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

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Section 1: Executive Summary

Overall, the authors of this report observe a rapidly developing environment with respect to the use of big data and data analytics in the Asia-Pacific region. Insurers and regulators in the region have an awareness of and appreciation for the potential benefits of big data and data analytics. Many markets in the region include insurers that are in the early stages of model development and implementation. The regulatory environment is developing as well to adapt to the growing use of new technologies and approaches in the pricing and servicing of insurance products. Regulators welcome and encourage 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.

The authors' expectation is that, as in other regions in the world including North America, the use of big data and data analytics will grow to the point that most insurers incorporate advanced modeling techniques in their everyday operations. Companies that are able to lead in this area have a potential significant competitive advantage over those slower to adopt such technologies and techniques.

There are various technologies such as artificial intelligence (AI), blockchain, cloud computing and the internet of things that are playing a key role in the development of big data and data analytics. These technologies are expected to become increasingly important in shaping the future of insurance by helping insurance companies build and implement successful applications, taking some of the oldest industries in the world, such as banking and insurance, into the 21st century and beyond and improving efficiency, customer service and access to health services and claim processing. There are, however, a few things that insurers should consider while implementing these new technologies, which may come as a challenge for some insurance companies. Some examples of those challenges include:

- New technologies are prone to data breaches, data leaks and cyber security issues.
- Roadblocks can include regulatory constraints, lack of top management buy-in, lack of well-thought-out strategy and road maps, as well as lack of implementation plans, which turn many projects into an academic exercise.
- Deployment of solutions is always a challenge. Analytics is successful only when it becomes part of the daily decision-making and not just a one-off project, and the data-driven philosophy has to become embedded in everything that an organization does to be successful.
- The existing data may be insufficient or of poor quality, so it may require a great deal of manual cleaning and manipulation before it can be used with any of these technologies.
- The cost of these new technologies is still quite high.

Despite the many potential challenges described above, 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.

The results of the *Big Data Analytics Market Study* that Dresner Advisory Services, LLC[1] conducted support this conclusion. The study surveyed participants from the U.S., Europe/Middle East/Africa (EMEA), and Asia-Pacific. Fifty-five percent of participants from North America say they use big data today, compared to 53% from EMEA and 44% from Asia-Pacific. Respondents form Asia-Pacific are also more likely than those from North America and EMEA to say that they may use big data in the future, and a few participants from each region indicated that they have no plans to use big data in the future at all (12% for North America, 11% for EMEA, and even less for Asia-Pacific). The study also indicates that regionally, among those that have not already adopted big data, North American organizations are most likely to adopt during the "current year" but also have the most plans deferred "beyond next year." Asia-Pacific respondents are most likely to adopt "next year"; EMEA respondents have the fewest "current year" plans; and more than 60% are deferring adoption "beyond next year."[2]

The authors would like to thank the Society of Actuaries (SOA) and the Project Oversight Group (POG) for their guidance and invaluable contributions to this research, including sharing information during the initial research stages, facilitating interviews, and assisting in identifying survey participants.

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[1] Dresner Advisory Services, LLC. Big Data Analytics Market Study. *dresneradvisory.com*, 2017
www.microstrategy.com/getmedia/cd052225-be60-49fd-ab1c-4984ebc3cde9/Dresner-ReportBig_Data_Analytic_Market_Study-WisdomofCrowdsSeries-2017.pdf (accessed July 7, 2019).
[2] Ibid; page 27.

Section 2: Background, Scope and Approach

2.1 BACKGROUND, SCOPE AND DEFINITIONS

The study covers the extent of the use of big data or data analytics to enhance insurer operations, including sales, distribution, product development, underwriting and claims management within various markets within the Asia-Pacific region where the SOA has a strong and growing member population. The Asia-Pacific markets within focus primarily include Hong Kong, Indonesia, Malaysia, Singapore, South Korea Taiwan, and Thailand; however, the authors considered other markets to the extent there was valuable information that could be beneficial to the primary target markets. The authors completed this research 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. They analyzed and summarized the results of the research in a final report.

Definitions
Big data refers to 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 refers to a process of inspecting, cleansing, transforming and modeling data with the goal of discovering useful information, informing conclusions and supporting decision-making.

2.2 APPROACH

The authors' research involved identifying underlying drivers of the issues and opportunities associated with Asia-Pacific region insurers' use of big data and data analytics, as well as a review of the regulatory environment. This includes consideration of the manner in which the regulatory process potentially influences insurer practices.

Below is a high-level overview of the authors' approach to the research:

Initial Research and Identification of Jurisdictions
This step involved performing initial research regarding the proposed topics, namely big data and data analytics. Concurrent with developing an understanding of the current state of these topics in Asia-Pacific, the authors developed a proposal for which jurisdictions to include in the research.

