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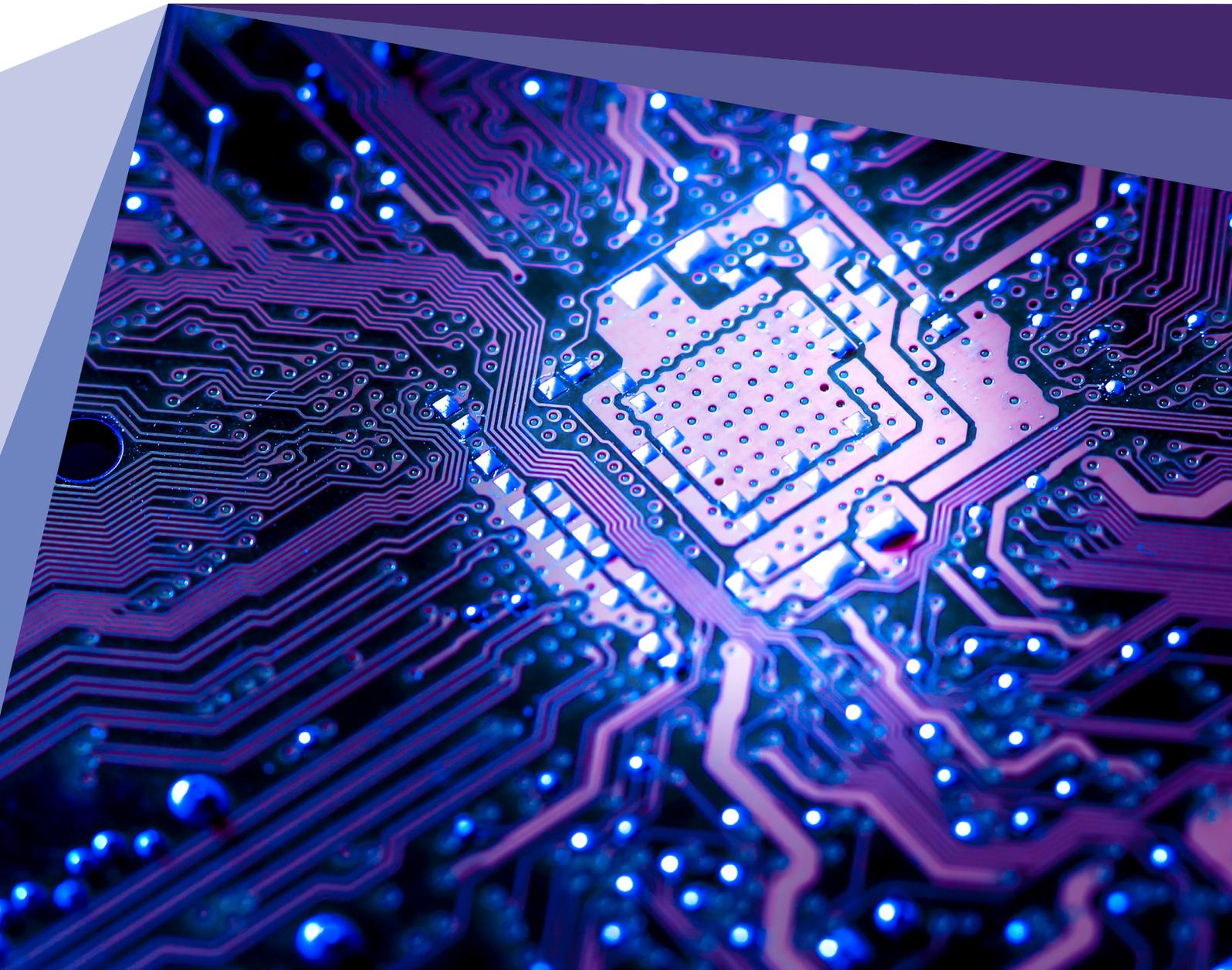


众安保险

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TECHNOLOGY-DRIVEN VALUE GENERATION IN INSURANCE

INDUSTRY REPORT



MARSH & McLENNAN
COMPANIES

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PREFACE

Insurers are leveraging cutting-edge technologies to improve and upgrade existing insurance products, develop innovative new ones, and reshape the industry. The key technologies include cloud computing, the Internet of Things (IoT), big data, artificial intelligence, and blockchain.

Applications based on these technologies are either being developed or adopted by insurance companies. While applications based on cloud computing, telematics, and big data are already having a significant impact on the insurance industry, further applications from big data, AI, and blockchain will have a greater impact in the future.

Insurers with strong technology capabilities could export their technologies to other insurance companies, financial services companies, or even non-financial services companies. ZhongAn Technology, a subsidiary of ZhongAn Insurance – the first insurer managing 6 billion policies in the cloud – was launched to export such expertise.

Oliver Wyman, ZhongAn Insurance and ZhongAn Technology are jointly publishing this report to analyse these technologies, and answer the following questions:

1. Which technologies are shaping the future of the insurance industry?
2. What are the applications of these technologies in the insurance industry?
3. What is the potential value these applications could generate?
4. How can an insurer with strong technology capabilities monetise its technologies?
5. Who is benefiting from the value generated by these applications?

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1. KEY TECHNOLOGIES SHAPING THE FUTURE OF INSURANCE

The evolution of financial technology (FinTech) is reshaping the broader financial services industry. Technology is now disrupting the traditionally more conservative insurance industry, as the rise of InsurTech revolutionises how we think about insurance distribution. Moreover, insurance companies are improving their operating models, upgrading their propositions, and developing innovative new products to reshape the insurance industry as a whole.

Five key technologies are driving the change today:

1. Cloud computing
2. The Internet of Things (including telematics)
3. Big data
4. Artificial intelligence
5. Blockchain

This report examines these technologies' potential to create value in the insurance industry. It also examines how technology providers could create new income streams and take advantage of economies of scale by offering their technological backbones to participants in the insurance industry and beyond.

Oliver Wyman, ZhongAn Insurance and ZhongAn Technology – a wholly owned subsidiary of ZhongAn insurance and China's first online-only insurer – are jointly publishing this report to analyse the insurance technology market and answer the following questions:

1. Which technologies are shaping the future of the insurance industry? (Chapter 2)
2. What are the applications of these technologies in the insurance industry? (Chapter 3)
3. What is the potential value these applications could generate? (Chapter 3)
4. How can an insurer with strong technology capabilities monetise its technologies? (Chapter 4)
5. Who is benefiting from the value generated by these applications? (Chapter 5)

2. INTRODUCTION OF FIVE KEY TECHNOLOGIES

2.1. CLOUD COMPUTING

Cloud computing refers to storing, managing, and processing data via a network of remote servers, instead of locally on a server or personal computer.

Key enablers of cloud computing include the availability of high-capacity networks and service-oriented architecture. The three core characteristics of a cloud service are:

- **Virtualisation:** The service is based on hardware that has been virtualised
- **Scalability:** The service can scale on demand, with additional capacity brought online within minutes
- **Demand-driven:** The client pays for the services as and when they are needed

Cloud services can be separated into broad categories based on the level of the systems stack at which the user obtains the service, from raw hardware and operating systems to applications and web servers.

Exhibit 1: Classification of cloud-computing service model

SERVICE MODEL	DESCRIPTION	EXAMPLE SERVICES
Software as a Service (SaaS)	Internet-based software based on cloud technologies and maintained by the provider's staff	Google Mail, Microsoft Office 365, Salesforce.com
Infrastructure as a Service (IaaS)	Provision of virtual servers, storage, or network	Google Drive, Amazon AWS, IBM Softlayer
Platform as a Service (PaaS)	A "sandbox" for software engineers to develop, test, and deploy new web-based applications	Google App Engine, Microsoft Azure, Force.com

Source: Oliver Wyman analysis

The cloud-computing deployment model continues to evolve along with the industry. As a result, the traditional classification of cloud computing into private, community, public, and hybrid has become more nuanced. However, since this report is evaluating the underlying technology, we will not further distinguish between these deployment models.

IaaS and PaaS are mature, with a few dominant global players, but they provide services which are not specific to insurance. Hence, this report will focus only on insurance-specific SaaS services.

