The advance of analytics

Harnessing the potential of burgeoning data and computer power to add value must become ingrained in insurers' every activity.

The use of data and analytics to underwrite risk is nothing new for insurance carriers. Yet in a digital world, it is revolutionizing their business. An industry in which 80 percent of all auto insurance claims are adjudicated automatically, and 80 percent of all life insurance policies are issued straight through without requiring any of the usual health checks, is no distant pipe dream. Neither is one in which the cost of acquiring a customer falls by as much as 70 percent because of precision marketing and personalization. Such is the power of analytics.

The convergence of several technology trends is behind this revolution. The volume of data continues to double every three years as information pours in from digital platforms, wireless sensors, virtual reality applications, and billions of mobile phones. Data storage capacity has increased, while its cost has plummeted. And data scientists now have unprecedented computing power at their disposal, giving birth to ever more sophisticated algorithms. As a result machine and deep learning are on the horizon (see box, "Analyzing analytics"). "We're moving from computer science, where computer coders write very explicit, line-by-line instructions, toward starting to train machines to look for information that could be valuable," says Scott Simony, head of industry at Google.

Yet data and technology alone do not deliver value, as too many companies have discovered to their cost. While some are seeing good results, others admit they have seen little effect to date from their investments in analytics.[1]

> We only have to glance at other industries to understand how powerful new competitors with large customer bases can rapidly invade other sectors.

It is important that this changes quickly, as those slow to adopt the technology at scale will surely struggle to compete. They will struggle against other insurers that use analytics to improve their core business by streamlining internal processes, raising revenue and cutting costs in the process. And they will struggle in the longer term as data and its analysis begin to break down business models and industry boundaries. In personal auto insurance, we can already see how data from sensors fitted to vehicles will put premiums under pressure as driving becomes safer. And we only have to glance at other industries to understand how, in a world in which data and analytics are king, powerful new competitors with large customer bases for

1 See "The age of analytics: Competing in a data-driven world," McKinsey.com.

Exhibit

Analytics at work in claims management

1 Case evaluation

OVERVIEW

- Advanced analytics enables carriers to use historical data to create robust data sets
- The data sets identify patterns in case characteristics (accident details, vehicle type, presence of bodily injury) that offer predictive markers that can be used to identify similar cases
- Once these markers have been defined, carriers can apply them to incoming cases to guide handling

ANALYTICS USE CASES	MAIN IMPACT
Fraud prediction	Claims costs
Total loss prediction	Handling costs
Litigation prediction	Claims costs
Severity prediction for BI cases	Claims costs

2 Case segmentation

OVERVIEW

Using the insights from case evaluation, carriers can determine a subset of cases ideal for straight-through processing vs. those that require specialized processing. Those requiring specialized attention are assigned to claims handlers (for example, by complexity)

ANALYTICS USE CASES	MAIN IMPACT
Identification of straight-through processing cases	Handling costs
Assignment of cases to handler units	Handling costs

3 Case management

OVERVIEW

The outputs of case evaluation also enable automation of case steering, so that carriers can direct customers to preferred garage networks to repair their vehicle, for example, or use an app to make self-service claims

ANALYTICS USE CASES	MAIN IMPACT
Prediction of success in case steering	Claims costs
Medical treatment	Claims costs
Reserve prediction	Claims costs

their core businesses can rapidly invade other sectors. Chinese e-commerce giant Alibaba also owns one of the world's largest technology finance companies, which include among its services insurance.

Here then, is how companies can move quickly to build their analytics muscle across the organization, avoiding common problems and ensuring their investments translate into business value. There are four phases.

Phase one: Building insights

The starting point is to be clear about how analytics can deliver insights and add value, and choose the use cases that will demonstrate this. Too often, companies give scant thought to the business problem they are trying to solve, instead getting carried away with refining data, gleaning perfect insights, or investing heavily in technology infrastructure. The exhibit shows how analytics can be put to work in claims management.

It is also important to understand what analytics can and cannot do. It cannot, for example, predict outcomes with pinpoint accuracy, particularly in low-frequency, high-severity, or shock-prone lines of business. For instance, the market for directors and officers liability insurance endured waves of litigation over the past decade—and subsequent spikes in claims—resulting from events such as the financial crisis and new regulations governing options backdating. It would have been difficult to predict any of these events with analytics.

Some life insurers are using social network and geographical data to reduce fraud by up to 25 percent.