The goal of the authors' initial research was to develop an understanding of the following:
- Current insurers operating in each jurisdiction and those companies' general product offerings.
- General regulatory requirements in each jurisdiction and implications of those requirements on the mix of insurance products available.
- The extent to which insurers in each jurisdiction use big data/data analytics and for which applications.
- Key differences in the above items among jurisdictions.
- Potential areas where data analytics could be used to improve availability and/or cost of products for consumers.

Survey of Industry Practitioner and Regulatory Interviews
Based on the results of the initial research, the authors developed surveys regarding key topics for which traditional research did not fully address their needs. They broke down the survey into two iterations—one focusing on industry practitioners and another focusing on regulatory regimes in the region.

The authors used a mix of written questionnaires and interviews to accomplish their objectives. Based on authors' 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. The authors recruited participants via their existing network, where feasible, but also leveraged SOA contacts in other markets or by directly reaching out to industry practitioners and regulators in other markets. They then worked with the SOA to identify the participants to be included in the survey to enable a strong representation of practice across each jurisdiction, including a range of company sizes and product types.

The survey responses and regulatory interviews provided in-depth, detailed information on the use of big data and data analytics in Asia-Pacific. Overall, the research reflects input from 10 sources—seven industry practitioners and three regulatory bodies.

Section 3: Analysis – Survey Results

3.1 SUMMARY OF KEY FINDINGS

Survey participants hold various positions in modeling, actuarial, data and technology departments, mainly within the insurance industry. Participants' experience spans all jurisdictions included in the study. This is depicted in Figure 1.

Figure 1

ASIA-PACIFIC MARKETS—EXPERIENCE OF THE SURVEY PARTICIPANTS (NOT THE PHYSICAL LOCATION)[2]

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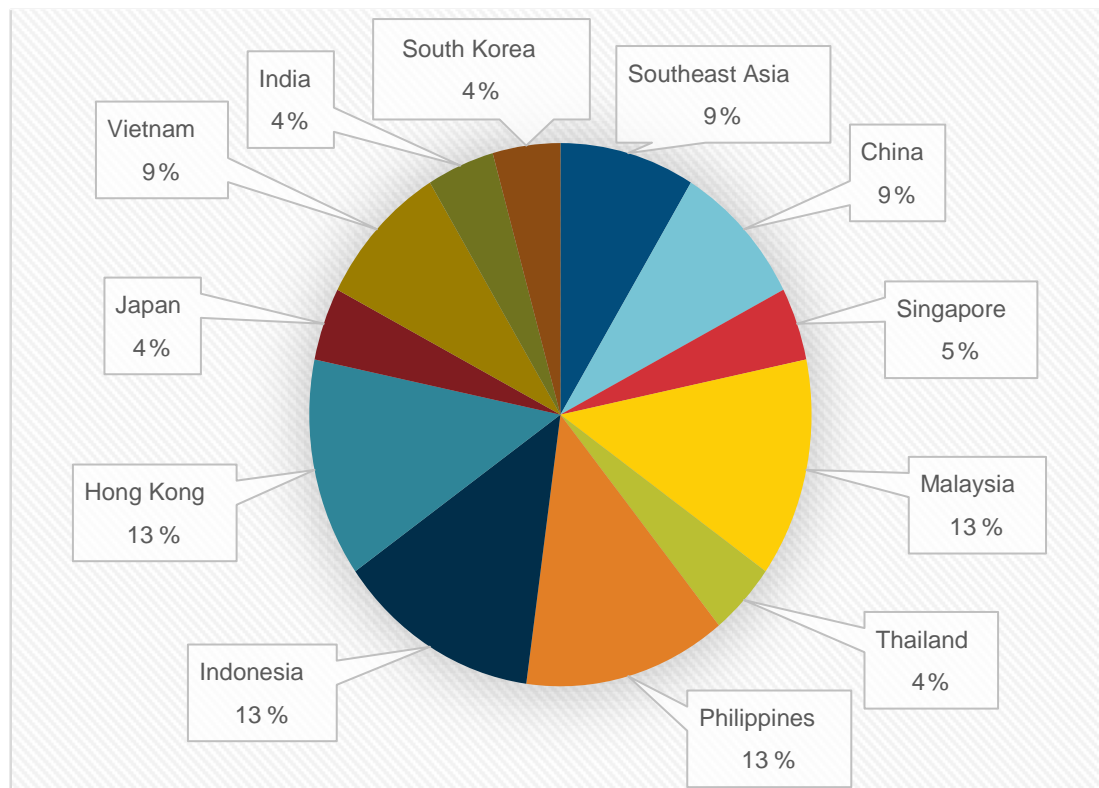
[2] Not all surveyed participants' experience falls within this research's focus areas—for example, China or Japan. The authors included all responses in Figure 1 to show the diversity of the interviewees' experience (if the area is not included in the chart above, the authors did not receive a response as to the specific experience in that market). While no survey participants identified Taiwan in these responses, 9% of the responses indicated familiarity with the Asia-Pacific region as a whole; as a result, the authors believe that the subsequent survey responses are relevant for all markets included in this study, including Taiwan. The participants also identified potential future uses of big data and data analytics, such as building more complex predictive modeling tools as the number of available data elements continues to grow that will allow for better risk selection, better fraud management, and using more sophisticated machine learning algorithms to improve results and increase efficiency.

