The future of insurance

How big data and cognitive computing are transforming the industry
Today, two major factors are poised to change the insurance industry in a way it hasn’t seen in more than 50 years—emerging capabilities enabled by cognitive computing and big data, and an empowered consumer. We are starting to get a glimpse of the possibilities these trends hold, as well as the challenges they represent. To understand their full impact on the future of the insurance industry, we need to look at the past to understand how paradigm shifts in the insurance industry follow paradigm shifts in the underlying computing technology. If history is any indication, these technologies will usher in a new paradigm for the insurance industry.
As tabulating machines first appeared around the turn of the last century, Prudential Insurance became an early adopter. Prudential quickly distanced itself from its competitors by embracing this technology, to the point that the competition had to change to keep up. The result? A new paradigm for the industry, enabled by a fundamental shift in the available technology.

Programmable machines appeared almost 50 years later, and the insurance industry was one of the first to capitalize on the value of this technology. Programmable technology supported more sophisticated modeling of risk and enabled the introduction of personalized rating factors. This allowed carriers to offer products that could be personalized, resulting in the business model still followed today.

As the programmable systems era evolved and the technology improved, companies became more efficient—but the fundamental business model paradigm has not changed. The industry is still product-centric with personalized variations that determine premiums and coverage.

The current approach of personalizing products and covering very discrete risks for fixed periods of time has become so ingrained that it is hard to think of alternatives. But these are also the limitations of the programmable-logic-based compute technology: advances in programmable systems allow insurance providers to calculate rates more quickly, but rates are ultimately still derived from a product-centric structure.

Tabulating machines enabled mass production and programmable machines enabled mass customization. Cognitive computing will enable truly personalized offerings.

Cognitive computing and the next paradigm shift

In January 2011, cutting-edge cognitive computing made a dramatic public premiere when the IBM Watson™ supercomputer competed—and defeated—the best of the best on the Jeopardy! television game show.

In the formative years of the insurance industry, experienced underwriters looked at each risk uniquely and priced insurance accordingly based on reasoning, judgment and past experiences. But underwriters couldn’t scale, so the industry embraced technology to help compute a rate—but in the process, it simplified the assumptions. The programmable systems era allowed for scale, but only on very structured terms.

Cognitive computing will allow underwriters to underwrite like their forebears—by evaluating the unique risks of each customer as opposed to aligning risk to a defined product. And this work can happen in real time based on knowledge of the customer, past experiences and future predictions—at great scale.

This defines a paradigm shift to a customer-centric approach to insurance. Each customer presents their own unique risk profile. Insurers will be able to assess profiles at the customer level instead of assessing abstract personal attributes and relating them back to a rigidly defined product model.

Entering the cognitive computing era

The cognitive computing era reaches past 2015 and is likely to have the greatest impact on three areas:

• Commercial underwriting
• Claims fraud
• Reinsurance optimization
Cognitive computers have the ability to do what the earliest underwriters did: approach each risk individually and, based on historical learning, apply reason and judgment to determine a rate. Going forward, logic will no longer be dictated strictly by lines of code. Cognitive computing allows insurers to analyze massive amounts of unstructured and structured information in real time, formulate thousands of hypotheses, test for the best hypothesis, determine an optimal outcome and learn from the results. As demonstrated by Watson, this can be done in milliseconds.

Ultimately, this presents a new computing model that will allow insurers to create a truly personalized and customer-centric product. The new era of cognitive computing has the potential to transform the insurance industry.

**Challenging the status quo to get more from big data**

The promise of cognitive computing can only be realized through the power and promise of big data. While affordable cognitive computing may be a few years away, the big data technology that will enable this shift is available now and can be used with traditional technology to achieve better business outcomes today.

While big data presents a great opportunity, it also poses challenges. To develop strategies that capitalize on the potential gold mine of information that big data represents, many carriers will have to challenge their data-centric, business-as-usual approach and the traditional principles that form the foundation of the industry.

