Big Data in Insurance
Beyond Experimentation to Innovation

A Sponsored SMA White Paper

Authors: Mark Breading, SMA Partner
Denise Garth, SMA Partner

Published Date: June, 2014

This sponsored white paper is based on SMA’s ongoing research on big data in insurance. ISO and SAS have purchased distribution rights.
Table of Contents

Big Data: Industry Experience Advances 3

Business Areas for Big Data 4

Customer Acquisition: New Insights for Marketing and Distribution
Risk Planning and Evaluation: New Insights for Actuarial, Product Management, and Underwriting
Enterprise Services: New Insights for Vital Internal Functions

Challenges and Approaches 10

Organizational and Technology Challenges
Technology Approaches

SMA Summary and Call to Action 12

About Strategy Meets Action 13

About the Sponsors 14

ISO
SAS

The content of this SMA White Paper is based on a study conducted in the second quarter of 2014 by SMA. The results are based on the participation of 75 insurers from property/casualty and life/annuity companies in North America. ISO and SAS are sponsoring this white paper and have purchased full distribution rights.
Big Data: Industry Experience Advances

The insurance industry has entered into the enlightened and strategic age of analytics. Nothing illustrates that more than the excitement about the potential of big data. Discussions about big data usually begin by defining what big data means and then move on to focusing on the technology options. Issues like what constitutes big data, what untapped sources of big data already exist within the company, and what big data should be brought in from the outside should be considered. And there are many different questions related to technology. Should we use approaches like Hadoop or NoSQL? Do we need an appliance on premises or should we leverage cloud-based solutions? Does our volume of data really qualify us to be considering big data?

These are very important questions that must be answered in order to fully realize the business potential of big data analytics. However, if insurers are going to achieve the strategic, transformative, and innovative potential of big data, they must start by determining how big data can enable and empower their business strategies. This includes identifying new insights for business innovation and defining business use cases where powerful analytics can be applied to create differentiating capabilities.

SMA research confirms that insurers are well on the way to leveraging big data for new insights to drive innovation. Big data usage has leapt way beyond the experimentation phase. Five years ago, only the most advanced thinkers in the industry had even heard of big data. A few large firms had embarked on experimentation. But the take-up over the last three years has been nothing short of remarkable, as illustrated by Figure 1.

Figure 1. Percent of North American Insurers Investing in Big Data Initiatives

Usage by the industry overall has more than doubled in the last year. The most distinct difference in growth is for insurers with over $1B in premium compared to insurers with under $1B. The larger-premium insurers have more data and more resources, so a higher percentage of big companies are moving forward with projects. With a significant and growing percentage of insurers in all segments now engaged in big data initiatives, the questions turn to where big data is being used, what types of business problems are being addressed, and how insurers are facing unique challenges related to big data.

To explore these dimensions of big data, SMA conducted a research survey of North American P&C and L&A insurers from April through June 2014. The survey and related
interviews investigated the business problems insurers are currently addressing, project and investment plans through 2016, data sources, and the approaches to organization, resources, and technology.

**Business Areas for Big Data**

A key theme for analytics and big data is the expansion of capabilities outside the traditional areas related to risk. For this research, SMA grouped insurer activity into four broad areas to assess how insurer strategies and investments are shifting, and how they differ by line of business and insurer size. The scope of these areas is as follows:

- **Customer Acquisition**: In broad terms, this area is represented by marketing and distribution. It encompasses everything related to building a brand, understanding customer needs, generating demand, and executing the sales process.

- **Risk Planning and Evaluation**: This category includes the actuarial, product management, and underwriting areas of an insurance business. Areas such as catastrophe modeling and loss control would also be included since they are fundamentally about assessing and managing risk.

- **Customer Service**: The core operational areas of the business such as policy service, billing, and claims are part of this category. This area plays a major role in fulfilling the insurance contract and strongly influences customer loyalty.

- **Enterprise Services**: This grouping includes a variety of functional areas that support the business but may not be considered to be part of the primary value chain. Examples include human resources, information technology, facilities management, and financial management.

Figure 2 shows the current state and plans by category. The plans to use big data are very high in five of these eight categories, with strategic use planned in the other three.

