

Analytics: The real-world use of big data in insurance

*How innovative insurance organizations extract value from
uncertain data*



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Saïd Business School at the University of Oxford

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By Peter Corbett, Michael Schroeck and Rebecca Shockley

“Big data” – which admittedly means many things to many people – is no longer confined to the realm of technology. Today, it is a business imperative. In addition to providing solutions to insurance companies’ long-standing business challenges, big data inspires new ways to transform processes, organizations and many aspects of the insurance industry as we know it.

Our newest global research study, “Analytics: The real-world use of big data,” finds that insurance executives are recognizing the opportunities associated with big data.¹ But despite what seems like unrelenting media attention, it can be hard to find in-depth information on what insurance organizations are really doing with regard to big data. In this industry deep dive, we will examine how insurance industry respondents from around the world view big data – and to what extent they are currently using it to benefit their businesses. The IBM Institute for Business Value partnered with the Saïd Business School at the University of Oxford to conduct the 2012 Big Data @ Work Study, surveying 1,144 business and IT professionals in 95 countries, including 42 respondents from the insurance industry, or about 4 percent of the global respondent pool.

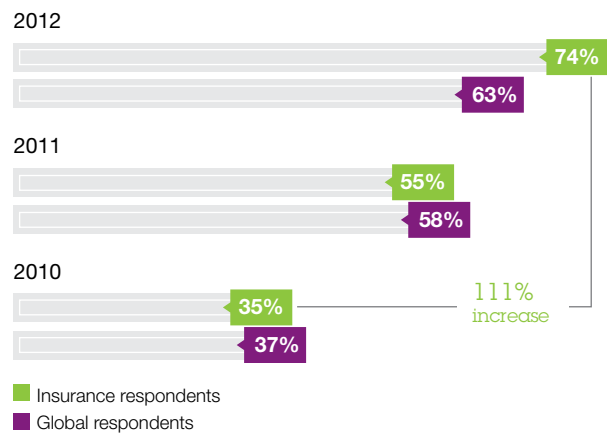
Big data is especially promising and differentiating for insurance companies. With no physical products to manufacture and sell, data is arguably one of their most important assets. Financial data, actuarial data, claims data, risk data, consumer data, producer/wholesaler data, etc. form the basis for virtually every important decision an insurer makes. Insurers often deal with large consumer and commercial customer populations, each with specific data types and attributes. And while the industry has made progress over the past decade in capturing and analyzing much of the structured information associated with their products and policyholders, there is even more valuable unstructured and semi-structured information that remains untapped. Agents, brokers, underwriters, claims managers, call center representatives, producers, wholesalers and countless other front- and back-office employees must capture and transmit complex insurance policy and claim information and sales correspondence, consistent with local regulatory requirements.

At the same time, the industry is undergoing a significant transformation as insurers work to sell to continually more demanding and empowered consumers who have real-time access to more diverse and instant insurance services than ever before. In addition, Internet-based entrants are leveraging information and analytics to enter new markets via new channels and pricing models. Many firms are also expanding into diversified services (e.g., banking, advisory, credit cards, etc.) and additional geographic markets. And on top of all of this, insurers must comply with new and emerging regulatory requirements, including the new health care act in the United States, which is unprecedented.

Therefore, to compete and win in this dynamic environment, insurers must leverage and optimize the value of big data. The study found that 74 percent of insurance companies surveyed report that the use of information (including big data) and analytics is creating a competitive advantage for their organizations, compared with 63 percent of cross-industry respondents. Compared to 35 percent of insurance companies that reported an advantage in IBM's 2010 New Intelligent Enterprise Global Executive Study and Research Collaboration, this represents a staggering 111 percent increase in just two years (see Figure 1).²

Further, our study found that insurance companies are taking a business-driven and pragmatic approach to big data. The most effective big data strategies identify business requirements first and then tailor the infrastructure, data sources and analytics to support the business opportunity. The organizations extract new insights from existing and newly available internal sources of information, define a big data technology strategy, and then incrementally extend the sources of data and introduce new technology over time.

