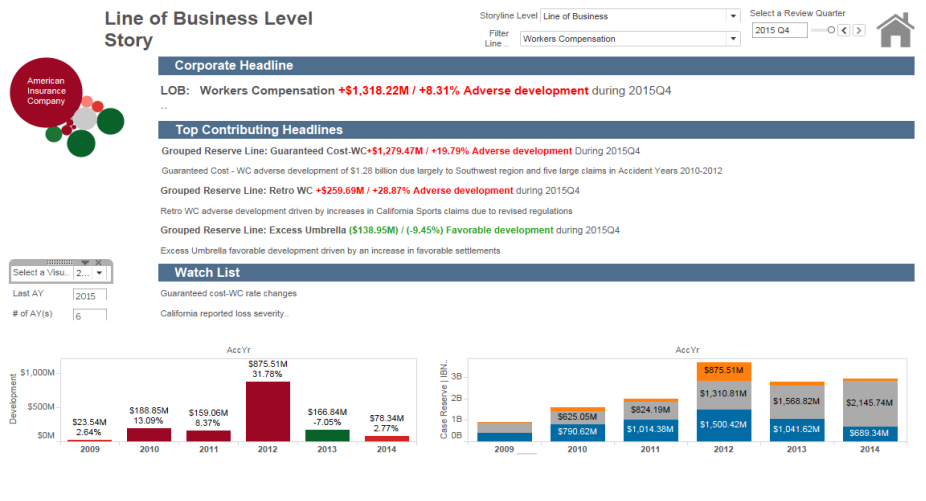
Model Output - Analytics

Communication

- Advantages
  - Once set up, quick to run and update
  - Ease of exploring output, better top-down validation
  - Fast insight generation

- Dangers and Challenges
  - Detailed data being taken out of context
  - Lack of control over actions arising from users' exploratory activities
  - Difficult to contextualise the detailed data to users

Challenging the Process

- Modelling processes have evolved slowly over recent years

- How does the process meet the needs of the business?
    - Regulatory use – Solvency requirements, ORSA
    - Regular business use – RI purchase, business planning, business metrics
    - Ad hoc – Economic scenarios, business scenarios, M&A, strategy planning

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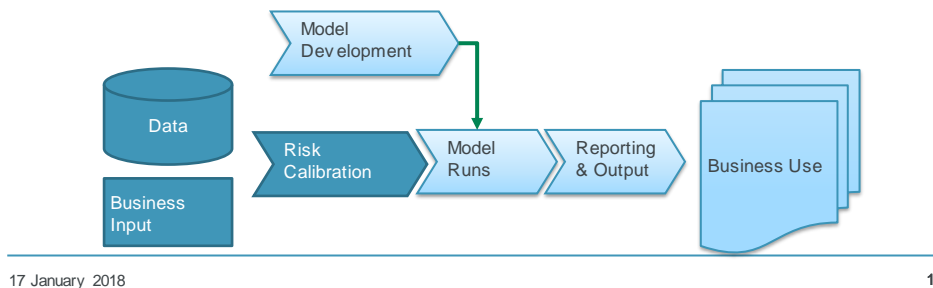
Challenging the Process

Objective: Maintain rigour for regulation but agility for the business, and prepare for the future!

Additional Benefits:

- Create capacity to focus on risk analysis
    - Free up time, simplify the process
- Create a clear, repeatable process
    - Easy to validate, clear and robust
- Create a scalable process
    - Next generation of data, more predictive factors
    - Can your process handle another 5-10 years of claims and policy data

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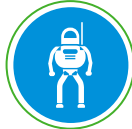
Challenging the Process

- Challenges with current processes:
  - Contain repeatable calculations, often with manual adjustments
  - Time consuming exercise
  - Consistency with other areas of the business
  - Availability of data

- Three tools for discussion:

Optimisation   **Automation**   **Future Development**

Optimisation

Manual Analysis:

Manually check data and reports. Apply manual adjustments

Prepare analysis, charts and narrative

Compile reporting and submit for review

Additional time for Insight

Optimised Process:

