Australian Data Actuaries – some case studies

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Andy Yang – Chair, Asia-Subcommittee

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Introduction

About me - Andy Yang

▲ Chair of the Actuaries Institute's Asia Sub-Committee in Hong Kong

▲ Senior Advisor, Coherent

   ▲ *"Coherent uses technology and data to solve the toughest challenges that insurers and intermediaries face on a daily basis"*

- Graduated from Macquarie University in **1988**. FIAA **1992**

- Over 30 years of experience living/working in 7 Asia-Pacific countries.

- Roles in Life Insurance & Investments including CIO, ALM, Risk Management, M&A, Products, and Project Management

- Twice Council Member of the Actuaries Institute

- Extended family has **8 members** in the actuarial profession.

- So … I have an interest in the future of actuaries, and in fintech/data

Why – the presentation?

▲ The aim of this presentation is to
  - ▲ **<u>Showcase</u>** some actuaries from the Actuaries Institute Australia who are working in the data field

▲ So as to …
  - ▲ **<u>Inspire</u>** actuaries to enter the data field.
  - ▲ **<u>Encourage</u>** more actuaries to be entrepreneurial and to take risks

<u>Disclaimer</u>:

- This is not an endorsement for any company, products or services.

What - is "Data Science/Analytics"?

▲ **"Data Science** is a multi-disciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from structured and unstructured data" *Source : Wikipedia.*

  ▲ «**Data Science** has now become the buzz word and the [Harvard Business Review](#) announced 'Data Scientist' as the "The Sexiest Job of the 21st Century". » *Source: https://towardsdatascience.com/data-science-for-beginners-850c3376a34a*

▲ **"Data analytics** is the science of analyzing raw **data** in order to make conclusions about that information. Many of the techniques and processes of **data analytics** have been automated into mechanical processes and algorithms that work over raw **data** for human consumption" *Source : Investopedia*
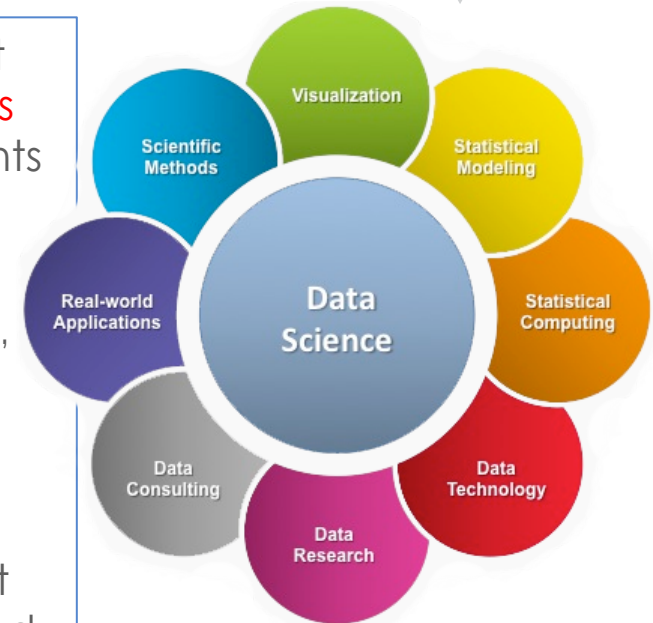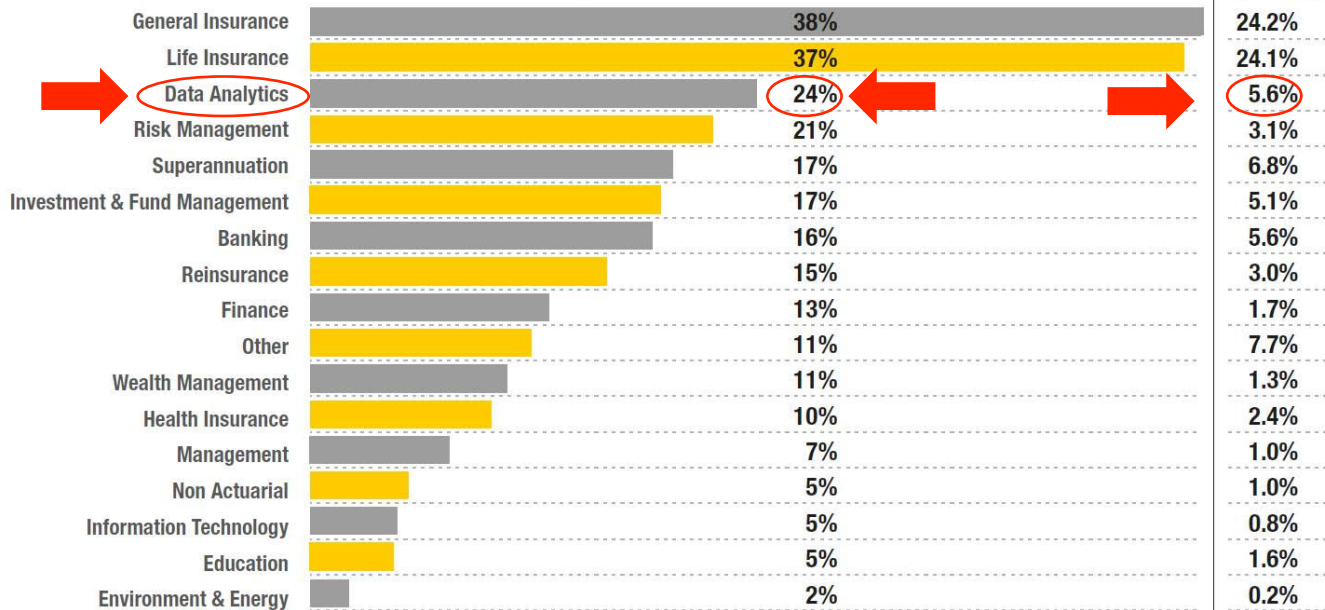

