AUGUST 2014

Unleashing the value of advanced analytics in insurance

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Advanced analytics can transform how insurers do business, but realizing its potential requires complex, large-scale organizational changes.

Actuaries using advanced math and financial theory to analyze and understand the costs of risks have been the stalwarts of the insurance business forever. Indeed, the analytics performed by actuaries are critically important to an insurer's continued existence and profitability.

Over the past 15 years, however, revolutionary advances in computing technology and the explosion of new digital data sources have expanded and reinvented the core disciplines of insurers. Today's advanced analytics in insurance push far beyond the boundaries of traditional actuarial science.

Consider how this has affected underwriting in personal auto insurance. Instead of relying only on internal data sources such as loss histories, which was the norm, auto insurers started to incorporate behavior-based credit scores from credit bureaus into their analysis when they became aware of empirical evidence that people who pay their bills on time are also safer drivers. While the use of credit scores in private-auto-insurance underwriting has been a contentious issue for the industry with consumer groups, the addition of behavioral and third-party sources was a significant leap forward from the claims histories, demographics, and physical data that insurers analyzed in the past.[1]

Now a new wave of innovation and applications of advanced analytics is emerging in all types of product lines and business functions. Life insurers and property-and-casualty insurers have lagged behind other financial-services sectors, but they are now catching up in their adoption of predictive and optimization models in business processes such as sales, marketing, and service. The overall effect of these developments will be greater depth and breadth of analytics talent throughout organizations, significant improvements in management processes, and new products that deliver greater value to customers and to society.

While the impetus to invest in analytics has never been greater for insurance companies, the challenges of capturing business value should not be underestimated. Technology, as everyone knows, changes much faster than people. The key for insurers is to motivate their highly skilled experts to adopt the newest tools and use them with creativity, confidence, and consistency.

[1] Chad Hemenway, "Massachusetts law bans credit scoring for auto insurance," PropertyCasualty360, November 30, 2011, propertycasualty360.com.

The next wave of innovation

Historically, competitors achieved significant performance differentiation mainly by combining scale of exposures and underwriting expertise. We are entering a period when this picture will change. In the future, the creative sourcing of data and the distinctiveness of analytics methods will be much greater sources of competitive advantage in insurance. New sources of external data, new tools for underwriting risk, and behavior-influencing data monitoring are the key developments that are shaping up as game changers.

Many new sources of external data

The proliferation of third-party data sources is reducing insurers' dependence on internal data. Digital "data exhaust" from social media and multimedia, smartphones, computers, and other consumer and industrial devices—used within privacy guidelines and assuring anonymity—has become a rich source for behavioral insights for insurance companies, as it has for virtually all businesses. Recently, the release of previously unavailable or inaccessible public-sector data has greatly expanded potential sources of third-party data. The US and UK governments and the European Union have recently launched "open data" websites to make available massive amounts of government statistics, including health, education, worker-safety, and energy data, among others.

With much better access to third-party data from a wide variety of sources, insurers can pose new questions and better understand many different types of risks. For example, which combination of geodemographic factors and treatment options will have the biggest impact on the life expectancies of people with Parkinson's disease? Which combination of corporate behaviors in health and safety management is predictive of lower worker-compensation claims? What is the probability that, within a given geographic radius, a person will die from a car accident or lose his or her house in a flood?

New tools to underwrite new risks

Millions of dollars of venture-capital investment in innovative analytics vendors specializing in insurance applications are spawning the development of new and more sophisticated tools. For instance, one vendor has developed a new health-risk model by blending best-in-class actuarial data with medical science, demographic trends, and government data. This forward- and backward-looking tool for modeling longevity risk captures data from traditional mortality tables and adds data on medical advances and emerging lifestyle trends such as less smoking, more exercise, and healthier diets. Innovations in analytics modeling will also enable carriers to underwrite many other emerging risks that are underinsured, including those related to cybersecurity and industry-wide business interruption stemming from natural disasters.