**Data as a natural resource**

According to IBM CEO Ginni Rometty, data is “a vast new natural resource.” Organizations that do a better job finding, extracting and refining data resources to produce insight will gain competitive advantage.

Historically, data was an asset to be collected, stored and maintained as a differentiating advantage—but today, simply having data is no longer an unqualified benefit. Data is abundant in volume and variety (see Figure 2). Some data is static while other data is dynamic. Some data is trusted, and some data isn’t. With so much data available to anyone with the skills to find and harvest it, the real benefits of big data are available only to organizations with the capability to discern patterns and distill actionable business intelligence.

As an example, consider a recent pilot program to measure the impact of movie trailers during the 2012 Super Bowl. Over the course of the event, IBM found and “extracted” more than a billion tweets, blog posts and social media messages during the Super Bowl telecast. From these, more than 100,000 relevant messages and tweets pertaining to the topics in question were refined to provide insight on the performance of the trailers.

Using the refined data, IBM produced more than 20 analytical views of sentiment, conversations, influencers, sharing behavior and more—in real time—to provide meaningful insight on the potential success of the target film. The insight suggested that the film would fail at the box office. And the insight was correct.

Imagine the significant cost and time savings if a movie studio could test the performance of a trailer before entering full production. The resulting competitive advantage could change the way films are made, radically altering the risk inherent to the industry—the definition of a paradigm shift.

**Embrace uncertainty**

Beyond volume, velocity and variety, there is a fourth dimension for data: veracity, or the trustworthiness of data. Many insurance companies believe that all data used to produce insight must be cleansed and polished in a warehouse before it can be used.
According to IBM Research, by 2015 a majority of data will be unstructured and uncertain. Part of this is due to increases in social media traffic and networked devices with sensors, both of which represent uncertain data sources. As the amount of unstructured and uncertain data rises, attempts to structure and cleanse all of it before it can be used will create serious bottlenecks for insurance providers and limit the usefulness of the data.

**Making sense**
The notion of “making sense” is a profound and complex problem. In creating the first scalable cognitive computing machine in Watson, IBM engineers could never structure the data to support every question. Similarly, it would be impossible to program a computer to answer any question that might be asked of an underwriter.

A better approach: make better sense out of the data. Break the question down into parts, form hypotheses and test them until a degree of confidence is gained.

Today we assume that the more data we have, the longer it takes to find an answer. But with computing technologies that focus on making sense of data, a larger volume of data can actually speed up the process of finding answers.

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**Figure 2**: The explosion of modern data happens along four key vectors.
Jeff Jonas, IBM Fellow and chief scientist for IBM Entity Analytics, has worked to show that the more data you have, the faster you can generate a result; like a jigsaw puzzle, as more pieces are connected, it gets faster to place the next one (see Figure 3). With enough data and computing technologies designed to make sense of that data, pieces more easily fall into place. So if an insurance provider found a criminal committing fraud, the relevant data can identify other relevant data to identify others connected to the criminal and similar cases that match the same profile.

**Discovery versus requirements**

In today’s world, companies figure out the questions they want to answer, and then pass data requirements to IT to build into a system, warehouse or data mart. When data was considered a precious resource, IT became a de facto gatekeeper, limiting agility and timeliness in exchange for “protecting” the asset.

Shifting the paradigm means empowering and enabling the business to discover data rather than constraining it by requiring line-of-business (LOB) personnel to go through IT to request data. Going forward, IT will need to relax control over non-regulatory data and provide business users with a rich provisioning platform to explore all sources of data—internal and external—to not only answer existing questions, but also to raise new queries based on those answers.

This will likely create a new role: LOB data provisioners. These are power users who know what you are trying to accomplish, have an uncanny ability to anticipate needs, and can find, extract and refine data from any source. IT alone will not be able to keep up with the breadth and depth of this new natural resource. Your organization will need a new skill set to take advantage of your data, and those users will need a new set of tools.