Feedback

Bot reviews data and flags any errors and makes recommendations

User Reviews findings and adds additional analysis.
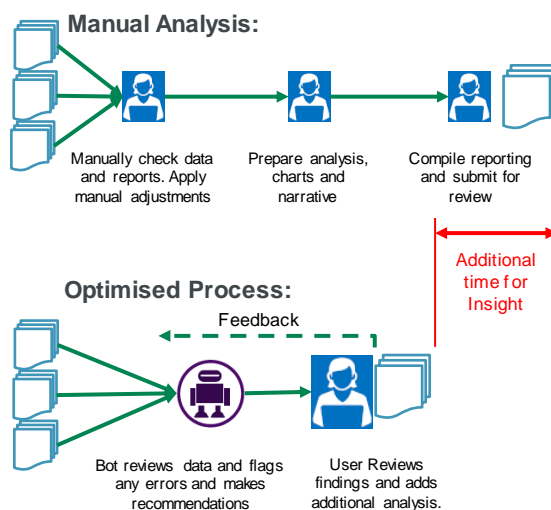
Approach

- Review data architecture and process flow

- Identify areas for efficiency gains:
  - Step reduction
  - Automation
  - Collaboration and reporting

- Control
  - Strategic validation
  - Review, challenge and feedback
  - Continuous improvement

Automation

Robotic Process Automation ('RPA') can consist of:

- Automation using scripts, programming, and macro-like interfaces
- Rules based actions – such as drawing out movements
- Self-learned behaviours – recognising key drivers and pre-populating narrative

Automation of existing procedures:

- For example aggregation of Procedure to develop an initial risk calibration
- Automate data processing, analysis and reporting
- Actuary can then review the data and calibration in one step and feed back if necessary

Feedback
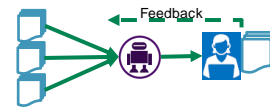
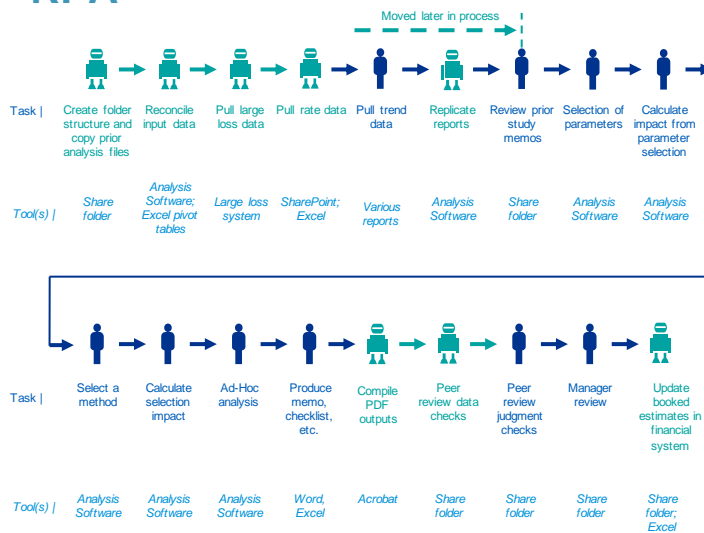18 January 2018   15

Automation - RPA

Moved later in process

Streamline a manual reserving process in 10 weeks:

- 8 of the 18 high-level manual tasks automated in the analysis process.
- automated 18% of analyst effort in analysis
- We also identified process re-engineering opportunities (incl. RPA)

Expected to reduce analyst effort approximately 50%

Task |	Create folder structure and copy prior analysis files	Reconcile input data	Pull large loss data	Pull rate data	Pull trend data	Replicate reports	Review prior study memos	Selection of parameters	Calculate impact from parameter selection
Tool(s) |	Share folder	Analysis Software; Excel pivot tables	Large loss system	SharePoint; Excel	Various reports	Analysis Software	Share folder	Analysis Software	Analysis Software

Task |	Select a method	Calculate selection impact	Ad-Hoc analysis	Produce memo, checklist, etc.	Compile PDF outputs	Peer review data checks	Peer review judgment checks	Manager review	Update booked estimates in financial system
Tool(s) |	Analysis Software	Analysis Software	Analysis Software	Word, Excel	Acrobat	Share folder	Share folder	Share folder	Share folder; Excel