Real-time data monitoring that influences behavior

Real-time monitoring and visualization is fundamentally changing the relationship of insurers and the insured. By agreeing to let insurance companies monitor their behavior, customers can learn more about themselves, and insurance companies can leverage the data to influence behaviors. In auto insurance, for example, telematics are being used to monitor in real time the driving habits of the insured and then send data back to the insurer. There is already evidence that this is influencing drivers and changing their driving habits for the better. One UK insurance company using telematics reported that better driving habits resulted in a 30 percent reduction in the number of claims; another UK insurer similarly used telematics to help a large client reduce accident-causing risky driving maneuvers by 53 percent.[2]

A framework for success

While more data, better tools, and new applications are creating opportunity in the insurance industry, to adapt and thrive in this emerging world of advanced analytics, insurers need to manage complex and large-scale organizational change.

Early investments in analytics were largely managed as IT projects. Now more companies are shifting their attention to people and management processes. Involved are the work habits and processes of thousands of highly skilled managers, many of whom have been working for decades without analytics-driven decision tools. Any habit is hard to change, and such habits are a factor whenever automated systems are introduced to support human judgment.

Whether an insurer begins a process transformation with small-scale experiments or dives in on a larger scale, the deployment of advanced analytics in a decision process is a complex undertaking demanding a thoughtful approach in several dimensions. We believe that a viable framework for such a transformation involves five interdependent components, each of which adds distinctive characteristics (exhibit). We begin with the source of value, accordingly derive the needed data ecosystem and the modeling insights, and then move into the two transformative dimensions: work-flow integration and adoption.

1. The source of business value

Every analytics project should start by identifying the business value that can lead to revenue growth and increased profitability (for example, selecting customers, controlling operating expenses, lowering risk, or improving pricing). To make the selection, business-unit managers and the frontline functional managers who will be using the tools need jointly to define the business problem and the value of the analytics. Analytics teams often begin building models before users in sales, underwriting, claims, and customer service provide their input.

[2] Natasha Lomas, "Ditched pay-as-you-drive insurance set for revival?," ZDNet, October 6, 2008, zdnet.com; and "Sullivan Buses selects GreenRoad to cut accident rate, reduce insurance risk," GreenRoad, October 5, 2009, greenroad.com.

Exhibit   The five-component framework can lead to success in advanced analytics.
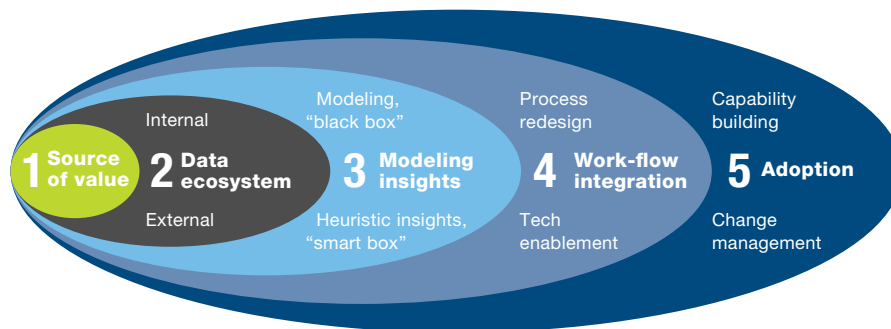
2. The data ecosystem

It is not enough for analytics teams to be "builders" of models. These advanced-analytics experts also need to be "architects" and "general contractors" who can quickly assess what resources are available inside and outside the company. Unlocking the business potential of advanced analytics often requires the integration of numerous internal and external data assets. For instance, risk pricing and selection often can be improved significantly by mapping the data from internal customer-management systems with traditional third-party data providers such as credit bureaus and data exhaust from new digital sources. Given the diversity of data sources and vendors, carriers must continually scan the ecosystem for technologies and partners to take full advantage of new analytical opportunities.

3. Modeling insights

Building a robust predictive model has many layers: identifying and clarifying the business problem and source of value, creatively incorporating the business insights of everyone with an informed opinion about the problem and the outcome, reducing the complexity of the solution path, and validating the model with data.

Close collaboration among the analytics professionals who build the models and the functional decision makers who use them combines a "black box" data-modeling process (pure statistical analyses of large amounts of data) and a "smart box" filled with the knowledge of experienced practitioners. Experienced claims adjusters, for instance, have an intuitive sense about which injuries have the highest probability of escalating. Often, a hypothesis based on judgment still needs to be validated against external data. Data from claims histories will not reveal that employee relations with management or the commuting time between home and the workplace can also be factors in how long claimants stay away.

