3rd Webinar on Health Insurance
9-Dec-2020

Application of Data Science in Health Insurance

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Institute of Actuaries of India

Agenda

- What is Data Science?

- Data Science & Machine Intelligence

- Machine Intelligence – Common Understanding

- Machine Intelligence in Health Insurance?

- Survey Results: Data Science in Indian Health Insurance Industry

- Current Status of Indian Market

- Key Challenges in Implementing Data Science Solutions
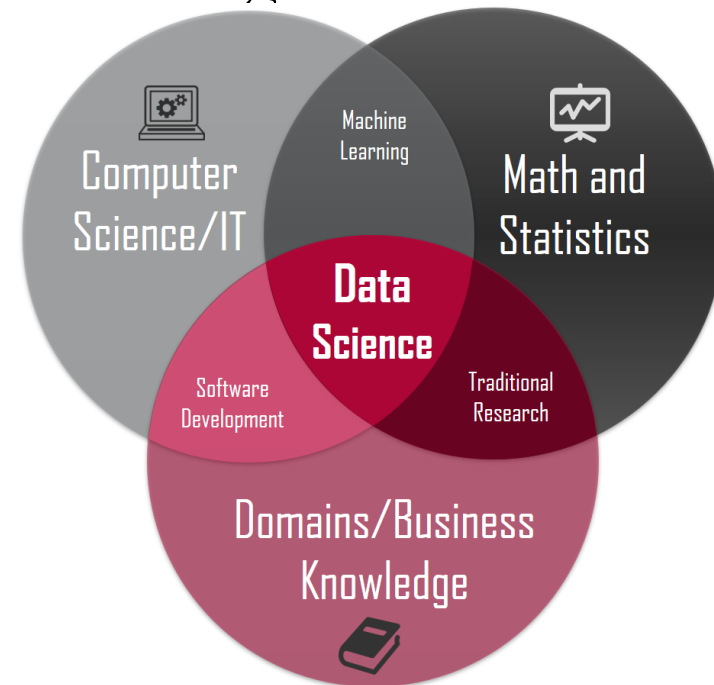
- Are Actuaries ready?

- Conclusion

What is Data Science?
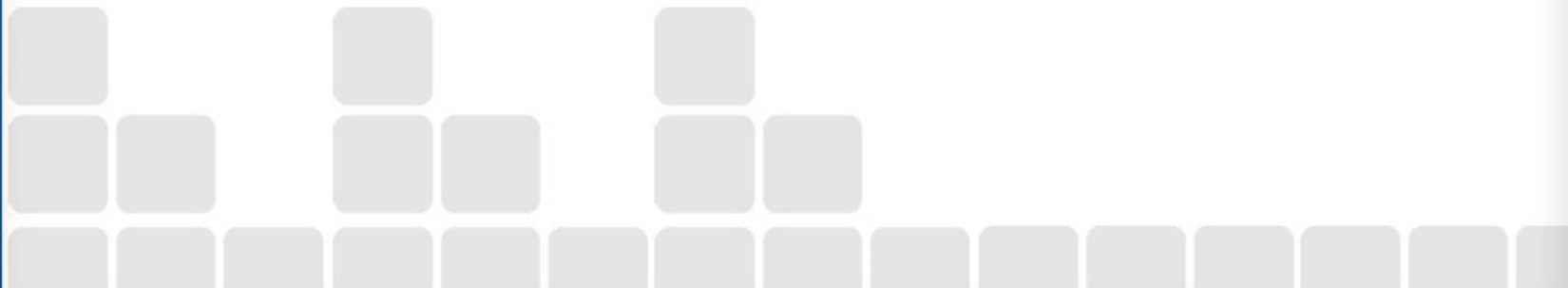
What is Data Science

Meaningful insights from data using

- Domain Expertise
- Programming Skills
- Mathematics & Statistics

"In insurance, firms sometimes hire actuaries with programming skills to reduce miscommunication when actuaries hand over their models to development engineers without knowledge of statistics"

Source: **Swiss Re** *sigma* No 5 /2020

Data Science & Machine Intelligence
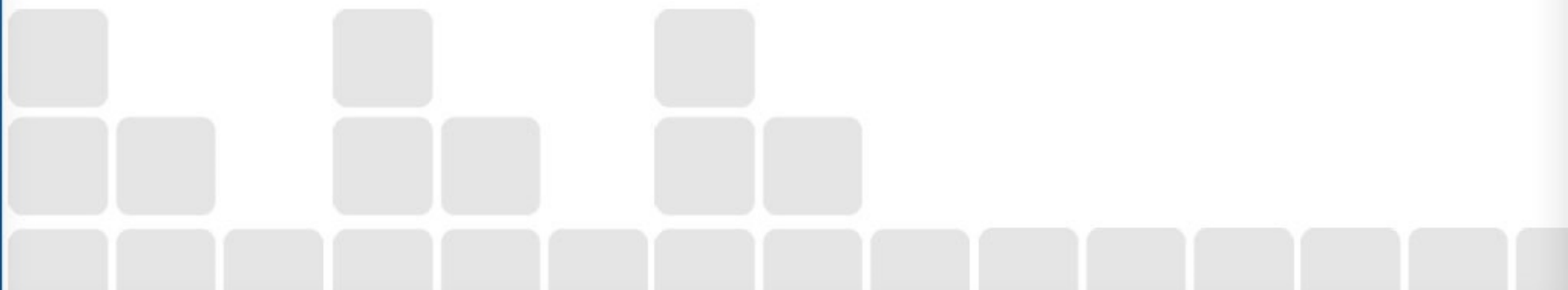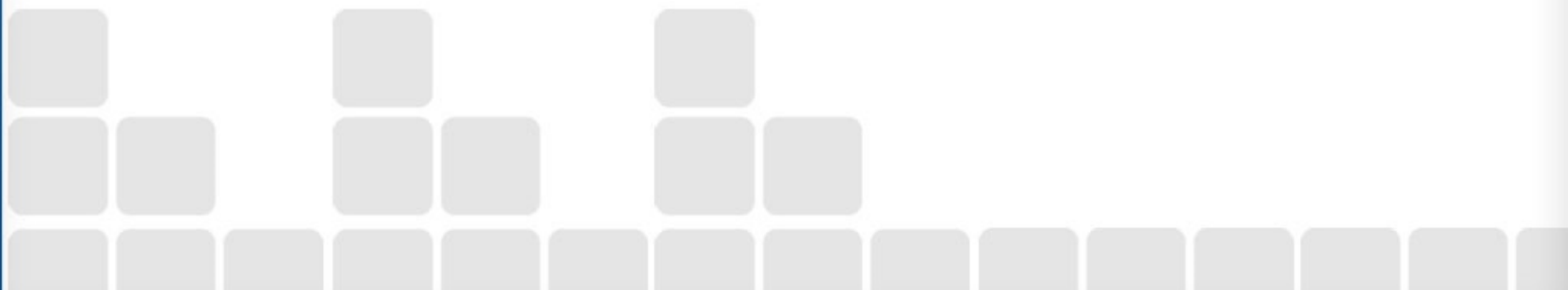
Data Science & Machine Intelligence

Application of machine learning algorithms and more to produce artificial intelligent systems that would ordinarily require human intelligence

In turn, these systems generate insights which analysts and business users can translate into tangible business value.