Overall, participants believe 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 also a great interest in studying, applying and growing and expanding the use of big data in:

- Underwriting.
- Marketing, sales and distribution.
- Claims.
- Risk management and customer experience management, including customer demographics and behavior.
- Banking and financial services sectors.

Some of the drawbacks of using big data were identified as:

- Poor data quality.
- Regulatory restrictions on the usage of data.
- Lack of implementation tools.
- Not enough data samples to ensure credibility.
- Data privacy issues.
- Lack of ability to understand and interpret data.

Participants also stated that the concept of big data is still very new, and they identified several areas that the companies would like to explore further, such as:

- Regulation around sources and uses of big data: o Regulation differs from market to market, with items covered ranging from types of data that can be used, requirements for data sharing and transfer, and data privacy and controls.
    - Regulatory guidelines around data are rapidly evolving and in many instances are still being developed (such as ethical usage of data).
    - The end user needs to be made aware of the regulations around big data.
- Practical challenges associated with access to software and tools in the implementation of big data and data analytics such as:
    - Being able to deploy big data platforms.
    - Being able to develop strategies that are compliant with current regulation and the company's internal policies.
    - Availability and accessibility of software.
    - Availability of knowledgeable personnel.
    - Cost and time.

3.2 STATISTICS GATHERED & ANALYSIS PERFORMED

Over the course of the research, the authors gathered various statistics from the participants. The statistics included (but were not limited to) the following:

- Type of organization for which the participants work.
- Participants' experience with big data and data analytics for insurance purposes.
- Markets where experience was focused and sectors in which data analytics have been focused.
- Sectors within Asia-Pacific that are considered to be more advanced in applying the benefits of big data.
- Purpose of big data and data analytics today including expected purpose in the future.
- Sources used to gather the information for data analytics.

Sixty-seven percent of the participants (not including regulators) came from the insurance sector, with the rest of the participants working for consulting firms. None of the participants surveyed were associated with a research firm or any other sector besides insurance or consulting. The individuals surveyed came from various roles within the organizations, which included (but were not limited to) modeling, actuarial, data, technology, data analytics, and product development. One hundred percent of experience included both theoretical and practical (that is, not focused on either the theoretical or practical aspect of big data or data analytics).

When asked which sectors are most advanced in the use of big data today in Asia-Pacific, survey participants split fairly evenly among the life, health, and property and casualty (P&C) sectors as displayed in Figure 2. Survey participants and regulators in the region frequently cited telematics and wearable devices (see Section 4) in the context of big data and data analytics in Asia-Pacific, and these have applications across the life, health and P&C sectors. It is, therefore, not surprising that survey participants view these three sectors as comparable in terms of stage of advancement in the use of big data and data analytics. In addition, big data and data analytics have become key innovation drivers in most of the banking and financial services sectors. Most of the legacy systems are now being brought into the new era, and data, which were locked up in individual departmental silos, are now being unified in data lakes or databases.

