

Insuring Against Decision Risk

Harnessing Analytics to Drive Decision-Making in the Insurance Industry

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Abstract

Investing in customer data and analyzing customer behavior have helped companies across different industries improve their bottom-line significantly. However, this practice of data-driven decision making, while somewhat prevalent in the actuarial vertical of the insurance business is rare in the rest of the data rich insurance industry. In the early Nineties, Capital One revolutionized the credit card industry by building its entire business around informed intelligence—collecting customer-driven information, mining the data, and using predictive modeling techniques—to target distinct segments of the market with uniquely designed, relevant products. Other similar success stories include Wal-Mart, Best Buy and Harrah’s—companies that have created repeated successes by investing time, resources, and establishing data-mining to better understand their customers’ needs, and fulfilling them. In contrast, there has been little effort in the insurance industry to leverage the potential of customer information or of the data that it possesses.

We will outline significant areas of opportunity across the customer life-cycle for data mining and predictive modeling in the insurance industry (both Property and Casualty, and Health), and also detail a framework that will help business executives to make informed decisions.

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The Power of Analytics

ANALYTICS AND INFORMATION-DRIVEN DECISIONING HAS allowed companies including Capital One, Wal-Mart, Best Buy, and Harrah's to re-write the rules of their industries and consistently generate superior bottom-line results. An examination of these companies suggests some common themes:

End-to-End Value Creation: These companies have assessed the use of analytics across their entire business model and have focused on areas where maximum value can be captured. For example, some have used micro-segmentation of their customer prospect base and have tailored products to specific segments; while others have used analytics to weed out unprofitable customers; and some others have leveraged analytics to optimize their distribution and sales channel strategy.

Target with the Right Product at the Right Price Using the Right Channel: They have revised significant parts of their business models and have been able to move beyond conventional industry practices in targeting, setting prices, product design or customer and channel management.

Executable Solutions: They have ensured that the back-end “rocket science” analyses finally emerge as simple and actionable business decision rules that the front-line staff can execute upon.

Test and Learn Culture: They have created a fact-based, data-driven company culture by incorporating analytics in almost all decision making.

ALL OF THESE COMPANIES COMPETE IN INDUSTRIES WHERE there is an abundance of customer-level transactional data. Considering insurance companies collect granular data on customers, policies and claims, there is a tremendous upside to investing in analytics: strong bottom-line improvements. This paper will outline a framework of effectively leveraging analytics. It will also address some of the concerns that insurers frequently raise:

- Lack of extensive, horizontal data can render analytics nearly impossible for some companies such as those underwriting specialized commercial insurance risks (e.g., large amusement parks)

Leading companies that used analytics to deliver superior bottom-line results

Company	CapitalOne			Wal-Mart	Best Buy	Harrah's
Analytics Performed	Micro-segmentation of the credit-cards market	Data-driven mapping of customer behavior	Monitoring the performance of its sales agents	Review of the pre-hurricane sales patterns in its Florida stores	Analysis of its customer base from purchasing patterns	Mining data on customers
Learnings	Cluttered market was ripe for innovative products	Common customer problems, preferences, buying patterns	Performance capabilities, and motivational levels of the agents	Comfort foods were most frequently purchased products, apart from emergency goods such as flashlights and batteries	20% of its 500m customer base was “undesirable.”	The “whales” or big spenders contributed to only 20% of revenues
Actions Enabled	Introduced the highly successful “Balance Transfer Program” offering customers low, introductory interest rates	Created a call-transfer system that matches customer's number to the customer's behavior map, and transferred the call to the best-suited service agent	Tailor a customized incentive plan for each of its agents	Stocked the stores with comfort foods soon after the hurricanes waned	Revised its promotional strategies and product stocking in stores to cater to the “valuable” customer base	Changed its loyalty program to target the “non-whales” and tailored promotions to suit intelligence gained from studying the spending patterns
Result	High conversion ratios in the undifferentiated credit card market	Increase in cross-selling products to customer based on behavior maps	High retention of the agents in a market of high attrition	Customers returned to buy more comfort foods	Lower cost of attaining “quality” foot-fall within stores	Higher share of the gaming revenues, up from 36 percent in '97 to 43 percent in '02.