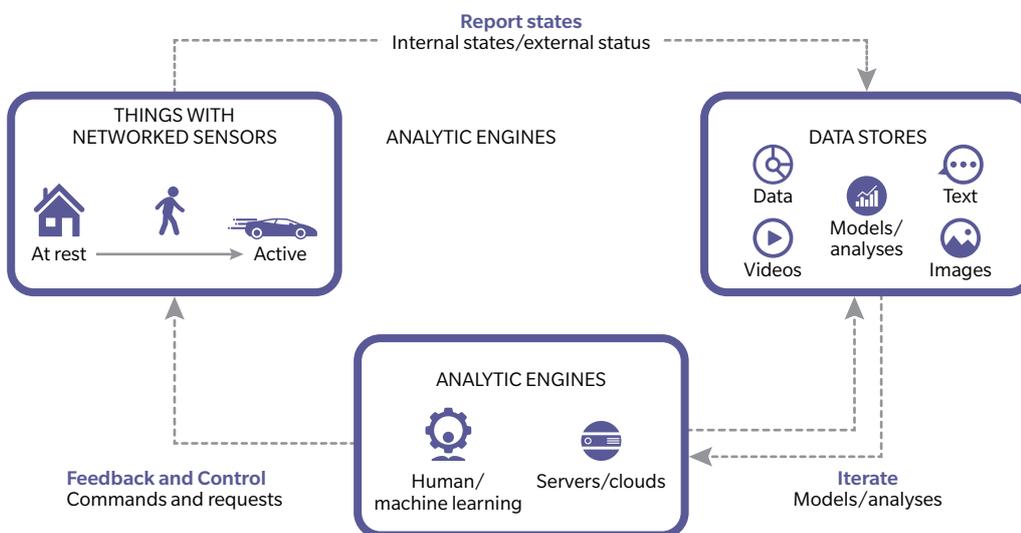
Key implication: Cloud computing benefits individuals through improved interactive platforms and data management, and businesses through cost efficiency and workforce mobility.

2.2. INTERNET OF THINGS (INCLUDING TELEMATICS)

Telematics is the most common form of the broader Internet of Things (IoT). The IoT refers to the combination of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these physical objects to collect and exchange data.

The IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems, and the Internet. This convergence has helped remove the walls between operational technology and information technology, allowing unstructured, machine-generated data to be analysed for insights that will drive improvements.

Exhibit 2: The Internet of Things-Three components with three sets of connections



Source: Celent – A member of the Oliver Wyman Group

One of the most advanced IoT applications is telematics, whose origins lie in the fusion of telecommunications and informatics and their application in vehicles. As data collection and transmission are improved, telematics leads to a better understanding of underlying activities and processes. Thus, telematics can make offerings more customer-centric by tailoring them to individual cases and creating new products to meet specific needs. Telematics can also help to steer user behaviour.

Key implication: Telematics can increase efficiency, productivity and create value through increased accuracy and speed of decisions through the connectivity between systems and objects.

2.3. BIG DATA

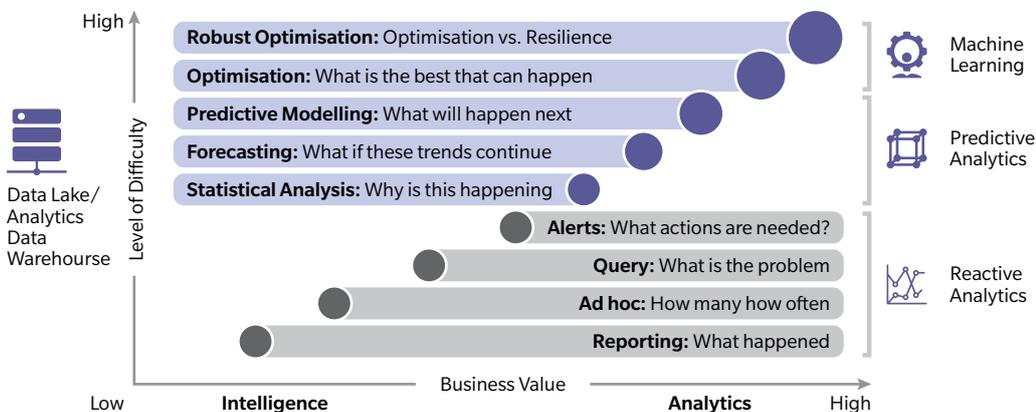
Big data refers to data sets that are so large or complex that traditional data processing application software is insufficient to deal with them. A definition from Celent (a division of Oliver Wyman) refers to the “five V” key challenges for big data in insurance:

- **Volume:** As sensors cost less, the amount of information gathered will soon be measured in exabytes
- **Velocity:** The speed at which data is collected, analysed, and presented to users
- **Variety:** Data can take many forms, such as structured, unstructured, text or multimedia. It can come from internal and external systems and sources, including a variety of devices
- **Value:** Information provided by data about aspects of the insurance business, such as customers and risks
- **Veracity:** Insurance companies ensure the accuracy of their plethora of data

Modern analytical methods are required to process these sets of information. The term “big data has evolved to describe the quantity of information analysed to create better outcomes, business improvements, and opportunities that leverage all available data. As a result, big data is not limited to the challenges thrown up by the five Vs. Today there are two key aspects to big data:

1. **Data:** This is more-widely available than ever because of the use of apps, social media, and the Internet of Things
2. **Analytics:** Advanced analytic tools mean there are fewer restrictions to working with big data

Exhibit 3: Moving from reactive to predictive analyses to deliver operational value



Source: Oliver Wyman analysis

One of the most advanced forms of analytics is machine learning. It enables machines to improve at tasks through experience, without explicit programming. In short, they mimic human reasoning and learning. These algorithms are applied to large datasets to make determinations or predictions about them, leveraging statistical methods such as decision trees and ensemble learning. The algorithms often produce significantly better results than traditional modelling.

Key implication: Big data offers more-advanced ways to analyse and use data – with a range of applications, from recommendation engines to fraud detection. Sensor data can also be leveraged to recognise human activity.

2.4. ARTIFICIAL INTELLIGENCE (AI)

The understanding of AI has evolved over time. In the beginning, AI was perceived as machines mimicking the cognitive functions that humans associate with other human minds, such as learning and problem solving. Today, we rather refer to the ability of machines to mimic human activity in a broad range of circumstances. In a nutshell, artificial intelligence is the broader concept of machines being able to carry out tasks in a way that we would consider smart or human.

Therefore, AI combines the reasoning already provided by big data capabilities such as machine learning with two additional capabilities:

1. Imitation of human cognitive functions beyond simple reasoning, such as natural language processing and emotion sensing
2. Orchestration of these cognitive components with data and reasoning

A third layer is pre-packaging generic orchestration capabilities for specific applications. The most prominent such application today are bots. At a minimum, bots orchestrate natural language processing, linguistic technology, and machine learning to create systems which mimic interactions with human beings in certain domains. This is done in such a way that the customer does not realise that the counterpart is not human.

