

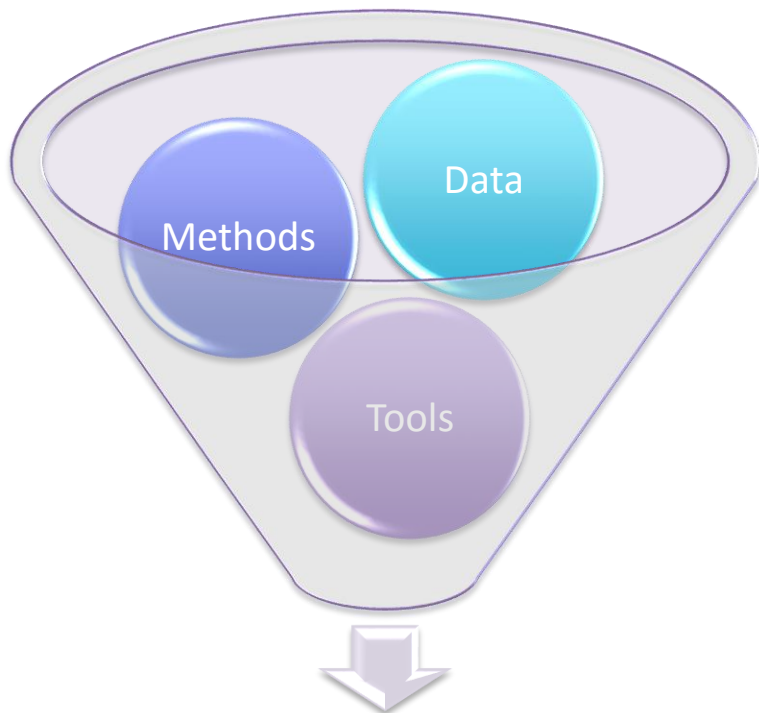


**Actuaries  
Institute**

# Reaching Customers with Data Analytics



Emily Chong  
Suncorp Group  
Insights, 4 July 2016



**Timely Business Decisions**  
**MORE HAPPY CUSTOMERS**

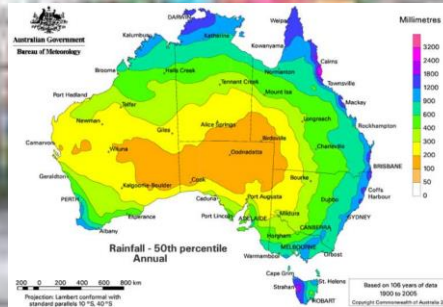
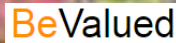
## Competitors



## Internal Data

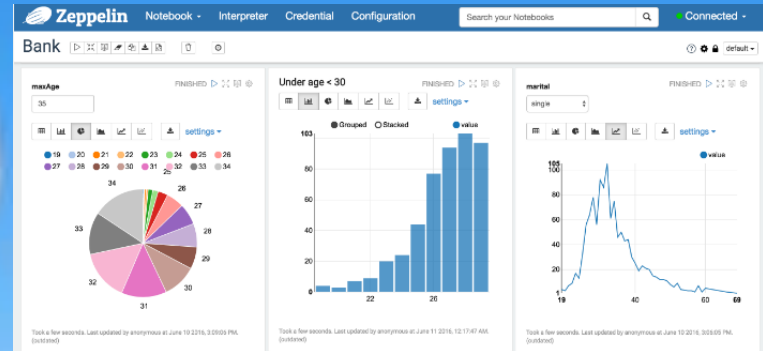


## External Data



## GLM vs GBM

Methods	GLM	GBM
Resources	10	1
Expertise	Set up - Highly Skilled Updates - Skilled	Set up - Skilled Updates – Low
Computing Power	Low	High
Update Frequency	Yearly	Monthly
Cost	\$\$\$	\$
Accuracy	Accurate	Can be more accurate in explaining residuals but there is a risk of overfitting.
Interpretability	Easy	Tricky
Implementability	Easy	Challenging





