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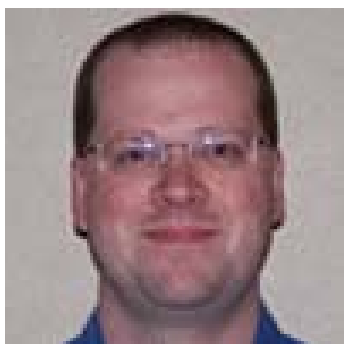
## Survival of the Fittest: Actuaries in the new data driven world

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# Agenda

- Introduction
- Data, Data, Everywhere
- The Actuary
- Paradigm Shift
- Decision Making Process
- The Actuarial Control Cycle
- A Vision



# Introduction

- Google, Amazon, Facebook and many more companies have taken data mining and predictive modeling to new heights, analyzing and deploying results real-time.
- A company's value is materially impacted by its ability to effectively and efficiently collect and analyze data, and to develop and deploy statistical models providing insight.

Actuaries are uniquely positioned to maximize the value that comes with increased data.



# Data, Data, Everywhere

Day after day, day after day,  
We stuck, nor breath nor motion;  
As idle as a painted ship  
Upon a painted ocean.

Water, water, every where,  
And all the boards did shrink;  
Water, water, every where,  
Nor any drop to drink.

*Taken from The Rime of the Ancient Mariner*



- Amount of data continues to grow exponentially
- Its quality is also getting exponentially worse
- Data = **Information**
- Can be considered on par with capital and talent
- Data is collected & managed, more or less 'fit for purpose'
- The value proposition comes from extracting information out of the data and telling the story

# The Actuary

- An **actuary** is a business professional who deals with the financial impact of risk and uncertainty.
- Actuaries provide assessments of financial security systems, with a focus on their complexity, their mathematics, and their mechanisms.
- “One of the key skills of an actuary is the development and application of models to help solve complex financial problems.”



Part super-hero. Part fortune-teller.  
Part trusted advisor.

# Paradigm Shift

What is driving change today such that it could be termed a 'paradigm shift'?

- 1.The amount of underlying information.
- 2.The type of analytics and model-building now possible because of the amount of information.
- 3.The need to shift from performing specific tasks to participating in the decision-making.



Part advocate. Part gold-miner.  
Part storyteller.

# Paradigm Shift

- Part advocate.
  - It starts with the data.
  - What is your company doing to collect it?
  - Is being collected and made available in such a way that it can be quickly analysed?
- Part gold-miner.
  - Parsimony is key to successful models. And governance.
  - How critical is the question of ‘why’ when you have ‘big data’?





# Paradigm Shift

- Part storyteller.
  - Requires continuous learning.
  - Requires initiative. Do projects. Or, if in management, sponsor.
  - Requires a willingness to be different. Others are pushing the limits, you must. Make the business case.
  - Showcase the competitive advantage.
  - It is in the successful telling of the story that the actuary takes on the key role in decision making.



# Decision Making Process: Goal

- What is the Business/Actuary's main Goal?
- Examples:
  - Comply with Regulations
  - Comply with Actuarial Standards
  - Pricing: Maximize Profitability, Maximize Return on Equity, Minimize Loss Ratio
  - Reserving: Sign off on Adequate Reserves
  - Other: Minimize Risk, Maximize Upside Potential



# Decision Making Process: Role

- Pricing Example
- Traditional pricing
  - Actuary determines cost.
  - Actuary presents analysis to underwriting.
  - Underwriting determines price.
  - Actuary may or may not have input into final pricing decision of the underwriter.
  - This could be individual risk or manual pricing.



# Decision Making Process: Role

- Pricing in a Data Driven World
  - Actuary uses any source of data available to achieve the business goal (i.e. maximize profitability) subject to constraints (regulations, Actuarial Standards, IT, business).
  - Actuary works side by side with the business leader, underwriting, claims, marketing, finance, accounting, and IT
  - Optimal strategies are developed for not only price, but for underwriting, risk selection, marketing territories, and claims management.



Any decision that uses data AND is aligned with the goal of maximizing profitability, the actuary should be part of the decision making process.