Data Science is a discipline of extracting insights from data & Machine Learning/ Artificial Intelligence are tools to implement it

Machine Intelligence – Common Understanding

Machine Intelligence

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Artificial Intelligence

Machine Learning
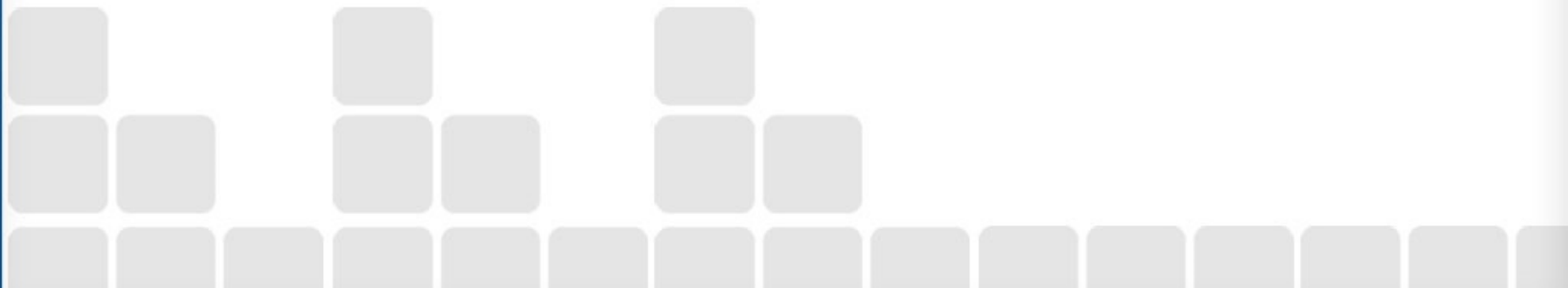
Deep Learning

Reinforcement Learning

Unsupervised Learning

Supervised Learning

Conventional Statistical Approaches

Data Science in Insurance

Data Science – Hype?

- AI as a term was first coined in the 1950s.

- A 2019 study found that two-fifths of Europe's labelled AI start-ups that claim to use AI actually do not

- A 2019 survey found that industry executives have high expectations about adopting ML in 2021. <u>They were optimistic in the past too,</u> with past surveys projecting high expectations for where they would be in 2019, although actual adoption last year was well below predictions

- MI-related patents filed by insurers have increased exponentially in recent years.

Data Science in Insurance: Trends

Growth (LHS) and composition of patents (RHS, 2018) at insurers
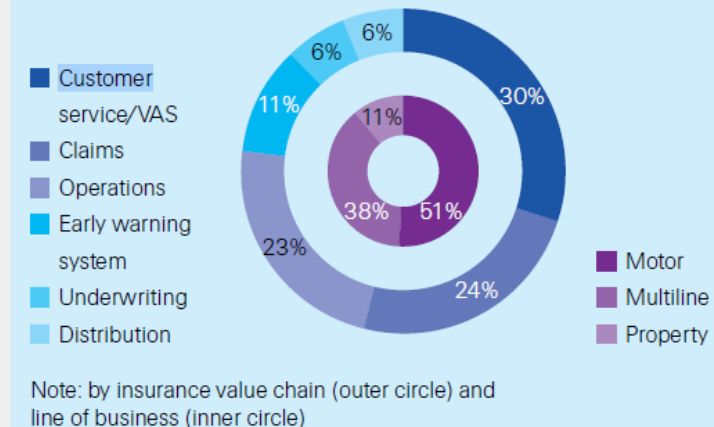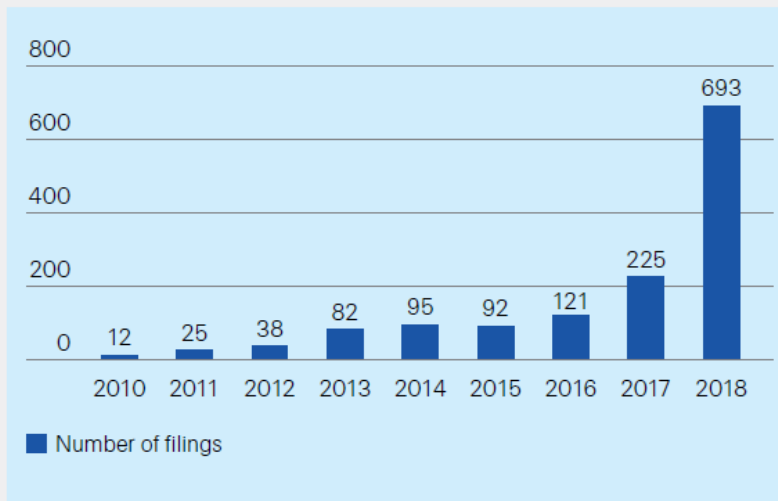
Source: Google Patent Database, Swiss Re Institute

- Most patents are designed to improve customer service, claims efficiency and reduce losses
- In the US, with 10 insurers accounting for 80% of activity. In China, less than five insurers accounted for 85% of MI-related patents filed

Data Science in Health Insurance
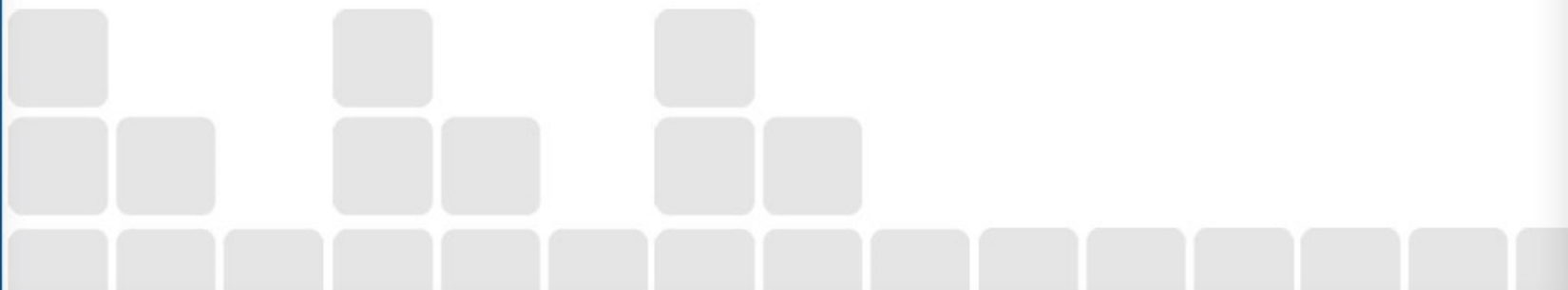
MI in Customer Engagement