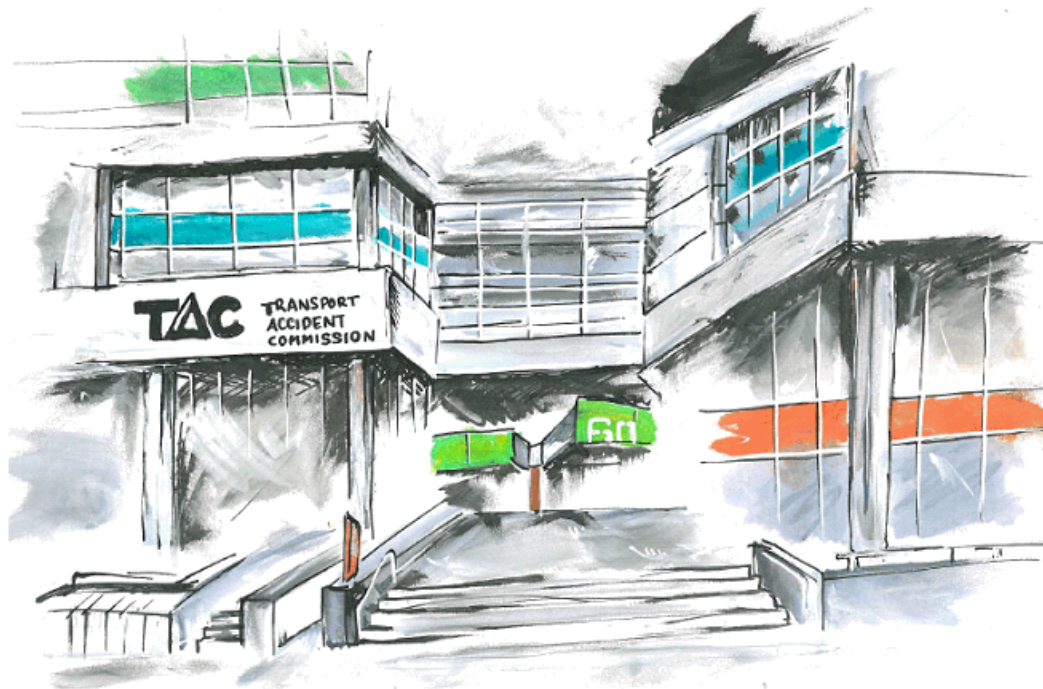


*Thank you*





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# Data Analytics at TAC.

# Insight must drive action



# Evolution of our data & insight

## Clients

- Payment data

- External research  
- Client research

- Longitudinal Client Outcome Study  
- Predictive analytics  
- Health data linkages

1986

2001

2010

2015

- Campaign research  
- Police data

- Monitoring of community attitudes and behaviours  
- Sophisticated vehicle safety data

- Enhanced Crash Investigation Study  
- Cross partnership data linkages

## Road Safety

# Claims management analytics.



## >> Recovery

- Automatically segmenting claims to appropriate teams at lodgement
- Analytics linked to claims management system

## >> Serious Injury Scoring Model (Hamlet )

- Grouping claims into more or less likely to be granted a 'Serious Injury' certificate
- Embedded in a prioritisation tool used by claims staff
- Linked to KPIs

## >> First Service

- Decision support for claim acceptance and initial income payment
- Embedded in claims management system

# Longitudinal Study.

## » Survey

- For the first time, asking the same clients about aspects of their recovery at different stages
- Time points
  - 3, 6, 12, 24 months completed
  - 4 year stage commencing