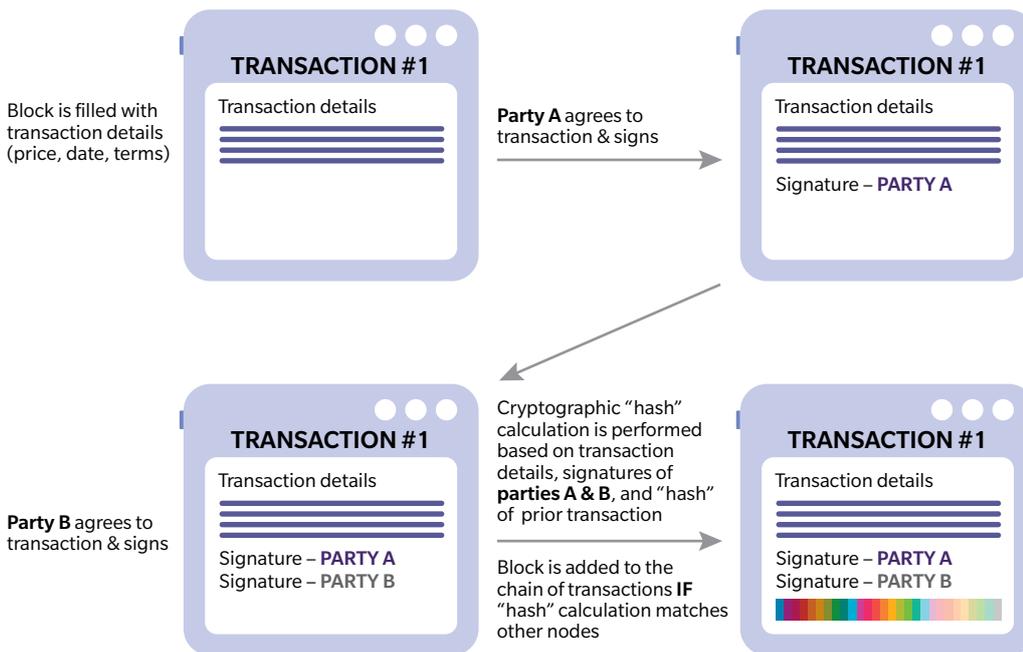
Key implication: Applications of AI are increasingly widespread and complex. A 2013 study by the Oxford Martin School – *The future of employment: How susceptible are jobs to computerisation?* – claims that 47 percent of US jobs in 2010 could become highly computerised in 10 or 20 years due to AI. This is especially important for insurers, as all the insurance-specific job profiles analysed had at least a 90 percent chance of being partially or fully digitised.

2.5. BLOCKCHAIN

Blockchain is a distributed ledger technology used to store static records and dynamic transaction data distributed across a network of synchronised, replicated databases. It establishes trust between parties without the use of a central intermediary, removing frictional costs and inefficiency.

From a technical perspective, blockchain is a distributed database that maintains a continuously growing list of ordered records called blocks. Each block contains a timestamp and a link to a previous block. Blockchains have been designed to make it inherently difficult to modify their data: Once recorded, the data in a block cannot be altered retroactively. In addition to recording transactions, blockchains can also contain a coded set of instructions that will self-execute under a pre-specified set of conditions. These automated workflows, known as smart contracts, create trust between a set of parties, as they rely on pre-agreed data sources and require not third-party to execute them.

Exhibit 4: Illustration of blockchain



Source: Goldman Sachs Global Investment Research

Blockchain technology in its purest form has four key characteristics:

- 1. Decentralisation:** No single individual participant can control the ledger. The ledger lives on all computers in the network
- 2. Transparency:** Information can be viewed by all participants on the network, not just those involved in the transaction
- 3. Immutability:** Modifying a past record would require simultaneously modifying every other block in the chain, making the ledger virtually incorruptible
- 4. Singularity:** The blockchain provides a single version of a state of affairs, which is updated simultaneously across the network

The most popular application example of blockchain is bitcoin, a digital currency. The distributed bitcoin ledger records bitcoin ownership and transactions made in bitcoins. Through the consensus mechanism, bitcoin overcomes the trust problem that typically characterises a network of unknown, distributed parties such as exist on the Internet. This illustrates one of the key advantages of blockchain over other technologies: It allows trusted, binding transactions between anonymous parties, something a central counterparty implementation – which is often more efficient – cannot deliver for similar applications.

Key implication: Blockchain has a range of use cases from virtual currencies like bitcoin to smart contracts, data storage, and automated transactions. Its technical potential is still understood by only a small group of experts. However, new uses continue to be developed.

3. VALUE GENERATION THROUGH TECHNOLOGY

3.1. IMPACT OF TECHNOLOGY IN INSURANCE

Insurance companies have been users of technology since the very early days of data processing. The industry often even proudly claims to have been the first “big data industry,” as it developed risk models based on data of historical loss events. Since then times have changed and the insurance industry would probably not be the first that a casual observer would associate with modern technology.

However, over the last five years insurance companies have increased their investments to modernise and advance their technology. This engagement is partly driven by the new applications enabled by these technologies and at least to some extent by external necessity, as InsurTech players make progress.

Today, many of the technologies mentioned in Chapter 2 are applied in the insurance industry. In general, we can distinguish three technology application areas.

Application area 1 “improve”: Improvement of operating models employed in producing traditional insurance propositions. This is “innovation behind the curtain,” as the end customer still interacts with a conventional insurance proposition.

Application area 2 “upgrade”: Technology-enabled upgrades of existing insurance products that alter the insurance proposition and have an impact on the customer experience. Such upgrades are “in front of the curtain” – they often add risk or claims services.

Application area 3 “innovate”: Insurance business model innovations, such as embedding insurance into an ecosystem which ultimately might not even need insurance propositions any more but has other, often opaque, ways of providing cover for risks.

3.1.1. APPLICATION AREA 1 “IMPROVE”: IMPROVEMENT OF TRADITIONAL OPERATING MODELS (“BEHIND THE CURTAIN”)

Other industries, such as automotive, rely heavily on supply networks and have significantly reduced the degree to which they add value internally over the last 30 years. But insurers still produce a very large portion of their products themselves.

Since a large portion of insurance companies’ value chains are covered internally, the application of technology could significantly improve their business and operating models. In many cases this has limited or no impact on the customer, or does not require the customer’s involvement. So clients may not necessarily notice that technology is being used to improve the insurance business.

We observe five major areas of improvement in the insurance industry today:

- 1. Street pricing:** Digitisation increases the transparency of the product offering. With only one click, customers can compare insurance conditions and prices online. Hence, insurers need to develop a dynamic pricing capability so they can react quickly in a transparent, agile market. Insurance companies will only be able to collect the premiums they need if they are able to offer prices acceptable to an individual consumer, taking into account the competitive situation at a given moment
- 2. Yield management:** Online distribution platforms, such as online brokers or price comparison platforms, route customers to insurance companies and are paid for this lead generation. However, the type, quality, and cost of these leads varies significantly and changes quickly. Google's search engine marketing pricing is the most obvious example of this variability. Therefore, insurers need to be able to react dynamically to changing quality, price, and lead costs to ensure that the right clients are channelled to their offerings. Technology to jointly optimise these three variables "lead cost", "steer price" and "customer lifetime value" is called yield management
- 3. Competition on speed:** Digital technology has dramatically increased the speed of dissemination of new trends. Customer beliefs and behaviours are changing at a much faster pace than in the past, when news were propagated through traditional media. As insurance companies rely heavily on static datasets such as mortality tables and claims triangles, they need to understand how changing behaviour in certain customer segments impacts their losses. One example is targeted marketing via social media by some lawyers to promote compensation claims after a whiplash injury. This is resulting in additional claims costs for insurers for certain customer segments

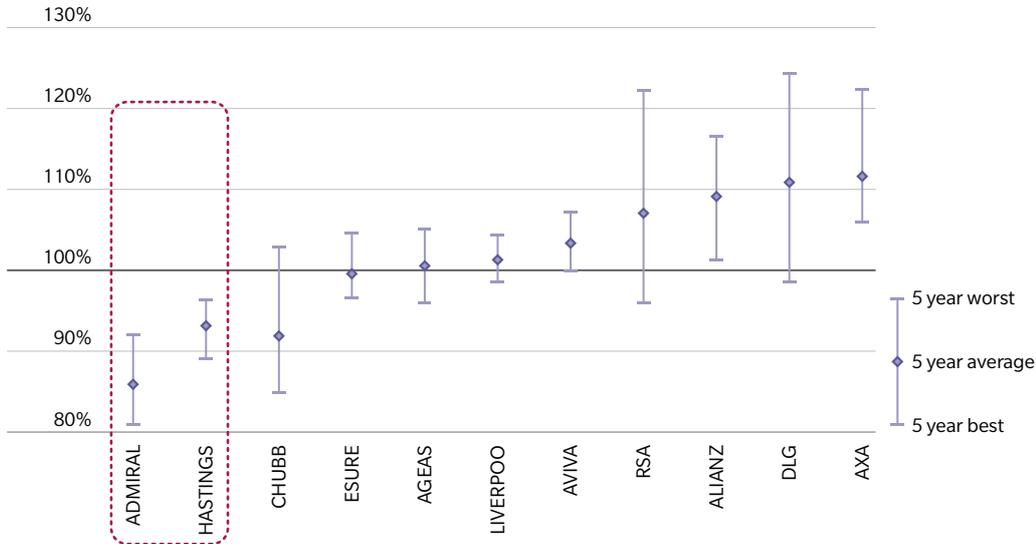
Insurance companies require technology that allows them to notice and analyse such trends in their data so that they can react quickly and adapt their pricing, underwriting, claims handling, and fraud detection. Oliver Wyman research has shown that the average actuarial model for motor insurance in the UK – as an example for a highly digitised market – declines in accuracy by 4 percent each year. While that might seem small, it means that there are likely segments in which actuarial models get out of sync with real behaviour by double-digit percentages. For insurers who can react and adapt quickly, this opens opportunities to "skim the cream" and underwrite the best risks