But their use can significantly improve predictive capabilities, unearthing insights upon which carriers can act. Some auto insurers now use credit scores to assess risk more accurately, analytics having revealed that people who pay their bills on time tend to be safer drivers. Some life insurers are using social network and geographical data to reduce fraud by up to 25 percent. And some companies are using data on insurance agents—their behavior, previous sales, regional location, and training undertaken—to predict how likely each one is to sell multiple products, and which specific products they would be most successful at selling, leading to a 20 to 25 percent increase in sales. As machine learning technology develops, it will be applied not only to predicting events and forecasting outcomes, but also to classification (including identifying images or making associations between data) and generation (from interpolating missing data to generating the next frame in a video sequence, for example).

Mining internal and external data

In some cases, organizations struggle to develop convincing use cases because data quality is poor. Many cannot yet

master their internal data, which remains disaggregated, unstructured, and generally underused, requiring substantial effort to be brought into working condition.

Leading organizations find ways to make sure the businesses work alongside the analytics function, and involve top management.

Accomplishing this should perhaps be a priority before a company begins mining external data. An additional challenge is to collect, integrate, and analyze unstructured data such as web content, network data, images, text, and audio and video recordings.

Many incumbents struggle with switching from legacy data systems to a nimbler and more flexible architecture to store and harness big data (whether from internal or external sources). But capturing the potential of analytics hinges on it. At the outset, companies should bear in mind the business case they are making, and that the very latest technology and significant upfront investment are not always needed. Before long, though, changes to IT architectures are likely to be required. These include establishing a master data-management system that gives a consolidated view of all data, in particular customer and product data, and the deployment of big data and analytics systems that integrate data sources and provide platforms to generate value-creating insights via predictive models or machine learning.

Phase 2: Capturing value

Here the focus shifts from proof of concept to adoption, the goal being for the businesses to lead demand for analytics. That is unlikely to happen unless the front line is involved from the outset and performance measurements are chosen carefully.

Involving the front line

When companies falter in their use of analytics it is often because the old way of working still prevails: that is, build a model (often based on unclear assumptions about the variables that have most predictive impact on the outcome) and roll it out, regardless of whether people on the front line understand precisely how to apply it. They might not know, for example, whether the model's recommendation is binding or if there is flexibility to deviate from it. Not surprisingly, efforts at adoption can meet resistance.

Instead, front-line employees need to be involved at each stage of the development process, from establishing the business case to deciding what data to draw upon,

Analyzing analytics

Analytics has emerged from four trends. First is the exponential growth in data that a digital world enables, including structured data that is machine readable and easily loaded into databases and queried, and unstructured data such as video, text, social media, and employee emails that is harder to collect, analyze, and process. In the past 18 months alone, more data has been generated globally than in the entire previous history of mankind. In the next five years, the amount generated will be three times more than has been cumulatively generated to date.

The second trend relates to revolutionary advances in computer technology and to analytics techniques, such as machine learning, that rely on automated, computer program-driven pattern recognition. These techniques are far more predictive than generalized linear modeling. With machine learning, algorithms "learn" from data and adapt to new circumstances without being explicitly reprogrammed. The concept is to give the algorithm "experiences" (training data) and a generalized strategy for learning, then let the algorithm identify patterns, associations, and insights from the data—in short, to train the system rather than program it.

Deep learning, a frontier area of research within machine learning, uses neural networks with many layers (hence the label "deep") to push the boundaries of machine capabilities. Data scientists working in this field have recently made breakthroughs that enable machines to recognize objects and faces, to beat humans in challenging games such as chess and Go, and even to generate natural language. Digital giants such as Google, Facebook, Intel, and Baidu, as well as industrial companies such as GE, are leading the way in these innovations, seeing machine learning as fundamental to their core business and strategy.

The third trend is the shift from batch processing to real-time processing, monitoring, and visualization of data feeds. This trend will continue to change the behavior of the insured and affect the operations of many core insurance functions such as underwriting and pricing, claims, billing, and customer relationship management.

Finally, flowing from all this, is a complex ecosystem of new analytics vendors and solutions that enable carriers to combine data sources, external insights, and advanced modeling techniques in order to glean insights that were not possible before.

how to integrate the output into working patterns, and what new skills might be needed. One large insurance carrier saw a 30 percent increase in adoption rates when front-line employees joined a cross-functional team engaged in defining use cases. They participated in workshops to define hypotheses on the variables with most predictive power, worked on understanding and refining modeling output, and finally integrated the output with the business process.