## » Communication

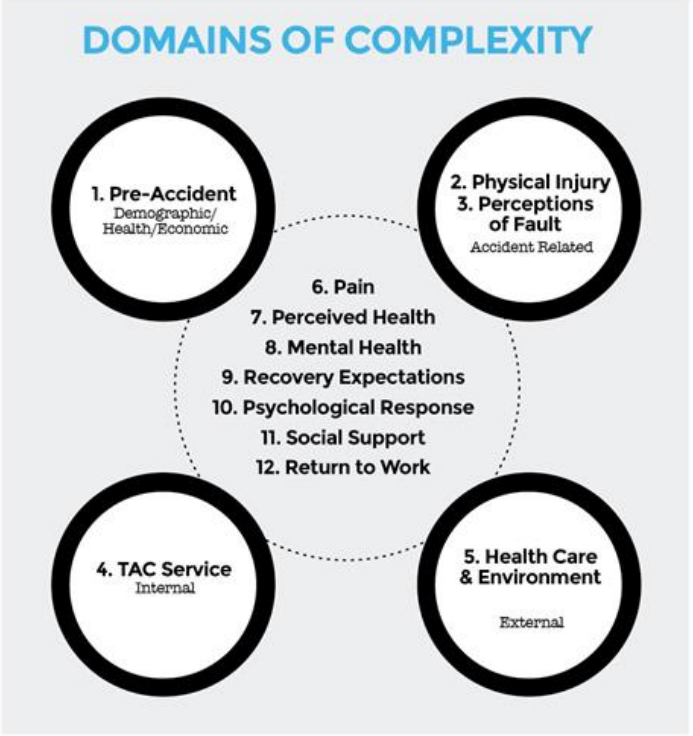
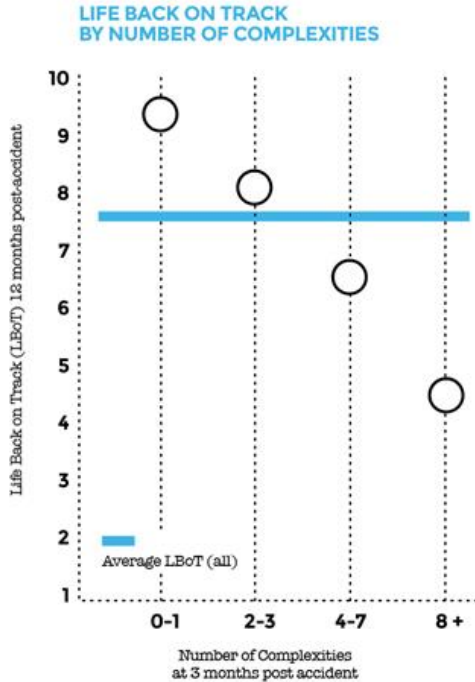
- Client stories brought to life using videos

## » Strategy Development

- Insights from the study key to the development of new TAC strategy and it's focus on **Clients' Lives Back on Track**

# Longitudinal Study.

## ➤ Claim complexities impact Life Back on Track score



# Developing Towards Zero.

## » Partnership

- Analysts working together across five organisations
- Combining data

## » Strategy Development

- 14 key problems identified
- Informed decisions around the initiatives included in Victoria's Road Safety Strategy and Action Plan (\$400 million investment)
- Modelling to ensure chosen initiatives would achieve the goals of the strategy
  - » 20% reduction in lives lost
  - » 15% reduction in serious injuries





# What We've Learned.



- »» The right balance between identification & action
- »» Delivery matters
- »» People matter too
- »» The communication is more important than the model
- »» The whole is greater than the sum of the parts





**Actuaries  
Institute**

# Paving the Way for Analytics in Melbourne

Extra Bits and Institute Focus

Daniel Smith

4 July 2016



# 15 minutes and counting ...

- Minute 1 – talking about the rest of this slide ...
- Minute 2 – analytics outside of insurance – a Qantas example
- Minute 7 – actuaries and analytics in Australia
- Minute 10 – actuaries and analytics in the rest of the world
- Minute 13 – challenges for actuaries in the “new world”
- Minute 14:55 – Thank you and back to Amanda

# A bit about Qantas

- In 2014/15 Qantas had revenue of almost \$16 billion. That is of the order of half of the whole of the Australian general insurance industry and more than any single Australian general insurance group;
- Qantas has approximately 30,000 FTE's, runs approximately 1,000 flights per day with something like 130,000 passengers per day
- Qantas, like insurance companies, is highly exposed to catastrophic events and economic conditions
- Qantas Loyalty has annual revenue of around \$1.5 billion and EBIT of around \$325 million
- With over 10 million frequent flyer members, almost 1 in 2 Australians are members. That means there is a lot of data!
- Loyalty members include frequent flyers, frequent shoppers, banking, and, as of a few weeks ago, health insurance

