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## 'Big Data' – Fact or Fallacy? General Insurance

**IFoA 2017 Asia Conference, Hong Kong  
11 May 2017**

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Jacob Craigie, Zurich Insurance APAC

25 April 2017



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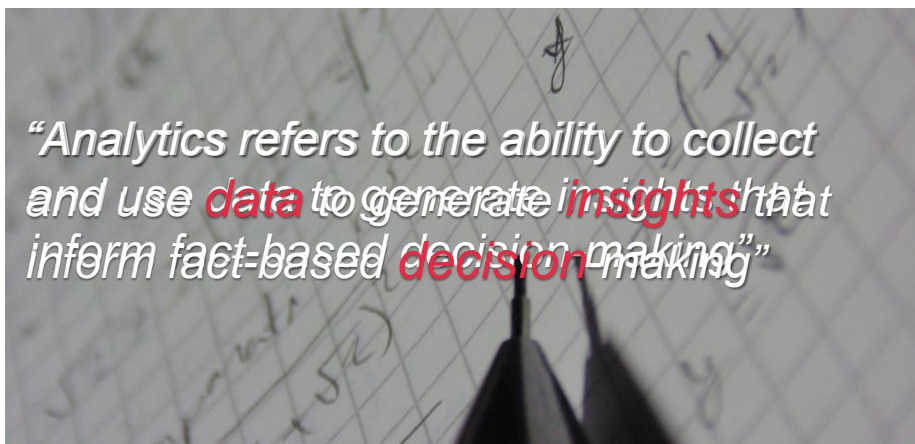


### **Objective for this morning's session:**

- Provide hands-on, practical advice for how to utilise 'Big Data' for Asia-based GI actuaries working in Pricing, Reserving and Capital
- In reality, this essentially boils down to enriching your data set and embedding analytical capability across functions

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## We are not going to define ‘big data’ – we believe the proof is in the pudding



Source: Bernard Marr



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## Insurance: an increasingly analytical industry where speed of success brings a competitive advantage

- **Non-life insurance in Asia** – still a tough nut to crack
- The insurance industry is **increasingly analytical**
- When we say this, we are thinking of the **bigger** insurance company **picture**:
  - Pricing, Reserving, Capital yes, but also:
  - Underwriting, Claims, Risk Engineering, Finance ...
- We will look at the challenges of gaining access to additional data, but...:
  - It's what you do with it (data) that counts – what **insight** do you bring?
  - **Analytical capability** and **'buy-in'** across the company is crucial in order to **create value**
- **Competitive advantage** – make no mistake, there is a real advantage waiting to be unlocked



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## Data: the age-old actuarial problem



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## Data: the age-old actuarial problem

- How many of us wish our data problems were behind us?
- Typical data challenges:
  - Data simply **isn't available**
  - **We don't know** what data is out there that we need!
  - Data isn't available in an **easily-accessible** form, or...
  - ... can be extracted, but hugely **time consuming** and at **disproportionate cost**
- Often this will (sadly) be the end of the story, but **you might be surprised what internal and external data is available**
- **If you don't ask, you will never know!**



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## Underwriting and Pricing: Investing in data and analytics can provide a unique, advantageous, perspective

More accurate pricing and risk assesment

Personalised products to meet customers' needs

More opportunities for cross- and up-selling

More effective Fraud detection

Improved Retention

Improved Customer journey



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## The importance of Technology

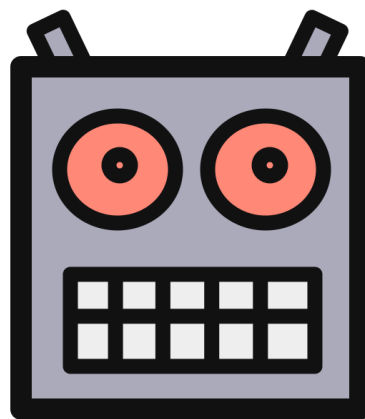
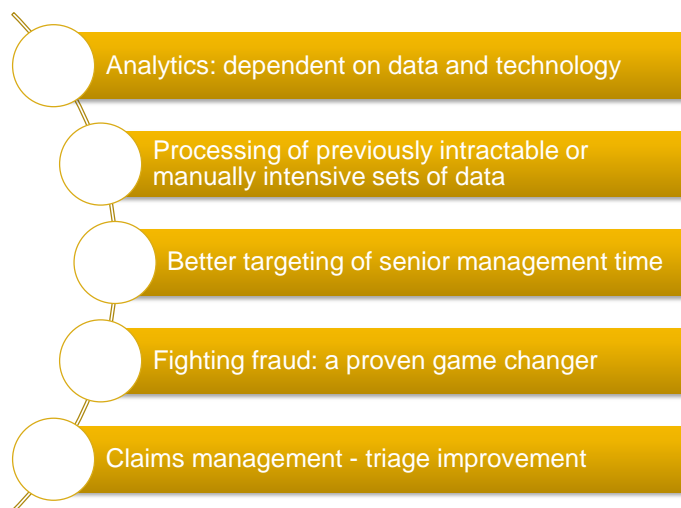