- AI Bots

- 97% interaction happens with AI Bots

- Type of interaction include
  - Applying for coverage
  - Checking benefits
  - File medical claims

MI in Claims Management

- ## Claims Management Platform

  CoverSelf

  - Claims Submission- Image processing
  - Claims Standardization - OCR
  - Claim Adjudication – Pattern Recognition, NLP
  - Claims Reporting & Analytics – Risk Stratification

RESULT: Venous duplex of the left lower extremity

AI in predicting Emergency Visit

- Predicts when a customer is likely to visit Emergency Room

prognos

- Examples
  - Knee or hip replacement 6 months in advance
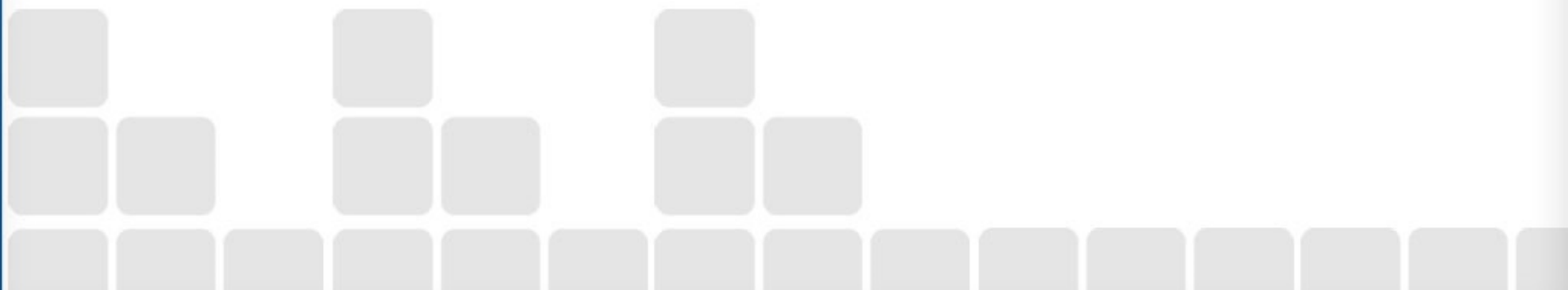 - Diagnosis of depression 3 month before any antidepressant is prescribed.

Poll Question : 1

Are you involved in advance data science projects dealing in advanced data science techniques like machine learning, predictive analysis, Deep Learning?

