VOLUME, VELOCITY AND VARIETY: How Big Data is Transforming Insurance

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Iowa Society of Actuaries
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Private Global Software Company
Worldwide revenues $3 billion USD
12,000 employees in 400 offices in 51 countries

Stability and Reliability
Consistent profitable growth for 36 years
Focused on information management and business analytics
25% revenue spent on R&D

Insurance is in our analytic DNA!
150+ insurance customers in the United States
All ten of the top ten carriers
Dedicated analytic solutions and practice areas for Insurance and Financial
There’s a “New Normal” for insurers

To what extent are each of the following business options incorporated in your company's strategies because your company has adapted a New Normal outlook?

- Thinking and acting in significantly different ways
  - Large: 11%
  - Midsize: 15%
  - Small: 30%

- Thinking and acting in somewhat different ways
  - Large: 33%
  - Midsize: 60%
  - Small: 70%

- There is a New Normal, but we've made no response
  - Large: 10%
  - Midsize: 15%
  - Small: 44%

- We do not think that there is a New Normal
  - Large: 0%
  - Midsize: 11%
  - Small: 0%

Insurance CIO Priority: “Building out stronger analytics and self-service models for business units to challenge the New Normal.”

Source: Celent 2011 US Insurance CIO Survey
Big Data

When volume, velocity and variety of data exceeds an organization’s storage or compute capacity for accurate and timely decision-making
OUR PERSPECTIVE

Big Data is about COMMUNICATING

Big Data

The proliferation of user-generated content that can be leveraged to make better business decisions in real-time.
OUR PERSPECTIVE

Big Data is about COMMUNICATING

17% of the world’s population used a social networking site in 2011.

Twitter logs 100 million Tweets per day.

Facebook counts 350 million unique visitors per day.

80% of companies use social media for recruitment.
The conversation is getting *noisier*
THRIVING IN THE BIG DATA ERA

VOLUME
VARIETY
VELOCITY
RELEVANCE

DATA SIZE

BIG DATA

INFORMATION OVERLOAD

RELEVANT DATA

TODAY

THE FUTURE

THRIVING IN THE BIG DATA ERA

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THE FUTURE
SIU Business Problem: Personal Auto Insurer

- *Reduce false positives* when identifying claims for investigation,
- *Better prioritize SIU workload*
- *Improve the efficiency* of their investigative resources.

**Approach**

Using claim, policy, and SIU data, SAS developed *multiple scoring models* and *network detection algorithms* to identify suspicious losses. The models incorporate *text mining* to leverage useful variables in unstructured notes.

**Results**

- A *hybrid solution* that incorporated rules, predictive models, text mining, anomaly detection and social network analysis.
- Identified single high risk claims as well as *collusive network behavior*.
- Reduced false positives and *improved impact rate* by 30%
- *Identified high risk claims early* in the claim lifecycle, improving ability to impact the claims pre-payment.
- Determined that *additional data sources* could improve results further.
Usage Based Insurance

- GPS devices installed in vehicles are used to price insurance based on time, distance and location
  - **OEM embedded telematics**
  - **OBD data loggers**
  - **Smartphone apps**

<table>
<thead>
<tr>
<th>5,000 GPS enabled autos</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 trips per day</td>
</tr>
<tr>
<td>156 journey points</td>
</tr>
<tr>
<td><strong>1.56 million rows of data per day</strong></td>
</tr>
</tbody>
</table>

Results

- Personalized premium
- Lower claims frequency
- Improved claims processing

**Commercial Lines Fleets**

- Identify and understand areas in need of improvement within their fleet
- Determine the telematics information that is available to shape their safety programs
- Provide guidance on effective driver feedback and coaching
Price Elasticity and Optimization

- Customer response modeling
- Understand the effect of different premium changes on different market segments

Life Insurance Underwriting

- Use of personal data to assess insurance eligibility and predict longevity
- Target who is likely to qualify for coverage
- Used as an indicator to determine the need for additional medical tests

- Customer attributes and attitudes
- Producer attributes and attitudes
- Internal influences
- Environmental influences
- Customer status changes and triggering events
## Mining Diamonds with AXA Equitable

- AXA mines its customer data to identify target opportunities for financial advisors
- Development of customer satisfaction index

### Approach

Using internal and external customer behavior and attribute data, AXA creates predictive propensity models to determine the next best offer for customer segments.

### Results

- Average number of sales increased by 40% for participating financial advisors

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"One of the biggest challenges in the field is having thousands of clients and achieving a level of data segmentation that allows us to understand our customers better. That allows us to stand back and analyze the decisions consumers are making and the trends that exist."

- Executive VP

FROM...

Siloed campaign processing, product selection and targeting...

TO...

Single campaign execution process to select names, apply contact rules, manage models, and select best product among an expanded marketing universe.

- **12% increase in revenue**
- **4% increase in commissions**
- **52% increase in earnings**

Deployed optimization to assess 25+ model outputs and determine the best offer strategy for each prospect.
The most profound technological innovations are driven by the need to communicate.
Information is *emotional* and *interactive*.

*Deliver better customer/producer experience*

*Understand the customer/producer relationship*
What is the total multi-year cost of your three most significant IT initiatives?