Figure 2

SECTORS WITHIN ASIA-PACIFIC THAT ARE CONSIDERED TO BE MORE ADVANCED IN APPLYING THE BENEFITS OF BIG DATA
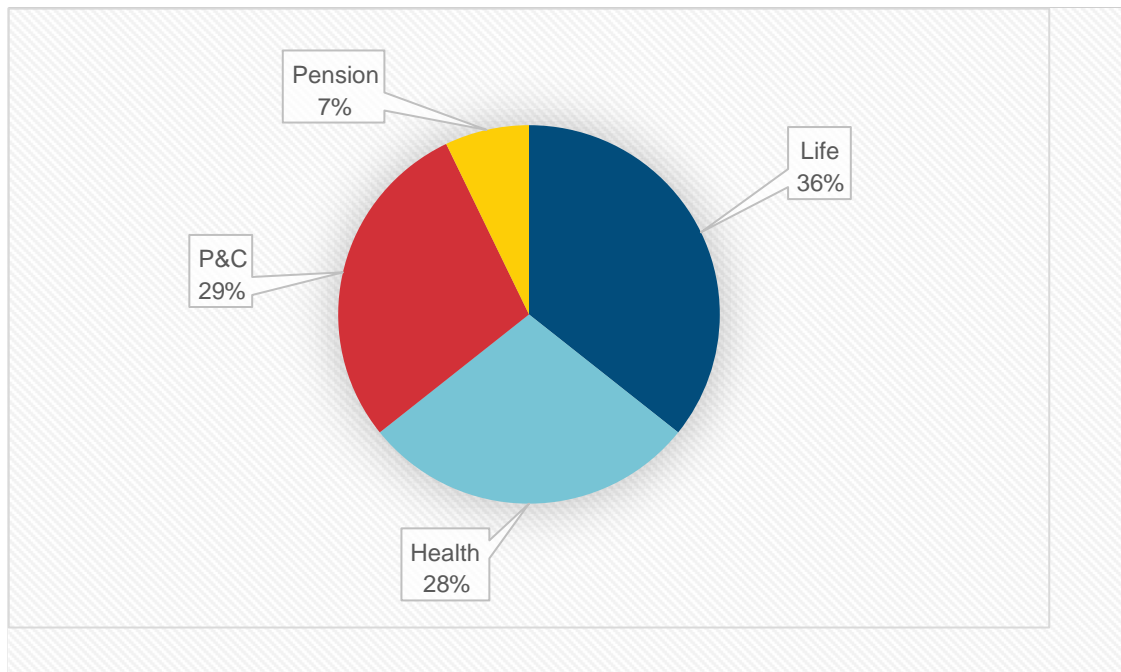
3.2.1 HOW BIG DATA IS USED IN INSURANCE MARKETS

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 is a classic big data application. Telematics refers to any device that merges telecommunications and informatics. It includes anything from GPS systems to navigation systems. Also, insurance companies are leveraging internet and mobile devices for various insurance applications, underwriting and claims management.

Many insurers in the region are investing in the development of various data analytics models, such as:

- cross-sell and upsell—such as 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.
- lapse and retention.
- media optimization.
- claims fraud analytics, claims orientation analysis.
- underwriting and pricing analytics.

Data-driven decision-making is being used in all segments of the insurance value chain: underwriting, pricing, marketing, sales, distribution, claims, risk management and customer experience management. 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. Claims data are also analyzed to drive upsell, cross-sell or risk mitigation and prevention opportunity for existing clients as well as to develop disease management programs by illness. There has been a movement toward greater optimization of clients' experience with digital and nondigital touch points, real-time product recommendations, and streamlined claims processes with machine learning models.

3.2.2 REGULATORY OR ACTUARIAL GUIDELINES THAT APPLY TO BIG DATA IN THE INSURANCE INDUSTRY

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 the Personal Data Protection Act) on 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 markets—such as India, Japan and North Korea—only anonymized data can be exported from the market. With respect to South Korea, no data are permitted to leave the market.
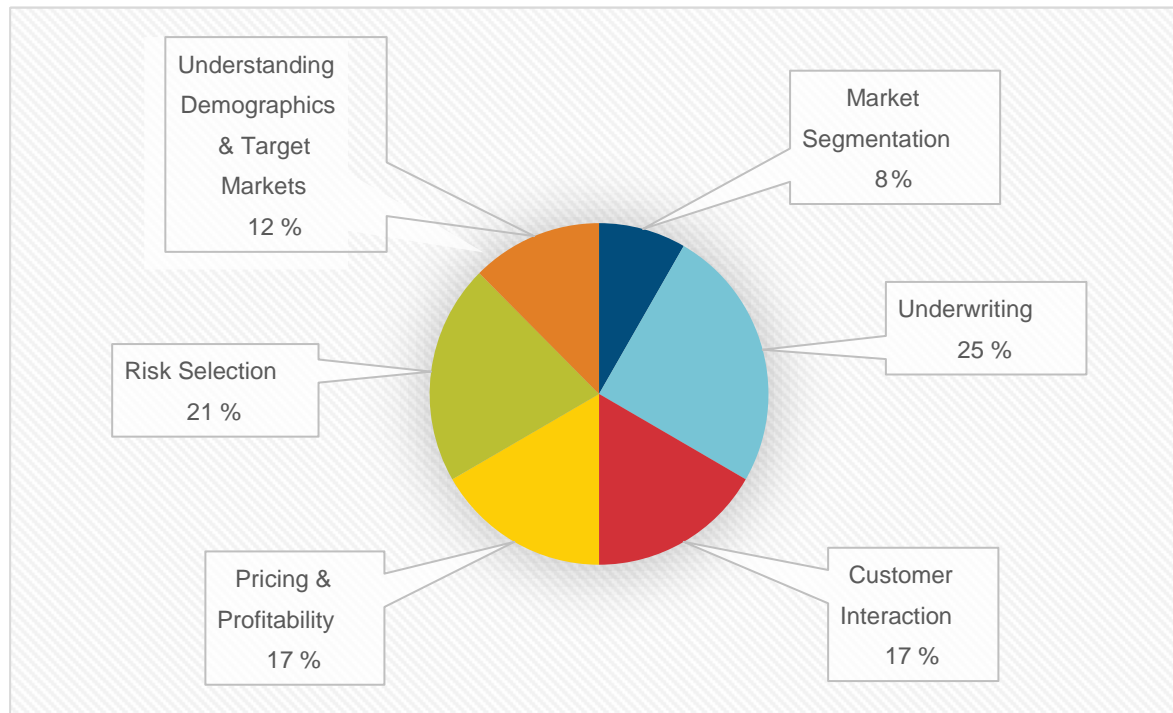
3.2.3 MAIN AREAS FOR USE OF BIG DATA AND DATA ANALYTICS TODAY AND IN THE NEAR FUTURE