- Is this very different from what actuaries do? Case studies to follow

Who - works in "DATA"?

INSTITUTE MEMBERS BY PRACTICE AREA

Actuaries work across multiple practice areas, this is recognised in the chart below.

Practice Area		Primary Practice Area Only
General Insurance	38%	24.2%
Life Insurance	37%	24.1%
Data Analytics	24%	5.6%
Risk Management	21%	3.1%
Superannuation	17%	6.8%
Investment & Fund Management	17%	5.1%
Banking	16%	5.6%
Reinsurance	15%	3.0%
Finance	13%	1.7%
Other	11%	7.7%
Wealth Management	11%	1.3%
Health Insurance	10%	2.4%
Management	7%	1.0%
Non Actuarial	5%	1.0%
Information Technology	5%	0.8%
Education	5%	1.6%
Environment & Energy	2%	0.2%

- In 2008, "data" was not a separate practice area.

- In 2018, **5.6%** of members identified Data Analytics as their primary practice area

- **24%** identified Data Analytics as their primary or secondary practice area

Case studies

… in order of University graduation…

Tan Haw Sin

▲ Haw Sin graduated from Macquarie University (Actuarial Science) in 1983

▲ He has previously worked in the NSW Government Insurance Office, McMullan Kilvington (a superannuation/life system provider), Lumley Insurance and Westpac Financial Services.

- *"Avoid system integration and design from a zero base. Continually seek simpler solutions and merge diverse disciplines to unearth fresh innovations"*

- *"Our purpose in life is to find a quantum leap through simpler solutions and not just develop another system. We believe the solution ALWAYS exists"*

- He founded Riskk.com in 1996 and is its managing director.

- Riskk.com delivers systems that disrupt core processing for Portfolio Management, Life Insurance and Accounting by doing it (100 times) faster, (up to 10 times) cheaper, and with 0 errors.