**More data is faster data**

![Figure 3: A better assessment of the data around and connected to a single piece of information enables a more complete, in-context understanding.](image)

**Culture change: Discovery versus control**

While the traditional approach to managing queries and data can achieve speed through structure, the big data approach embraces the flexibility to answer more complex and insightful queries.

**Traditional approach**
- Characterized by structured and repeatable analysis
- Business users determine what questions to ask
- IT structures the data to answer the questions
- Sample analysis: monthly sales reports, profitability analysis, customer surveys

**Big data approach**
- Characterized by iterative and exploratory analysis
- IT delivers a platform to enable creative discovery
- Business users adopt the platform to explore what questions could be asked
- Sample analysis: Brand sentiment, product strategy, maximum asset utilization
A paradigm shift that leads to Smarter Insurance

Cognitive computing—enabled by big data—will create a new paradigm for insurance that starts with the customer instead of a product, modeling the risks that each unique customer faces and matching them with the right coverage and price.

IBM calls this customer-centric approach Smarter Insurance. In this model, insurers attract customers instead of selling to them; they provide protection to their customers against the unexpected instead of just issuing policies; they serve customers by preventing claims rather than just paying for them; and they optimize the business with insight instead of just managing it with instinct.

Three steps for embracing customer-centric insurance

- Secure a briefing on “The Future of Insurance” as enabled by cognitive computing, big data and the empowered customer
- Develop a business roadmap that incorporates advances in the compute paradigm and leverages data as a natural resource
- Engage in a customer-centric pilot to discover information about your customers that you don’t already know

Find out more about how you can get started by visiting ibm.com/big-data/insurance

The IBM platform for big data

IBM is unique in having developed an enterprise-class big data platform that blends traditional technologies that are well suited for structured, repeatable tasks with complementary new technologies that address speed and flexibility and are ideal for ad hoc data exploration, discovery and unstructured analysis. The analytics are placed as close as possible to the big data sources to cost-effectively manage and analyze the data in its native format—whether unstructured, structured or streaming.

With the IBM® Big Data Platform, you can start small with just a single project using one big data analytics capability and easily add others over time.

Key components include:

- **IBM InfoSphere® Data Explorer**: Discovery and navigation software (previously known as the Vivisimo® Velocity™ Platform) that provides real-time access and fusion of big data with rich and varied data from enterprise applications for greater insight and ROI.
- **IBM InfoSphere BigInsights™**: An enterprise-ready Apache Hadoop–based system with sophisticated text analytics, visualization, performance, security and administrative features for managing and analyzing massive volumes of structured and unstructured data.
- **IBM InfoSphere Streams**: In-motion streaming analytics software that enables continuous analysis of massive volumes of streaming data with sub-millisecond response times, helping to improve your organization’s level of insight and decision making, as well as promoting real-time response to events as they happen.
- **IBM PureData™ System for Analytics**: The PureData System for Analytics, powered by IBM Netezza® technology, is a simple data appliance for serious analytics. It simplifies and optimizes performance of data services for analytic applications, enabling very complex algorithms to run in minutes not hours.
• **IBM InfoSphere Warehouse**: Comprehensive data warehouse software platform that delivers access to structured and unstructured information in real time; supports operational analytics and applications with up-to-the-minute insights.

• **IBM InfoSphere Information Server**: A complete collection of data integration and data quality capabilities that help ensure delivery of trusted information; enables organizations to understand, cleanse, transform and deliver trusted information to critical business initiatives by integrating big data across enterprise IT systems.

• **IBM InfoSphere Master Data Management**: Creates trusted views of master data about customers, products and more, and provides a centralized data source that promotes accuracy and data quality to help improve your applications and business processes.

Not all of these tools are required for every big data installation, but they cover the spectrum of potential needs for most insurers.

**For more information**
To learn more about IBM cognitive computing and big data technologies, please contact your IBM representative or IBM Business Partner, or visit:

- [www.ibmbigdatahub.com](http://www.ibmbigdatahub.com)
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