The Use of Big Data and Data Analytics to Enhance Insurer Operations in Asia-Pacific

By Veronika Cooper

Definitions:

Big Data: The study and applications of data sets that are so big and complex that traditional data-processing application software are inadequate to deal with them.

Data Analytics: A process of inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, informing conclusions and supporting decision-making

Introduction:

In 2019, Risk & Regulatory Consulting, LLC authored a study sponsored by the Society of Actuaries (SOA) that covered the extent of the use of Big Data or Data Analytics to enhance insurer operations, including sales, distribution, product development, underwriting, and claim management within various markets within the Asia-Pacific region where the SOA has a strong and growing member population. The Asia-Pacific markets in focus primarily included **Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Taiwan, and Thailand**; however, other markets were considered as well. The research was completed using approaches that included a review of technical specifics from relevant literature along with interviews of individual experts on the use of Big Data within the Asia-Pacific region. The results of the research were analyzed and summarized in a final report published by the [SOA](https://www.soa.org/resources/research-reports/2019/use-big-data-asia/) (https://www.soa.org/resources /research-reports/2019/use-big-data-asia/).

The research involved identifying underlying drivers of the issues and opportunities associated with the use of Big Data and Data Analytics by insurers in the Asia-Pacific region, as well as a review of the regulatory environment. This included consideration of the manner in which the regulatory process potentially influences insurer practices.

The first step in the study was to conduct initial research and identify jurisdictions, followed by surveys of industry practitioners and regulatory interviews. We used a mix of written questionnaires and interviews to accomplish our objectives. Based on our past experience conducting cross-border research through a survey approach, some respondents prefer to use email responses, which can help address language and time zone barriers, and others prefer to discuss questions over the phone, which allows for clarifying questions and may be less time consuming for the participant. We recruited participants via our existing network, where feasible, but also leveraged SOA contacts in other countries. We then worked with the SOA and the Project Oversight Group (POG) to identify and secure many of the key participants to be included in the survey to enable a strong representation of practices across each jurisdiction, including a range of company sizes and product types. The survey participants, which were selected for the study, hold various positions in modeling, actuarial, data and technology departments, mainly within the insurance industry. Overall, the research reflected input from many different sources – seven industry practitioners, three regulatory bodies, 11 members of the POG as well as representatives from the SOA.

Summary

Overall, participants believe that there are many benefits of Big Data and Data Analytics for the markets, industry and products. Some of these benefits are focused on the customer and others on the insurer. The following list of benefits captures a mix of both:

- New data sources that enable better classification of risk
- Better understanding of customer behavior
- Better prioritization of cases for fraud investigation
- Increase in revenue, business growth, efficiency and customer retention
- More efficient processes
- Improvement in customer interaction, persistency and financial protection

There is a great interest in studying, applying and expanding the use of Big Data in underwriting, marketing, sales and distribution, claims, risk management, customer experience management (including customer demographics and behavior) and in the banking and financial services sector. In addition, there are several areas surrounding the concept of Big Data and Data Analytics that companies would like to explore further, such as regulation around sources of Big Data (such as requirements for data sharing and transfer), privacy, controls as well as availability of Big Data platforms, accessibility of software, availability of knowledgeable personnel, cost and time.

From the regulatory perspective, the study showed that existing regulations generally do not contemplate the technological developments that have taken place in the insurance industry. Fundamentally, regulators want to make sure that insurers are treating the customer fairly. A rule-based approach may not be an effective framework for achieving this goal with respect to Big Data and Data Analytics. Fixed rules can potentially be circumvented as technologies continue to develop. Instead, a principle-based approach, with clear guidelines and consequences for compliance failures may be the preferred framework for the development of regulations focused on the use of Big Data and Data Analytics in the insurance industry.

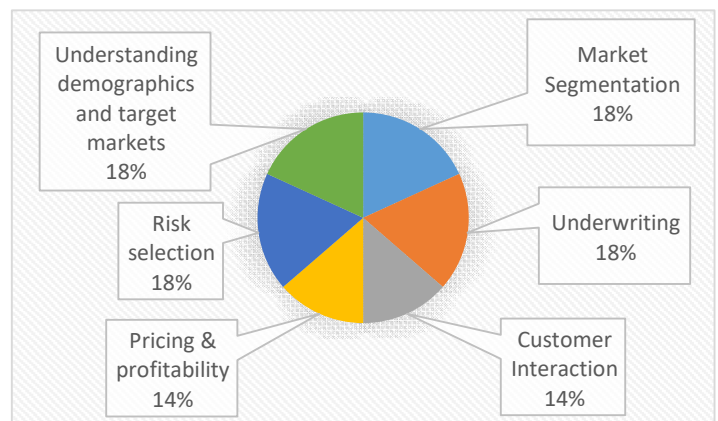## Use of Big Data in Insurance

Insurance companies are very interested in studying and applying Big Data applications. For example, many auto insurance companies in China are experimenting with Telematics (which refers to any device which merges telecommunications and informatics. It includes anything from GPS systems to navigation systems), which is a classic Big Data application. Many insurers in the region are investing in the development of various Data Analytics models such as cross sell/upsell (selling additional products or services to an existing customer or inducing the customer to purchase more expensive items, upgrades or other add-ons in an attempt to make a more profitable sale), claim fraud analytics, claims orientation analytics and underwriting and pricing analytics, to name a few. In addition, insurance professionals are striving to understand the demographics, behavior and potential needs of existing clients or target markets by using various methods such as gathering data from administration systems or wearable fitness devices and analyzing social media data for product pricing. There has been a movement towards greater optimization of clients' experience with digital/non-digital touch points, real time