The integration element is particularly important and often particularly challenging, given that it involves a significant shift of mind-set away from the old method of working. How will data that reveals insights be presented? It is no point sending quantities of it to the person required to use it. Carriers will need to be creative so that data is in a form that is self-explanatory and prescriptive. It is also important that analytics becomes part of the work process, rather than being an additional, separate task that busy people are unlikely to complete. Better that it be integrated directly into core tools being used for, say, customer relationship management and pricing.

Performance management

Early on, organizations are understandably keen to see a return on their investments. But too much focus on certain metrics can impede progress. It is hard, for example, to isolate the financial impact of an analytics initiative from that of other business initiatives such as efforts to improve customer retention based on digital marketing or strategic projects—and trying to do so can become an exercise in false precision. Diligently tracking the impact of use cases in terms of their adoption and satisfaction might prove a better measure of early progress, as well as an indication of when version 2.0 or 3.0 is needed. Comparing outcomes for those who use the new models and those who do not is also a helpful gauge.

> The end-state is one in which analytics shifts from being regarded as a business aid to being seen as a capability that sits at the core of the way business is conducted.

Phase 3: Achieving scale

The application of analytics often begins within the pricing and underwriting functions. Employees here are relatively accustomed to modeling and data-driven analyses, and the potential to improve previous practices should be clear—be it by finding new variables, exploring new modeling techniques, or further automating processes. Eventually, however, it needs to be deployed in all businesses and functions. To reach that point efficiently, leading organizations use heat maps that indicate where to

prioritize efforts. They also find ways to make sure the businesses work alongside the analytics function, and involve top management.

Prioritization

The heat map should be drawn up on the basis of three dimensions: the value that analytics can deliver, their feasibility (drawing on a large number of different systems to collect data will make it harder to capture value from a use case, for example), and strategic relevance. Importantly, the map needs to be updated at least once a year to align with changing strategic priorities and feasibility based on the technology and data lessons learned in the previous year.

Balancing business engagement with a strong analytics function

As carriers master the execution of use cases, so a permanent center of excellence (CoE) needs to take shape to support the businesses. Carriers can wrestle with how best to position the CoE. Should it be autonomous with its own reporting and profit-and-loss statements? Or should it function as an on-demand resource? The advantage of the former is that the CoE is likely to be more proactive in developing analytics initiatives across the organization and more accountable for their success. The latter has the advantage of more closely aligning the CoE with the businesses' agenda.

The best approach probably lies somewhere between the two, making sure there is strong business and analytics leadership. Whatever structure chosen, companies need a CoE with teeth to come up with ideas and recommendations, as well as businesses and domains that shape and approve the CoE's agenda and the costs allocated to it.

Direct involvement of top management

As the CoE scales up, senior management needs to make clear that analytics is a corporate priority, paying close attention to the portfolio of initiatives and understanding how it will achieve impact. To promote take-up, executives can encourage line leaders to contribute to the pipeline of analytics ideas as part of the annual planning process. And, while understanding that returns on investment might not be obvious within the first few quarters, executives can highlight

> An industry in which 80% of all auto insurance claims are adjudicated automatically, and 80% of all life insurance policies are issued straight through without requiring any of the usual health checks, is no distant pipe dream.

quick wins and celebrate successes that will prove the concept and maintain momentum.

Phase 4: The analytics-driven organization

The end-state is one in which analytics shifts from being regarded as a business aid to being seen as a capability that sits at the core of the way business is conducted. Indeed, it will become so ingrained in daily work practices that the CoE is made redundant. Various functions—claims, distribution, underwriting—might still exist, since the practical activities and the skills required for them differ. But the core decision-making and the analytics engine that supports decisions are likely to converge at a single point. When that point is reached, all business and strategy decisions are made with data and analytics at their center.

At this stage it will make no sense to measure success by returns on investment. The business metrics themselves become the markers of success, be it price adequacy or loss, expense and combined ratios, or the quality of new-business growth. In addition, analytics will firmly shape the organization's talent strategy, becoming an integral part of multiple roles.

▼ ▼ ▼

While most carriers have taken up analytics, they have barely begun to tap its potential. Yet the intensity of competition and the use cases emerging dictate that gradual improvement is no longer an option. Analytics will soon become a core corporate capability, and those carriers that leap ahead and bring it to insurance are likely to capture an unrivaled competitive advantage. ▢

Ramnath Balasubramanian is a partner in McKinsey's New York office, where **Khushpreet Kaur** is an associate partner and **Ari Libarikian** is a senior partner. **Paolo Moretti** is a senior partner in the Milan office.