- Riskk.com also provides data analytics services

RISKK.COM

Riskk.com assists clients with data analytics through **Credit Value-At-Risk** and **Reverse Stress Test** calculations:

- Each run can entail billions of calculations ie 10,000 combination of parameters × 100 securities × 100,000 simulations per security

- Credit VAR is a worse case loss on a portfolio with a specific confidence level over a specific holding period minus the expected loss

- Reverse stress tests are stress tests that require a firm to assess scenarios and circumstances that would make its business model unworkable, identifying potential business vulnerabilities.
    - This differs from stress tests and scenario tests which tests outcomes arising from changes in in circumstances

Alan Greenfield

- Alan graduated from Macquarie University (Actuarial Studies) in 1987 and has been an FIAA since 1992

- In 2015, he was awarded Actuary of the Year by the Actuaries Institute

- Before founding Taylor Fry, Alan worked as an actuary in Sydney, London, Chicago and New York

- In 1999, Alan co-founded actuarial consultancy Taylor Fry

- With fellow Principal Richard Brookes, he established the analytics arm of Taylor Fry in the mid 2000s

- In 2015, Qantas bought a 51% stake in Taylor Fry to better access its analytics capabilities

Alan works with clients across a range of practice areas to make a difference in people's lives using big data

Alan is known for his ground-breaking work in applying insurance actuarial techniques in the social welfare system to help improve people's outcomes

According to the NSW Families and Communities Services Minister Gareth Ward, the findings from Taylor Fry's recently published *Forecasting Future Outcomes* report will:
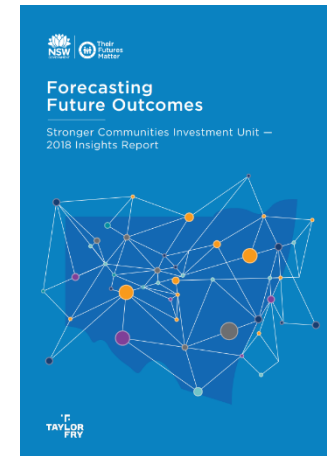
"… transform forever the way we improve outcomes and reduce costs to the taxpayer"

and

"… help reform and improve the way we allocate every precious dollar in order to achieve the best possible outcome"

Adam Driussi

▲ Adam graduated from Macquarie University (Actuarial Science) in 1993 and has been an FIAA from 1996

▲ In 2013, he was awarded Actuary of the Year by the Actuaries Institute

▲ He was previously a Partner at Deloitte

• He co-founded Quantium in 2002 with Greg Schneider, and is its CEO.

• Quantium offers a 16 year track record of innovation in data science

• It has worked with iconic brands in over 20 countries

• *"At Quantium we believe that when expertly harnessed and strategically applied, data can be transformational."*

• *"We believe in using data for progress, with great care and responsibility. We believe in better goods, better services, better experiences, and championing the benefits of the data age to be fairly shared for a brighter future."*

Quantium

▲ *"It was 2002 and I was 28 when we started Quantium. If I was starting a business now, I'd be more conscious of risk but back then I never thought for a second that it wouldn't work. I was much more focused on the opportunity than the risk, even though my wife was eight months pregnant and we had a new mortgage. We now have about 700 staff"*

▲ Retail and FMCG (fast-moving consumer goods) are Quantium's largest sectors. In 2013, Woolworths (AU) bought a 50% non-controlling stake in Quantium.

▲ Example: Forecasting work for Walmart (US) means dealing with a million items in 4,500 stores – there's a lot of combinations to model and ensure no empty shelves/minimise waste. *"if we promote coconut sugar, should the promotion be 40 per cent off, or 30 per cent off, or two for one?"*

Iris Lun

- Iris graduated from the University of Melbourne in 1999, and has been an FIAA from 2005 She has previously worked in Willis Towers Watson, ING Life Japan, ING Nederland, ING Taiwan, ING HK, ING Asia Pacific, and Prudential Corporation Asia in various roles – actuarial, finance, strategy and risk management.

- In 2016 she co-founded in 10Life, an online insurance platform with over 600k users in Hong Kong.

10Life's mission is to empower consumers to find the right protection, and enable insurance companies to offer better products and services.