- Yes
- No

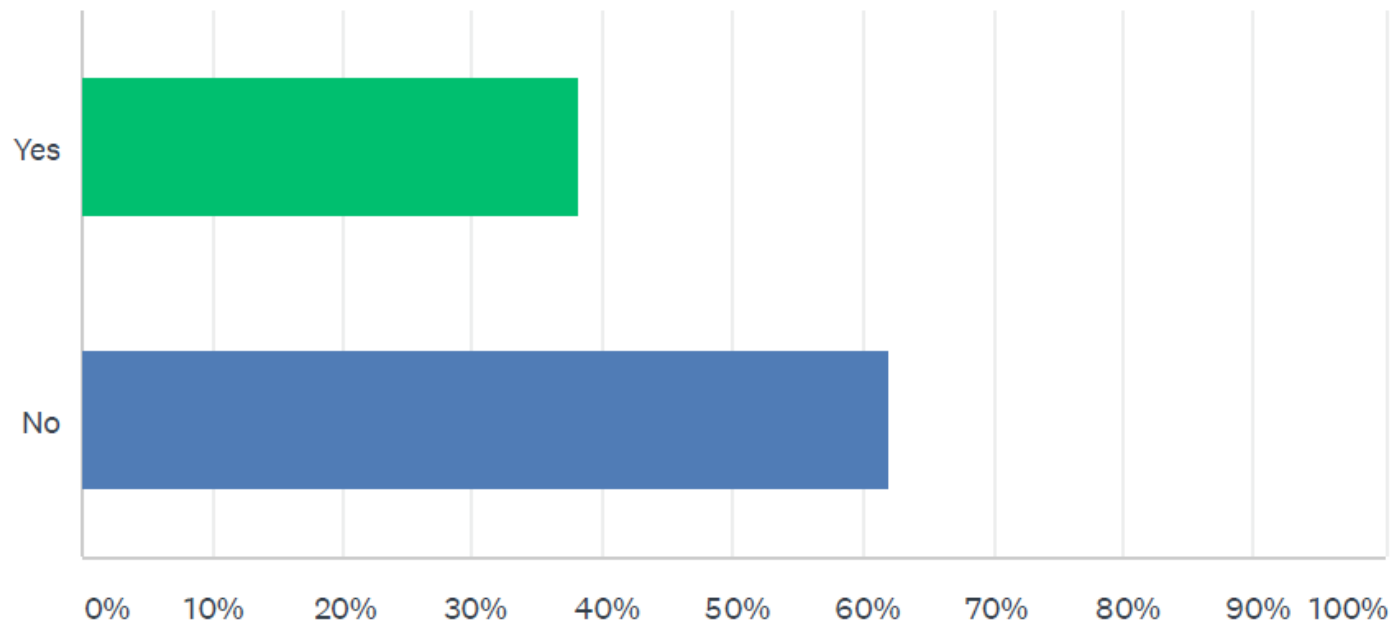# Data Science in India: Survey

Survey: Context Setting

- Carried out as part of Whitepaper on Use of Data Science in Health Insurance

- Target Audience – All insurance players in India writing health business

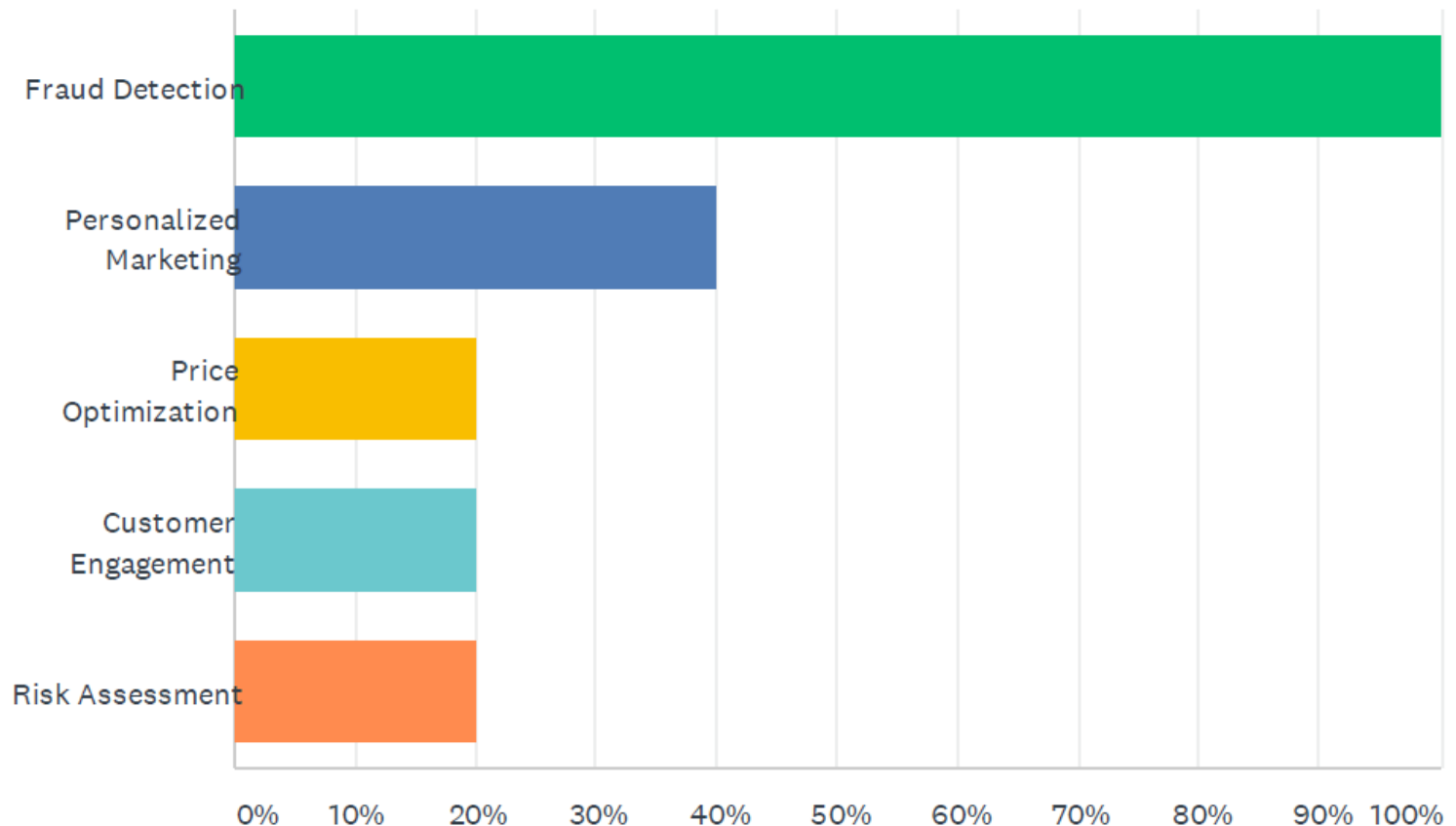- Responses Received (so far) - 21

Survey Results

What proportion of insurers in India use Data Science techniques for health insurance?

Survey Results

What problems are being solved?

Survey Results

RoI generated?
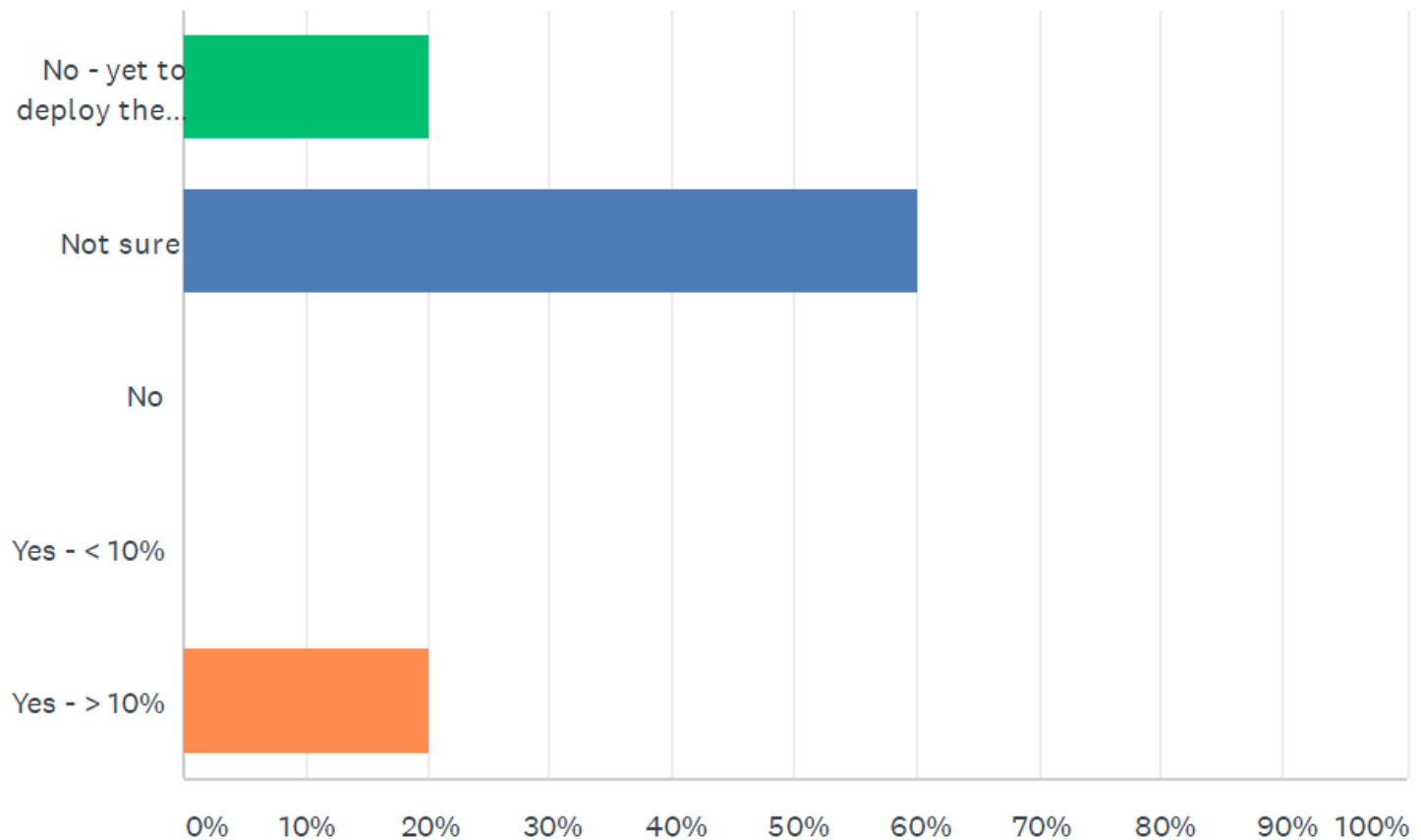
Poll Question 2

Which one is true?

