Session 1E: Data + Graphics = Business Intelligence

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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.
Presentations are intended for educational purposes only and do not replace independent professional judgment. Statements of fact and opinions expressed are those of the participants individually and, unless expressly stated to the contrary, are not the opinion or position of the Society of Actuaries, its cosponsors or its committees. The Society of Actuaries does not endorse or approve, and assumes no responsibility for, the content, accuracy or completeness of the information presented. Attendees should note that the sessions are audio-recorded and may be published in various media, including print, audio and video formats without further notice.
Consider the enormity of public data from entities like the CDC and the FDA combined with insurance policy-level detail that the industry holds. How can we explore this vastness quickly and precisely to locate the information we need for predictive modeling, product development or other business applications? We need a map.

Today’s advanced BI tools make big data exploration possible and help us react far more quickly to market changes. These tools are game changers – giving the creator access to statistical programs that can transform a reporting tool (primarily found on the back end of an analysis) to an interactive tool used during the discovery phase of a project. We will explore two use cases that demonstrates how visualizing data can impact actuarial analysis.
James leads a team of data scientists and actuaries conducting predictive analytics research. He provides both business and technical expertise to support the core business’s operation, reporting and analytics needs. James has most recently served as product owner for one of SCOR’s major strategic initiatives.

James is a Fellow in the Society of Actuaries and member of the American Academy of Actuaries. He holds a Bachelor of Science in Mathematics and a Master of Arts in Teaching Mathematics from Stony Brook University in New York.
Davy is responsible for enhancing and managing the Business Intelligence offering through Tableau. This responsibility includes the creation of data visualization solutions from designing the data source architecture to the visual analytics. She also facilitates feedback sessions to improve underwriting and business processes.

Davy holds a Bachelor of Science degree in Industrial and Operations Management from University of North Carolina at Charlotte and is Tableau Certified (Desktop Associate).
AGENDA

Let’s explore the power visuals can have on big data.

Analytics Value Curve
What part do data visualization tools play on the road to process optimization?

Use Case #1: Risky Business
How did SCOR Velogica transform a complex tool into an interactive game changer for our clients?

Use Case #2: Models in Ship Shap
How did SCOR use Tableau and SHAP to completely explain machine learning models?

Q & A
What questions do you have?
DATA ANALYTICS MATURITY CURVE

How advanced is your analytics maturity?

Figure 1. Analytics Value Curve. From Utility Analytics Institute (2016, June 28). Retrieved from https://energycentral.com/o/utility-analytics-institute/analytics-value-curve
DATA ANALYTICS MATURITY CURVE

What insights are you gathering?

Figure 1. Analytics Value Curve. From Utility Analytics Institute (2016, June 28). Retrieved from https://energycentral.com/o/utility-analytics-institute/analytics-value-curve
DATA ANALYTICS MATURITY CURVE

What data analytics tools are you using?
How far have they advanced your organization?

Figure 1. Analytics Value Curve. From Utility Analytics Institute (2016, June 28). Retrieved from https://energycentral.com/o/utility-analytics-institute/analytics-value-curve
Use Case #1

Risky Business

The Producer Analysis is a tool we developed several years ago to statistically identify a subset of agents or producers that exhibit unusual behavior. This behavior can lead to serious adverse mortality and can have a significant impact on the client’s financial reserves and, in turn, our own financial reserves (as the reinsurer).

CHALLENGE: How do we take a complex tool and turn it into something meaningful for the client? The output should give the client the supporting evidence to take action on those outlier agents.
Effective?

Does it show which agents are the worst?

Does it show which agents are improving?

Is the algorithm transparent enough to legitimize the tool?

Consensus – No!
Use Case #2
Models in Ship Shape

How can Tableau and SHAP be combined to completely explain machine learning models?
What is SHAP?

SHAP (SHapley Additive exPlanations) is a game theoretic approach to explain the output of any machine learning model. It connects optimal credit allocation with local explanations using the classic Shapley values from game theory and their related extensions.

Scott Lundberg
https://github.com/slundberg/shap

What is a Shapley value?

Imagine there are three people working together to hammer in a very large nail, each person gets one turn.

Person 2 is a professional hammerer, while person 1 and 3 have very little experience comparatively.

Because of imperfections in the wood, sometimes it takes a very strong hit to move the nail, and other times it can be moved very easily.

The order in which the individuals hammer therefore matters.

A Shapely value is calculated as the average of each person’s contribution after repeating the exercise in every possible order.
Q & A: What questions do you have?