Realizing a competitive advantage



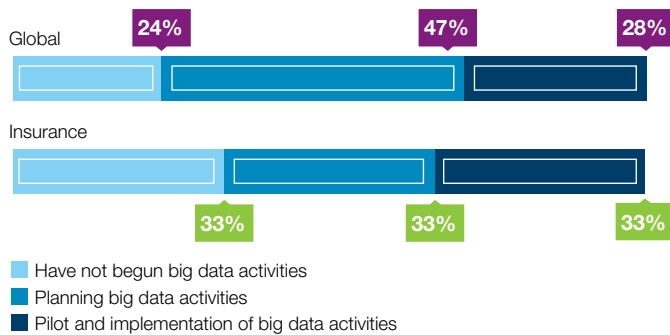
Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 1: Insurance companies now outpace their cross-industry peers in their ability to create a competitive advantage from analytics and information.

Organizations are being practical about big data

Our Big Data @ Work survey confirms that most organizations are currently in the early stages of big data planning and development efforts, with insurance companies on par with our global pool of cross-industry counterparts (see Figure 2). While a greater percentage of insurance companies are focused on understanding the concepts (33 percent of insurer respondents compared to 24 percent of global organizations), the majority are either defining a roadmap related to big data (33 percent of insurance respondents versus 47 percent of global respondents), or have big data pilots and implementations already underway (33 percent of insurance companies compared to 28 percent of all organizations).

Big data activities



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 2: The majority of insurance companies have either started developing a big data strategy or piloting and implementing big data projects.

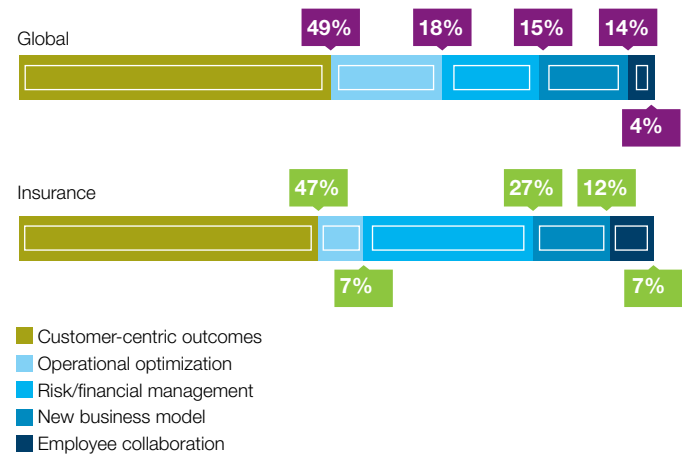
In our global study, we identified five key findings that reflect how organizations are beginning to embark on this journey into the next era of information management. We based our findings on global respondents whose organizations have already launched big data pilots or implementations. For a more in-depth discussion of each of these findings, please refer to the full study, “Analytics: The real world use of big data.”³

In this industry-specific analysis, we will examine the maturity of insurance organizations with respect to these key findings and our top-level recommendations for insurance companies.

1. Customer analytics are driving big data initiatives

When asked to rank their top three objectives for big data, just under half of the insurance industry respondents with active big data efforts identified customer-centric objectives as their organization’s top priority (see Figure 3).

Big data objectives



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 3: Just under half of the big data efforts underway by insurance companies are focused on achieving customer-centric outcomes.

This is consistent with what we have observed in the marketplace, where insurers are under tremendous pressure to transform from product-centric to customer-centric organizations, with the customer serving is the central organizing principle around which data insights, operations, technology and systems revolve. By improving their agility and ability to rapidly respond to changing market conditions, competitors and new regulations, insurance organizations are better positioned to deliver new customer-centric products and services, more quickly seizing market opportunities with lower and more predictable costs.

In addition to helping insurers better understand the needs of their policyholders, customer analytics can also be used to uncover fraud and improve claims processing. Fraud is a very real challenge for insurance companies around the world. Whether fraud is on a large scale, such as arson, or involves a smaller claim such as an inflated auto repair bill, payouts for fraudulent claims cost companies millions of dollars every year – and that cost gets passed down to the customer in the form of higher insurance premiums. Insurance companies are fighting fraud, but traditional techniques such as legal action and private investigation are time consuming and cost prohibitive.