- 4. Improved insight:** As a by-product of digitisation, insurance companies now have access to incredible amounts of data, which can be analysed to improve existing processes. This enables insurance companies to reduce their reliance on proxy variables when pricing their products. Underwriting and the detection and prevention of fraud could also be improved through such additional insights
- 5. Automation:** Several processes in insurance companies' back-offices could be partially or fully automated through advanced technology such as AI going beyond the already established straight-through processing capabilities for simple transactions. One example would be the automation of in-mail processing services to reduce operating costs. This includes steps such as scanning and indexing based on mail routing rules. More advanced companies could even use AI-based language and emotion recognition to classify the mail according to the mood of the senders or their education. Each letter could then be processed accordingly

These improvements are already having an impact today. For instance, in the UK motor insurance sector, combined ratios for digital leaders such as Admiral and Hastings have consistently been significantly lower than the industry average over the last few years. The five technology capabilities discussed are a key source of competitive advantage for these digital leaders.

Exhibit 5: Case study-to lower combined ratios

EXAMPLE – MOTOR AVERAGE COR 2011–2015, PRA DATA BASED ON NEP AS DENOMINATOR (HASTINGS/ADMIRAL ANNUAL REPORTS)



Source: Oliver Wyman analysis

In recent years, Admiral has been using an automated claims tracking service that is differentiated from those of its competitors. It provides a better customer service process, reduces administration and personnel costs, and ensures prompter responses to employees and customers.

Hastings Direct for example has selected a new technology as part of their digitalisation journey. Through the implementation of a User-Experience Platform and Agile Bridge, Hastings Direct aims to deliver a digital workstream programme that will enable self-service capabilities to its customers for a multitude of purposes. The selected solution has been constructed to extend the functionality of Guidewire InsuranceSuite by:

- Enabling self-service through digital channels (e.g. policy holders can manage their own MTAs, quotations, renewals, claims tracking etc. 24/7) and across multiple devices (e.g. desktop, smartphone, tablet, SmartTV)
- Speeding up the delivery of new products to the market
- Allowing policy access via multiple platforms and channels as well as different browser types

3.1.2. APPLICATION AREA 2 “UPGRADE”: TECHNOLOGY-ENABLED UPGRADES OF EXISTING INSURANCE PRODUCTS THAT ALTER THE INSURANCE PROPOSITION AND IMPACT THE CUSTOMER EXPERIENCE (“IN FRONT OF THE CURTAIN”)

More obvious to customers and observers of the insurance industry are upgrades of products and services. In the last five years, the insurance industry has evolved in the way it thinks about products. Several technology-enabled upgrades of existing insurance products are already available; others will be introduced in the coming years. These upgraded products and services allow an extended value proposition or value-added services that revolutionise the customer experience.

Four major areas for such upgrades are the following.

- 1. Core insurance products:** Several insurance products have already been upgraded through digitisation. One of the best-known is probably telematics products that enable risk coverage concepts in car insurance such as “pay as you drive,” or the even more innovative “pay how you drive”
- 2. Insurance-related excess-value offerings:** Insurance companies are trying to increase their range of service offerings to generate unique selling points. An example of an excess-value offering could be an online risk analysis tool for small businesses. Insurance companies can also reduce their risk exposure while increasing value for customers by advising them on how to reduce risk and using gamification with a focus on lower-risk behaviour
- 3. Other excess-value offerings:** Technology enables insurance companies to extend their offerings and services in areas that are not connected to the insurance industry any more. One good example could be an online alarm system provided as an additional component to the householder’s insurance policy. If the alarm goes off, the insurance company can alert the police, notify the customer, and start the claims process if a theft has taken place
- 4. Claim handling services:** Services and products that provide additional value to customers in “moments of truth” – that is, when they make a claim – are extremely valuable for insurance companies. An insurance company can significantly reduce its operating and claims costs throughout the process. More importantly, customers will be able to experience and value a smoother claims process

Exhibit 6: Upgrades of insurance offering

CORE INSURANCE PRODUCTS		INSURANCE RELATED EXCESS		OTHER EXCESS VALUE OFFERINGS		CLAIM HANDLING SERVICES	
FROM...							
Static product calculation	Risk questionnaire	Claim coverage	Discounts	Health insurance	Assessment of risk	Claims payment	Lengthy manual process
TO...							
Dynamic product calculated based on usage, behaviour and individual characteristic (pay-how-you-drive)	Automatic analysis of risk profile, e.g. based on available records and pictures of	Loss prevention, e.g. based on sensor data to recognise seepage claims in their early stages	Preventive maintenance	Holistic health care, e.g. as a integrated service offering doctors appointment scheduling	Provision of risk management tools and risk advisory, especially in B2B relationships	Digitally organised replacement in kind	Fast claim handling by digital and automated systems

Source: Oliver Wyman analysis

3.1.3. APPLICATION AREA 3 “INNOVATE”: BUSINESS MODEL INNOVATIONS, SUCH AS EMBEDDING INSURANCE INTO AN ECOSYSTEM

In the long run, insurance companies will need to come up with ideas on how to better leverage assets such as data and client-access points.

Three major areas of innovations are the following.

- 1. Ecosystem integration:** A digital ecosystem is a network of companies, individuals, institutions, and consumers that interact to create new services and value. One typical ecosystem for insurance providers is a one-stop shop: a broad set of services offered around an integrated set of customer needs, for example, “everything I need to lead a healthy lifestyle.” In this example, the insurance company could leverage its health data and knowledge and partner with nutritionists, makers of fitness-tracking devices, and fitness centres
- 2. Individual coverage concepts:** The large corporate insurance business already uses individual coverage concepts, where every contract is geared towards specifying the individual risk that is insured. This approach is very complex and time consuming. However, several of the previously introduced technologies could make individual coverage concepts possible within the retail or commercial (small and medium companies) space. In addition, the coverage could be adapted to changing life and risk situations in real time, and could even be made partially automatic. An advanced vision of such a coverage concept could feature an end consumer in dialogue with a chat bot. The consumer would describe what coverage they need. The bot would ask for information needed to assess the risk, and then issue concrete statements on the coverage. The transcript of this dialogue would become the insurance contract, without the need for further insurance products or terms and conditions
- 3. Self-regulation insurance:** An ideal form of insurance would give customers truly hassle-free risk coverage. The claims-handling process in particular can sometimes be time consuming and unnerving for clients. In the future, claims could be resolved at the moment they occur – automatically. For instance, a claim from a farmer with crop hail insurance could be resolved based on a weather report and satellite surveillance of the field, without the farmer having to file a claim

3.1.4. SUMMARY OF TECHNOLOGY APPLICATION AREAS

The three application areas just introduced represent different stages of maturity of the insurance industry in applying technology. On the one hand, “innovate” is clearly the most disruptive and advanced area to leverage new technology. On the other, the use of technology to “improve” and “upgrade” is much more straightforward and can be much faster and easier to implement.

Obviously, technology will remain just an enabler for business model improvements, upgrades, or innovations. The technologies introduced in Chapter 2 cannot be allocated to a single application area, but will to a degree mostly be enablers for each of the three application areas. That is why insurance companies need to be aware of these technologies and understand their potential. But, even more important, they need to develop a specific strategy for the application areas.

Leading insurance companies have very clear visions of their paths to reshape and refine their business models through technology. Very often, they will not focus on one of the above application areas, but rather evolve from one to the next.