Source: Celent 2011 US Insurance CIO Survey

“We’ve overused the data warehouse pattern – it doesn’t work for analytics.”
- SAS Insurance Customer
OUR PERSPECTIVE

Data awareness must evolve as well

Data Management Maturity

Ability to Execute

High

Low

High

Low

Standard Reporting

Enterprise Data Warehouse

CRM

Data Quality

Data Stewardship

Data Integration

Org. Data Governance

Governance Process and Policy
### INSURER PERSPECTIVE

### Case Study: Data management complaint session

<table>
<thead>
<tr>
<th>Legacy system owners do not view the needs of decision-makers as a priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated data is sitting all over the company</td>
</tr>
<tr>
<td>We can get data out, but we can't put data back in</td>
</tr>
<tr>
<td>The benefits of a quick analysis are outweighed by data access processes</td>
</tr>
<tr>
<td>We don't consistently bring information together</td>
</tr>
<tr>
<td>Our source system data is not at the right level of detail</td>
</tr>
<tr>
<td>Transactions are not always tagged or clearly identified</td>
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<tr>
<td>Poor communication between analytic and operational groups</td>
</tr>
<tr>
<td>Slow speeds in accessing data impacts our ability to perform analysis</td>
</tr>
<tr>
<td>Inconsistent and incomplete quality review of source information</td>
</tr>
<tr>
<td>IT can't get us data fast enough</td>
</tr>
<tr>
<td>Our data is structured for reporting, NOT analysis</td>
</tr>
<tr>
<td>Upfront data capture may not be as complete as we'd like</td>
</tr>
<tr>
<td>Information used in our analytic process may be incorrect - we don't know</td>
</tr>
<tr>
<td>We're confused about the context of the data</td>
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</table>
Top-Down at An Insurer

Initial Vision
Assemble Core Team
Create Guiding Principles

Workshop 1: Scenario Planning
Workshop 2: Ownership
Workshop 3: Small Controlled Project

Identify Decision-Making Bodies
Determine Governance Stakeholders
Assign Decision Rights

Apply Process
Increasing capabilities

- Data integration, data quality, MDM and data governance are leveraged and designed together
- Move from ETL to ELT: leverage the processing power of the data more effectively and minimize data movement
- Include a more expansive view that includes analytics and decision support

Ad-hoc to strategic

- From a project based mentality to a holistic, enterprise view
- The strategic flow of information across business capabilities and technologies

Reactive to Proactive

- Move from a reactive approach to addressing data needs to a managed and predictive approach to managing information
- Expanding from a limited approach to governance to a comprehensive approach covering the spectrum of decision-making needs
The Maturity Model Approach

Stage 1
- Limited segmentation
- Segmentation confined to marketing
- Basic analysis
- Organization agrees to vision/mission
- Limited e-channel support
- Limited online presence

Stage 2
- Basic segmentation
- Reactive segmentation
- More dynamic analysis
- Partial organizational alignment
- Limited e-channel support
- Limited online presence

Stage 3
- Predictive customer segments
- Proactive segmentation across multiple touchpoints
- Holistic view of customer
- Full organizational alignment
- Multi-channel acquisition and self-service
- Distinct brand established
- Pervasive online presence

End State
- MDM, data integration, and data management services drive customer experience across business processes & channels

Current State
- Limited segmentation
- Basic segmentation
- Limited online presence
- Limited e-channel support

Ability to Execute

Completeness of Vision
“The IT organization needs to dramatically modernize its IT systems, transforming outdated data management infrastructure and replacing it with a more up-to-date and superior information environment.”

- Gartner Hype Cycle for Enterprise Information Management, July 2011
Is business intelligence **dead**?

**The old paradigm:**
- Pre-created canned or ad hoc reporting capabilities
- Limited to the information available at the time in the format provided
- Challenged with latency, flexibility and performance issues
- Doesn’t support predictive modeling or statistical exploration

**The new paradigm:**
- Interactive visual exploration
- Flexibility to explore and share massive amounts of data quickly
## OUR PERSPECTIVE

### Move the process to the data

*Cycle time improvement for logistic regression modeling*

<table>
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<tr>
<th>Organizational Background</th>
<th>Business Challenges</th>
<th>Goal</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly variable selection process used for model development</td>
<td>20gb dataset</td>
<td><strong>Reduce cycle time</strong></td>
<td>Executed PROC HPLOGISTIC in-database procedure and reduced run time to minutes</td>
</tr>
<tr>
<td>Used to identify which characteristics are candidates for modeling</td>
<td>Each modeling group trying to attack the problem in a different way</td>
<td><strong>Standardize process</strong></td>
<td></td>
</tr>
<tr>
<td>Critical first step in any subsequent modeling activity</td>
<td>Process run-time is more than 167 hours and often fails</td>
<td><strong>Bring the process to the data</strong></td>
<td></td>
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</tbody>
</table>
## Organizational Background
- Siloed analytic environments by division
- Mature analytic teams were at overcapacity on their hardware, while other groups were under capacity

## Business Challenges
- Inefficient allocation of computing resources
- Each analytic silo had its own administrative resources
- New teams that wanted access had to buy their own infrastructure (and hire people to manage it)

## Goal
- **Maximize existing investments in hardware**
- **More efficiently allocate computing power where and when needed**
- **Ease of onboarding new business areas**
- **Centralize infrastructure management**

## Outcome
- Grid-enabled SAS allowed them to better share and allocate computing resources where needed
- Cost effective growth of new infrastructure
- Reduced costs in managing the infrastructure
- Better internal customer service

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**US P&C Insurer**
Final Thoughts....

- Insurance analytics are moving beyond pricing
- Your customers are talking – are you listening?
- Big data is coming at you
- Data governance is more important now than ever!
- The infrastructure needed to support this paradigm is evolving
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