- The highly regulated nature of setting prices may provide little or no pricing flexibility
- Lack of clarity and information about the customer may limit availability of data (for example, in the health insurance segment, the end customer can be the member, the company or the broker)
- Actuaries have already built time-tested pricing models by applying sophisticated statistical tools. Incremental benefit from additional analysis is not clear

based applications to determine the risk level and associated pricing for both its personal and commercial products, Progressive was a pioneer in offering tiered pricing structures for different customer segments. It also believes that there is an opportunity to reduce fraud through data correlation techniques.

Safeco and The Hartford have also begun data mining for pricing their small commercial lines. In early 2003, Safeco rolled out its first automated small commercial underwriting model and plans to implement similar models for business owners,

Inductis Case Study 1:

For a Top 5 health insurer, Inductis created an analytical engine for end-to-end strategic marketing decision support. A thorough analysis of the customer lifecycle revealed that the key focus area should be customer retention, as the company was losing millions of customers every year. By mining through 12 months of history for 19 million customers, Inductis identified the characteristics of members who were unlikely to renew their contracts. We then built predictive models to estimate the likelihood of a member renewing its contract 9 to 12 months prior to the actual renewal date, along with the drivers of this renewal behavior. These models helped the carrier develop a targeted marketing plan to preempt the customer from shopping elsewhere and generate over \$25m in annual pre-tax income.

Inductis Case Study 2:

For a Commercial General Liability line of a large commercial insurer, Inductis was able to demonstrate a 10% lift in predicting loss ratio by appending external commercial credit bureau data.

Analytics in Insurance Today

BEFORE WE TRY TO UNDERSTAND THE FRAMEWORK, IT IS important to remember that analytics is not a new concept to the insurance industry. Actuaries have been using analytics for a long time to underwrite and price policies. For example, underwriting an auto insurance policy requires the actuary to predict the underwriting losses based on a set of attributes of the person and the car (car model and make, age, gender, location of insured), and then to quantify this risk.

Property and Casualty

A few early adopters have been investing heavily in implementing data mining and predictive modeling in both their personal and commercial lines. Progressive was one of the first adopters to apply risk-based pricing to personal auto insurance underwriting in the mid-1990s. Using credit scoring

commercial auto, and workers' compensation lines. The models have been developed in-house to create proprietary correlations between its data and client financial data. Safeco's Combined Ratio has improved by 12.4 points in the first half of 2004 over the same period in 2003 (Safeco's executives would attribute this improvement to their use of analytics in addition to the fact that they witnessed a hard pricing market). The Hartford has used data mining techniques to develop scoring models for small (\$1,000 to \$10,000 policy size) and mid-market commercial lines. It has found that a strong correlation exists between scoring models and profitability for small commercial lines. This is reflected to a significant degree in its 26% growth in premium, during the second quarter of 2004, despite softer market conditions.

Similarly, the re-insurance sector has seen a rise in analytically driven catastrophe modeling, which has resulted in the expansion of the Bermuda

reinsurance market and provided a floor to catastrophe pricing over the past several years.

Health

Ingenix, a subsidiary of United Health insurance, is creating data assets for other health insurers. It houses more than 6 billion health records of 220 million individuals from across the industry. The data collected includes claims, billing data, fraud incidents and prescription history information. Ingenix makes this data anonymous and integrates it in a protected data warehouse. A health insurer can use this data, in conjunction with its internal data, for benchmarking analytics, fraud detection and recovery, claims coding and billing and compliance.