Big data is used in a variety of insurance applications. This is expected to continue in the future, with potential added emphasis to underwriting and risk selection. This can be seen by comparing the two figures below:

Figure 3
CURRENT USES
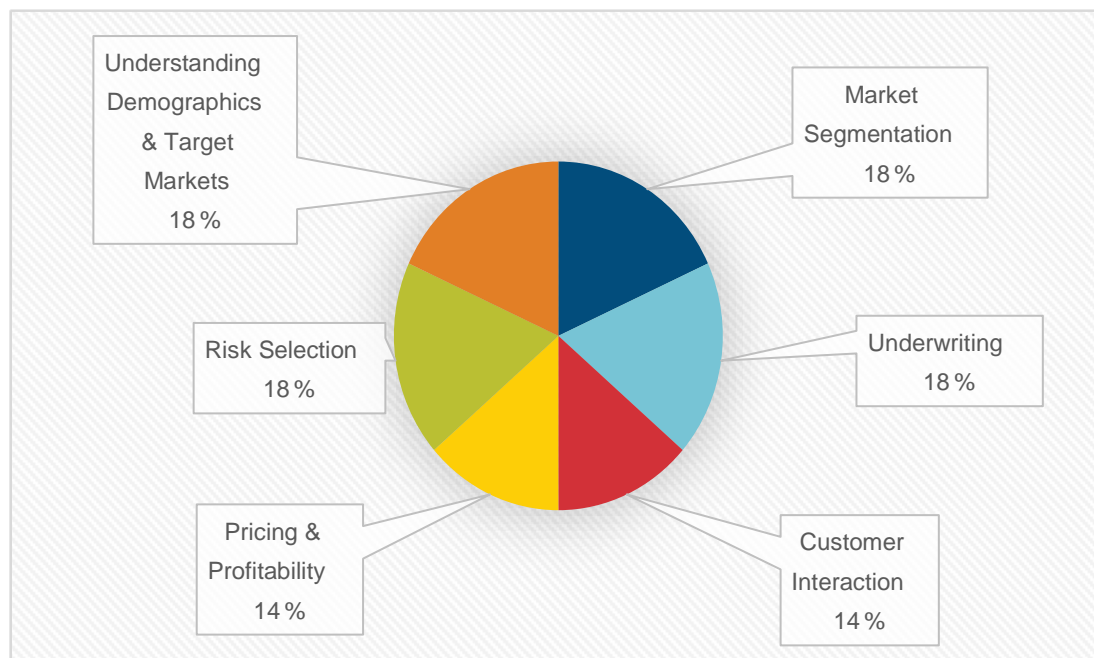
Figure 4
FUTURE USES

3.2.4 INSURANCE PRODUCTS USE BIG DATA AND DATA ANALYTICS

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

3.2.5 SOURCES USED TO GATHER INFORMATION FOR DATA ANALYTICS

Both traditional and nontraditional sources are used to obtain external data and provide any kind of data that can be linked to an organization's internal data to see whether they have any impact on the target. For example, at least one large insurer in the Asia-Pacific region is trying to leverage its internet data for insurance purposes.

A critical aspect of the process relates to the cleaning and filtering of data. Considerations related to data sources include potential regulatory concerns and the relevance of the data to the purpose of the analytics. Ultimately, data filtering typically is a subjective exercise and is based on human judgement. That is why it is important to have substantive industry expertise within the data science team to make those decisions.

3.2.6 BENEFITS AND DRAWBACKS OF BIG DATA AND DATA ANALYTICS

The benefits of big data and data analytics include but are not limited to:

- 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.