As South Africa's largest short-term insurance provider, Santam definitely felt the impact of insurance fraud. Because agents had to handle and investigate both high- and low-risk claims, all claims took a minimum of three days to settle, and Santam began to feel its good reputation for customer service suffer in the age where customers demand fast results.

Santam improved operations and gained the ability to identify fraud early. The big data solution analyzes data from incoming claims, assesses each claim against identified risk factors and segments claims into five risk categories – separating potentially fraudulent and higher-risk claims from lower-risk cases. With the new system, the company not only saves millions previously paid on fraudulent claims, but also drastically reduces processing time for low-risk claims, leading to resolution in less than an hour for many customers. Within the first year, Santam also uncovered a major auto insurance fraud syndicate. Big data, predictive analytics and risk segmentation helped the company identify patterns that led to this fraud detection.⁴

Not surprisingly, risk and financial management were also important to insurers, with 27 percent identifying risk management and financial reporting as other high priority big data objectives.

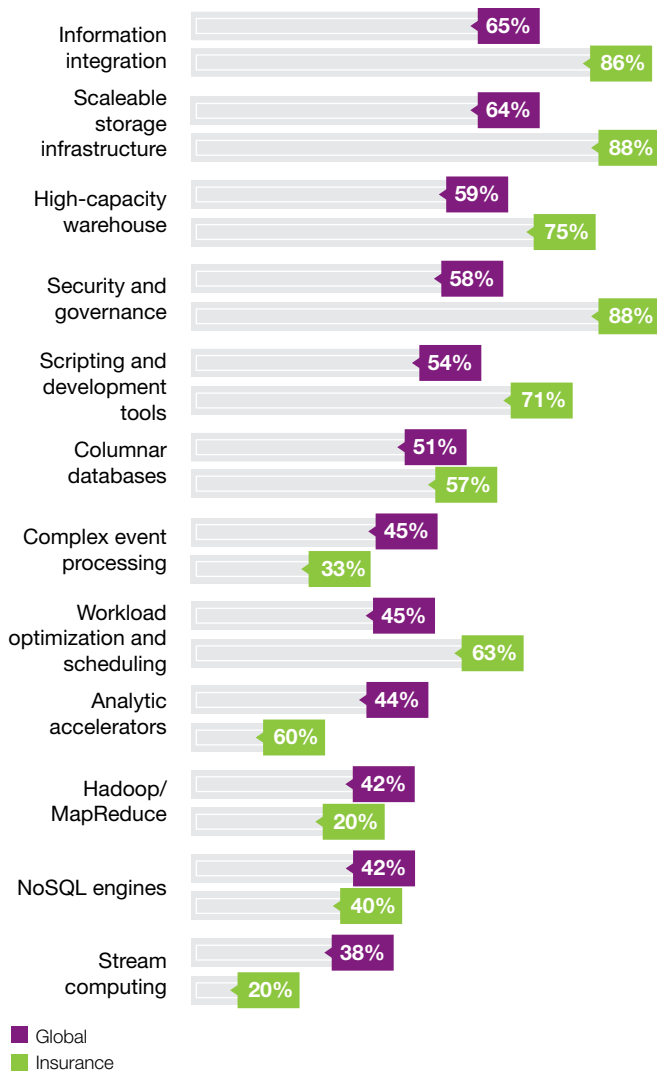
2. Big data is dependent upon a scalable and extensible information foundation

The promise of achieving significant, measurable business value from big data can only be realized if organizations put into place an information foundation that supports the rapidly growing volume, variety and velocity of data. We asked respondents to identify the current state of their big data infrastructures. An impressive 86 percent of insurance companies with active big data efforts report having integrated information, and 88 percent say they have a scalable storage infrastructure that can scale to meet the demands of big data (see Figure 4).

The insurance industry has spent decades focused on creating the ability to integrate data across organizational and department silos, a necessity since most legacy organizations were organized by product groups (e.g., whole life, term, auto, home, commercial, etc.). In addition, diversification and mergers have created countless silos of data through the years. This integration is even more important, yet much more complex, with big data. Integrating a variety of data types and analyzing streaming data often require new capabilities, like Hadoop, MapReduce, NoSQL, analytic appliances, data streaming or text analytics as an extension to a company's existing information management environment.