# A bit about Qantas (cont.)

- There are a lot of moving parts



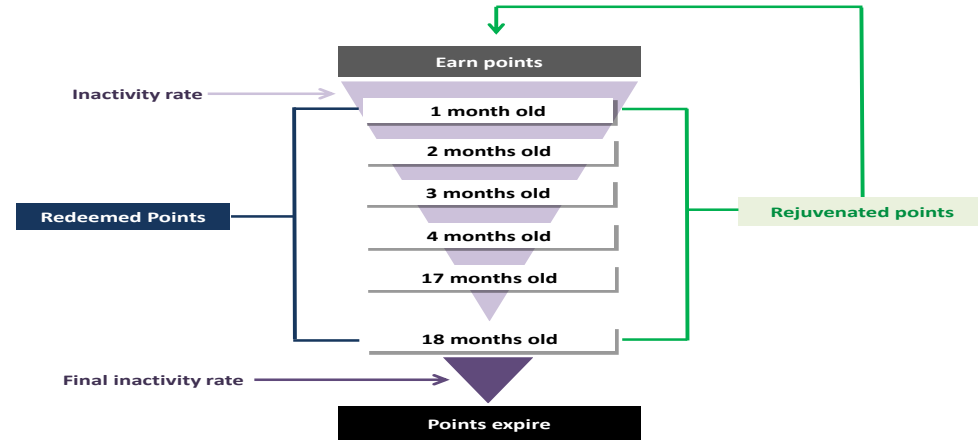
# What do actuaries offer an airline?

- Professionalism – through Code of Conduct and Professional Standards (differentiates actuaries from many other analytics professionals)
- Integrity – “actuary” is a very strong brand
- Actuaries have high entry standards and an education that provides broad financial and mathematical knowledge
- The ability to take a longer-term view
- A structured basis for problem solving
- A business solution
  
- “Taylor Fry grasped our unique business model and airline vernacular with incredible speed. They have turned their actuarial knowledge into a language which our business executives can understand.”
- **Kimon Giannopoulos, Deputy CFO – Qantas Loyalty**



# What do actuaries offer an airline? (cont.)

- An example ... “breakage”
  - Qantas sell points to companies for their loyalty programs
  - Those points have an expiry date
  - Qantas have a liability ... but it is less than the value of points sold
  - This is the same as an actuarial reserving problem



## What do actuaries offer an airline? (cont.)

- Similar to actuarial reserving, the breakage analysis leads to an assessment of the value of points
- Similar to actuarial reserving, patterns of usage and consumer expectations change over time and projections of future experience are required
- Similar to actuarial reserving, there is a considerable amount of uncertainty
- Similar to actuarial reserving, the client expects the right answer!

## What do actuaries offer an airline? (cont.)

- The exciting part (for us) is that there is a lot more that can be done
  - Loyalty structure
  - Pricing – within Loyalty but also for the airline
  - Optimisation
  - Almost anything that the airline does (fuel, scheduling, staffing, ...)
- The sky's the limit ...

# The Australian Experience

## THE AUSTRALIAN BUSINESS REVIEW

### Alan Joyce unleashes Qantas's power of numbers

THE AUSTRALIAN | FEBRUARY 27, 2015 12:00AM

**THEY** are Alan Joyce's new weapon in maintaining the double-digit earnings profile of his booming flyer business.

A 40-strong team of actuaries and mathematicians will descend on the Qantas bunker at Mascot over the coming months after the airline announced yesterday it had taken a controlling stake in Australasian analytics and actuarial consulting business Taylor Fry.

Two actuarial firms, one partly owned by a large retailer and one partly owned by an airline loyalty program business

THE AUSTRALIAN

### Quantium shines as retailers seek big data

THE AUSTRALIAN | NOVEMBER 17, 2014 12:00AM



SAVE

**THE** retail sector's hunger for intimate insights into the spending patterns of its customers, known in the trade as "big data", has more than tripled revenue for analytics company Quantium, enabling it to pay a \$6 million dividend to shareholders including supermarket chain Woolworths.

The firm, which offers a range of customer analytical services to clients such as eBay, Telstra, Suncorp, Qantas and increasingly food and grocery manufacturers, has hit a goldmine in Australia's \$250 billion retail landscape.