- The 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 and regions.
- The ability to improve client persistency and reveal potential upsell opportunities through more detailed analysis of client behavior.
- Equitable pricing for each risk. Big data enables the company to gather and analyze the data in a more streamlined approach and in much larger volumes. This leads to better and more accurate identification of trends, rather than using a traditional approach of looking at the prices of similar competitor products and benchmarking the value of their own product to come up with the best pricing strategy for their own line.[3]
- The ability to streamline the underwriting process 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.
- The 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 data sets. 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.
- Better prioritization of cases for fraud investigation. Traditionally, fraud investigators had relied on data analysts to execute standardize query language queries against a data warehouse that stores massive amounts of claims, billings and other information. Due to the volume, velocity and variety of data in the warehouse, the process could take weeks or months before enough evidence for a legal case was developed. So, it took much longer to detect fraud, and organizations would suffer more losses in the meantime. With big data, companies have been developing an integrated approach, where data are aggregated and processed through the big data framework, which enables insurance companies' fraud detection efforts to be more scalable, faster and more accurate.[4]
- Increase in revenue, business growth, efficiency and customer retention through analyzing higher volumes of data and at higher speeds than was done traditionally.

The drawbacks are identified as:

- Restrictions on data usage, including regulatory and public concerns.
- The inability to implement recommendations due to lack of sufficient tools. Companies typically need new enterprise information technology (IT) architectures to work with vast volumes of data, which require larger organizational commitment and an organization's ability to acquire the necessary skills to manage the data at the required speed and scale.[6]
- The 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 (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).

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[3] Pricing Solutions. How Does Data Analytics Impact Pricing Strategy? https://www.pricingsolutions.com/pricingblog/data-analytics-impact-pricing-strategy (accessed July 9, 2019).
[4] Nelson, Paul. Fraud Detection Powered by Big Data - An Insurance Agency's Case Story. Search Technologies, https://www.searchtechnologies.com/blog/fraud-detection-big-data (accessed July 9, 2019). [6] Accenture. Big Success with Data Executive Summary. 2014, https://www.accenture.com/usen/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_14/Accenture-Big-DataPOV.pdf (accessed July 9, 2019).

- Limits on availability of technology to gather and analyze data.
- Business stakeholders' lack of understanding of the data.

3.2.7 RECOMMENDATIONS FOR COMPANIES OR MARKETS THAT HAVE NOT YET ADOPTED THE USE OF BIG DATA FOR THEIR OPERATIONS

Perspectives from survey participants include:

- Companies should be aware of risks, including but not limited to adverse selection, potential for lower customer satisfaction and potential for lower operational efficiency.
- Companies need to start as soon as possible in light of competitive pressures.
- Companies should consider starting small.
- It is important to get the basics right, hire well and have support from management and stakeholders.

Practical challenges associated with adopting big data approaches for insurers include:

- Access to skilled expertise.
- Collaboration between practitioners with different backgrounds (for example, IT, statistical, modeling, actuarial and business), particularly if they are not trained data scientists and/or do not have an insurance background.
- 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.
- Stakeholders, in turn, will need to transition from the traditional understanding of insurance to accepting new insights generated from big data and data analytics.

3.2.8 TECHNIQUES FOR GATHERING USEFUL INFORMATION FOR BIG DATA ANALYSIS—SIMPLE OR COMPLEX?

The challenges of gathering information have less to do with techniques or software and more to do with data availability, data quality, business knowledge of data (including insurance professionals' deep domain knowledge of insurance data), and data applications. For example, if insurance professionals collect telematics data, they will need different architecture than if they were simply gathering customer information. They have to implement digital tools, websites, applications, call center recordings and sales tools, which could be simple or complex depending on the data captured, skills available and techniques used across different products.

### 3.2.9 KEY TECHNOLOGIES AND THAT WILL IMPACT THE FUTURE OF INSURANCE

Survey participants offered the following perspective on technologies that are expected to impact the future of insurance. Participants cited big data, while not a technology, was cited by participants as a key element underlying future applications and, therefore, is included in the list below:

- Artificial intelligence—the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making and translation between languages.
- 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.
- Blockchain—a time-stamped series of immutable records of data that are managed by a cluster of computers not owned by any single entity. Each of these blocks of data (i.e., block) is secured and bound to each other using cryptographic principles (i.e., chain). One example of blockchain is a system in which a record of transactions made in bitcoin or another cryptocurrency are maintained across several computers that are linked in a peer-to-peer network.

- Cloud computing—the practice of using a network of remote servers hosted on the internet to store, manage and process data, rather than a local server or a personal computer.
- Robotic process automation—an emerging form of business process automation technology based on the notion of software robots or AI workers.
- The internet of things (including telematics)—the ever-growing network of physical objects that feature an internet protocol address for internet connectivity and the communication that occurs between these objects and other internet-enabled devices and systems. The internet of things is closely related to social media and social media mining, which is the process of obtaining big data from user-generated content on social media sites (such as Facebook, LinkedIn and Twitter) and mobile applications to extract patterns, form conclusions about users, and act upon the information, often for the purpose of advertising to users or conducting research.