A good example of such an evolution is Control Expert. The company was founded in 2002 with the objective of making motor claims and maintenance management easier, faster, and more efficient for all parties involved. It was committed to innovation, automotive expertise, and – above all – the courage and determination to completely rethink and redesign things.

Control Expert started to operate as a service provider in motor claims processes, especially in the area of invoice verification. This allowed it to collect a huge amount of data on car repairs, which it used to analyse damage and claims patterns. It also built a digital network connecting a significant number of garages, so enabling digitally managed workflows. These services enabled savings to insurers of up to 10 percent of the repair costs. While the company started in Germany, it is now globalising. It is currently executing a successful roll-out in the United States, and also entering other markets such as China.

In some markets, one significant lever for insurers to reduce their indemnity spend is the customer's choice between having the damage repaired and receiving a compensation payment based on expected repair costs. Control Expert is often tasked to perform a compensation payment estimation. By using big data, employees today are significantly faster at estimating the repair cost and defining the compensation payment than in the past. This is an example of Application area 1 "improve."

As a side effect to the core business, Control Expert gained so much insight through data analytics that today it also advises the automotive industry on how to build cars so that they have lower cost of insurance.

A relatively new tool introduced by Control Expert is the Easy Claim app, which changes the claims handling process for many customers (Application area 2 "upgrade"). After an accident, the customer calls the insurance company. The insurance company then sends an Internet link to Easy Claim to the smartphone of the customer. Using the app behind the link, the customer takes photos of the damage and the vehicle registration certificate. In a few minutes, Control Expert calculates the compensation payment and offers a choice between this payment and navigation to a garage to get the car repaired. If the customer chooses the compensation payment, the claim is settled in a couple of minutes. Otherwise the car can be navigated to a garage in the partner network of the insurer or to a garage of the customer choice depending on the terms of the insurance contract.

Control Expert invests a lot in research and development to ensure that it keeps up with the fast-evolving technology. One element of its vision of future services is using sensors in cars to evaluate claims at the moment the accident occurs. This would allow a new level of roadside assistance and claim regulation, without even taking a picture of the car. The end vision is that in the moment the car comes to a stop after a crash, the technology has already calculated the extent of the damage using data from the sensors in the car. It will then offer the same services offered today by Easy Claim on a screen in the car itself. This is a full embedding of insurance coverage into the car ecosystem, and is an example of Application area 3 "innovate."

3.2. TECHNOLOGY APPLICATION IN INSURANCE AND OTHER INDUSTRIES

As mentioned in Chapter 3.1, there are various application areas for the five technologies discussed in this report. This section looks closer at each technology to understand its potential application and value to the insurance industry. Since technologies have their own maturity levels and might be leveraged in different areas of the value chain, each one is different in terms of its value delivery pattern for the insurance industry. Also, while it is possible to assess the value delivered by a technology today, the potential is much less certain. This is why we only assess the maximum potential from application areas already visible today. There will be technologies which never reach their full potential, as substitutes emerge or promising application areas fail to deliver or to scale. It is also conceivable that further application areas might be found.

For each of the five key technologies introduced in Chapter 2, deep dives will use the following framework to evaluate maturity and the potential to create value for the insurance industry.

Dimension A: Maturity of the underlying technology

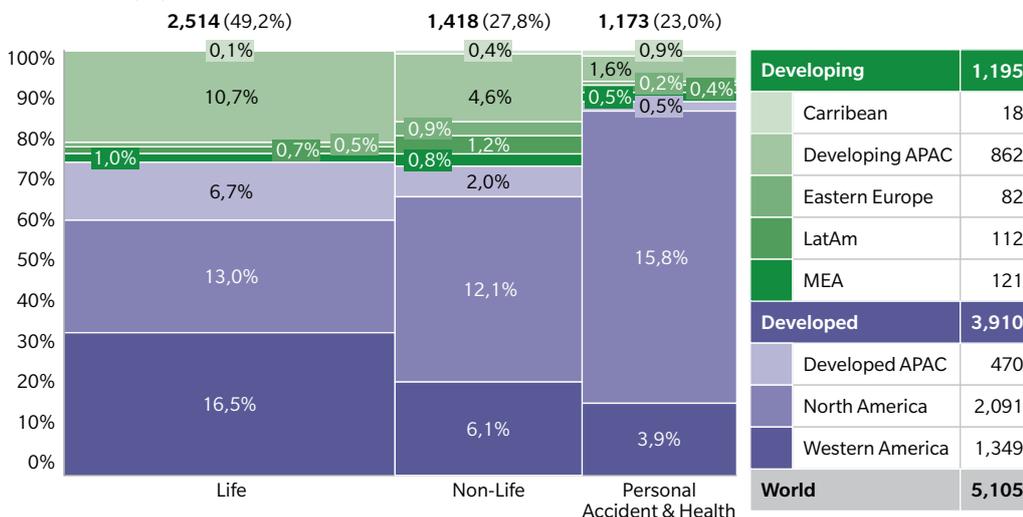
Dimension B: Value generation by the technology

- **Dimension B1:** Relevance as an enabler to “improve,” “upgrade,” or “innovate” the insurance business or operating model
- **Dimension B2:** Applicability to different lines of business, such as life, non-life, and health
- **Dimension B3a:** The impact of the technology on key elements of the insurance value chain today
- **Dimension B3b:** The maximum potential impact of the technology on key elements of the insurance value chain tomorrow

Dimension B2 – the applicability to different lines of business, such as life, non-life and health – provides a link between the technologies and the premium pools of each line of business. This link is the basis for any value assessment.

Exhibit 7: Global written premium in insurance

US\$ TRILLIONS, %, 2015



Source: AXCO

The worldwide insurance premium pool totals \$5.1 trillion, which is mainly driven by life, at 49.2 percent of the total. Non-life insurance premiums contribute 27.8 percent of the overall global total, while health insurance contributes 23 percent. The technologies mentioned above can be applied in different core lines of business. A technology which can only be applied in a single line of business, or possibly only in some market types, is clearly less valuable than one applicable to all today's \$5 trillion-worth of insurance premiums. If a technology applicable globally to all lines of business only had a value-generation capacity of 1 percent of the premiums, that would still imply a \$50 billion value-generation opportunity. That would clearly be worth targeting for technology companies.

Dimension B3 – the impact of technology on key elements of the insurance value chain – evaluates the extent of possible value generated by a technology. Value can be generated by stimulating additional top-line growth or improving the bottom line. There are four principal value generation opportunities:

- **Support additional sales:** Attract new, or retain existing, customers
- **Reduce losses:** Improve and better control indemnity or loss-adjustment costs
- **Reduce distribution costs:** Lower costs related to sales and distribution
- **Reduce administration costs:** Lower back-office costs

We will use the profit pool (B2) and the impact on value levers (B3) to indicate the size of the current and potential value generated by each technology.

3.2.1. CLOUD COMPUTING

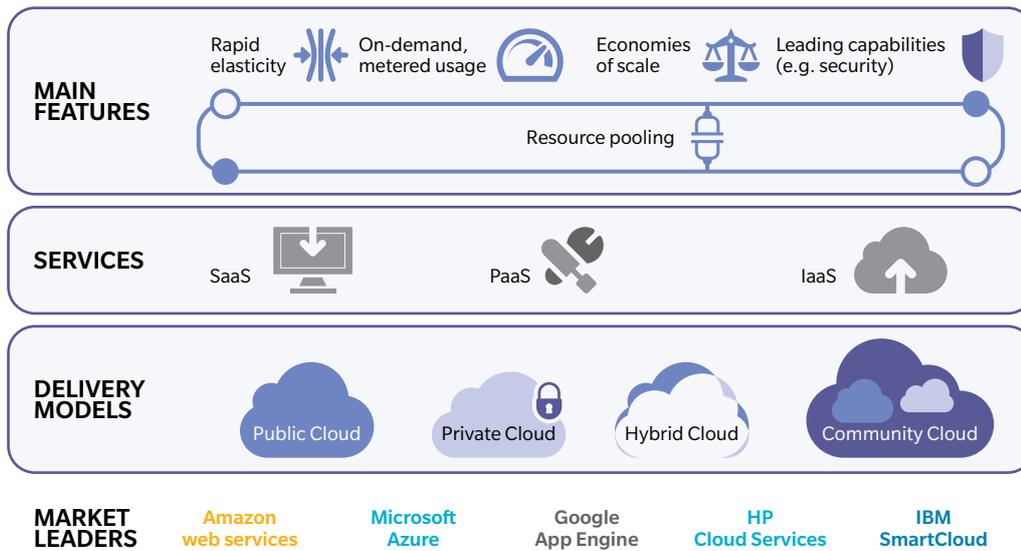
Financial institutions considering the migration of some of their computing infrastructure to the cloud services model share the motivation of other large corporate users: the unification of the very complex and costly business of running data centres or applications in-house.