![Figure 2. Percent of Insurers Using/Planning to Use Big Data by Business Category](source: SMA Research, Big Data in Insurance 2014, n=75)
In fact, for both P&C and L&A, the areas of highest usage today are in risk planning and evaluation. Some of the most interesting findings are the aggressive plans for using big data across many areas. Many insurers are evaluating, piloting, or implementing big data projects, especially for risk and customer acquisition. P&C insurers see significant opportunity for big data in the policyholder service arena, especially to contribute to the customer experience and to improve profitability. These categories will be explored in more detail to understand the specific types of business use cases and business value being pursued by insurers.

**Customer Acquisition: New Insights for Marketing and Distribution**

A wide variety of possible project areas are candidates for big data investment toward improving customer acquisition. These initiatives address areas such as brand perception, segmentation, campaign effectiveness, customer lifetime value, producer/channel performance, and more.

**Customer Acquisition in P&C**

The top projects for P&C are shown in Figure 3 based on the average investment level of insurers. For each area, the plans vary significantly, for example for renewal/retention (the top customer acquisition project), 33% plan high investments, but 13% plan no investments at all. The percentage of insurers planning to leverage key data sources for customer acquisition related projects is depicted on the right side.

![Figure 3. Plans for Big Data in Customer Acquisition in P&C, 2014-2016](image)

In the highly competitive P&C marketplace of North America, both personal and commercial lines insurers are focused on trying to keep and grow their customer bases. The top new big data project investments in this area are aimed at gaining a better understanding of what factors affect retention and renewals. Close behind is a deeper analysis of new business operations to determine how to increase conversion rates.
Distribution segmentation and customer relationship management (CRM) are two additional areas where big data projects are planned.

Interestingly, the number one data source cited by P&C insurers for big data analytics related to customer acquisition is social media. The majority of the big data initiatives thus far in insurance have used structured transaction data, but insurers are now looking for trends, needs, and behavior patterns from unstructured social media data. Many structured data sources are also highly important to the analysis of customer acquisition, including information about the insured items and various perils.

**Customer Acquisition in L&A**

Life and annuity insurers are intensely focused on improving customer acquisition and have big plans for leveraging big data in the future. Figure 4 illustrates the top project areas and key data sources insurers expect to use.

Life and annuity insurers are intensely focused on improving customer acquisition and have big plans for leveraging big data in the future. In particular, L&A insurers see potential for big data in new business analysis and distribution segmentation.

Most L&A insurers have complex distribution channel networks and a high number of producers to manage. These channels and producers sell defined products to specific segments in certain geographic areas, often with considerable overlap. It is, therefore, not surprising that L&A insurers are investing in analytics for distribution segmentation. New business analysis is deemed another key opportunity area for big data. Related SMA research reveals that CRM is a vital investment area across the enterprise for L&A insurers. Applying big data to enhance this area is the next logical step. Customer segmentation and further insights into the new business process are also good candidates for big data.

Key data sources include prescription information, social media data, and customer purchasing information. The fact that prescription, health, and financial information are in the top five data sources makes perfect sense. These are today’s critical data sources for normal business operations, and more analysis is likely to reveal additional patterns and insights. But less obvious is why social media data and customer purchasing...
information are considered important for big data analytics in this area. Upon reflection, insurers are realizing that the richest sources of information about customer wants, needs, and behaviors are from their social media interactions and from information about what other products they actually buy.

**Risk Planning and Evaluation: New Insights for Actuarial, Product Management, and Underwriting**

SMA identified ten different types of big data projects that are being conducted across the areas of actuarial, product management, and underwriting, and almost twenty kinds of data sources. These include both operational and strategic planning activities, in areas such as product development, portfolio analysis, underwriting operations, loss control, and pricing.

**Risk Planning and Evaluation in P&C**

Figure 5 lists the top big data projects for P&C, along with the top data sources that will be used during the three-year period from 2014 through 2016.