Another industry strength is in the area of security, with 88 percent of insurance respondents with active big data efforts indicating they have strong security and governance processes in place. The need for strong security and governance is exacerbated by the volume, variety and velocity of big data; all three increase the risks of malicious attacks or unauthorized use of data (much of the focus of data security), as well as the risk that improperly managed data is used to support key decisions – the provenance of data governance. Moreover, the need for business users to share data and direct big data activities also increases the need not just for IT governance, but business-driven governance.

Big data infrastructure



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

3. Initial big data efforts are focused on gaining insights from existing and new sources of internal data

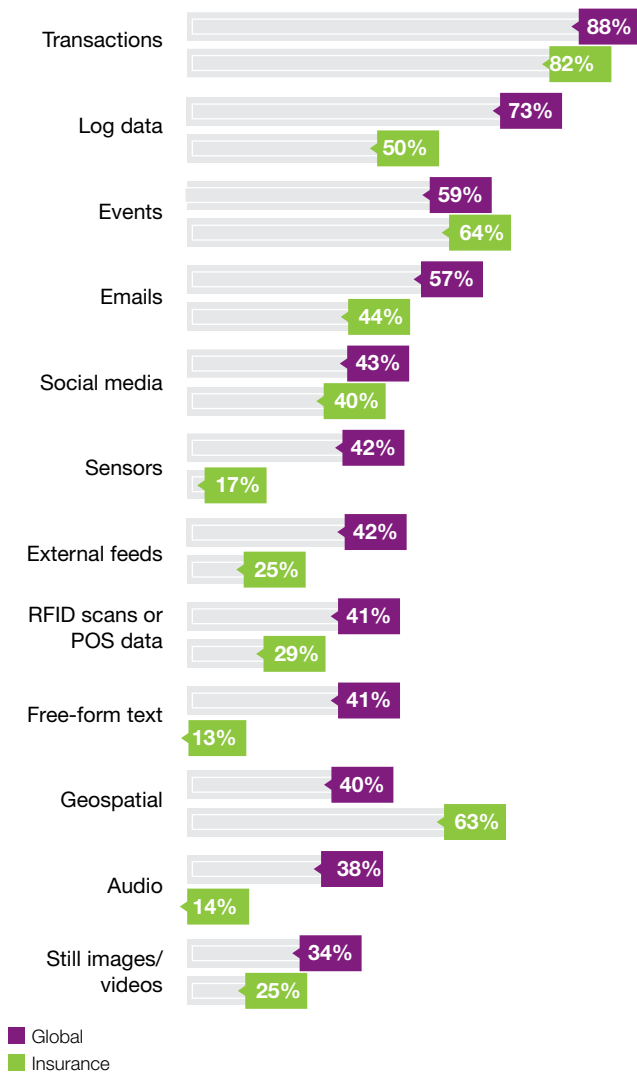
Most early big data efforts are targeted at sourcing and analyzing internal data, and we find this also to be true within insurance companies. According to our survey, an overwhelming majority of insurance respondents reported internal data as being the primary source of big data within their organizations. This suggests that insurance companies are taking a pragmatic approach to adopting big data and also that there is tremendous untapped value still locked away in internal systems.

Roughly nine out of ten insurance respondents with active big data efforts are analyzing transactions (88 percent), and half are analyzing log data. This is data generated to record the details of operational transactions and automated functions performed within the insurers' business or information systems – data that has outgrown the ability to be stored and analyzed by many traditional systems. As a result, in many cases, this data has been collected for years but not analyzed (see Figure 5).

Like their peers in other industries, 40 percent of insurers are analyzing social media, compared to a similar 43 percent of the cross-industry group. The insurance industry lagged in analyzing free form text, reporting just 13 percent of respondents (compared to 41 percent of cross-industry respondents). This may represent an area of opportunity, especially given the industry's text-heavy and document-driven business model.

Figure 4: Most insurance companies with big data efforts report having integrated information and a scalable infrastructure.

Big data sources



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 5: Insurance companies are primarily focusing initial big data efforts on internal sources of data.