- *"As an actuary it breaks my heart to learn that many people don't know what insurance they bought, and can't get the protection they really need."*

10Life

- ▲ 10Life is an online platform (web and app) that provides education and ratings on complex insurance products in Hong Kong.
  - ▲ Data stored on cloud;
  - ▲ Reverse-engineer pricing information for scoring
  - ▲ Analysis is the hard part – finding useful stories/patterns

- ▲ 10Life also provides a channel for consumers to have their questions addressed without a hard sell
  - ▲ With the vast amount of product and consumer behaviour (anonymous) data , it empowers insurance companies to create better products and services
    - ▲ Most popular product in category?
    - ▲ What comparisons are made?
   - ▲ Does the rating matter for the product?

Frankie Chan

- ▲ Frankie gained his B.Com & B.Sc in 2001 and his MAppStat in 2015 from Macquarie University. He has been a FIAA since 2009

- ▲ He has previously worked in Ageas, Etiqa, CommBank/CommInsure, QBE, Finity and has lectured in statistics at Macquarie University

- He joined Asiamiles in 2017 and is its Program Development & Analytics Lead

- Asiamiles is Asia's leading travel and lifestyle rewards programme and is a fully owned subsidiary of Cathay Pacific Airways
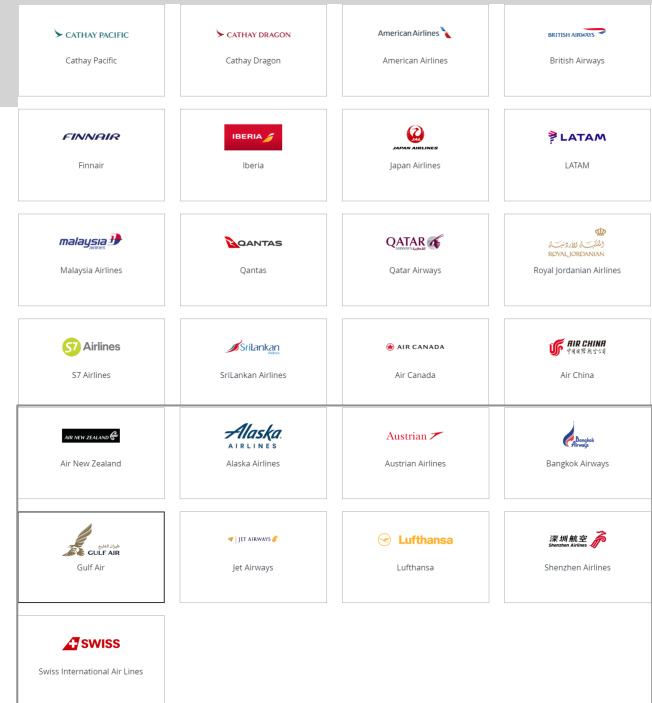
- *"I hear and I forget, I see and I remember, I do and I understand"* **Confucius**

- *"Actuaries' multi-disciplinary training plays a unique role in data science. By applying a blend of technical skills (statistical, financial, economics etc) and commercial acumen, we interlock effectively between technical and business teams to turn data into tangible, actionable solutions. No other profession offers training like this."*

CATHAY PACIFIC	CATHAY DRAGON	American Airlines	BRITISH AIRWAYS
Cathay Pacific	Cathay Dragon	American Airlines	British Airways
FINNAIR	IBERIA	JAPAN AIRLINES	LATAM
Finnair	Iberia	Japan Airlines	LATAM
malaysia	QANTAS	QATAR	ROYAL JORDANIAN
Malaysia Airlines	Qantas	Qatar Airways	Royal Jordanian Airlines
S7 Airlines	SriLankan	AIR CANADA	AIR CHINA
S7 Airlines	SriLankan Airlines	Air Canada	Air China
AIR NEW ZEALAND	Alaska AIRLINES	Austrian	Bangkok Airways
Air New Zealand	Alaska Airlines	Austrian Airlines	Bangkok Airways
GULF AIR	JET AIRWAYS	Lufthansa	Shenzhen Airlines
Gulf Air	Jet Airways	Lufthansa	Shenzhen Airlines
SWISS			
Swiss International Air Lines			

Asiamiles

Data is used everywhere across the business to:
- Inform
- Understand
- Predict

Members

- Propensities to transact
- Customer value modelling
- Conjoint analysis
- Affluence detection
- Breakage analytics

Partners

- Recommendation systems
- Targeting & Campaign support
- Segmentation

Business

- Liability valuation
- Redemption value optimization
- Award charts review
- What-ifs/scenario analysis

Sue Kong

- Sue gained her Bachelor's in Actuarial Science in 2001 and her Master's 2002 from Australian National University. She has been an AIAA since 2009 and is also a certified PRINCE2 Practitioner

- She has previously worked in Caltex, Quantium, PwC, Suncorp, NIB Health Funds and ABS.