The industry has already seen significant activity regarding pricing models over the last few years. Sophisticated modeling and more precise segmentation are enabling insurers to improve pricing optimization. Increasingly, predictive models or other analytical techniques are being run more frequently and with more data, moving them into the realm of big data. This is potentially one of the biggest game-changing opportunities for big data in P&C insurance. Gaining more insights into profitability is another critical area for insurers. Both product profitability and underwriting profitability are viewed as big areas for big data to make a big difference.
The top data source going forward on the actuarial side is catastrophe modeling data. The entire catastrophe modeling arena is changing rapidly as modeling becomes more open, peril data becomes more widespread, and geocoded location data becomes more precise. In the P&C segment, more big data projects are focused on property than auto; therefore, key data sources for big data include property characteristics and weather data. The data that insurers expect to use for underwriting purposes in big data projects is not much different from the primary data used today, for example, information about properties and credit histories.

**Risk Planning and Evaluation in L&A**

Figure 6 lists the top big data projects for L&A in the risk arena, along with the top data sources that will be used during the three-year period from 2014 through 2016.

In the life and annuity segment, there are important big data opportunities related to product. Developing and managing new products are essential to L&A companies, so insurers are looking to better understand the profitability of individual products/versions and the overall product portfolio. Insurers learned some hard lessons in the wake of the global financial crisis in terms of being able to do sophisticated analysis of the portfolio to support strategies for de-leveraging risk and rebalancing the product mix.

The highest usage data sources for actuarial and underwriting activities in L&A are a mix of traditional and new sources. Actuaries plan to use financial and health/medical data in their new big data projects, but they also intend to use customer purchasing data and social media. In the underwriting area, the top data sources are traditional – health/medical data, prescription information, and credit data. However, close behind those sources for underwriting are social media and customer purchasing data. Some L&A insurers even plan projects using data from wearable devices and sensors.

The new emphasis on the customer experience means that insurers must gain more insights into policyholder/member service interactions. This is true for all lines of business, but perhaps more so for P&C, given the complexity of claims and the series of customer service interactions that are generated by claims.

Customer Service in P&C

Claims generate enormous amounts of data and involve a broad network of service providers and other third parties. Combined with the impact of a small percentage of change in the loss ratio or improvements in fraud prevention, it is no wonder that insurers sense major opportunities for big data in claims. Analyzing frequencies and severities is an age-old business in insurance. Now there are new opportunities to spot triggers and trends much earlier by sifting through more data and iterating on analytics more frequently. Fraudsters are becoming more sophisticated and are using business intelligence and analytics techniques themselves to stay ahead of insurers. This means that P&C companies must up their game just to stay even—which is the approach most have taken over the last two decades. Now there is an opportunity to leap ahead using big data. Time is of the essence and pattern recognition from vast amounts of data is the norm. It is a perfect use case for big data.

Claims departments plan to continue using data from industry organizations, but high on the list for new big data projects are social media, geospatial data, and expanded/more accurate property data. The policy side may have fewer opportunities for big data, but insurers plan to use a combination of traditional and new data sources to do a more in-depth analysis of policies in force.

Customer Service in L&A

In the near term, L&A insurers are focusing a much higher level of technology investments on acquiring customers and less on servicing them. Although there were a low number of survey responses in this area and market indications of limited big data activity, this area should not be ignored. In particular, it is important to understand how the volume of service interactions varies by line and individual situation, and how that has an impact on customer retention and profitability. The twenty-year level term life policy customer may have almost no interactions once the policy is on the books, especially if the premium payment is automated. There is not much big data to mine there. On the other hand, a claim on a disability policy may result in many interactions every month for the rest of the policyholder’s life.

Although the survey responses were low and provide little enlightenment, direct discussions with insurers reveal opportunities for big data. The previously mentioned disability example is one area where large amount of interactions and data can be combined with external data on treatments, new medical options, and analyses of similar cases to help reduce payouts and improve results for individuals. Using big data to analyze policy lapses to identify root causes may also prove useful. Once again, this...
is a case of starting with the unique business strategy and understanding how the new technologies might uncover insights that were not previously available or possible.