Retailers are hungry for any data they can glean from shoppers to help refine their offers and gain an edge over competitors.

It is something that Woolworths has also focused on. Last year it paid \$20m for a 50 per cent stake in Quantium to help augment its own customer loyalty programs and put to work the information that flows from millions of spending transactions that pass through its checkouts each week.

# The Australian Experience

- 3.5% of members have data analytics as primary practice area and 12% when secondary practice area is included
- Extending the reach of actuaries in data analytics is identified as one of the Actuaries Institute's five strategic goals

A screenshot of the Actuaries Institute website's "Actuaries in Data Analytics" page. The page features a blue header with the logo and navigation links. Below the header is a section with colorful bar and line charts, followed by a navigation bar with tabs for "ACTUARIES AND DATA ANALYTICS", "PEOPLE AND NETWORK", "EVENTS", "KNOWLEDGE", and "NEWS". The main content area is titled "Using data analytics to deliver trusted insight and commercial strategy" and includes two icons: "Vision" (an eye) and "Mission" (a target). A text box on the right highlights the actuarial skill-set's contribution to data analytics.

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## Actuaries in Data Analytics

ACTUARIES AND DATA ANALYTICS | PEOPLE AND NETWORK | EVENTS | KNOWLEDGE | NEWS

### Using data analytics to deliver trusted insight and commercial strategy

**Vision**

That Actuaries are recognised as experts in data analytics not only in financial services but all industries. That Actuaries are sought after for their trusted insights and commercial strategies

**Mission**

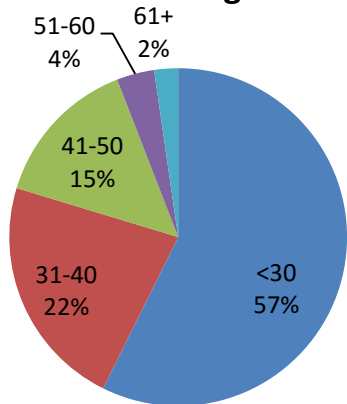
To support and promote Actuaries working in data analytics by providing lifelong learning opportunities, thought-leadership and promoting our expertise in data analytics to business and government leaders.

The actuarial skill-set is well positioned to contribute to data analytics and many actuaries are making significant contributions today in the areas of financial services, loyalty schemes, retail, telecommunications and technology.

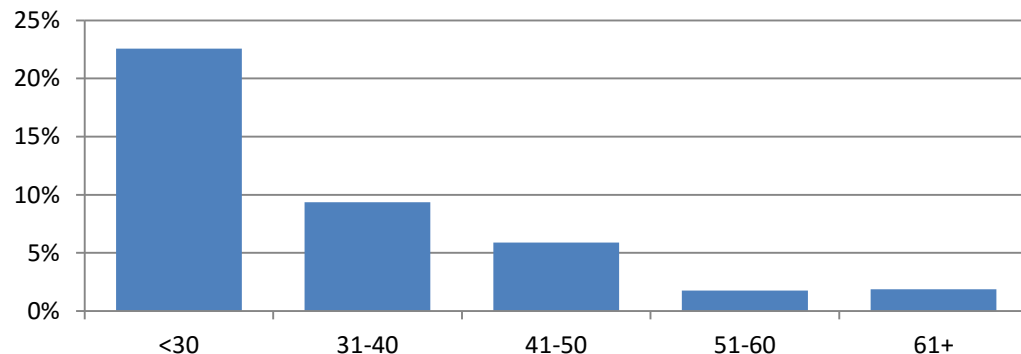
# Actuaries and Analytics in Australia (cont.)