product recommendations and streamlined claims processes with machine learning models.

Most insurance products use data analytics in one of two ways: they are either analytics-driven products, where analytics drive the product development; or traditional insurance products, which use analytics, as experience under the insurance product is accumulated. Ultimately, all insurance products tend to incorporate Big Data and Data Analytics in some form.

The following two charts from the SOA report illustrate a comparison of current and expected future uses of Big Data in insurance as identified by the surveys:

Current Uses:

Future Uses:
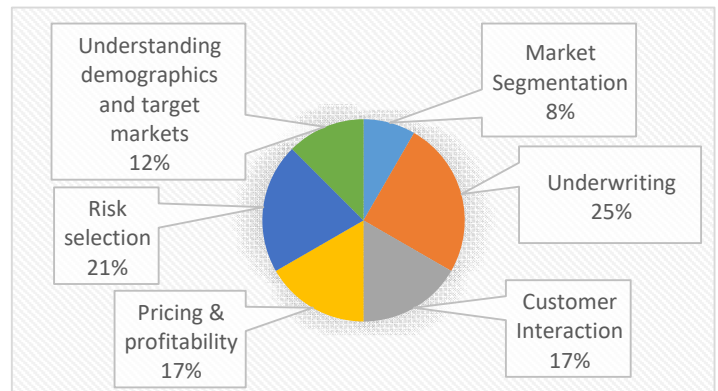
In regards to the use of Big Data in insurance applications in Asia-Pacific, the study noted that the Asia-Pacific region generally has significant privacy regulations in place on the use of data. In some cases, privacy regulations are stricter or more comprehensive than those in the U.S., leading to more restrictive use of certain information in insurance applications. For example, in the U.S., the use of credit scores or personal financial data for lines of business such as Auto and Home is typical, but in Asia-Pacific, this practice is uncommon, because there are more privacy regulations (such as Personal Data Protection Act) on the data than in the U.S. As a result, using third party vendors' data or external data is more restricted. There are also regulations around usage of personal data with respect to customer consent and data storage that are applicable and need to be incorporated. In many of the countries such as India, Japan and North Korea, only anonymized data can be exported from the country. With respect to South Korea, no data is permitted to leave the country.

Pros and Cons of using Big Data

Despite the many potential challenges, it appears that there is general acceptance that Big Data and Data Analytics-based approaches will only continue to grow in use in the Asia-Pacific region. The potential benefits are viewed as significant, both in terms of competitive advantage and in terms of customer satisfaction and product availability. It seems likely that the use of Big Data and Data Analytics will increase slowly but surely over time. Many of the challenges relate to the availability of data and data quality; addressing these challenges typically requires significant investment. Insurers in the region generally appear to be willing to make these investments in order to be in a position to realize the benefits of Big Data and Data Analytics across the breadth of their operations.

Below is a sample of some of the benefits and drawbacks of Big Data and Data Analytics as identified by the surveys:

Benefits

- Higher accuracy and quality of analysis that are a result of much larger sets of data being analyzed. The chances of missing smaller details, outliers and/or certain clusters of data decrease as the volume of data increases.
- Ability to develop products that better fit clients' needs (better understanding of customer behavior). Big Data can help insurers focus on the right data to

be studied through efficient aggregating of user data from multiple points across different products and through more targeted analysis of markets, regions and even countries.
- Ability to improve client persistency and reveal potential upsell opportunities through more detailed analysis of client behavior.
- Ability to streamline underwriting processes for ease of doing business (more efficient processes).
- Improved distribution channel analysis and advisor performance forecasting by improving companies' ability to identify new opportunities quickly and efficiently.
- Ability to use digital assets and enhance client interactions. There are many Big Data digital platforms that companies can choose from that can provide unique analysis of large sets of data. More advanced Big Data technology can also generate more sophisticated Big Data models that take into account the bigger picture of the collected data.
- New data sources that enable better classification of risk.
- Increase in revenue, business growth, efficiency and customer retention through analyzing higher volumes of data and at higher speeds than was done traditionally.

