1. Reputational Risk – some particularities
2. Social Media and Sentiment Analysis
3. A Scenario Approach for modeling Reputational Risk
Reputational risk must be included within the ERM Framework
Effectively managing reputational must recognize that reputation is a matter of perception/sentiment and identify the risk drivers
Various stakeholders (investors, customers, suppliers, employees, regulators, politicians, nongovernmental organizations, the communities in which the firm operates)
And specific categories (product quality, corporate governance, employee relations, customer service, intellectual capital, financial performance, handling of environmental and social issues)
Reputation ‘takes year to build but seconds to destroy’ (tail events)
Highly correlated to other types of risk
Measurement of both reputational and reputational risk remains a key area
AN APPROACH

Causes (Risk Factors)
- Identify the main risk drivers across stakeholders and categories
- Measurable indicators (KPI/KRI)
- External Factors must be included

Risk Events
- Create an appropriate Taxonomy
- Collect all relevant details
- Controls can be implemented
- Difficult to underwrite/insure

Reputational Effects
- Collect both financial and non-financial impacts
- Analyse correlations between effects
- Time laps in between main event and its reputational effects
REPUTATION RISK FACTORS

SCALED BY LEVEL OF POSSIBLE EFFECT

Untrustworthy Sources
Few Benefits
Involuntary
Not Controllable
Unfair
Catastrophic
Man Made
Unfamiliar
Dreaded
Uncertain
Vulnerable Populations
Memorable
Immoral/Unethical
Mixed Non-Verbal Message
Unresponsive
High Media Attention
Victims Identifiable
Delayed Effects
Effects Irreversible
Not Well Understood

LOW RISK
MEDIUM RISK
HIGH RISK
REPUTATION RISK ANALYSIS

TRADITIONAL TECHNIQUES – SAS GLOBAL DATA

Research → Analysis → Modeling
SAS OpRisk Global Data: Methodology

- Loss Events
  - Retrieval
  - Summarization
  - Categorization
  - Financials
  - Grouping
  - Review
  - Validation
  - Peer Review
  - Manager Review

SAS ® OpRisk Global Data

Operational Losses
- Preliminary operational events
- Non-monetary operational events
- Business risk events
- Quasi-business risk events
- Non-profit organization events
# Reputation Risk: Creation of a Reputation Equity Curve

<table>
<thead>
<tr>
<th>Scope</th>
<th>Data Input</th>
<th>Analysis</th>
<th>Key Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess Client Profile</td>
<td>Search For Key Data Using:</td>
<td>Create Coefficients using historical data for each type of reputation loss</td>
<td>Classification of Reputation Risk Events with List of the current and future events that may have similar effects</td>
</tr>
<tr>
<td>+ Organization</td>
<td>+ Public News Sources</td>
<td>Use the coefficient to then quantify the effects of current events and future possible losses by comparing historical loss values to current risks, emerging risks and risks associated with stakeholders</td>
<td>Classification of stakeholders and how they have historically responded to and would affect future events.</td>
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<tr>
<td>+ Stakeholders</td>
<td>+ Company Filings</td>
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<td>+ Historical Events</td>
<td>+ Industry Reports</td>
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<td>+ Future Forecasts</td>
<td>+ Governmental Policy</td>
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<td>+ Legal Documentation</td>
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Collect Key Historical Information on Reputation Losses to assess severity by type of loss.
• Reaches settlement for $200M with CFTC over LIBOR rates

• Reaches settlement with Financial Services Authority on interest-rate hedging products

• Chairman Marcus Agius and CEO Bob Diamond resign

• New investigations and lawsuits over LIBOR begin

• Risk Management requires measurement and modeling

• Lack or scarce historical data

• How can sentiments/perceptions be transformed into useable information that can serve as a basis for modeling?

• A combination of:
  • Information and Social Media Sciences (news, info databases, web, research)
  • Cognitive Sciences (emotions, perceptions, beliefs to actions)
  • Computational Techniques (data and text mining, affect engines, sentiment studios)
SMA TAXONOMY/RULE ENGINES

Industry Base

Retail Bank
Online Retail
Telco
Hospitality
Automotive
...

Language Base

English
Spanish
French
German
Japanese
...

International Base

Emoticons (😊 😞)
Source-driven vernacular (like Twitter-speak)
Anti-Spam “Bad Words” (open sourced)
Places (city, state, country, region)
Twitter & Txt Speak

- Best practice industry-standard classification structures
- Enhanced and version-controlled by SAS (Teragram) R&D team
SENTIMENT ANALYSIS / CLASSIFICATION APPROACH

- Taxonomies and Sentiment Analyses are customized for each customer to ensure best alignment and accuracy possible
- Content Categorization is used by the team to further clean and organize the raw data
- measures both document-level and attribute-level sentiment using a hybrid of two primary methods:
  - **Statistical Method** (Bayes Algorithm, BM25, Pivoted Length Normalization, Smoothed Relative Frequency and Relative Frequency)
  - **Rule-Based Method** (wide range of Boolean operators used to develop manual rules for additional control and customization)
REPUTATION RULES
## CREATION AND MAINTENANCE OF SPECIFIC RULES

### SAS Sentiment Analysis Studio - Banking

**Corpus**
- Intermediate Entities
  - Products
    - CorporateReputation
      - Feature
        - Positive
        - Neutral
        - Negative
    - CustomerService
      - Positive
      - Neutral
      - Negative
    - DepositsProducts
      - Positive
      - Neutral
      - Negative
    - CardProducts
      - Positive
      - Neutral
      - Negative
    - LeadingProducts
      - Positive
      - Neutral
      - Negative
    - InvestingProducts
      - Positive
      - Neutral
      - Negative
    - OtherProducts
      - Positive
      - Neutral
      - Negative
    - OperationalRisk
      - Positive
      - Neutral
      - Negative
    - Summary
      - Positive
      - Negative
      - Neutral
  - Statistical

**Rule**
- Type
- Body
- Weight

<table>
<thead>
<tr>
<th>Rule Type</th>
<th>Rule Body</th>
<th>Weight</th>
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**Search Rules**
- Type
- Body
- Weight

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**Note:** The image shows a screenshot of the SAS Sentiment Analysis Studio interface with various rules and entities displayed.
OVERALL SENTIMENT ANALYSIS
EXAMPLE OF KPI ANALYSIS PER SENTIMENT, GEOGRAPHY, PRODUCT
REPUTATIONAL RISK
A SCENARIO BASED APPROACH

- Analyse historical data to understand how the ‘reputational’ equity has been impacted and which risk drivers and linked KPIs/KRIs are relevant
- Break-down the KPI to the relevant granular level (sales, commissions, fees etc) to assess direct correlation to the triggering event (ie internal fraud in AM)
- Implement early-warnings mechanisms and controls to mitigate such potential events (whether operational, credit, strategic risks etc.)
- Understand the time lag effect as well as the aggregation impact resulting in ‘tail effects’
- Expert Panell to select the potential event scenario topics, relevant KPI/KRIs and expected variation, assumptions and the final scoring of the scenario in terms of probability and potential direct and indirect impacts
- Use for both for modelisation and stress testing
SCENARIO EXAMPLE
Thank You!