Key Levers for Successful Analytics

1. **Improve Data Collection:** Collect information from all business units within the company, and from external sources like commercial bureaus
2. **Prioritize Analytics across Customer Lifecycle:** Examine use of analytics across the entire customer life cycle: customer acquisition, underwriting, claims servicing and customer management
3. **Build an Analytics Capability:** Develop a capability to continuously collect data, conduct relevant analytics, and create simple actionable decision rules for front line staff to execute upon

Creating a State of the Art Analytics Company

1. Improve Data Collection

In order to truly benefit from robust analytics, insurance companies have to enhance their collection of cross-organizational data on customers. Data needs to be collected from all business units, e.g., finance, marketing, sales, actuarial, etc. In addition to internal data, external data—which has been largely overlooked to date—needs to be integrated as well. Examples of external data include commercial credit data from D&B, consumer credit data from Experian, demographic information from Claritas, or sector-specific data from specialized

data aggregators. For example, an auto insurer may collect a customer's credit score, motor vehicle violation data, and claims history to improve its models. Data un-availability can pose significant problems in conducting appropriate analytics. For some products, there may be so few customers that analytics cannot be applied. This problem is not unique to the insurance industry—even in the Financial Services Industry analytics cannot be leveraged as extensively in the corporate loan market as in the consumer credit business. Sometimes, drawing parallels between other products within the company leads to better underwriting. For example, while underwriting for large companies, parallels from middle market segments may provide effective guidance.

2. Prioritize Analytics across the Customer Life-Cycle

Once the relevant internal and external data has been collected, companies need to identify specific areas for conducting analysis.

a. Customer Acquisition

Traditionally, insurers use multiple channels to acquire customers—the health insurance sector relies mostly on brokers; personal lines rely on direct and broker channels. Companies can harness the power of analytics by using it for the following:

- **Assessing Channel Economics:** Understanding drivers of channel costs, allocating costs across channels, and prioritizing investments across channels
- **Improving Channel Effectiveness:**
 - o **Direct Channels:** Improving effectiveness of marketing techniques, optimizing spend through segmentation, and better understanding of current and prospective customers
 - o **Indirect Channels:** Improving decisions around sales and agent deployment, and analyzing broker incentives and commission schedules
- **Identifying geographies to improve acquisition coverage**
- **Assessing characteristics of high-value customers**

The end result of these analyses should be to generate marketing lists, such as customer and broker prospect lists, cross-sell prospect lists and

broker coverage lists.

b. Underwriting

Experienced underwriters have traditionally used analytics and statistical modeling extensively (e.g., casualty modeling, life expectancy models and claim occurrence models). We believe that there are some areas where we can benefit from improved analytics:

- **Risk Assessment:** Building predictive models to manage the overall risk for the entire portfolio, or an individual product across an industry, product type, or region.
- **Product Pricing:** Once such risk models have been created, it becomes simpler to create pricing tables that are determined by segmenting customers based on their risk and projected cash flows. Some states limit the price that may be charged for a particular type of insurance which can lead to losses on unprofitable customers for the insurer. Analytics can help identify customers that are

profitable, and evaluate the risk of insuring the unprofitable customers. Insurers can approach regulators with facts to support a decision to change the price limits. This type of analysis also helps pricing in a hard market, and adjusting the terms and conditions to ensure that price setting is within acceptable bands.

- **Loss Reserves:** Claims prediction models can help develop appropriate loss reserves which are better aligned to expected needs. This analysis can also encourage an insurance company to negotiate better deals with the credit rating agencies, freeing up capital for deployment elsewhere.
- **Product Design:** The relationship between customer profitability and product features is crucial; models can help determine the best product for a particular customer to maximize profitability, given certain constraints.

c. Claims Servicing

Analytics can be used to improve claims processing

Customer Lifecycle Analytics



in the areas of:

- Identifying and flagging potentially fraudulent claims
- Identifying claims with potential for subrogation
- Identifying customers who are more likely to switch to a less expensive channel (manual processing costs 50 times more than online processing)

d. Customer Management

Segmentation analysis, logistic, and linear regression models can be used to better manage existing customers:

- Identifying characteristic of customers that are profitable and those that are not
- Identifying customers that are likely to attrite

and devising strategies to retain them

- Identifying cross-sell or up-sell opportunities

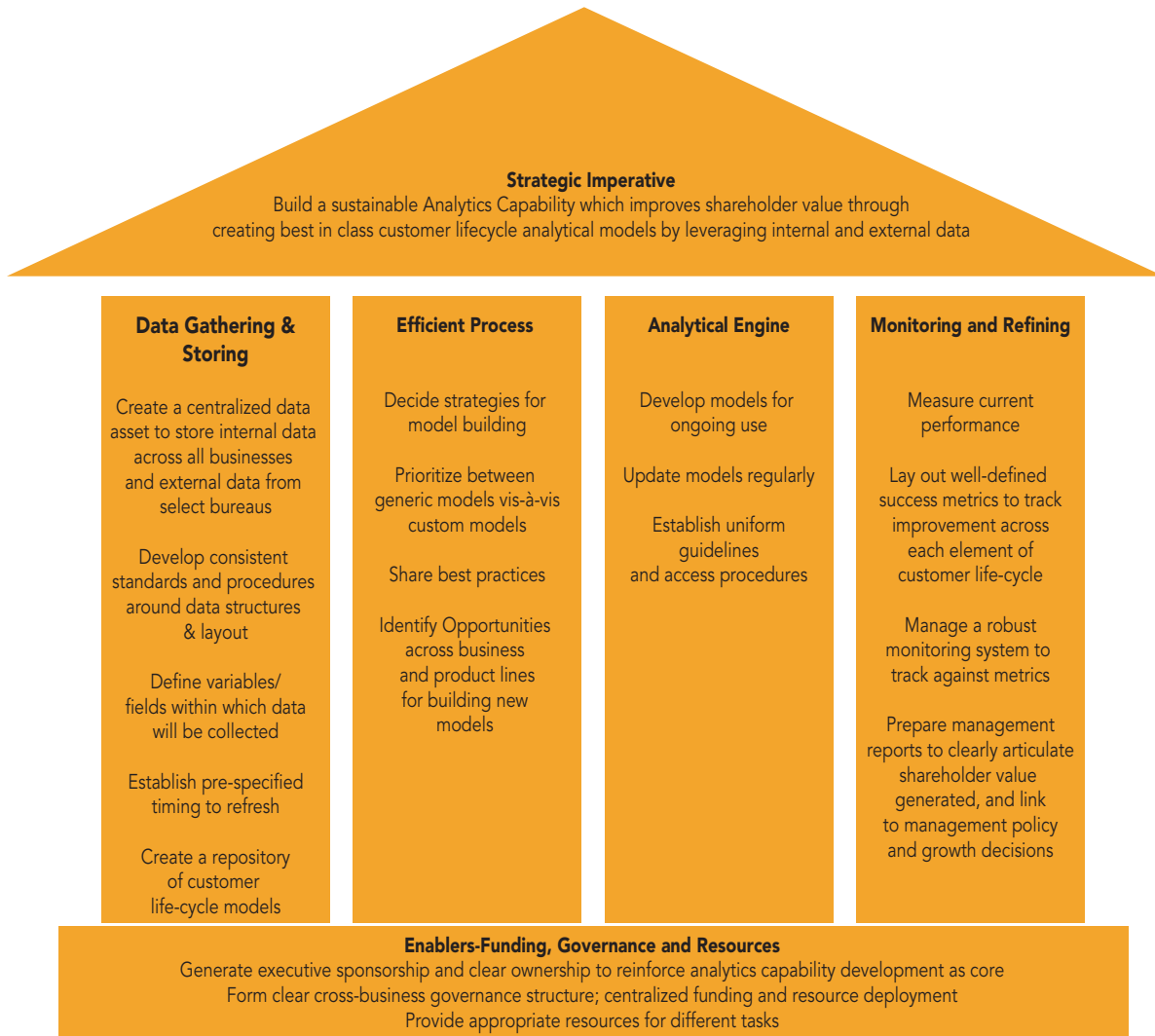
3. Build an Analytics Capability

IN ORDER TO HARNESS THE FULL POTENTIAL OF ANALYTICS across the customer life cycle, significant capabilities must be built. Inductis has developed its industry-specific six-point framework that helps companies to build a robust and holistic analytical capability.