Drawbacks

- Restrictions on data usage, including regulatory and public concerns.
- Inability to implement recommendations due to lack of sufficient tools.
- Inability to gather large sets of data (low volume of data), which leads to low data quality, which, in turn, makes it difficult to use Big Data to drive decision-making (if not enough samples are available, analyst should be careful to caveat the findings).
- Data privacy issues and the danger of "data dredging" (which is the use of data mining to uncover patterns in data that can be presented as statistically significant without first devising a specific hypothesis as to the underlying causality).
- Limits on availability of technology to gather and analyze data.
- Business stakeholders' lack of understanding of the data.

Considering the potential benefits and drawbacks mentioned above, insurance companies should be aware of risks such as adverse selection, potential for lower customer satisfaction and potential for lower operational efficiency. It is important to start small and start as soon as possible to be able to manage competitive pressure and gain access to skilled expertise. In addition, the companies should increase collaboration between practitioners with different backgrounds (for example, information technology, statistical, modeling, actuarial and business), particularly if they are not trained data scientists and/or do not have insurance backgrounds (the training process could be lengthy and expensive and may involve bringing a team (or multiple teams) of external experts to lay the foundation of an internal data science team). Also, the stakeholders will need to transition from the traditional understanding of insurance to accepting new insights generated from Big Data and Data Analytics.

Regulatory Challenges

To gain a deeper understanding of Big Data and Data Analytics from a regulatory perspective in Asia-Pacific, we conducted interviews with individuals from the following organizations:

- Monetary Authority of Singapore (MAS)
- Insurance Authority of Hong Kong
- Office of Insurance Commission of Thailand (OIC)

The study showed that new regulations emerging in the region in response to the increasing use of Big Data and Data Analytics generally relate to privacy concerns, along with the fair treatment of customers. An example includes MAS's principles-based Fairness-Ethics-Accountability-Transparency (FEAT) regulation, which provides guidance to firms offering financial products and services on the responsible use of Artificial Intelligence (AI) and data analytics, and how to strengthen internal governance around data management and use. This is intended to foster greater confidence and trust in the use of AI and data analytics, as firms increasingly adopt technology tools and solutions to support business strategies and in risk management.

Greater use of algorithms and AI by insurers and their service providers will challenge regulators' ability to supervise these processes adequately. The potential risks that they pose (e.g. operational, cyber-security) could also be impacted by the potentially limited expertise in most insurers at present, and the lack of robust and tested risk management systems and controls with respect to advanced technologies.

If such a function is outsourced, then the insurer and the regulator will have the added challenge of overseeing and conducting due diligence on such activities.

These developments also mean that supervisors will have to develop new skill sets. Regulators will need to build a better understanding of how these technologies and business models work, be able to monitor the behavior of such firms and assess their impact on the market, and develop/hire the skill sets necessary to supervise these activities. Given the shortage of talent in some of these fields, supervisors may also find it challenging to compete with the industry for them.

Collaboration between supervisors, insurers, and technology providers is a key requirement in the development of effective regulation of Big Data and Data Analytics. An example of a collaborative measure taken by a supervisor is the use of sandbox, provided by the supervisor, which allows insurers to test new algorithms prior to implementation.

Conclusion

The use of Big Data and Data Analytics in Asia-Pacific appears to be evolving in a practical and well thought out manner. Insurers are generally implementing new technologies, and slowly incorporating the information from those technologies into pricing and other areas of insurance operations. This is a prudent approach, as significant time is required to develop a credible volume of experience under evolving technologies and changing behaviors.

The use of Big Data and Data Analytics is perceived to be widespread, at the very least in terms of insurer aspirations if not implementation. We believe that there is a general expectation that the use of sophisticated modeling and

technologies will only grow in the future. There is also optimism from both the industry and the regulatory perspective that these technologies can have a significant positive impact on the insurance industry – in terms of customer satisfaction, product development, lower costs, and safer and healthier consumers.

There is also an understanding that there are significant risks associated with the implementation of Big Data and Data Analytics-based approaches. Such risks include privacy, the fair treatment of consumers, unexpected costs of developing new solutions, and the acceptance of technological-based information as the basis for decision making by the management of insurers. It appears that the industry and the regulatory community are proactively and collaboratively developing new strategies to address these challenges, understanding that the potential benefits of Big Data and Data Analytics make its continued development in the insurance industry within the Asia-Pacific region all but inevitable.

The regulatory environment in Asia-Pacific is developing in concert with the increasing use of Big Data and Data Analytics. There is a general consensus that regulatory capabilities need to be expanded in order to effectively supervise insurers. Regulations need to evolve in order to catch up to changes in the way insurers do business. Those regulations are likely to be principles-based rather than rules-based as a means of setting guidelines for insurers without being overly prescriptive. Regulators in the region appear to be open to the responsible use of Big Data and Data Analytics in their jurisdictions and support exploration and further development of techniques related to Big Data and Data Analytics among insurers.

About the Author

Veronika Cooper, FSA*, **MAAA*** is an Actuarial Senior Associate, Risk & Regulatory Consulting, LLC. She can be contacted at veronika.cooper@riskreg.com*