- Not surprisingly, Data Analytics growth is driven by young actuaries

Age of Members Working in Data Analytics



% within age group of Members Working in Data Analytics



# The Australian Experience

Established a Data Analytics Working Group at the start of 2015

There are 4 main areas of focus:

- **Vision** - Determine a strategic vision for Actuaries
- **Actuarial Community** - Develop a Community for Actuaries working in data analytics
- **Education** - Investigate short, medium and long term qualification and CPD requirements
- **Employer engagement** - Better understand the needs of employers

# Australian DAWG activities

- Held data analytic conference



- Determined CPD framework
- Held MOOC study group
- Run yearly Kaggle competition
- Established Data Analytics Community Linked-in group
- Set to launch data analytics microsite

**CPD Framework**

**Data Analytics - General**

**Data Architecture**

**Programming**

**Data Preparation and Exploration**

**Data Analysis**

**Data Communication and  
Visualisation**



# International Initiatives

# South Africa – Wider Fields

- Wider Fields / Business Intelligence Forum of the Actuarial Society of South Africa (ASSA)
- Work streams: Eminence, Education, Research
- Objectives:
  - Increase awareness amongst students, the Profession and in the industry
  - Host Sessional meetings & Presentations at Convention
  - Drive research topics
  - Investigate need for analytics syllabus in actuarial curriculum

During 2015:

- Presented to Uni Actuarial students to create awareness
- Hosted well-received Sessional meetings
  - Predictive Modelling using Survival - Data Mining
  - Advanced Analytics on a Shoestring
  - Big Data – Big Opportunities
  - Data Visualisation Techniques
- several presentation slots at Actuarial Convention

- **Strategic Plan 2016-2019**
  - Strategic Goal: CIA members are recognized as the leading professionals in predictive modelling and big data in Canada by 2021
- **CIA Education System**
  - New CIA education syllabus identifies predictive modelling as a key element of Associate education
  - Delivery of education and assessment via education partners
- **Predictive Modeling Committee**
  - Promote actuaries with PM field both within and outside the profession;
  - Identify existing and new research in PM that will draw attention to the work of actuaries;
  - Contribute to education and continuing education

# The CAS Institute



- New subsidiary of the Casualty Actuarial Society
- Provides credentialing and professional education to quantitative specialists in selected areas
- Predictive Analytics / Data Science credential launching in 2016-2017
- For actuaries and non-actuaries
- Offerings in other analytics and quantitative specialties will follow

## Overview on 2014-2016 period and coming actions

### Waypoint on past and future actions of Big Data Committee

- BDC was established in January 2014,
- Objectives
  - Developing a data scientist culture
  - Assessing the impacts of Big Data Technology shift on actuarial and business practices,
  - Updating / Enhancing initial core syllabus
- Actions of BDC
  - Information with conferences , communication (more than 20 conferences in 2 years), and congress (100% data science, colloquium SCOR-Institut)
  - Establishing work streams for assessing specific issues (Mathematical and IT context, Professional and Education impacts, Regulatory issues ...)
  - Joint WG with local regulators (data & freedom, insurance)
  - Pushing new actuary generations for using Machine learning / BD
- BDC Findings
  - Evolving data regulatory environment scrambles the way to use external data sources in insurance offers / products
  - Data Quality and Traceability are strong requirements and customers behavioral knowledge highlights the importance for mastering analytical algorithms and technical environment,
  - Actuaries might have a strong role ... if they develop adequate skills and promote jointly their education and professional values in such environment.

## Data science for actuaries award (DSA)

- DSA was established in 2015
- DSA is an education program for actuaries focused on data science
  - Already 2 promotions with a total of 40 students,
  - Awarded for its innovation in 2016 by the Insurance industry
- With DSA , the Data Scientist Actuary is be able to :
  - Implement statistical methods using Python (or R),
  - Evaluate a given algorithm's performance (complexity measure, memory footprint..) and distribute the algorithm when needed
  - Make decisions on how to handle data storage
  - Use advanced offline/online methods
  - Identify relevant reporting and visualization tools
  - These newly acquired skills will enable the Data Scientist Actuary to perform teamwork with IT and Marketing departments to ensure new offers' efficiency and solvability
- Core syllabus corresponding to 168 hours :
  - A - Python
  - B - Data mining with R
  - C - Practical Machine Learning
  - D - Statistical Learning Foundations
  - E - Distributed Machine Learning and applications
  - G - Case Studies
  - H - Data science personal project & presentation
- EAGER TO ADAPT IT TO A NEW GLOBAL AWARD « CEDA » LIKE CERA !