Figure 5
PARTICIPANTS' METHODS USAGE
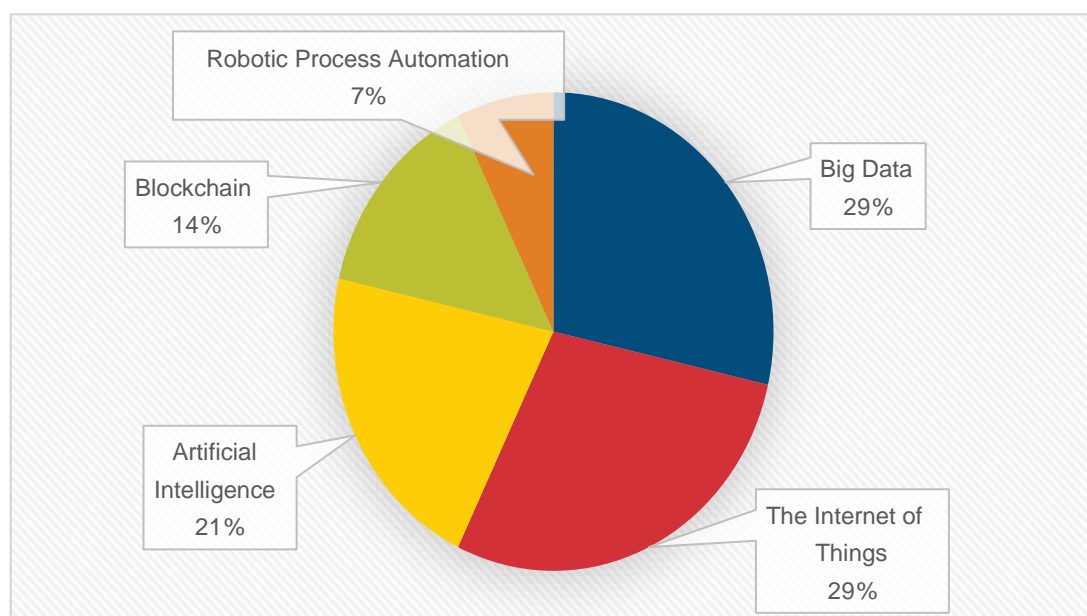
The following are considered to be these technologies' benefits to the insurance market:

- These technologies help insurance companies build and implement successful applications.
- They are taking some of the oldest industries in the world, such as banking and insurance, into the 21st century and beyond.
- The markets have already observed significant improvement in profitability, growth and operational efficiency after implementing some of these technologies.
- They improve customer service, including access to health services and claim processing.

The following are considered to be these technologies' drawbacks to the insurance market, including some of the examples of practical challenges that participants observed from the use of these technologies in the insurance markets:

- At first, insurance professionals may be very excited about these new technologies but then fail at implementation and lose confidence in benefits.
- New technologies are prone to data breaches, data leaks and cyber security issues.

- Because these technologies are all rather new, markets may run into sustainability issues.
- There are regulatory constraints, lack of top management buy-in, lack of well-thought-out strategy and road maps, as well as lack of implementation plans, which turn many projects into an academic exercise.
- Deployment of solutions is always a challenge. Analytics is successful only when it becomes part of the daily decision-making and not as a one-off project, and the data-driven philosophy has to become embedded in everything that an organization does to be successful.
- The pushback from insurance agents may affect the success of digital innovations.
- The existing data may be insufficient or of poor quality, so they may require a great deal of manual cleaning and manipulation before they can be used with any of these technologies.
- The cost of these new technologies is still quite high.
- Senior management's mindset, as well as company culture, may be unwilling to take an agile approach—this makes implementing new technologies even more challenging.

3.2.10 SURVEY RESULTS—CONCLUSIONS

Despite the many potential challenges described in the previous section, 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 to be in a position to realize the benefits of big data and data analytics across the breadth of their operations.

Section 4: Big Data and Data Analytics from the Regulatory Point of View

To gain a deeper understanding of big data and data analytics from a regulatory perspective in Asia-Pacific, the authors conducted interviews with the individuals from three Asia-Pacific market insurance authorities. The authors have consolidated information from these interviews in the sections that follow.

4.1 STATE OF THE MARKET

Use of Big Data and Data Analytics

In recent years, there has been a significant amount of interest in leveraging technological advancements to improve the customer experience and revamp existing manual processes within the insurance sector. There have also been a number of new startups entering the market to develop solutions targeted at improving specific segments of the insurance value chain.

While interest is high, insurers' implementation of big data and data analytics-related techniques is still in early stages.

The focus to this point has included:

- Telematics for auto insurance.
- Wearable devices for life and health insurance.
- Digital distribution channels, such as website or mobile phone-based options for obtaining insurance.
- Marketing, such as through targeted advertising on social media platforms.
- Customer service, such as through chatbots.
- Fraud detection.