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## Claims: once a manually intensive function

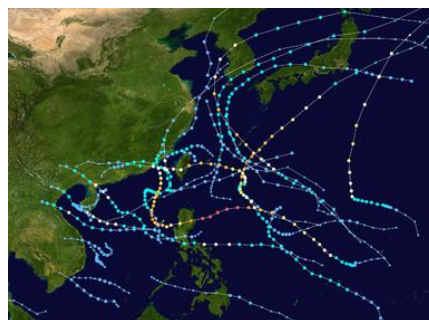
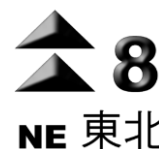
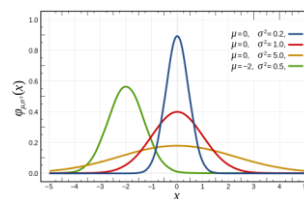
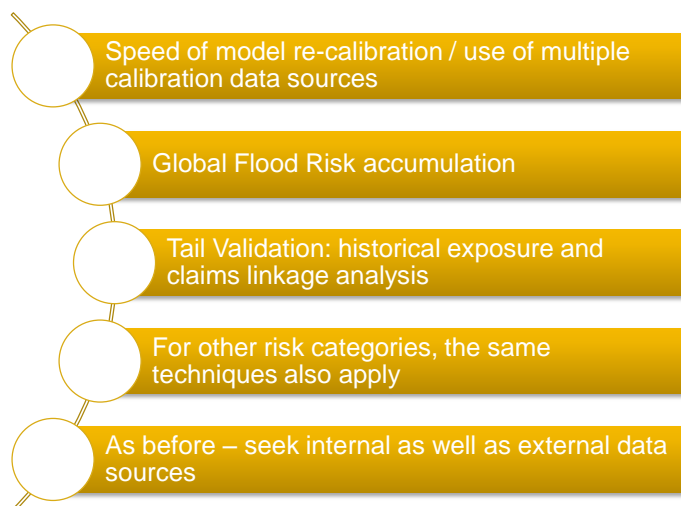


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## CAT / Capital modelling



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## Reserving

- Insurance companies produce **massive amounts of data** everyday – what data is available to you? How can we better utilise what we already have?
  - **Direct access to claims data?** Including text fields?
  - **Access to policy level data?** Including policy limits, premiums, etc...?
  - **Historical data** – may become less granular, but reveal longer term loss trends – i.e., correlations with economic or underwriting cycles – which can be predictive and act as **early warning indicators**
- You might be very surprised** to learn what data is actually available to you!
- What external data sources are available? i.e., fuel and oil prices, stock market indices, property price indices, construction indices, crime data

## Merging datasets: the value of a single data version of the truth

- This can be **very powerful** – but can be **very hard and very expensive** to achieve
- Can **policy and claims data be merged** – allowing loss ratio performance to be monitored at all granularities and splits?
- A **granular view of profitability** is often desired but can be hard to achieve. Can IBNR, ULAE and expenses be allocated to any desired split of the data?



## Seeing the woods from the trees

- Commercially available **data discovery and visualisation** packages can:
  - **Unlock value in your data**, simply by virtue of making it eye-catching and sparking a debate
  - **Quickly create interactive dashboards and visualisations**, which can be shared and turned into storyboards
  - Allow **monitoring of loss trends and loss ratio performance** by any split available in the data, and further derived splits – e.g. small, mid and large claim trends
  - **Drill into portfolios**, and examine performance of individual channels, agents, brokers, regions...
  - **What other things can we visualise?**: development factor selections, AvE, diagnostics, claims operational statistics, loss ratio walks, analysis of change

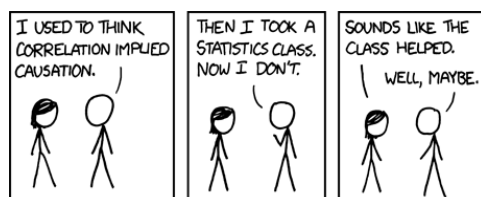


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## Beware of spurious correlations...

