SESSION 4B: WHAT TO DO WITH ALL THIS DATA???
Active participation in the Society of Actuaries is an important aspect of membership. While the positive contributions of professional societies and associations are well-recognized and encouraged, association activities are vulnerable to close antitrust scrutiny. By their very nature, associations bring together industry competitors and other market participants.

The United States antitrust laws aim to protect consumers by preserving the free economy and prohibiting anti-competitive business practices; they promote competition. There are both state and federal antitrust laws, although state antitrust laws closely follow federal law. The Sherman Act, is the primary U.S. antitrust law pertaining to association activities. The Sherman Act prohibits every contract, combination or conspiracy that places an unreasonable restraint on trade. There are, however, some activities that are illegal under all circumstances, such as price fixing, market allocation and collusive bidding.

There is no safe harbor under the antitrust law for professional association activities. Therefore, association meeting participants should refrain from discussing any activity that could potentially be construed as having an anti-competitive effect. Discussions relating to product or service pricing, market allocations, membership restrictions, product standardization or other conditions on trade could arguably be perceived as a restraint on trade and may expose the SOA and its members to antitrust enforcement procedures.

While participating in all SOA in person meetings, webinars, teleconferences or side discussions, you should avoid discussing competitively sensitive information with competitors and follow these guidelines:

- Do not discuss prices for services or products or anything else that might affect prices
- Do not discuss what you or other entities plan to do in a particular geographic or product markets or with particular customers.
- Do not speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- Do leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
- Do alert SOA staff and/or legal counsel to any concerning discussions
- Do consult with legal counsel before raising any matter or making a statement that may involve competitively sensitive information.

Adherence to these guidelines involves not only avoidance of antitrust violations, but avoidance of behavior which might be so construed. These guidelines only provide an overview of prohibited activities. SOA legal counsel reviews meeting agenda and materials as deemed appropriate and any discussion that departs from the formal agenda should be scrutinized carefully. Antitrust compliance is everyone’s responsibility; however, please seek legal counsel if you have any questions or concerns.
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THE PANEL

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ML in Insurance: What can you do with all this data

Nanditha Nandy, Senior Data Scientist, Swiss Re
Times are changing fast: Era of massive data, cheap storage, faster processing power

1MB hard drive cost $1M in 1967, today it’s about $0.02

- In the last 2 years, 90% of the world’s data has been created (source IORG)
- 2.5 quintillion bytes of data are produced by people every day (source Social Media Today)
- Forbes estimated 17% of companies used predictive analytics in 2015 and increased to 53% just 2 years later
- The scale and ease with which analytics can be conducted today completely changes the ethical framework. We can now do things that were impossible a few years ago, and existing ethical and legal frameworks cannot prescribe what we should do
- How can our industry leverage?
Insurance industry now is in an era with massive digital data

With the increasing availability of data, we have a unique opportunity to process and spot signals on a broad range of topics – an impossible task using traditional methods.

Critical and strategic business decisions rely on sound judgment of information. Using smarter and consistent ways to process and visualize information can solve this challenge.

Combining AL/ML techniques with expert judgement enables to process large amounts of data to derive relevant insights.
Machine Learning (ML) on Insurance’s Value Chain

- Sales & Marketing
- Under-writing
- Costing & Pricing
- Claims Analytics
- Risk Management
Tabular data & Big data

• Structured data use cases
Accelerated Underwriting solutions - The Next Generation of Underwriting

- Life Carriers can leverage new data sources and predictive models to triage and accelerate more applicants.