With the commoditisation of insurance products and the shift in sales channels, cloud computing and its promise of converting fixed capital expenditures into variable operating costs have captured the attention of most insurer CIOs and, by extension, CFOs.

Insurer-owned data centres, accustomed to delivering mission-critical services 24 hours a day, seven days a week, are more likely to have the capacity to meet peak demand requirements than their counterparts in nonessential services. For insurers that only occasionally experience high peak demand, the cost of maintaining this reserve processing capacity can be significant.

In addition to the economic benefit, the operational advantages of cloud computing are also appealing to many potential insurers. While it can take days or weeks to deploy a new physical server in a traditional in-house data centre, a new cloud-based virtual server can be called up within a matter of minutes through a simple system command. That enables an insurer to respond better to new processing opportunities and challenges.

Exhibit 8: Cloud schematic/market leaders



Source: Oliver Wyman analysis

Similar arguments hold true for the application layer. While it can take years to implement or upgrade core insurance systems, software-as-a-service vendors promise to deliver a fully-fledged application via the cloud. This capability has traction in application areas which naturally lend themselves to cloud delivery. The prime example is customer relationship management, which was the driver behind the success of Salesforce.com – today a business with a market capital valuation of \$60.1 billion.

However, insurance carriers also see challenges from cloud computing. The biggest concerns are related to privacy and security; potential theft of intellectual property; and regulations and legal compliance. Many cloud vendors report that insurance carriers are extremely concerned about privacy and security.

TECHNOLOGY EVALUATION

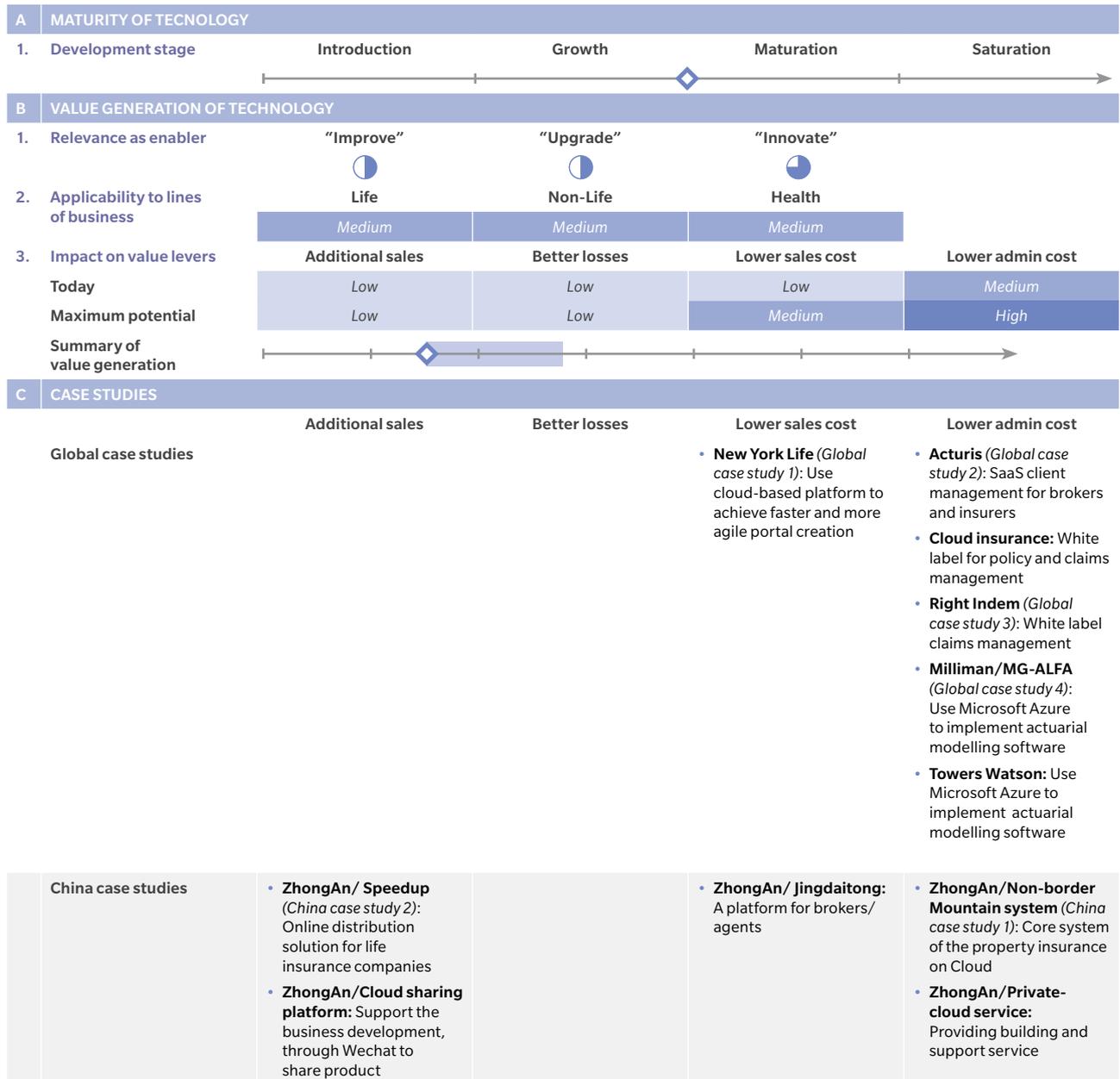
Cloud computing technology in the platform-as-a-service and infrastructure-as-a-service models is relatively mature. It has been widely applied in the Internet industry, judging from the size of cloud storage, the variety of cloud computing offers, and the flexibility of solutions. SaaS solutions are much less mature. While SaaS applications for horizontal business processes like human resources and customer relationship management have already reached a considerable level of maturity, only recently have providers entered the business of providing SaaS solutions for core business processes.

In 2015, Celent surveyed a group of 41 insurance technology executives to better understand cloud solutions in the insurance industry. (See the 2015 Celent report, *Life in the cloud*.) They found that cloud-enabled solutions are on the rise, with more than 80 percent of responding vendors reporting that they have cloud-enabled core systems. More than 75 percent have implemented data and reporting solutions, and almost 60 percent report cloud-enabling document and workflow solutions.

Although the majority of the cloud offerings have been around for over two years, almost 30 percent were launched in the last two years, and some vendors are looking to launch in the next six months.

Overall, cloud-enabled solutions are on the rise, with more than 80 percent of responding vendors reporting that they have cloud-enabled core systems. More than 75 percent have implemented data and reporting solutions, and almost 60 percent report cloud-enabling document and workflow solutions.

Exhibit 9: Technology evaluation framework: Cloud



Relevance degree: Low High

Applicability/Impact: Low Medium High

Value: Today Potential

Source: Oliver Wyman analysis

DEVELOPMENT IN CHINA AND GLOBALLY

US companies are leading SaaS innovation and adoption, with giant tech companies, such as Microsoft, and specialised players, such as Salesforce. However, the Chinese insurance sector is more aggressive in SaaS adoption, and is even leading this segment globally. One reason is a large and growing applications in Area 3 mentioned in Chapter 3.1.3., which requires cloud computing. Another is China's large number of online ecosystems and players, which are also built on cloud computing.

CASE STUDIES

Despite insurers' and reinsurers' reputation for reluctance to engage with new forms of technology, a growing number of firms are taking advantage of the cloud.