4. Transformation: Work-flow integration

The goal is always to design the integration of new decision-support tools to be as simple and user friendly as possible. The way analytics are deployed depends on how the work is done. A key issue is to determine the appropriate level of automation. A high-volume, low-value decision process lends itself to automation. A centralized underwriting group, for example, which had manually reviewed thousands of insurance-policy applications, needed only to review 1 percent of them after they adopted a rules engine. At the other end of the spectrum, automation can never replace the expertise and judgment of managers handling multimillion-dollar commercial accounts.

Integrating a new decision-support tool into a work flow can pose significant behavioral challenges. One insurer in commercial- and specialty-insurance lines tested three different ways to display information—a numerical score, a letter grade, and colored flags—to see which one led to the highest adoption and most accurate results. This kind of detail might seem minor, but such choices determine whether a decision maker uses a model or ignores it. Claims adjusters, underwriters, and call-center representatives will only incorporate analytics into their decisions if the tools address the issues in ways that make sense to them and if it is easy to integrate the tools into their work flow.

5. Transformation: Adoption

Successful adoption requires employees to accept and trust the tools, understand how they work, and use them consistently. That is why managing the adoption phase well is critical to achieving optimal analytics impact. All the right steps can be made to this point, but if frontline decision makers do not use the analytics the way they are intended to be used, the value to the business evaporates.

An insurance carrier developed a model to predict which injury claims would escalate based on the conditions and circumstances of the claimants. The system provided claims adjusters with different ways to work with claimants to help them with their recovery. The model was painstakingly constructed and efficacious, but getting adjusters to use the model proved as difficult as constructing the model itself. Successful adoption requires collaboration up front, follow-up communication as to the model's value, and investment in training people to use it. Equally important, the heads of sales, underwriting, and claims need to be engaged so that their visions of success and expected results are built into their business plans. Business leadership is needed to ensure that all players are asking the right questions: What does successful adoption look like? Where will it have the most impact?

A center of excellence

In any major change effort, there is value in starting small and experimenting in order to learn what will work in a given company. Several companies achieved success by forming a small team that demonstrated to specific user groups the impact of analytics in two or three use cases.

Building an advanced-analytics center of excellence

Creating an internal analytics center of excellence is part of building a world-class organizational capability in analytics. These are the essentials:

Multidisciplinary leadership. The leading body of a center of excellence should be composed of business, information-technology, and analytics leaders. The center will need someone to work with business units to identify and articulate problems, as well as someone who can work with modelers to find the right approaches. Today, a few insurers have hired people with titles such as chief decision scientist and chief data officer to head new departments of digitally savvy experts. These roles will become more common, but finding individuals with the desired combination of technical skills and business-leadership experience will not be easy (by 2018, global demand for technical and managerial talent will exceed supply by 50 to 60 percent[1]).

Technology oversight. Companies usually start this journey without user controls for data quality and with a limited technology infrastructure. An internal center of excellence can help to identify the data elements and technology requirements, addressing questions such as these: What technology infrastructure is required to source and store data? What kinds of analytical and visualization tools are needed?

External partnerships. The "data ecosystem" is best sourced by those with direct experience in external relations and partner development. The designated individual or team would be responsible for scanning the landscape of third-party data and analytics vendors, evaluating offerings, and identifying opportunities to lock in high-value proprietary relationships.

Culture change. A fully developed data-driven or analytics culture can be defined as one where science-based, rigorous data-driven decision making is the norm throughout the organization. Achieving such a culture involves education and the introduction of different performance metrics. Insurance companies beginning their analytics journey might start by asking whether they should create one center of excellence or embed multiple centers in the businesses.

[1] Based on data from Dun & Bradstreet, the US Bureau of Labor Statistics, and the US Census, as well as McKinsey Global Institute analysis.

The advantages of this approach are that it builds conviction and provides insights into what works and what does not. It also helps expose business needs and build an understanding of how a centralized analytics group might help meet them. Where should analysts and data scientists reside? Where should data management reside? How should the business be supported with work-flow integration and adoption? These questions can be best explored by an internal analytics center of excellence (see sidebar, "Building an advanced-analytics center of excellence").

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Weaving analytics into the fabric of an organization is a journey. Every organization will progress at its own pace, from fragmented beginnings to emerging influence to world-class corporate capability. As participants gain experience, pilots help shape an operating model for future rollouts. In the discipline of analytics, the more testing that is performed, learning that is achieved, and new data and knowledge that is applied within the organization, the better the decisions and the outcomes will be.

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