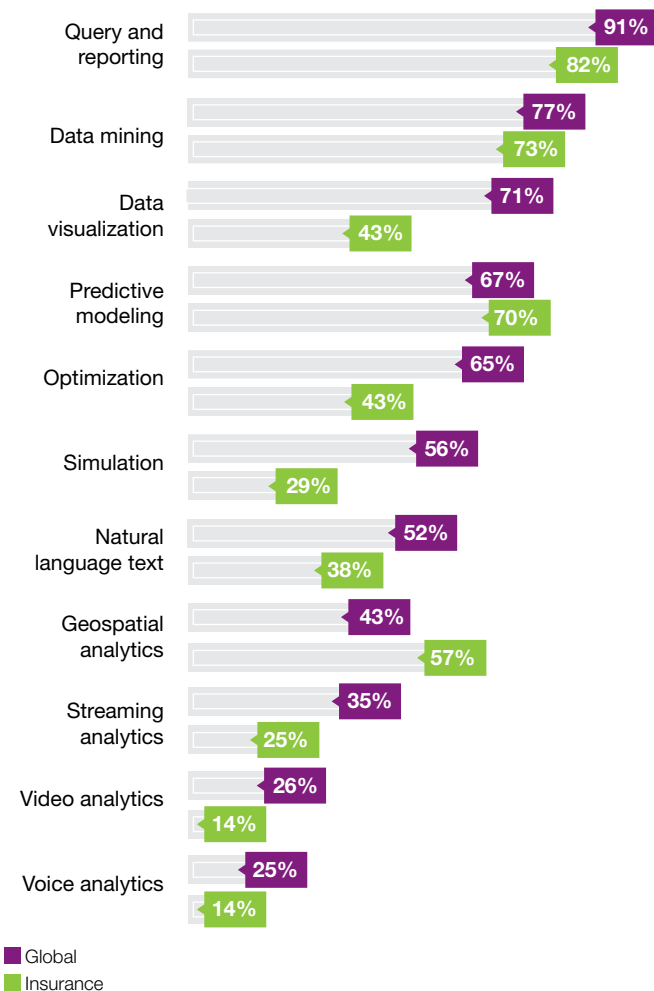
A new European auto insurance company uses telematics to price insurance based on near-real-time driving habits with the help of a powerful data warehousing solution. Although many teens are good drivers, they often incur higher premiums because of higher-than-average claims filed by youthful, inexperienced drivers. This company saw an opportunity to base rates on an individual's actual driving history instead of the aggregate pool of drivers. It uses telematics placed in the vehicle to record near-real-time information about location, drive time, acceleration, speed, braking and other dimensions of driving. This telematics data is then used to personalize and increase objectivity and accuracy in pricing and claims processing. The company grew from zero customers to more than 20,000 within its first year in business.

4. Big data requires strong analytics capabilities

Big data itself does not create value until it is put to use to solve important business challenges. This requires access to more and different kinds of data, as well as strong analytics capabilities that include both software tools and the requisite skills to use them. As with other industries, many insurance respondents lack some of the information management and analytical skills required to fully embrace big data.

Examining those insurance companies engaged in big data activities reveals that they start with a strong core of analytics capabilities designed to address structured data, such as basic queries, predictive modeling and data mining. However, they lag behind their cross-industry counterparts in core capabilities of data visualization and simulation (see Figure 6).

Analytics capabilities



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

The need for more advanced data visualization and simulation capabilities increases with the introduction of big data. Datasets are often too large and unstructured for business or data analysts to view and analyze with traditional reporting and data mining tools. In our study, insurance respondents indicated that only two out of five active big data efforts utilize more advanced analytical tools such as data visualization.

5. The current pattern of big data adoption is focused on delivering measurable business value

To better understand the big data landscape, we asked respondents to describe the level of big data activities in their organizations today. The results suggest that there are four primary stages of big data adoption and progression, along a continuum that we have identified as Educate, Explore, Engage and Execute (see Figure 7). For a deeper understanding of each adoption stage, please refer to the global version of this study.⁵