a) Data Science and Big Data are separate with substantial overlap

b) Big Data is subset of Data Science

c) Data Science is subset of Big Data
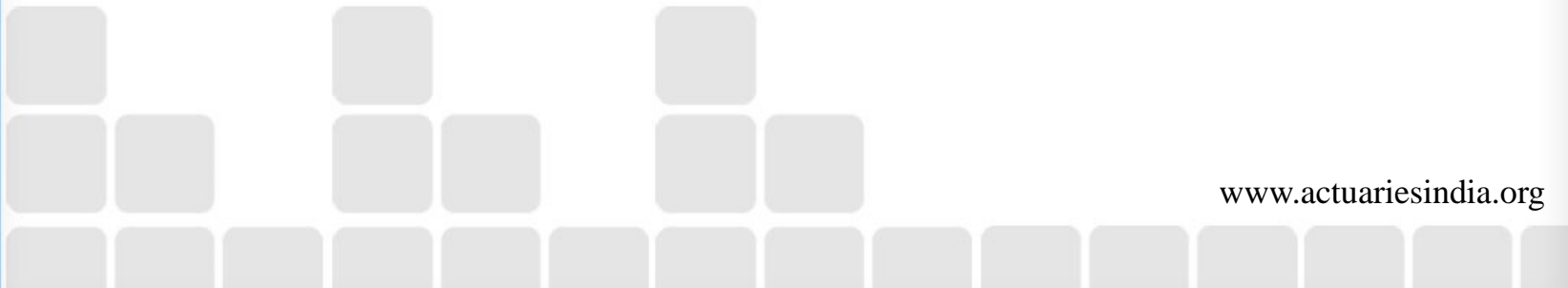
Before we begin….

- Not just related to Health Insurance
- No new discovery
- Going to share some questions that are being asked now and can become reality of tomorrow

Where Indian General Industry stands today in leveraging Data Science?

A check

Which Functions are using Data Science Techniques?

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The Current Categories

- Broadly three categories of Insurance Companies
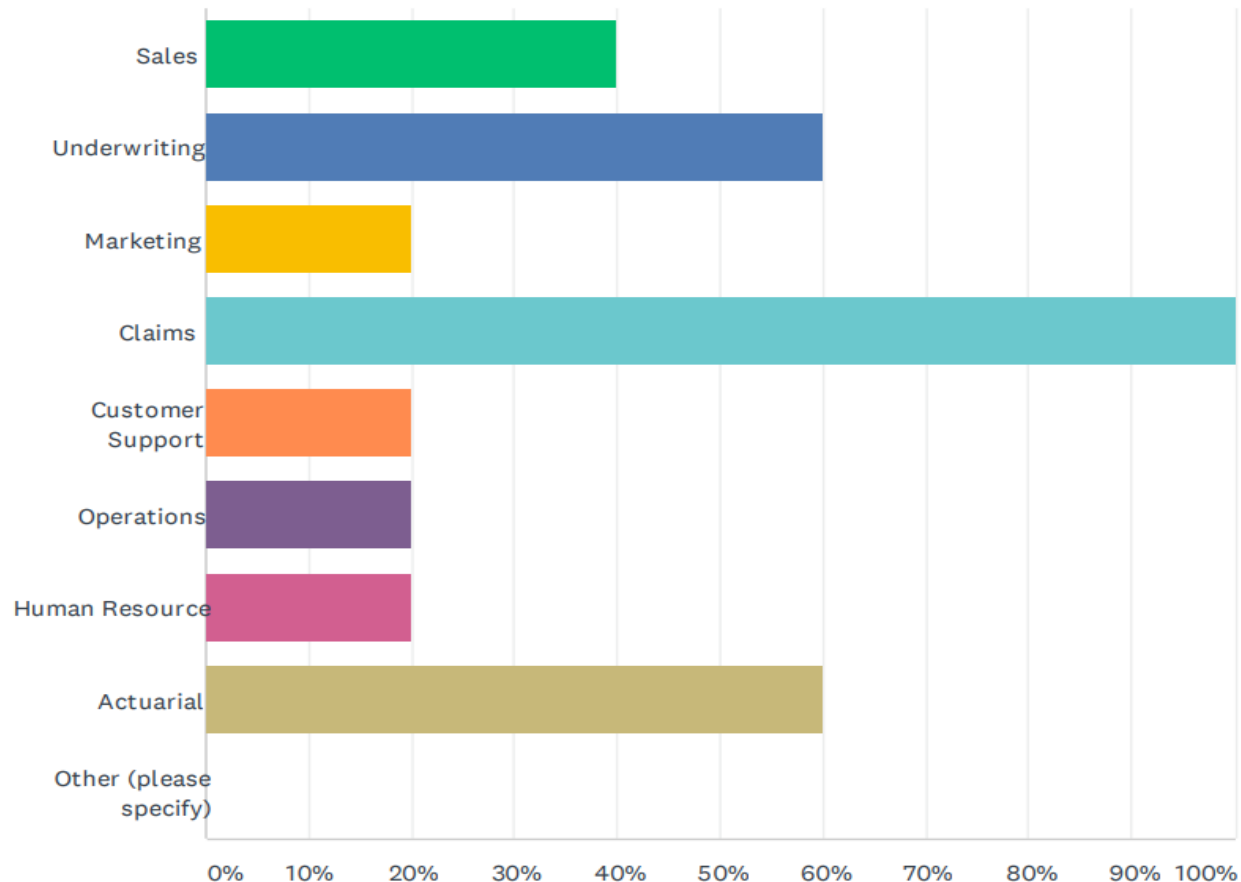- Started 7 to 8 years back

What is data Science?	We are doing a bit?	We are the leaders
• Still focused on the old ways of core insurance jobs • Deterministic Data Analysis • Still having the 'Old' systems and 'Data' issues	• Claims Management/Fraud Analytics • Underwriting • Sales • Actuarial	• Claims Management/Fraud Analytics • Underwriting • Sales • Actuarial • Customer Support • Operations • Human resource

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Challenges in starting Data Science Function

- Vision and Commitment from the Management
- Misconception "We don't have that kind of data"
- Lack of the proper understanding of the data in the working force
- Fragmented Data Sources
- Identifying right technique
- Identifying the right skill set
- Identifying the right area to invest
- Right Story Telling

Challenges in translating Data Science Results to Business results

- Silos within the Companies
- Lack of understanding of Data in the working force
- Lack of understanding of use of Data Science by the working force
- How to measure the impact of the Data Science
- How to optimize to create an impact
- How to leverage Pilots at Enterprise level
- Risk based coverage vs pooling

Challenges in delivering Customer Satisfaction

- Insurance is sold and not bought and Insurance products are complex, with very limited understanding in people – human interaction is required

- Mismatch with the needs leading to dissatisfaction later

- Silos within the company

- Current systems are not flexible

- Risk based coverage vs pooling

A Word of Caution!