However, the use of more advanced technological solutions (such as AI, big data, data analytics, blockchain technologies and machine learning) generally remains exploratory in nature, with the majority of these solutions being developed by a specific group of insurers (mainly large international insurance groups) rather than widespread testing and adoption across the entire sector.

Telematics is viewed as particularly promising in the insurance market, because it leverages GPS technology and wireless communications to enable insurers to collect usage and behavior data that are current. By doing so, insurers' pricing accuracy may improve, overall claims are expected to be lower, and the products and premiums can be customized to each customer. With the increasing adoption of connected devices and internet of things in consumers' daily lives, telematics has the potential to significantly change the insurance market.

Potential Areas Where Big Data and Data Analytics Could Help Improve Product Availability and/or Cost to the Consumer

With innovations, there is a potential for an increase in expanded insurability. There would ideally be a wider choice of products coupled with the potential for lower premiums. With the use of advanced analytics, there can be more risk-sensitive and real-time underwriting that could lead to customization of products. Fraud detection and improved claims management from advanced data analysis are additional manners in which the cost to the consumer could be improved.

Key Technologies that Affect Insurance

There has been a gradual increase in use cases where insurers are beginning to use technological solutions to automate and digitalize existing manual processes for efficiency gains and to provide more agile services to the consumer. At present, these are mainly through relatively basic technological solutions, such as the use of rules-based algorithms where certain processes, such as underwriting or claims management, are performed based on defined parameters, with more complex cases being escalated for human intervention.

4.2 REGULATORY CHALLENGES

Some existing regulations in some markets do not specifically contemplate the technological developments that have taken place in the insurance industry, while others are intentionally left open to allow for a wide variety of processes and technologies across all insurance lines. 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.

Insurers' and their service providers' greater use of algorithms and AI will challenge regulators' ability to supervise these processes adequately. The potential risks that they pose (e.g., operational, cybersecurity) could also be accentuated 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 and 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 among supervisors, insurers and technology providers is a key requirement in the development of effective regulation of big data and data analytics. An example of collaborative measures that some supervisors has taken is the use of sandbox, provided by the supervisor, which allows entities to test new algorithms prior to implementation. In some cases, sandboxes may include licensed insurers, and in others unlicensed entities are permitted.

4.3 NEW REGULATIONS

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 the Monetary Authority of Singapore's Fairness-Ethics-Accountability-Transparency (FEAT) principles.[5]

The FEAT document provides guidance to firms offering financial products and services on the responsible use of AI and data analytics 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.

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[5] Monetary Authority of Singapore. Principles to Promote Fairness, Ethics, Accountability and Transparency (FEAT) in the Use of Artificial Intelligence and Data Analytics in Singapore's Financial Sector.

4.4 CONCLUSION

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 to effectively supervise insurers. Regulations need to evolve 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.

Section 5: Concluding Remarks

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, because 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. The authors believe 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 their continued development in the insurance industry within the Asia-Pacific region all but inevitable.

Appendix 1: Software and Tools Used in the Implementation of Big Data and Data Analytics

The information in this appendix is drawn from industry practitioners' survey responses.

List of Software and Tools

- SAS—a software suite developed by SAS Institute for advanced analytics, multivariate analysis, business intelligence, data management and predictive analytics. It is a software suite that can mine, alter, manage and retrieve data from a variety of sources and perform statistical analysis on it.
- R (for modeling)—a programming language and free software environment for statistical computing and graphics supported by the R Foundation for Statistical Computing. The R language is widely used among statisticians and data miners for developing statistical software and data analysis.
- Python—an interpreted, high-level, general-purpose programming language.
- Spark (for production implementation)—a free and open-source software web application framework and domain-specific language written in Java. Spark is intended for quickly creating web applications in Java with minimal effort.
- Hadoop—an open-source software framework for storing data and running applications on clusters of commodity hardware. It provides massive storage for any kind of data, enormous processing power and the ability to handle virtually limitless concurrent tasks or jobs.
- Tensorflow—an open source software library that Google released in 2015 to make it easier for developers to design, build and train deep learning models. At a high level, Tensorflow is a Python library that allows users to express arbitrary computation as a graph of data flows.
- Keras (deep learning specific tools)—an open-source neural-network library written in Python. Keras was conceived to be an interface rather than a standalone machine-learning framework.
- SQL—a standardized query language for requesting information from a database.
- Emblem—an industry-leading software solution used in both commercial and personal lines to build predictive models that support a broad range of applications, including pricing premiums more effectively.
- Radar (or software-defined radar technology)—radio technology where software defines some or all of the physical layer functions. This means that the specification, performance and function are all achieved through software alone, without any changes to the physical hardware.

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