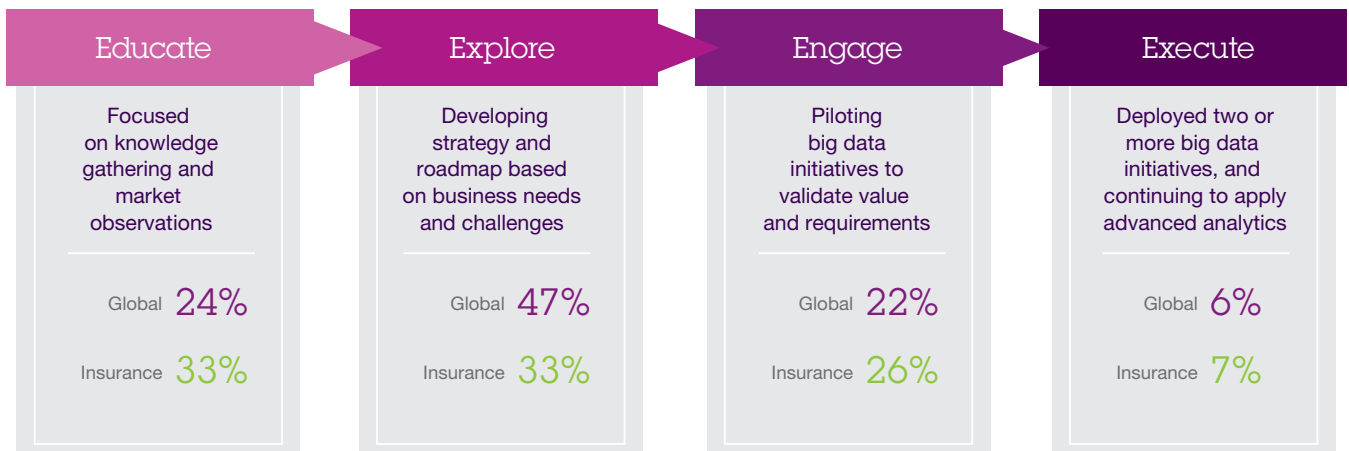
- **Educate:** Building a base of knowledge (33 percent of insurance respondents)
- **Explore:** Defining the business case and roadmap (33 percent of insurance respondents)
- **Engage:** Embracing big data (26 percent of insurance respondents)
- **Execute:** Implementing big data at scale (7 percent of insurance respondents)

Figure 6: Insurance companies lag behind their cross-industry peers in the areas of data visualization and simulation.

In the cross-industry study, the findings suggest that early stages are often driven by CIOs, while business executives drive the latter stages. However, insurance respondents were much more likely than those in other industries to report business-specific executives (e.g., marketing, customer service, risk management) participating in these early phases, which often include IT-driven activities. CEOs were often involved in the very early phases and then later in the Execute phase, suggesting that they were proponents of the original strategy and committed to the outcomes, but tended to delegate the path between the two to the senior executive most impacted by the initial efforts.

At each adoption stage, the most significant obstacle to advancing their big data efforts reported by insurance firms is the need and ability to articulate measurable business value. While executives intuitively understand the value that can be gained from leveraging big data, they want to quantify both the benefits and costs associated with implementing their big data strategies, pilots and enterprise projects. As a result, organizations should be vigilant in articulating the value, forecasted based on detailed analysis and industry best practices that are directly tied to each of the above noted stages.

Big data adoption



Source: Analytics: The real-world use of big data, a collaborative research study by the IBM Institute for Business Value and the Saïd Business School at the University of Oxford. © IBM 2012

Figure 7: Most insurance organizations are developing big data strategies or pilots.

Recommendations: Cultivating big data adoption

IBM analysis of our Big Data @ Work Study findings provided new insights into how insurance companies at each stage are advancing their big data efforts. Driven by the need to address important business opportunities, in light of industry transformation, advancing technologies and the changing nature of data, insurance companies are starting to look closer at big data's potential benefits. To extract more value from big data, we offer a broad set of recommendations tailored to insurance firms.

Commit initial efforts to customer-centric outcomes

It is imperative that organizations focus big data initiatives on areas that can provide the most value to the business. For most insurance companies, this will mean beginning with customer analytics that enable better service based on a clearer understanding of customer needs and preferences to better anticipate future behavior patterns. Insurance organizations can use customer insights to generate sales leads, enhance products, improve marketing/advertising campaigns, optimize pricing and increase customer loyalty.