- She joined KPMG in 2017 and is a Director. Her vision is to increase the footprints of *KPMG Actuarial and Advanced Analytics* beyond Finance Services and Insurance sectors.

- *KPMG Actuarial and Advanced Analytics* has expanded into Telecommunications, Infrastructure, Fast Moving Consumer Goods, Packaging and Fuel industries

- *"I believe that Actuaries have the unique combination of strong data skills and logical mindset that can benefit many sectors other than just financial services."*

- *"I am constantly fascinated by how much I can learn from working in different sectors and from other professionals."*

KPMG

▲ Models enabled NBN Co (broadband wholesaler) to predict demand movements of Retail Service Providers as prices and other drivers change, giving insights to revise strategy and competitive advantage to negotiate.

▲ Strategic model for NBN Co C Suite executives to incorporate cross functional business assumptions and data to structure the future pricing roadmap, to achieve specified customer experience / IRR / social utility objectives.

▲ Dynamic Cost to Serve Model for a confidential FMCG client to identify actions to improve supply chain profitability.

▲ Monte Carlo Simulation Model for Chief Strategist and C Suite executives of a confidential Infrastructure client to evaluate the returns and risks of different scenarios for a multimillion dollar bid (which they won).

▲ A cross-functional Customer Performance Project with the Caltex B2B Sales Team generated an annual profit uplift of ~AUD25m through new margin insights, customer intelligence and new levels of discipline in customer management

▲ A B2B Customer Database enabled Caltex to accumulate high quality data around contractual terms, customers and sales teams to improve contract renewal rate, optimise the contract value, minimise leakages and increase efficiency.

▲ Collaborated with stakeholders in setting up Customer Segmentation and a Value Based Pricing Optimisation Model for ~600 retail petrol sites for Caltex. Visualization dashboards and monitoring tools enabled groups to make decisions based on data driven insights. Each dashboard was tailored – for C Suite leaders to operating pricing team members.

Jeffrey Chan

- Jeffrey graduated from Macquarie University in 2009 and gained his Masters in 2010. He is a FIAA (2014) and is using Coursera to increase his knowledge on topics like deep learning.

- He has previously worked in Quantium, EY, Hyper Anna (data scientist) and Expedia

- Jeffrey joined Boston Consulting Group in 2019 as Senior Data Scientist

- BCG is a management consulting firm and has a Big Data & Advanced Analytics practice called BCG Gamma with 600+ data scientists globally

- *"… helping clients to understand and unlock the value of their data, unearthing actionable insights and delivering value"*

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Boston Consulting Group

▲ BCG partnered with **Starbucks** on its personalization journey and helped Starbucks to become the #1 personalized brand in the world. The Starbucks App provides individualized multi-channel offers with real-time tracking where the algorithms individualize >400,000 discount/ reward permutations, delivered to 20M+ customer base.

▲ BCG helped **Qantas** to launch Qantas Assure, a holistic digital lifestyle platform to incentivize healthy behavior, from paper to product to business in < 12 months.

Take-aways

Take-aways

- **Promote data** as a practice area for our members
  - Talk about it among ourselves with examples
  - Include it in the exam syllabus and in CPD (more math/stats? computing?)
  - Build a community – articles, online courses to build skills, CPD, fellowship & networking

- **Promote actuarial value add** to business community
  - Business domain knowledge, particularly in our traditional areas
  - We solve problems with mathematics and business sense
  - Ethics/professional standards

- Those that do enter the data field will not be going down a familiar, well-trodden path - **encourage entrepreneur mindsets** and **measured risk-taking**

Thank you