- **Avoid the rabbit hole** or the wild goose chase!
- **Understand what your data is telling you** – not to do so could result in unintended or unadvisable decisions being made
- Spend enough time looking into your data and you are likely to find correlations, but remember, **correlation does not imply causation!** We must always ask, “what is the causal mechanism that relates these two things?”



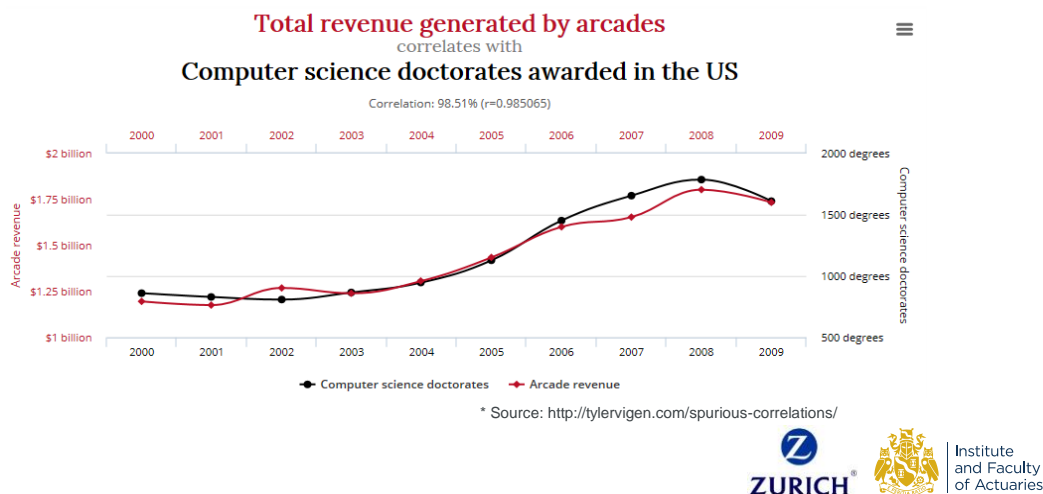
\* Source: <https://www.xkcd.com/552/>



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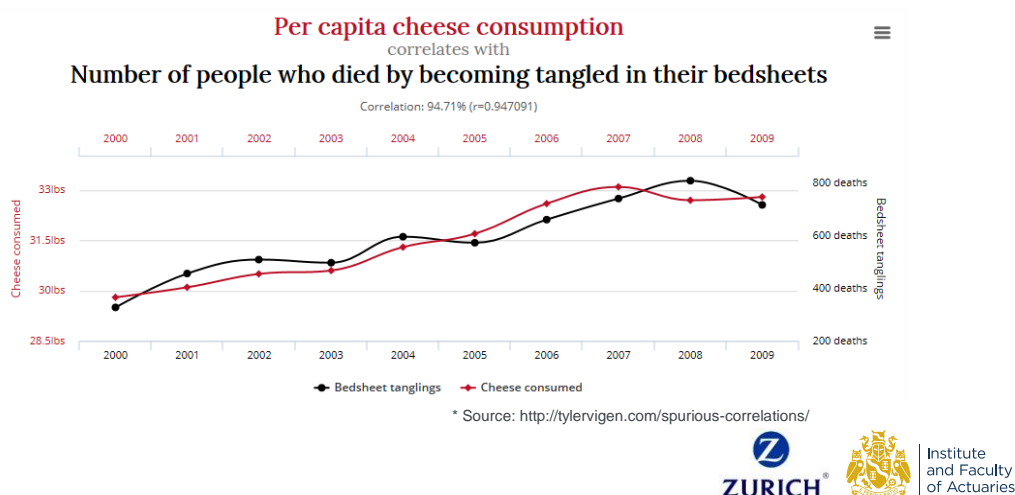
## Beware of spurious correlations...



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## Beware of spurious correlations...



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## Beware of spurious correlations...

Car colour	Relative loss ratio
Black	112%
Blue	110%
Brown	106%
Cream	98%
Gold	102%
Green	108%
Grey	120%
Maroon	110%
Orange	74%
Pink	118%
Purple	120%
Red	116%
Silver	120%
Yellow	98%



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## Beware of spurious correlations...