Few Studies worth considering

- According to a Swiss Re survey, less than 10% of firms in all sectors have managed to scale MI pilots for roll out across multiple processes

- Same survey states that, a third of firms in Insurance sectors are concerned for the blockage or limitation in efforts resulting from Regulatory changes

- July 2019: VentureBeat AI reports **87% of data science projects never make it into production**

- Jan 2019: Gartner says 80% of analytics insights will not deliver business outcomes through 2022 and 80% of AI projects will "remain alchemy, run by wizards" through 2020.

- Nov 2017: According to Gartner analyst Nick Heudecker, over 85% of data science projects fail.

- A report from Dimensional Research indicated that only 4% of companies have succeeded in deploying ML models to production environment.

Key Challenges Faced in Developing the Data Science Solutions
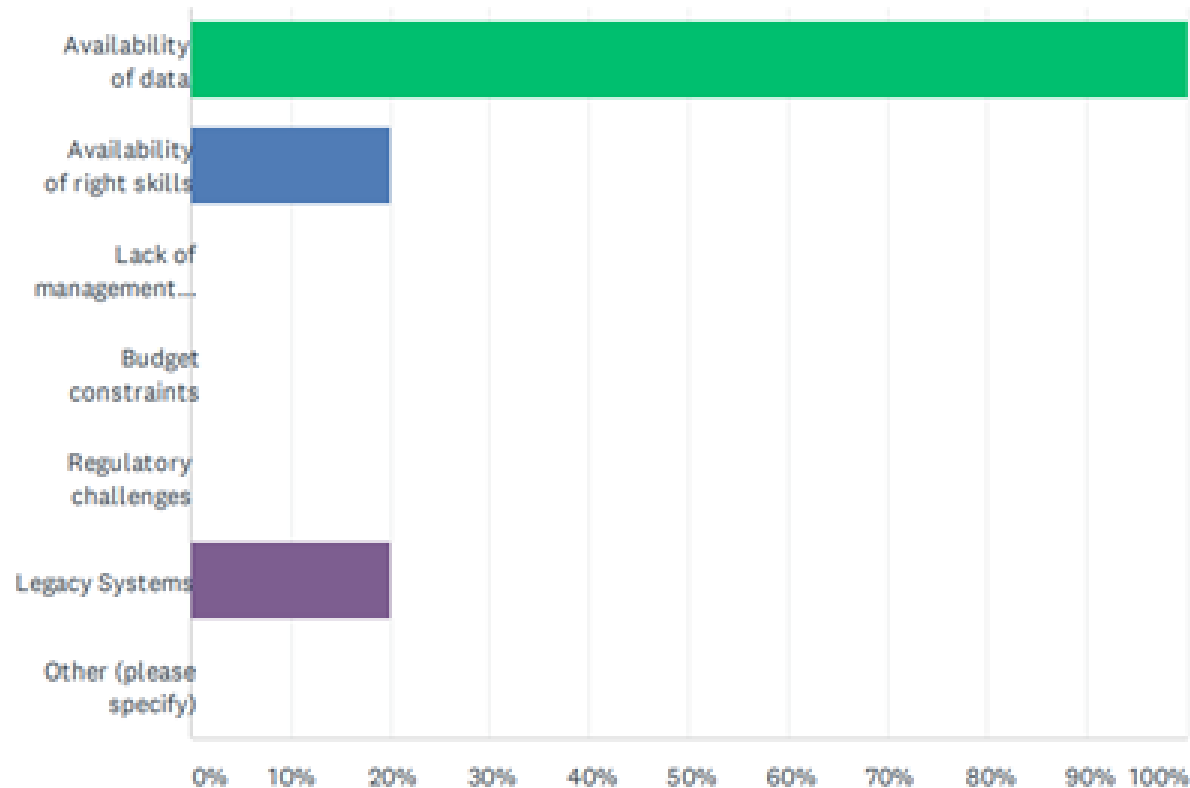
Other challenges envisaged
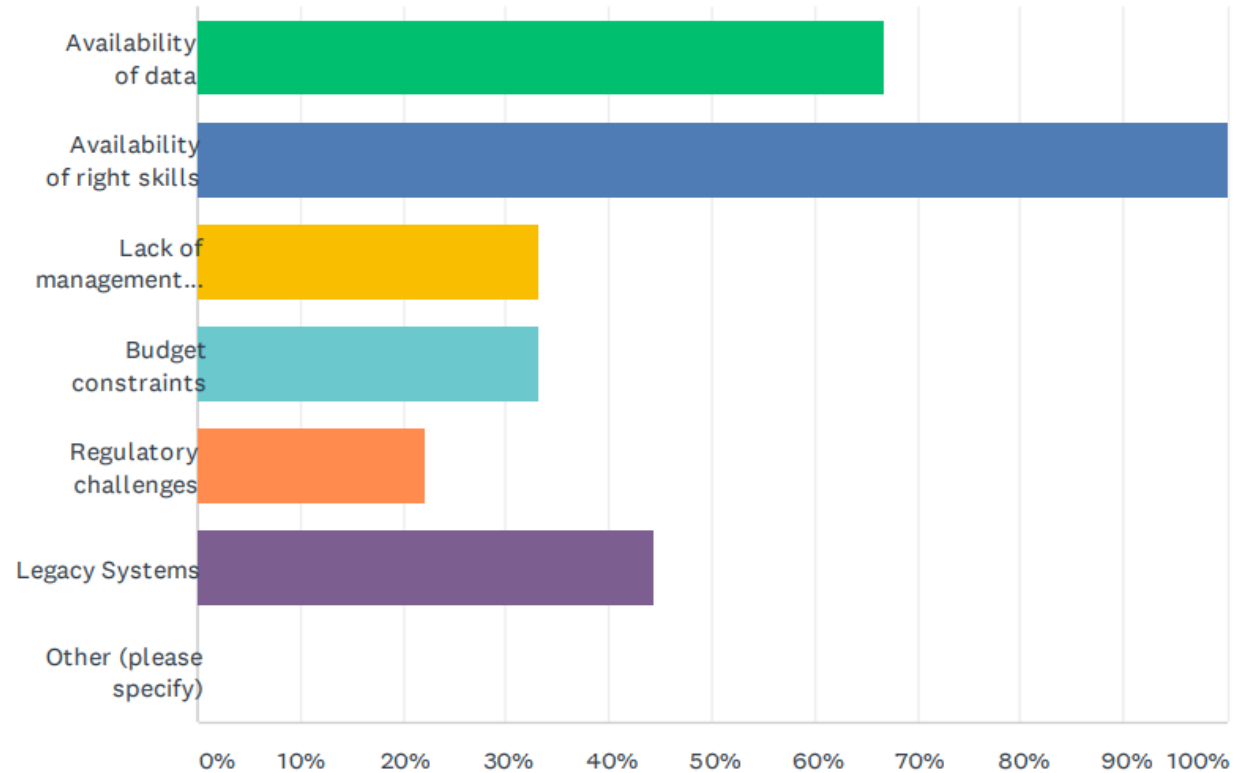
Major Reasons