**Dynamic, individualized, and automated** underwriting with minimal impact to mortality

Replace traditional requirements
Optimize the referral and requirements ordering process
Accelerate underwriting for more applicants

01. Application
Applicant comes in with some initial information

02. Initial Assessment
Use a combination of new data sources and predictive models to make a preliminary risk assessment

03. Triage
Determine whether referral to an underwriter or ordering additional requirements would help inform the risk assessment
Improved Customer Journey in Healthcare - Risk Assessment, Dynamic Underwriting, and Improvable Risk

- Consumer/Patient
- Alternative data sources collection
- Linking solution to UW engine
- Data Analytics & Services
- HbA1c
- Insights sharing
- Insurance offers
- Healthcare Recommendations
- Engaged policyholders
- Healthier policyholders
- Lower claims costs

Clinical Outcomes

Consumer Modifiable Behavior

Swiss Re
Expediting Underwriting Process – Taking a look at the questions of an application

• Expedite the application process while maintaining an accurate quantification of risk

1. Better Estimate Risk
2. Expedite Applications
3. Write More Business

Efficiency & Insights to write better and more business
Text data

• Unstructured data use cases
Yesterday
Our primary source of new information
Today

Our primary source of new information
Enable proactive business decisions by identifying and managing relevant risks faster than ever before

- Monitoring “known” drivers
- Analyzing inforce experience against identified events
- New opportunities
Identifying Potential Risks

• Mine large scale datasets to screen and identify emerging risks. Example- risk of a pandemic
Image data

- Unstructured data use cases
Assessing Loss Damages after Natural Catastrophe Events

- Use aerial imaging technologies to estimate damages
- Expedite claim assessment
- Improve reserving/capital preparation
- Engage consumers

\[ D(p_i) = f(I_{\text{after}} - I_{\text{before}}) \]

Estimating damages after Hurricane
AI in Insurance – “”
Opportunities await
Proceed with caution
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Considerations in Data Ethics

Stephanie Weist, FSA, MAAA
Sr AVP, NF Modeling Actuary
Nationwide Financial
Just because you can, doesn’t mean you should

• “If we send someone a catalog and say, ‘Congratulations on your first child!’ and they’ve never told us they’re pregnant, that’s going to make some people uncomfortable,” Pole told me. “We are very conservative about compliance with all privacy laws. But even if you’re following the law, you can do things where people get queasy.”¹

¹https://www.nytimes.com/2012/02/19/magazine/shopping-habits.html?pagewanted=1&_r=1&hp
Data Privacy is responsibly collecting, using and storing data about people following regulations and laws.

Data Ethics is doing the right thing with data, considering human impact and making decisions based on your company’s values.
Consumer protections
Competitive advantages

• Study by McKinsey & Company with consumers²
  • “The responses reveal that consumers are becoming increasingly intentional about what types of data they share—and with whom. They are far more likely to share personal data that are a necessary part of their interactions with organizations. By industry, consumers are most comfortable sharing data with providers in healthcare and financial services,...”
  • “As consumers become more careful about sharing data, and regulators step up privacy requirements, leading companies are learning that data protection and privacy can create a business advantage.”

• Analytics provides a competitive advantage for a company.
  • Sales leads generation
  • Automated underwriting
  • Predicting behavior to calculate reserves

Company Trends

• New roles: Chief Data Officers/Chief Privacy Officer – need to cover privacy and ethics

• Data Ethics Committees reporting to the Board

• Impact on Actuaries
  • Members one of these committees or subcommittees given our extensive work with data and models
  • At least will be consulted on what data is being used and how it is being used
ML/AI Bias


https://www.wired.com/story/ai-biased-how-scientists-trying-fix/


Is Your AI Fair?

- Fairness is subjective and not always clear what is fair
- Can use existing legal standards to mitigate many discriminatory challenges
- Intentional vs unintentional discrimination
- Document ways you’ve attempted to minimize disparate impact or algorithmic unfairness
- New laws and guidance targeting fairness in AI are coming
Automated Underwriting

• Classify ethical issues for
  • Data
  • Algorithms
  • Practices to manage and oversee
• Review impact assessments for race and gender biases routinely
• Test historical data for evidence of discriminatory features
• New developments
Actuarial Resources

• Code of Professional Conduct
  • Precept 1 – “Act honestly, with integrity and competence…”

• Big Data and the role of the Actuary (AAA Big Data Task Force)
  • If the application of an algorithm or model results in an outcome that regulators or others perceive as unfair or unfairly discriminatory, its use may be restricted or disallowed
  • Actuaries have some implicit level of professional or ethical responsibility in the development and use of a model.