- The **past is not always a good predictor of the future** – if we don't understand the mechanism that correlates two factors, how can we know if that mechanism will continue to exist?
  - Will the relationship between fuel prices and motor claims frequency continue to exist after electric vehicles and self-driving cars dominate?
- **Can we be certain** we have the correct explanation for a correlation?
  - If we see average motor damage claim costs increasing in-line with inflation, is this because inflation is pushing up the cost of replacement car parts and labour, or, are we just insuring more high-end vehicles as a proportion of the portfolio?
- **Mean reversion** - are we seeing a trend, or just noise?
  - Large loss ratios improving over several years – do we conclude we are getting better at risk selection, only to see a new large claim tomorrow?
- **Decision paralysis and information overflow** – powerful tools give us many options, but are we making conclusions?

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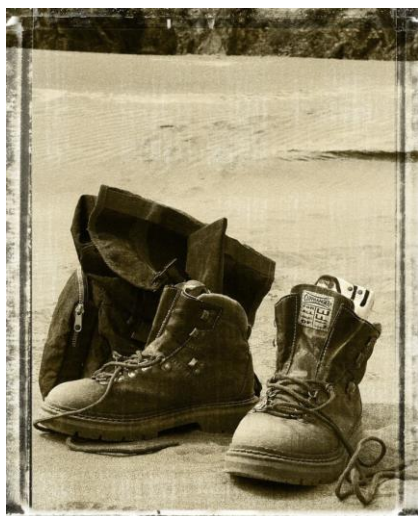
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## The usefulness of data depends on the ability to act on the insights taken from the data



- Actuarial insight is relevant for each step of the chain – actuaries should be involved end to end!
- Communication should be clear and structured, to allow formulation of actions
- The impact of any actions should be monitored, and fed back into any future analysis

## To wrap-up: harnessing the power of 'big data' and analytics is a journey that is far from easy



### Data:

- don't take no for an answer
- get to know your IT and MI colleagues

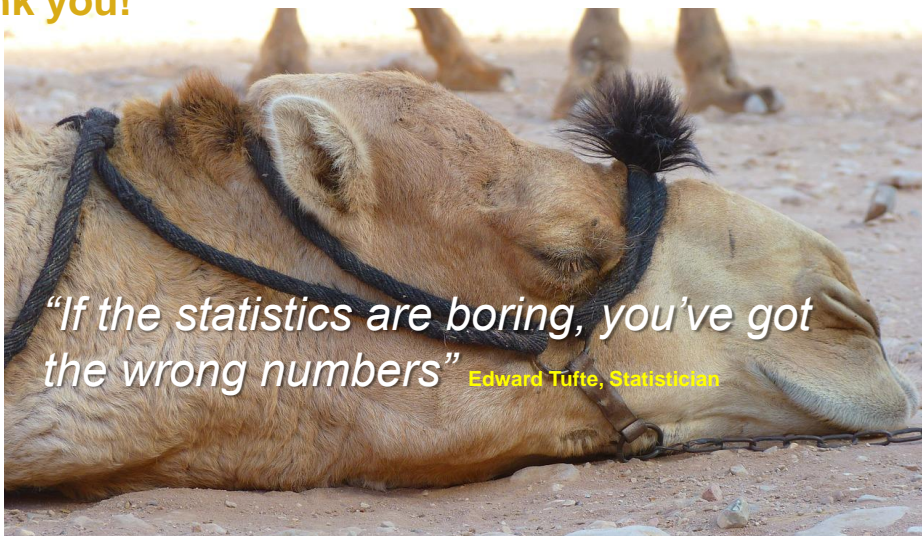
### Generating interest and traction:

- engage senior leadership
- work across functions to unlock value
- visualise!

### Be ready to put in the hours:

- if it were easy, we wouldn't be here today

Thank you!



*"If the statistics are boring, you've got the wrong numbers"*

Edward Tufte, Statistician

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## Modelling, Analytics and Insights from Data

- IFoA working party
- This cross practice working party was established to investigate "Big Data". Primarily focused on the latest and emerging thinking associated with modern mathematical tools and techniques, the working party will explore how the actuary may utilise these techniques to remain practical and add value to the businesses it serves

**Actuaries.org.uk: search 'MAID'**

**<https://www.actuaries.org.uk/practice-areas/general-insurance/research-working-parties/modelling-analytics-and-insights-data>**



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## Questions

## Comments

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