Organizational constraints than model failure:

- Silos within the Company

- No centralized Data Curation leading to Duplicity

- Current systems are not flexible

- Unrealistic Timelines

- Being focused more on 'Model' accuracy than practical application

- Companies are not able to define the benefit for the end-user

Some highlights of the Swiss Re Sigma

❖ *Without data engineering, the performance of the models have proven to be slow and expensive relative to existing human-centric processes.*

❖ *Low Quality Algorithms with High Quality Data Engineering yield higher than High Quality Algorithms with low Quality Data Engineering*

❖ *Investments in Data Collection and Curation Capabilities will be a key differentiator*

❖ *Insurer should accept that the project completion timelines will be longer than many expect*

❖ *Integration of MI algorithms with Human intelligence is a must*

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Some questions for all of us!

Time to think!

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Poll Question 3

Can Data Scientists replace Actuaries in the Insurance Industry?
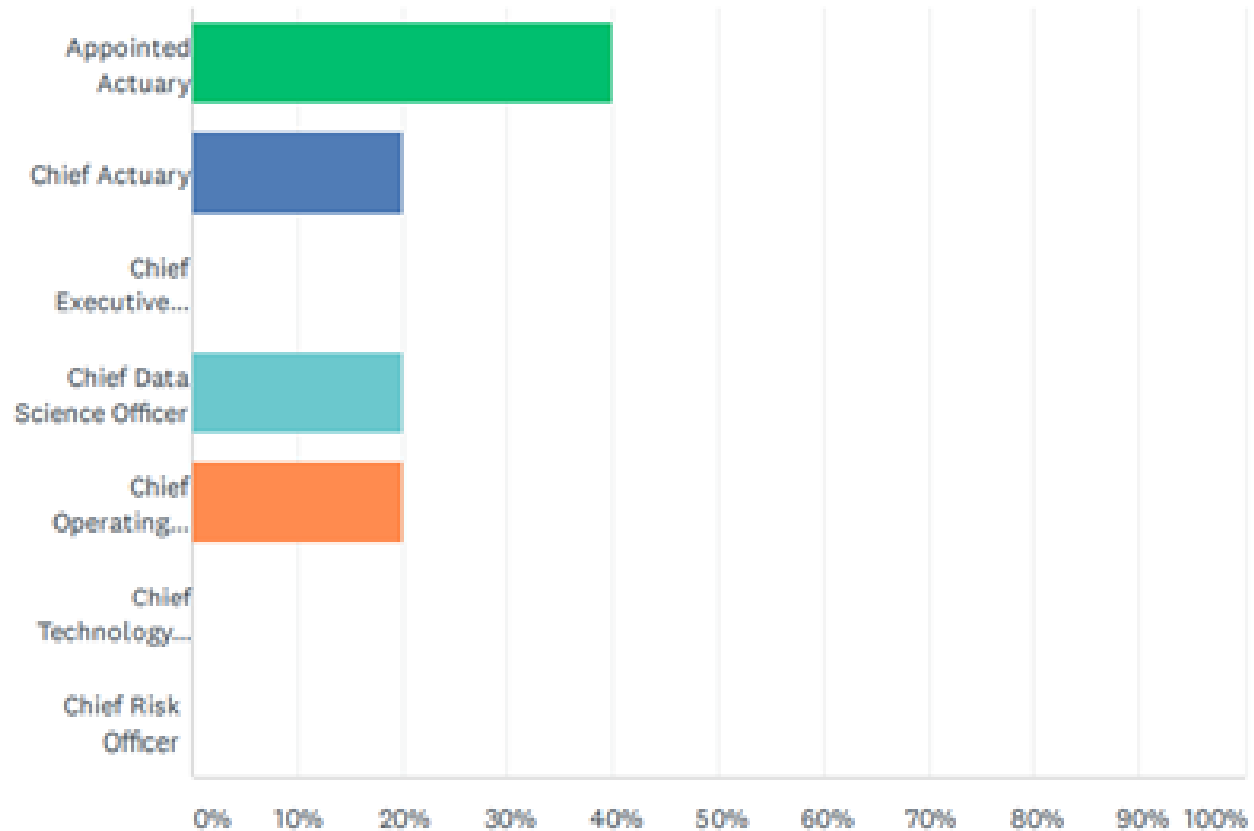
Data Scientists or Actuaries

- ✓ Insurance Domain Knowledge
- ✓ Cost Consideration
- ✓ Statutory roles

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Poll Question 4

Can Actuaries become the drivers of the use of Data Science in the Insurance Industry?

Who heads the Data Science Function?