• ASOP 23 Data Quality Section 3.4.c Use of Data
  • If the actuary judges that the use of the data, even with adjustments and assumptions applied, may cause the results to be highly uncertain or contain a significant bias, the actuary may choose to complete the assignment but should disclose the potential existence of the uncertainty or bias, and, if reasonably determinable, the nature and potential magnitude of such uncertainty or bias, in accordance with section 4.1(g).
WHAT TO DO WITH ALL THIS DATA???

Industry trends and future state visioning

October 27, 2020

Ramandeep Nagi
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AGENDA

1 Organizational challenges
2 Industry trends
3 Future state visioning and expected organizational benefits
4 Tools and technologies
ORGANIZATIONAL CHALLENGES

INTERNAL CHALLENGES

1. Significant manual time to prepare and adjust data; issues with source systems leading to frequent data errors

2. Underlying model structure concerns resulting in duplicated efforts for model development and use

3. Actuaries spend substantial time on routine reporting including “pressing run” on models

4. Resource strain on contributors with the greatest level of institutional knowledge

5. Resources spending time on tasks not aligned to their skillset

EXTERNAL CHALLENGES

1. Regulatory change and global parent expectations

2. Increasing external expectations

3. Economic uncertainty

4. Inorganic growth demands
INDUSTRY TRENDS – DATA & TECHNOLOGY

Centralizing data
Access to consistently structured central data can reveal underlying relationships and profit drivers

Deploying the cloud
Processing power from the cloud unlocks new capabilities to analyze data

Streamlining and accounting
Drill-down capabilities in the ledger can connect trends in financials back to source data

3 out of 4 insurers are implementing a centralized data solution

Economies of scale is driving 2 out of every 3 insurers to the cloud

60% of insurers are hooking up a data repository to a standardized accounting engine

80% of insurers are implementing streamlined solutions to feed data to actuarial models

MARKET INDICATORS
Prudential spent $2.35 B to acquire AssuranceIQ
MetLife is partnered with 10 InsurTech startups

INDUSTRY TRENDS – PROCESS OPTIMIZATION

Automation and reporting improvements are a relatively small cost with a significant return if implemented alongside required regulatory changes.

**Current state**

Excel remains a primary tool for most insurers despite appetite for automation and greater analytics capabilities.

<table>
<thead>
<tr>
<th>Microsoft Excel</th>
<th>Microsoft Access</th>
<th>Automated IT workflows</th>
<th>Analytical tools (e.g., Tableau, Power BI, Alteryx, Python, R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>73%</td>
<td>21%</td>
<td>25%</td>
<td>14%</td>
</tr>
</tbody>
</table>

**Regulatory impacts**

80% of companies expect to materially change processes for LDTI.

<table>
<thead>
<tr>
<th>Process Type</th>
<th>High impact</th>
<th>Medium impact</th>
<th>Low impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-model processes (e.g. in-force creation)</td>
<td>41%</td>
<td>41%</td>
<td>17%</td>
</tr>
<tr>
<td>Post-model processes</td>
<td>41%</td>
<td>45%</td>
<td>14%</td>
</tr>
<tr>
<td>Experience studies &amp; assumption setting</td>
<td>21%</td>
<td>38%</td>
<td>41%</td>
</tr>
<tr>
<td>Sub-ledger or journal entry rules engine</td>
<td>21%</td>
<td>31%</td>
<td>48%</td>
</tr>
<tr>
<td>Data visualization &amp; reporting processes</td>
<td>10%</td>
<td>28%</td>
<td>62%</td>
</tr>
</tbody>
</table>

**Future state**

85% of insurers are planning to automate repetitive processes.