**Enterprise Services: New Insights for Vital Internal Functions**

A small percentage of both P&C and L&A insurers are currently using or plan to use big data analytics to improve enterprise services. This is an expected result since areas such as financial management, human resources, IT, and facilities planning are considered to be primarily internal support functions. They may never garner the dollars or resources for the high-powered analytics that are becoming common for the core areas of the insurance business. However, it would be a mistake to dismiss the potential for big data in enterprise services. There are certain very focused areas that have a large impact on financial performance where big data will be vital. Chief Investment Officers are always looking for ways to improve the performance of their investment portfolios. Asset management for firms that have tens or hundreds of billions of dollars under management is an area where big data techniques are already being used. Econometric modeling, asset/liability matching, and other financial uses cases will also benefit from analyzing more data and producing results much faster. The technology investments and human resources may not be as large as they are in other areas, but the business impact may be crucial to the firm’s success.

**Challenges and Approaches**

**Organizational and Technology Challenges**

Taking advantage of the potential of big data requires some different approaches to organization, resources, and technology. As in many new technologies that offer promise, there are challenges to successful implementation and the production of meaningful business results. The number one organizational challenge identified by survey respondents was determining the business value, with funding a close second. Rankings from P&C, L&A, larger insurers, and smaller insurers all show business value at the top of the list. Talent is the other big issue – identifying the business and technology experts inside the enterprise, recruiting new employees, training and mentoring individuals, and partnering with outside resources is clearly a critical success factor for big data. Implementing the technology and organizing the data are listed as lesser challenges by insurers, although they are still areas that require attention.

The biggest technology challenge in the big data world is framed in the context of five V’s that define big data. These include the standard three V’s of volume, velocity, and variety, plus two more – veracity and value. The resounding theme among insurer respondents was that the variety and veracity of the data presented the biggest challenges. As insurers venture beyond analysis of structured transaction data to incorporate external data and unstructured data of all sorts, the ability to combine and input the data into an analytic analysis may be complicated. On one hand, the variety expresses the promise of big data, but on the other hand, the technical challenges are significant. The veracity of the data is also deemed as a challenge. It is true that some
big data analyses do not require the data to be as cleansed and organized as in traditional approaches. However, the data must still reflect the underlying truth/reality of the domain.

**Technology Approaches**

As mentioned at the outset of this paper, technology should not be the first focus area for evaluating the potential of big data in an organization. However, choosing the best technology platform for your organization and business problems does become an important consideration for success. Figure 7 identifies many of the key technology approaches available in the market and the plans of insurers.

**Figure 7. Big Data Technology Platforms Insurers are Using or Considering**

The results surface two key trends in the platforms for big data. First, all six of the approaches listed have a significant percentage of insurers that are using or considering using the technology. The second finding is that cloud computing will play a very important role in big data. An amazing 82% of insurer respondents say that they are either currently using cloud for big data or considering it for the future. Although there are challenges and new approaches required for big data, there is a growing body of experience, expertise, and best practices to assist in successful big data implementations.

Source: SMA Research, Big Data in Insurance 2014, n=75
SMA Summary and Call to Action

Insurers have been experimenting with big data for the last three to four years. For the leaders, that experimentation has moved to the next stage, with big data being applied to important problems across the company. The use of big data analytics is not just the next turn of the crank or a way to do things faster. It’s true that big data projects focus on many of the same types of insurance business issues that have existed for eons. But insurers are now turning to big data for breakthrough thinking in these areas. And now new areas of opportunity are emerging because of big data, especially those that are related to understanding and serving customers. In short, the reason insurers want to capitalize on big data is for innovation.

Many insurers are facing the question of how to move forward with big data. To many, the task of leveraging this new approach seems daunting. A measured approach to three key areas will serve companies well in the development and execution of big data strategies.

- **Business opportunities:** Recognize the types of business problems that might be addressed and how they can contribute to strategies for differentiation. This does not require you to be an expert in the specific technologies, but it does require creative, outside the box thinking. As we move into the big data era, the scope of the possible is greatly expanded: Analyze the content of the entire web to gauge how our brand is perceived? Possible! Build custom catastrophe models and run them in hours instead of days? Possible! Spot new product opportunities for a specific segment based on posts, tweets, likes, and favorites? Possible! There is a whole new universe of possibilities, but it starts with reimagining the business and asking new questions.