Task executed by an RPA bot with analyst interaction for exception handling only

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Optimisation and Automation Benefits

- Less time producing charts, more time with the business
  - Maintain an efficient and rigorous process
    - Efficient and effective validation
  - Respond quickly to changes in the business and requests
    - Consistent business information
  - Create capacity to develop look forward
- Ability to expand
  - More detailed data used for calibration and analysis
  - More predictive factors can be included
    - Better understanding of dependencies
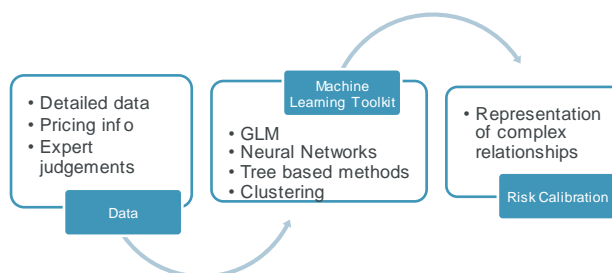 - Enhanced behavioural modelling

Next Generation Development

An optimised capital process can handle much more data and information:

- Is it required, will it benefit the model?
  - Greater detail during analysis, yes!
  - Greater detail in the model, maybe!
- New tools for handling data
  - Data Automation
  - Analytics and insight
  - Machine Learning

Data
- Detailed data
- Pricing info
- Expert judgements

Machine Learning Toolkit
- GLM
- Neural Networks
- Tree based methods
- Clustering

Risk Calibration
- Representation of complex relationships

Next Generation Development

Reserve Risk Calibration Example
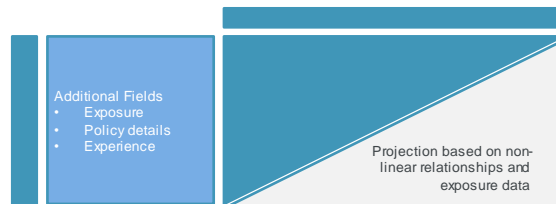
- Existing chain-ladder and reserving techniques link development factors to development period

- At an triangle level, we can include more information to compare
- Build towards a more granular approach
  - Scalable

- Traditional methods:

Traditional experience only projection

- ML Methods:

Additional Fields
- Exposure
- Policy details
- Experience

Projection based on non-linear relationships and exposure data

Challenging the Norm:

- Re-thinking communication
  - Methods which scale with increased data
  - Can communicate complex relationships
- Re-thinking the process
  - Build an efficient process
  - Leverages skills effectively
  - Can handle another 20 years of detailed data
- Build for the future
  - Broaden the analysis
  - Improve our understanding of risk
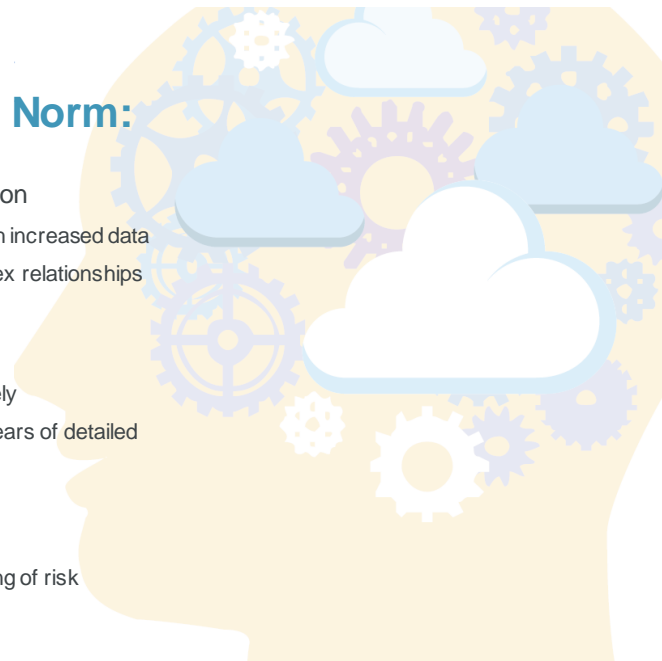
Questions

Comments

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