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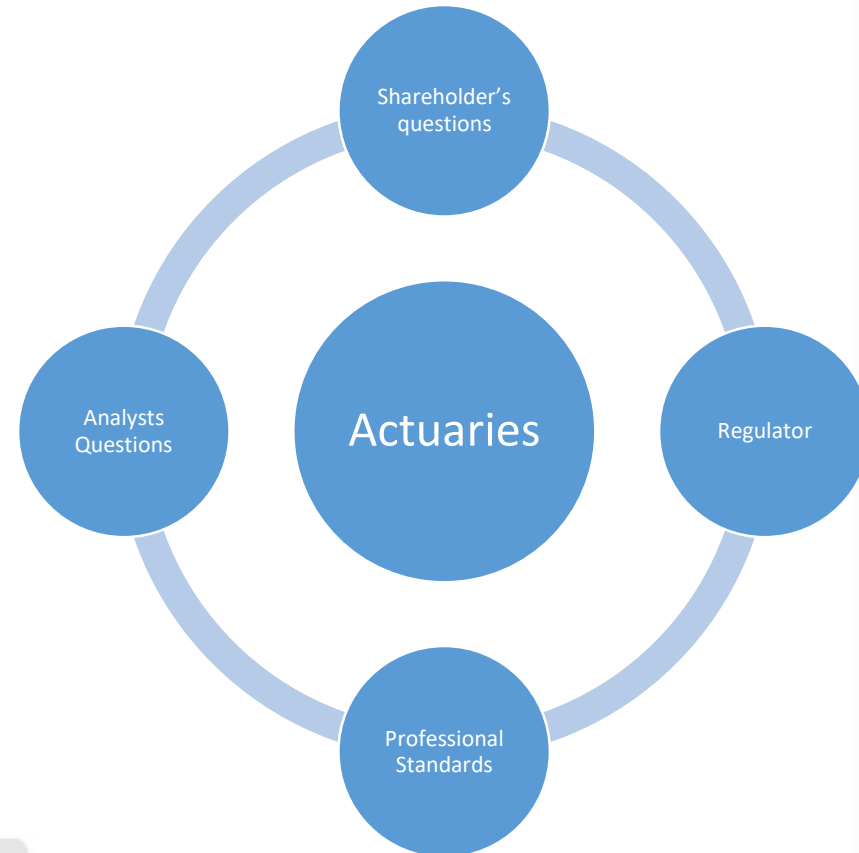
Recent IFoA CPD case study

- [Course: PST 2019/20 A Trusted Profession , Topic: Inside the black box (actuaries.org.uk)](#)

✓ Sets up a scene with a multidisciplinary team of actuaries and data scientists lead by an Actuary to implement a pilot using AI technology for insurance renewal pricing

✓ Actuary is not clear what is happening in the model

✓ Appropriate Documentation is not done

✓ Actuaries are responsible for the final result

✓ Management hasn't envisaged that much more time is required for the full scale implementation

✓ Actuaries are also bound by the Professional standards
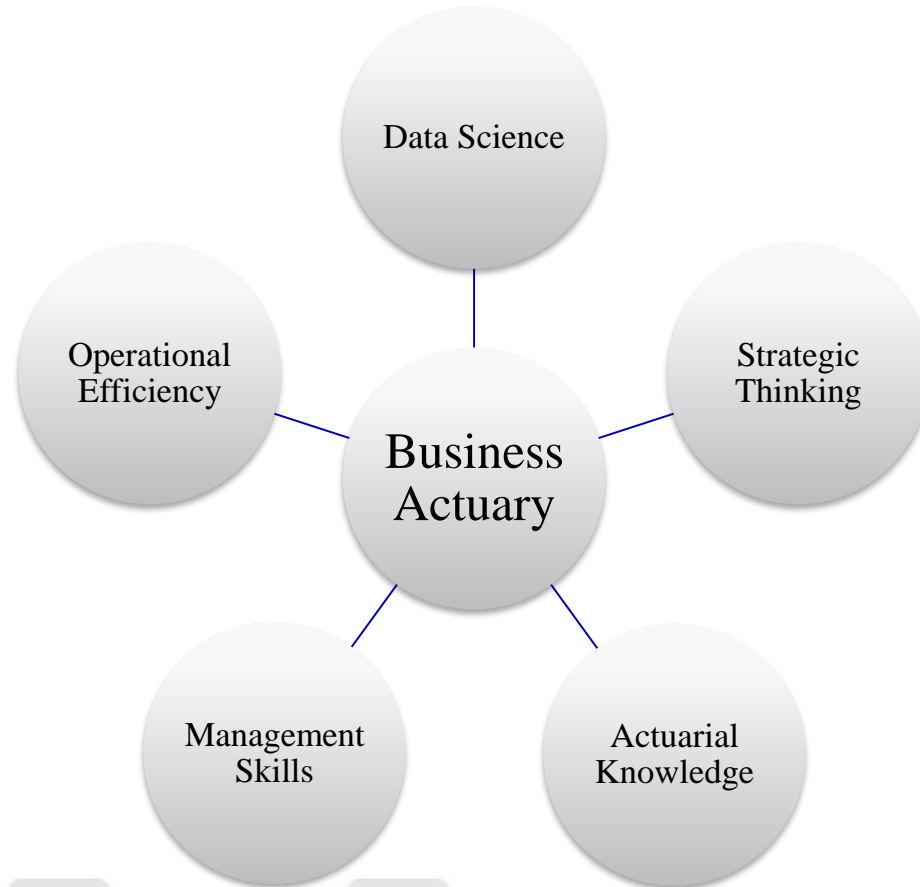
Are Actuaries ready?

Changing world:
- ✓ Customers demands are changing
- ✓ Focus on Cost and Capital Optimization
- ✓ Regulatory changes
- ✓ IFRS 17

Actuaries will only be able to handle it and contribute meaningfully to the Industry as a Profession, if Actuaries are prepared for it
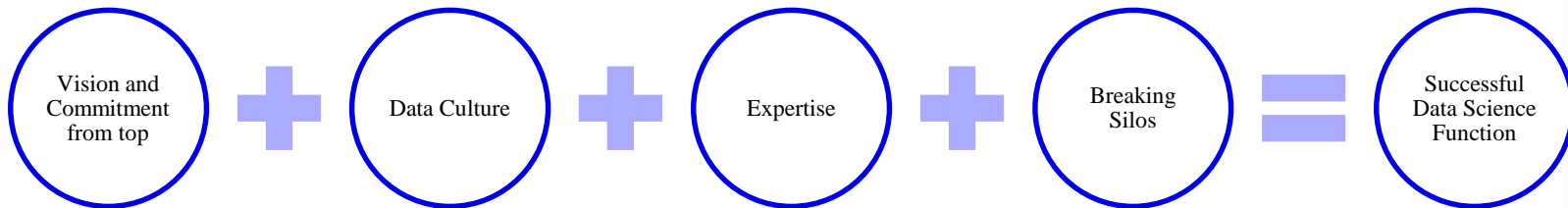
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Shareholder's questions

Analysts Questions

Actuaries

Regulator

Professional Standards

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Time to transform

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Conclusion: Lets focus on the bigger picture

✓ *Data Science not to be looked in isolation or some magic potion for certain sections of the business.*

✓ *Instead, lets look at it as an integral part of how the world is changing and how we need to adapt to it!*

Vision and Commitment from top **+** Data Culture **+** Expertise **+** Breaking Silos **=** Successful Data Science Function

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Questions & Answers

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