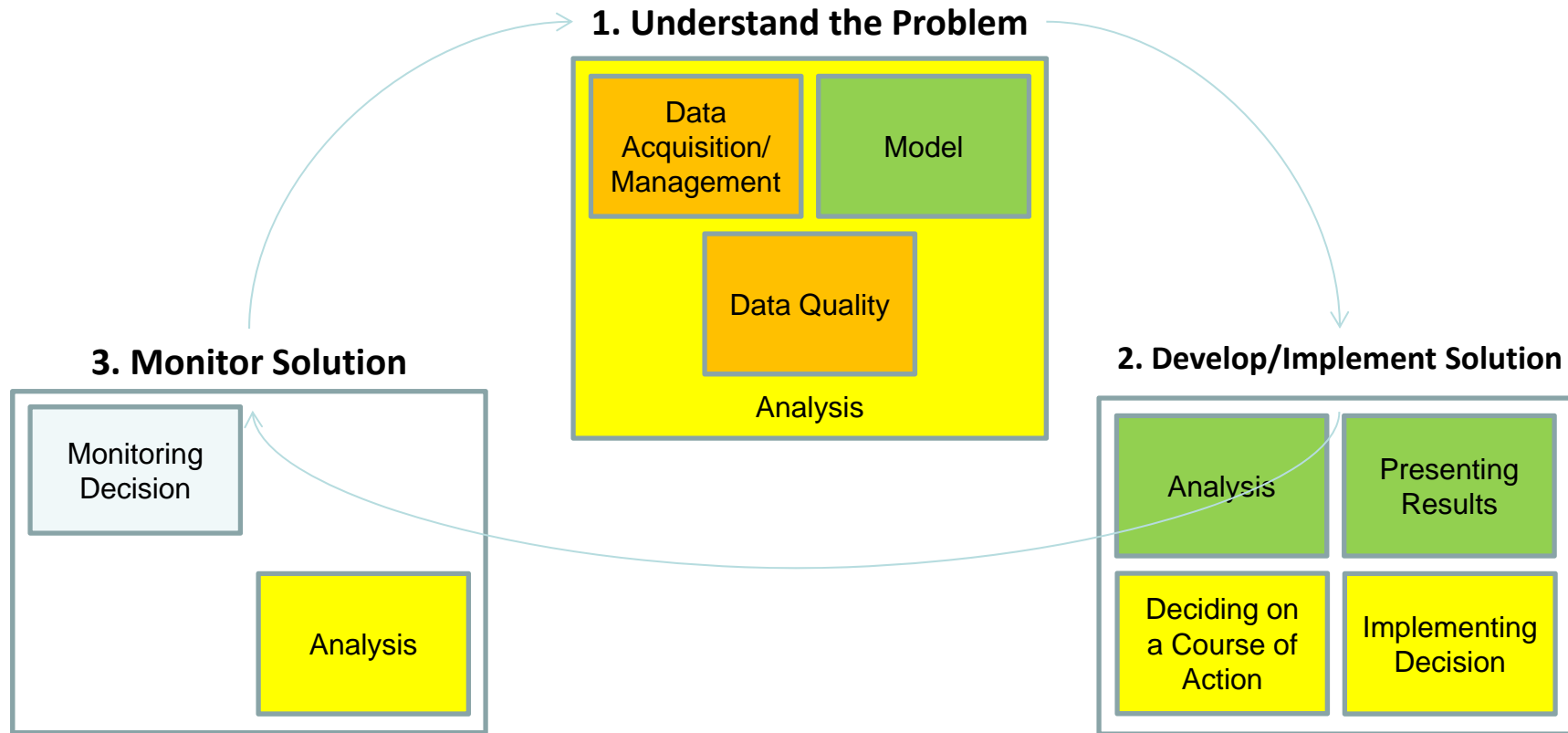
# Actuarial Control Cycle

- The Actuarial Control Cycle is based on the following problem-solving algorithm:
  - understand the problem
  - develop and implement the solution
  - monitor the effectiveness of the solution
  - if necessary, repeat the steps



Source: Adapted from Bellis, Shepherd and Lyon; Understanding Actuarial Management: the actuarial control cycle

# Actuarial Decision Making – Traditional vs. Data Driven



- Doing, but is inadequate for data driven tasks.
- Traditional Actuarial Task, but not always performed
- Some actuaries are doing, some are not.
- Traditional Actuarial Tasks

# Data Acquisition

- Data acquisition needs to be collaborative
- Data needs to be timely and made available
- Differences between Traditional and Data Driven

Dimension	Traditional	Data Driven
Aggregation Level	LOB/Year/Coverage	Individual Record
Type of Data	Structured Only	Structured and Unstructured
Amount of Data	Small – only a few fields	Large with many fields



# Data Quality: ASOP 23

## U.S. Data Quality Requirements

- Data should be appropriate, reasonable and comprehensive
- Disclose reliance on data supplied by others
- Validity and comprehensive of data is responsibility of those that supply the data
- Review the data or disclose if a review was not completed
- Disclose any limitations of the data



Source: Actuarial Standards of Practice No. 23, Actuarial Standards Board



# Beyond ASOP 23

## Proactive Data Quality

- Measure quality of the source data
- Emphasize process improvement
- Influence continuous data quality
- Data quality steward
  - Ensures that the quality of the data meets the needs of the line of business in addition to the organization as a whole.



# A Vision

- Be involved in the entire process – from data to decision
- Be equipped to function in a data-driven analytically-sophisticated world
  - Frame work in the context of the era of Big Data
- Balance sophisticated analytics with ‘real life’ business needs