i. Creating a Strategic Imperative

Once the end-to-end customer lifecycle has been analyzed and the key focus area identified, a clear point of arrival vision needs to be developed and communicated widely across the organization to better manage the change.

Dimensions of Building Analytics Capability



ii. Building Data Gathering and Storing Capabilities

In order to capture internal and external data, an insurer will need to link multiple databases (e.g., marketing, broker information, claims history, product details), which is a significant task and appropriate resources need to be deployed. A key lesson to remember is that getting the right data is important to minimize investments in data mining. Many companies have lost millions of dollars in trying to get “all” data, most of which is irrelevant and low value add for analytics required (Pareto’s 80-20 principle applies here as well). For example, when customer level aggregated monthly information will suffice, investing millions of dollars in creating a data asset that stores daily information is not required. In addition to the data asset, a best-in-class IT infrastructure is required to support the analytics. Components of this infrastructure include ultra-high performance servers, ample data storage for growth in data collection, analytical tools (e.g., SAS, SPSS, CART and MARS), availability of high-speed connectivity to all users and Business Intelligence tools to support ongoing reporting.

iii. Outlining Efficient Process for Analytics

For the analytics to be effective and efficient, processes must be defined for the inner workings of the system. Examples of such process include building generic and custom models, and sharing learning and best-in-class practices across the company.

iv. Implementing an Analytical Engine

After data has been properly gathered, cleaned and stored, and an analytics process created, it is necessary to implement the analytical engine. The output of this engine should be simple lists that the front-line staff can act upon. Models need to be also updated to reflect new policies and new data. Guidelines for data/model access and use should be clearly laid out.

v. Monitoring of Results

The fifth foundation of this capability is to implement a process to monitor progress and make appropriate refinements to the engine. To do this, it is vital to choose the appropriate metrics across each element of the customer life cycle, measure performance at regular intervals and compare it to a predefined baseline. An appropriate combination

of both quantitative (e.g., loss ratio, amount cross-sold, customer retention/acquisition) and qualitative metrics (e.g., customer satisfaction, ease of use/implementation of models) should be used. Clear management reporting needs to be developed which tracks progress against baselines and measures shareholder value creation.

vi. Enabling Change: Funding, Governance, and Resources

It is essential to have senior level support, sponsorship, and clear ownership of analytics functions in order to gain organizational traction. The whole process faces significant risk of failure if it is regarded as another “nice-to-have-idea” and treated as a “utility/support” function, and not as a mainstream line function. Funding, setting goals, and employee incentive structures are important. It is imperative that appropriate resources be available to execute the numerous steps in the analytics process. Employees supporting the analytics functions fill the following roles:

- Business Analysts to understand overall objective and strategic imperative, structure/prioritize analytic initiatives and identify new opportunities for the application of analytics
- Modelers to execute analytics and create data asset
- Technology experts to assess and implement infrastructure needs
- Analysts to implement and maintain models

Summary of Learning

SOPHISTICATED ANALYTICS HAS BEEN APPLIED IN MANY industries. The most successful companies have been able to track customer behavior across the customer life cycle and translate that into informed actions. Insurers have an abundance of data across their organizations, but most have not leveraged the full potential of this data in customer acquisition, underwriting, claims servicing and customer management. Insurers need to improve data collection, prioritize the application of analytics across the customer life-cycle, and build an analytics capability to create a sustained culture of data driven decision making and drive shareholder value.