To effectively cultivate meaningful relationships with their customers, insurance companies must connect with them in ways their customers perceive as valuable. The value may come through more timely, informed or relevant interactions; it may also come as organizations introduce new capabilities and channels (e.g., mobile) and improve the underlying operations in ways that enhance the overall experience of those interactions.

Insurance companies should identify the processes and related data that can most directly impact their customers. Even small improvements matter as they often provide the proof points that demonstrate the value of big data and the momentum to do more. Analytics fuel the insights from big data that are increasingly becoming essential to create the level of depth in relationships that customers expect.

Define big data strategy with a business-centric blueprint

A blueprint encompasses the vision, strategy and requirements for big data within an organization and is critical to establishing alignment between the needs of business users and the implementation roadmap of IT. A blueprint defines what organizations want to achieve with big data to help ensure a pragmatic yet comprehensive approach and investment of resources.

An effective blueprint defines the scope of big data within the organization by identifying the key business challenges to which it will be applied, the sequence in which those challenges will be addressed, and the business process and technical requirements that define how big data will evolve. It is the basis for creating a roadmap to guide the organization through a realistic approach toward developing and implementing its big data solutions in ways that create early and sustainable business value.

For insurance organizations, one key step in the development of the blueprint is to engage business executives early in the process, ideally while the company is still in the Explore stage. For many insurance companies, engagement by a single C-Suite executive is sufficient. However, more diversified companies may want to tap a small group of executives to develop a blueprint that reflects a holistic view of the company's challenges and synergies that can be addressed across silos.

Start with existing data to achieve near-term results

To achieve near-term results while building the momentum and expertise to sustain a big data program, it is critical that insurance companies take a pragmatic approach. For most insurance companies, the logical and cost-effective place to start looking for new insights is within the organization's existing data stores, leveraging existing skills and tools.

Looking internally first allows insurance companies to leverage their existing data, technology and skills and to deliver near-term business value. In addition, companies can gain important experience as they then consider extending existing capabilities to address more complex sources and types of data. While most organizations will need to make investments that allow them to handle larger volumes of data or a greater variety of sources, this approach can help reduce investments and shorten the timeframes needed to extract the value trapped inside these untapped sources. It can accelerate the speed to value and help organizations take advantage of the information stored in existing repositories to deliver significant business value. Then, as new skills and technologies are adopted, big data initiatives can be expanded to include greater volumes and variety of data.

Build analytics capabilities based on business priorities

The unique priorities of each insurance organization should drive its development of big data capabilities, especially given the tight margins and regulatory compliance requirements that most insurance firms face today. The upside is that many big data efforts can concurrently help reduce costs and increase revenues, a duality that can bolster the business case and offset necessary investments. At the same time, these big data capabilities can also be used to plan for and comply with the various regulatory reporting requirements (e.g., the Solvency II Directive, Affordable Care Act and Health Insurance Portability and Accountability Act).

For example, several insurance firms leverage customer data to simultaneously identify fraud and abuse and improve the customer experience. Others use big data technologies to simplify and enable data integration across each customer touchpoint. This helps provide a consistent channel user experience, improve customer service and reduce costs.

Insurance companies should focus on acquiring and/or developing new information management and analytics skills, especially those that will increase the organization's ability to analyze unstructured data and visualize its presentation to make it more consumable by business executives.

Create a business case based on measurable outcomes

Developing a comprehensive and viable big data strategy, blueprint and roadmap requires a solid, quantifiable business case. Therefore, it is important to have active involvement and sponsorship from one or more business executives throughout this process. Equally important to achieving long-term success is strong, ongoing business and IT collaboration.

Getting on track with the big data evolution

An important principle underlies each of these recommendations: business and IT professionals must work together throughout the big data journey. The most effective big data solutions identify the business requirements first and then tailor the infrastructure, data sources, processes and skills to support that business opportunity.

To compete in today's consumer-empowered economy, it is increasingly clear that insurance companies must leverage their information assets to gain a comprehensive understanding of markets, customers, products, distribution channels, regulations, competitors, employees and more. Insurance companies will realize value by effectively managing and analyzing the rapidly increasing volume, velocity and variety of new and existing data and putting the right skills and tools in place to better understand their operations and customers, as well as the new markets necessary to compete and thrive in this global, dynamic marketplace.

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