- **Streamline and automate** experience studies
  - 84%
- **Streamline and automate valuation processes**
  - 67%
- **Workflow implementation** (ledger, assumptions)
  - 42%
- **Implement analytics tools** to improve reporting
  - 52%
- **Utilize visualization** tools to improve analytics
  - 33%


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**IMPACT**

A recent transformation project determined that ~15% of capacity could be released through automation and streamlining alongside LDTI.
FUTURE STATE VISIONING – OVERVIEW

CHALLENGES

Significant manual time to prepare and adjust data; issues with source systems leading to frequent data errors

Underlying model structure concerns resulting in duplicated efforts for model development and use

Actuaries spend substantial time on routine reporting including “pressing run” on models

Resource strain on contributors with the greatest level of institutional knowledge

Resources spending time on tasks not aligned to their skillset

OPPORTUNITIES

On-demand insights powered by easily accessible data from a single enterprise data solution

Streamlined forecasts and quick what-if analysis from an actuarial platform with consistent model architecture

Robust and automated reporting delivering key metrics to management through dashboards and visualization

Strategic changes to talent development, technology vision, and governance
FUTURE STATE VISIONING – EXPECTED ORGANIZATIONAL BENEFITS

LDTI minimum viable state

DATA

- Automated financial reporting
  - (Valuation only)

- Expanded access to transformed data to power streamlined analytics and models

- Confidence in data through a central repository acting as a single source of truth

- Foundational capability to support regulatory demands (i.e. LDTI, IFRS) on data

- Faster and controlled reporting through automated journal entry booking

- Streamlined and controlled assumption updates via workflow tools

- Automated data transformation resulting in minimal manual data preparation

REPORTING & WORKFLOW

- On the fly management analytics
- Streamlined ALM processes and improved ALM analytics
- Better understanding of risk and rewards across product lines
- On the fly experience analysis
- Significant lower effort onboarding resources
- 25-50% less time required to do EEV, CFT, etc.

- Automated model runs through run orchestration

MODELS

- Thin, dynamic valuation models

- Automated model runs through run orchestration

ACCOUNTING METHODOLOGY & TRANSITION

- Auditable Testware

- Productionalized LDTI including best practice management reporting

- Established LDTI and IFRS methodologies aligned with company’s accounting principles

- Improved forecasting reflects policyholder behavior in different market conditions

- Standardized, automated case pricing and rate adequacy assessment

- Confident in data through a central repository acting as a single source of truth
FUTURE STATE VISIONING – EXPECTED ORGANIZATIONAL BENEFITS

Target state

DATA

Automated data transformation resulting in minimal manual data preparation

REPORTING & WORKFLOW

Automated financial reporting

On the fly management analytics

Streamlined ALM processes and improved ALM analytics

Automated model runs through run orchestration

On the fly experience analysis

Significant lower effort onboarding resources

Faster and controlled reporting through automated journal entry booking

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25 - 50% less time required to do EEV, CFT, etc.

ACCOUNTING METHODOLOGY & TRANSITION

Better understanding of risk and rewards across product lines

Thin, dynamic valuation models with automated rollforward procedures

Established LDTI and IFRS methodologies aligned with company’s accounting principles

Auditable Testware

Productionalized LDTI including best practice management reporting

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TOOLS AND TECHNOLOGIES

Data visualization

SPECIALIZED

CODING BASED

GRAPHICAL USER INTERFACE (GUI)

DATA TRANSFORMATION

MULTI-FUNCTIONAL

Cloud computing

Data transformation

TOOLS AND TECHNOLOGIES

CODING BASED

GRAPHICAL USER INTERFACE (GUI)

DATA TRANSFORMATION

MULTI-FUNCTIONAL

Cloud computing
Questions
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