Global Case Study 1: New York Life operates throughout the United States in the fields of life insurance, mutual funds, annuities, and group insurance. It was facing challenges to meet the unique needs of its brokers and associates. The launch of new enrolment sites took months, as it uses product-specific portals for brokers and third-party administrators to sell a variety of group life, health, and disability products. A cloud-based platform made the creation process of new portals required for new products faster and more agile. Furthermore, the system reduced the time to market and decreased client-drop-out rates thanks to the real-time integration of data and processes. Also, the scalable and extensible system reduced maintenance costs and unscheduled downtime.¹

Global Case Study 2: Acturis provides a comprehensive cloud solution for insurance companies, ranging from customer relationship management for underwriting and claims to accounting in the form of software as a service. The solution includes an integrated management information suite with an integrated reporting system. Insurers can tailor prebuilt reports to specific requirements. For communication with insurers' customers, Acturis provides integrated communications with branded documents, email and text production, distribution, and storage.

Global Case Study 3: RightIndem provides a white-label online claims solution for insurers to accelerate the claims process. The system consists of a self-service platform for customers to manage their claims. By streamlining the claims management process, higher customer retention rates and lower claims handling costs are expected. The platform is delivered in the form of software as a service.

Global Case Study 4: Milliman implemented its actuarial modelling software MG-ALFA in partnership with Microsoft on the Microsoft Azure cloud. MG-ALFA uses stochastic simulations to measure financial results and supports insurance companies in a variety of tasks such as product pricing, risk management analysis, and compliance with regulatory reporting requirements. Before the cloud implementation, MG-ALFA's stochastic analysis, which requires high-performance grid-computing capabilities, was conducted on-premises. Through the application of the cloud-based solution, the associated IT cost was cut by 30 percent.

1. A more detailed description can be found in the report *Celent Model Insurer 2017: Case Studies in Digital and Omnichannel*

China Case Study 1: ZhongAn Insurance is the first insurance company in China which deploys all systems in a public cloud. To serve more than 450 million customers who purchased online insurance from ZhongAn, the cloud computing systems achieved excellent operational performance. For example, the policy processing speed can be up to 14,000 per second; the system can generate a response in 10 milliseconds and provide feedback within one second; no policies are lost; and reconciliation is completed within a day.

During the Double 11 festival of online shopping on November 11, the system processed 200 million policies in 6.5 hours, for a total of RMB 128 million in premiums.

The core business system in property insurance, Non-border Mountain, now stores 10 billion items of data, including 6 billion related to policies, and performs real-time data analysis. It is estimated that the system can handle 200 million transactions per day.

China Case Study 2: Leveraging its experience in ZhongAn Insurance’s core system, ZhongAn Technology developed its leading position as a cloud-based platform provider and successfully developed a life insurance cloud platform called SpeedUp.

SpeedUp has been developed in different versions – including for PC, mobile apps and Wechat – which allows users to access the platform easily. As a non-core system, SpeedUp can quickly access the existing core insurance system. It can consolidate the customer information obtained and perform analysis for other purposes, such as precision marketing. SpeedUp is supported by automated customer services, which help the insurance companies reduce long-term labour costs.

ZhongAn Technology has also started the development of a core life insurance system, which will be implemented by a new life insurer in Hong Kong.

Exhibit 10: SpeedUp – life insurance cloud platform highlights

	<p>DIFFERENT VERSIONS</p> <ul style="list-style-type: none"> • SpeedUp is developed in PC, app and Wechat versions
	<p>ACCESS TO CORE BUSINESS</p> <ul style="list-style-type: none"> • Speedup can access to core insurance system quickly • ZhongAn Tech has abundant experience of working with the third-party platforms
	<p>MARKETING SUPPORT</p> <ul style="list-style-type: none"> • Perform customer data analysis for precise marketing • Powerful rule engine with flexible configuration
	<p>AUTONOMOUS SERVICE</p> <ul style="list-style-type: none"> • Provide artificial customer services

Source: ZhongAn Technology, Oliver Wyman analysis

3.2.2. INTERNET OF THINGS AND TELEMATICS

Telematics – or in a broader context the Internet of Things – ameliorates data collection, customer understanding, and opportunities to increase customer centricity. It can thus help steer user behaviour. The motivations to use the IoT in an insurance setting are therefore mostly to enhance the product offering and reduce claims costs.

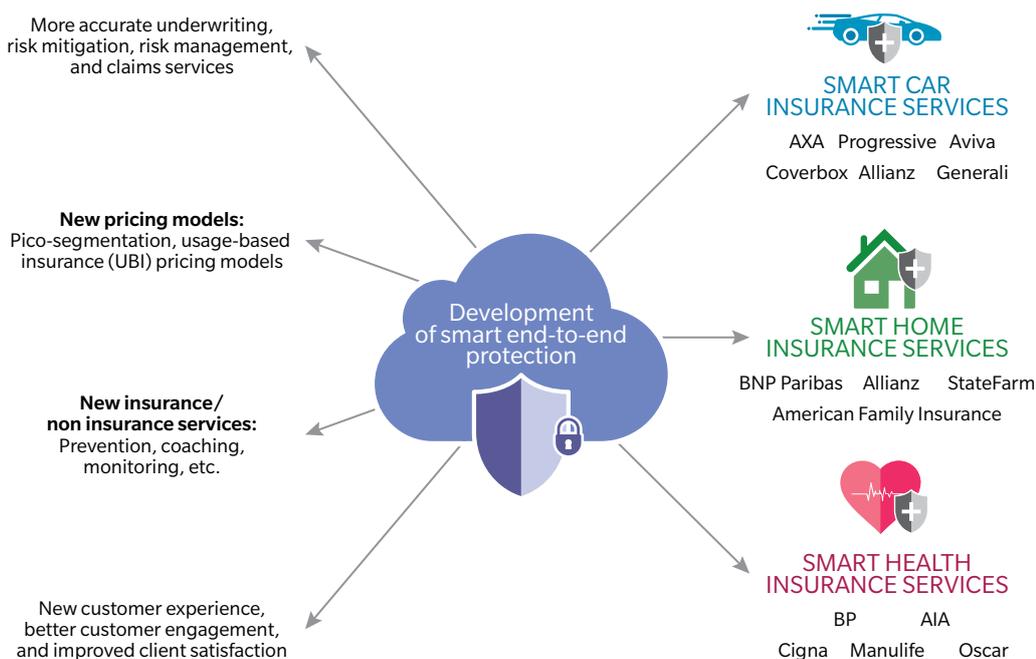
Understanding and analysing risk is undoubtedly a cornerstone of the insurance business. The assessment of risk requires that information be gathered and observed over time. Up to now, the basic model of risk understanding has been to observe correlations between claims costs, composed on the one hand of the frequency and severity of insurance claims, and on the other of the characteristics of the insurable assets as described by data. This analysis is the basis for models to select risk and manage risk portfolios. Such information is known as cold data, and primarily entailed a static description of the object being exposed to an insurable risk and the environment expected to influence that risk.

The IoT makes available a new type of dynamic information for risk assessment known as hot data. The data relates to the object, its usage, and user behaviour, and replaces proxy variables with directly measured variables. Where risk is directly related to the object and the behaviour of policyholders, the IoT has the potential to thoroughly transform risk selection, pricing, and monitoring models.