Institute  
and Faculty  
of Actuaries

# The IFoA...

**Identified the need to diversify into non-traditional sectors where the actuarial skill-set adds value:**

- Data Analytics is a chosen area
- Introducing skills in Data Analytics as part of our Curriculum;  
Review – started with Associate/Fellowship, moving on to Certified Actuarial Analyst (CAA)
- Exploring its wider implications for the actuarial profession and its regulation - through our Analytics and Data Working Party



## Big data initiative

Launched in 2015, Big Data Working Party is SAS' initiative to explore the future of big data, analytics and unstructured data in Asia and what actuaries need to do to have the right skillsets that will be in demand for such work. The working party is made up of actuaries and data scientists based across Asia from diverse range of industries.

## Key achievements

- Developed a practical case study using medical data to demonstrate machine learning techniques to actuaries which is used to deliver CPD training to members
- Presentations and published articles at conferences and afternoon forums in Singapore, Hong Kong and Malaysia
- Organized hands-on workshop on machine learning using R with participants from all around Asia
- Supporting regional societies by sharing knowledge and in organizing of CPD events and workshops
- The 2016 General Insurance Conference in May has a particular focus on big data

## Where to from here?

Continue to equip the profession with tools to make the most of opportunities that big data brings to actuaries and their companies

- Workshop on text mining and transaction sequencing coming up
- Asia Actuarial Analytics Challenge underway. Deadline 30 September 2016
- Developing more practical case studies which actuaries working in different areas may use to apply in various business situations
- We are also looking out to organizations wishing to collaborate with us on research and development in practical applications of data analytics in actuarial context

## Other regional activities

- **Thailand –** Machine learning workshop conducted by local society with assistance from Singapore Actuarial Society's BDWP
- Interest from other regional societies for conducting more workshops with assistance of Singapore



# SOA Predictive Analytics

- Underway
  - Numerous meeting sessions, seminars and webcasts
  - Predictive Analytics and Futurism Section
  - Limited attendance seminar in Advanced Business Analytics (8+ administrations)
- Forthcoming
  - Enhancements to associateship education
  - Development of concept map of skills and abilities
  - Certificate in Predictive Analytics
  - Limited attendance seminar in Health Analytics



IAA NON-LIFE INSURANCE SECTION  
SECTIONS ASSURANCE NON-VIE DE L'AAI

ASTIN have established a Data Analytics Working Party

Multiple smaller groups established to write research pieces on

- Predictive modeling
- Telematics
- Data Governance &
- Machine learning

# Challenges for actuaries in the “new world”

- Analytics means different things to different people
- The field is extremely broad and changing daily
- Actuaries do not have a defined role
  - Competing against cheaper providers
  - Competitors typically don't have professional standards to comply with
  - Stereotypes can be difficult to overcome
- The profession can be too rigid and too slow to move
  - Note – I am not an advocate of radical change but we need to keep pace with change
- How to blend entrepreneurship and maintaining standards?

# Challenges for actuaries in the “new world” (cont.)

- Methods for analysing “big data” are ever-evolving
- Many consider that traditional statistical methods (such as GLMs) have passed their use-by date
- Machine learning methods and multiple models are standard – this is readily observed via kaggle competitions
- Actuaries need to be skilled in a broad range of modelling techniques and able to manipulate extremely large data sets with both structured and unstructured data
- Our current education does not meet the requirements of the future

# A challenge for the actuarial leaders ...

- Actuarial associations need to grasp the opportunity
- Some entrepreneurial actuaries will succeed without help ...
- ... but will they take the profession with them?
- PwC has recently reported that half of Australia's professional jobs will be automated within 20 years
- The status quo WILL NOT guarantee survival of the profession

# Let's not finish on a negative tone ...

- The opportunities for actuaries and the actuarial profession in data analytics are considerable
- With applications across any business there is an opportunity for actuaries to expand their footprint
- “Big data” is only going to get bigger! This is not a short-term flavour of the month
- Data analytics is attractive to graduates and a great way for the profession to attract the best talent
- Actuaries in traditional fields should benefit from a growth in data analytics with more people knowing about actuaries and, hopefully, breaking down the stereo type.

# And now it's back to ... ..