- **Talent and expertise:** Concentrate on the critical success factor of human brainpower – not computer brainpower. Assembling a team of business and technology experts that understand where and how big data can be applied – and how to interpret and act on it – is perhaps the number one critical success factor. Analytics officers, data scientists, modeling experts, and others in emerging new roles should form the backbone of the team. But visionaries, big thinkers, and subject matter experts in key business areas are just as important.

- **Technology:** Take a different approach to the technology than you may have in the past. A lot of experimentation and learning are required. Failures will occur – accept them; learn from them. Some investments and projects will not deliver game-changing results. On the other hand, some projects will hit it big, delivering new insights about customers, products, risks, operations, investments, and other business areas. That is the nature of innovation. You can’t win if you don’t play the game.

Your competitors are increasingly playing in this game, looking for opportunities to win, and win big. The opportunities for big data are many. The industry is rapidly moving beyond experimentation to full-fledged innovation! The winners of the future will accelerate their journey by capitalizing on the power of big data.
About Strategy Meets Action

Exclusively serving the insurance industry, Strategy Meets Action (SMA) blends unbiased research findings with expertise and experience to deliver business and technology insights, research, and advice to insurers and IT solution providers. By leveraging best practices from both the management consulting and research advisory disciplines, SMA’s services are actionable, business-driven, and research-based – where strategy meets action – enabling companies to achieve business success.

This white paper is based on SMA’s experience, research, and insights. ISO and SAS have paid for distribution rights, and have not influenced the survey data or analysis. The content is a synopsis of SMA’s analysis and insights.

Additional information on SMA can be found at www.strategymeetsaction.com.

Mark Breading, SMA Partner can be reached at mbreading@strategymeetsaction.com or 614.562.8310. Co-author and SMA Partner Denise Garth can be reached at 402.963.0198 or dgarth@strategymeetsaction.com.
About the Sponsors

ISO

Since 1971, Insurance Services Office ("ISO") has been a leading source of information about property/casualty insurance risk. ISO offers numerous solutions to help customers enhance their insurance data and to take action on insights derived from the enhanced data. Those solutions include the ISO Risk Analyzer® suite of predictive models, which help insurers examine the interactive effects of hundreds of rating variables to help to predict expected losses at the level of an individual policy, and ISO Advanced Rating Toolkit™ for personal auto, which lets customers more precisely segment, underwrite, and rate their existing books of business and expand into new and promising markets. They numerous benchmarking offerings and actuarial analyses that can assist customers to develop their pricing, loss reserving, and marketing strategies; and consulting services that provide customized assistance with an analysis of a customer's own underwriting experience, development of classification systems, and a wide variety of other business decisions.

ISO is a member of the Verisk Insurance Solutions group at Verisk Analytics (Nasdaq:VRSK). The Verisk family of companies provide additional tools and insights that add value to customers’ data, including visual and aerial surveys and analytical assessments of the risks at commercial properties around the United States; models to enable companies to identify, quantify, and plan for the consequences of catastrophic risks (including hurricanes, earthquakes, winter storms, tornados, hailstorms, flood, terrorism, and electrical blackouts); solutions to assist in estimating all phases of building repair and reconstruction; and telematics services to help insurers attract and retain better drivers. For more information, visit www.iso.com and www.verisk.com.

SAS

SAS has been working with the insurance industry for over 35 years, and more than 1,200 insurance companies worldwide use SAS solutions. The digital age has brought with it a quantum increase in the amount of data available for business analytics. But getting insights out of big data in a timely manner requires a different approach. SAS High Performance Analytics enables insurers to tackle problems using big data and sophisticated analytics. It allows data visualization, complex data exploration, model development and model deployment steps to be processed in-memory and distributed in parallel across a dedicated set of nodes.

SAS IS THE LEADER in business analytics software and services, and the largest independent vendor in the business intelligence market. Our award-winning solutions help insurers worldwide with data management, fraud detection, risk management, regulatory compliance, customer intelligence and other critical needs. The insurance industry contributed over 10 percent of the total company software revenue of $3.02 billion in 2013. Learn more at www.SAS.com/insurance.