TECHNOLOGY EVALUATION

IoT technology is in the growth stage. Usage-based insurance and pay-how-you-drive for car insurance in the US are at the forefront of the development. IoT in a broader sense is expected to impact a range of personal line insurance types that are directly linked to the insurable object, such as automotive, home, and health. (See Exhibit 11)

Exhibit 11: Impact of IoT on personal lines insurance



Source: ABI Research, Oliver Wyman analysis

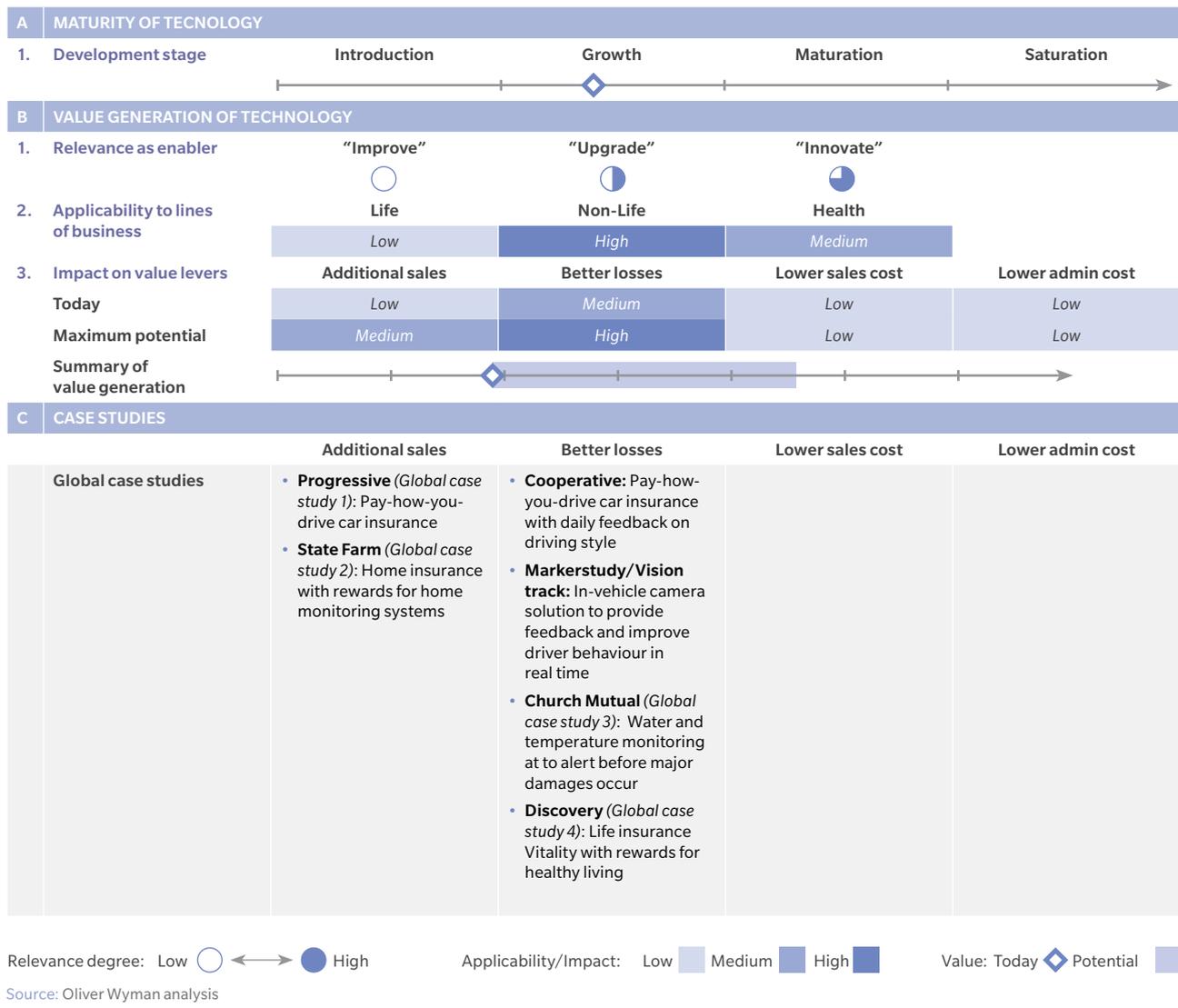
Car insurance is most advanced in applying the IoT, in the form of telematics to monitor driving style and to form pay-as-you-drive pricing or pay-how-you-drive models. Currently, there are more than 150 pilots globally in the telematics field for car insurance, and the number of usage-based car insurance contracts is estimated to be around 20 million. To collect the driving data, insurance companies require drivers to use built-in devices, plug-in-devices, smartphones, or a combination thereof. In some market, telematics has already helped early adopters improve profitability and competitive advantages, but not in some other markets. The different impacts are explained by multiple factors, such as sophistication of pricing and current pricing levels, potential risk of car theft, and existing driving behaviours, etc. More value can be created through adopting telematics in a market, where auto insurance pricing is high, the level of social security is low, or drivers often drive badly.

Similar pilots have emerged in health and life insurance. Wearables monitor the health-relevant behaviour of the insured person, and in the case of health-beneficial behaviour the insurance companies grant discounts. These models require insurers to overcome customers' data privacy concerns.

The IoT is also expected to impact commercial insurance, with a greater emphasis on risk prevention than on pricing models. We see potential especially in agricultural insurance, building insurance, and insurance for small and medium businesses.

In addition to helping a better understanding of risks, the IoT is enhancing the customer experience. Traditionally, insurance has been a low-interaction business, with most interactions having negative connotations because they concern claims management. The IoT enables insurance companies to evolve from a low-frequency, transaction-based model to one where they work on prevention and provide advice, coaching, and rapid assistance. In the eyes of customers, the transition from "insurer as payer" to "insurer as advisor and protector" is a fundamental change in positioning. The IoT thus gives insurers the opportunity to unlock new revenue streams, reduce claims, reinforce customer relationships, and improve their images. The extent of the value generation will depend on the sophistication of the pricing, fraud, and claims models which are in play today. This can be seen in the degree of penetration of telematics in different markets: Italy, which has a less-mature traditional model; the UK with its skewed pricing; and Germany, which historically already has very sophisticated loss models.

Exhibit 12: Technology evaluation framework: Internet of Things/Telematics



DEVELOPMENT IN CHINA AND GLOBALLY

Telematics and the IoT are common in China, but the impact on insurance has not yet been observed, mainly because usage-based insurance has not yet been approved by the Chinese insurance regulator. Other insurance products, such as home property insurance and health insurance, are smaller in scale compared to auto insurance, so it will be hard for IoT-related advances to generate significant premiums in the short and medium term.

CASE STUDIES

Global Case Study 1: The US insurance company Progressive has been the leading pioneer in insurance telematics since 1998, with currently circa 1.5 million subscribers. Progressive offers a pay-how-you-drive product. Telematics collects data on mileage, time of driving, and harsh braking events, all of which impact pricing.

The product offering is tailored to price-conscious drivers, as the insurer grants a driving-style dependent discount averaging 15 percent and rising to a maximum of 30 percent. Progressive reacted to privacy concerns and data security concerns in 2011 by discontinuing location-based services using GPS. Progressive's main advantages are deep experience in the underwriting process and data intelligence stemming from being a market pioneer.

Global Case Study 2: The US insurance group State Farm rewards home owners with smart monitoring devices. If a customer installs a recognised alarm system, it offers discounts both to the purchase of the device and to the home insurance premium. The devices monitor the home and emit alerts if they detect events such as intrusion, smoke, or high moisture. The rationale is that early detection reduces the damage and thus the amount claimed from the insurer. The customer benefits from lower disruption from the incident and premium rebates.

Global Case Study 3: Church Mutual Insurance Company insures religious institutions as well as schools, camps, and senior-living facilities throughout the United States. Due to the nature of its clients, the insured properties are only temporarily frequented, so the causes of damage can remain unnoticed for a substantial amount of time, meaning the damage can increase. In order to react earlier to the causes, Church Mutual applies temperature and water sensors connected to a round-the-clock monitoring system. Using wireless IoT technology and telematics, the system alerts customers so that they can react before major damage occurs. The programme was launched in 2016 after a two-year test phase.²

Global Case Study 4: The South African financial services group Discovery has launched a shared-value model for life insurance. In this model, customers are rewarded for healthy living. They track their activities through wearables and can collect "Vitality" points for healthy behaviour, which can qualify them for rewards or life insurance premium discounts. Discovery cooperates with other insurance companies like Manulife in Canada by providing a calculation of Vitality scores. Through its partner network, Discovery has expanded this concept to 14 countries.

China Case Study 1: Many Chinese insurance companies are actively investing to build up their telematics capabilities. But most of them are currently in the phase of testing usage-based insurance, as the regulator has not yet formally approved this type of product. One leading player, PingAn, has launched a customer loyalty program for its car insurance users. Drivers are encouraged to download an app and use it for tracking and scoring their driving behaviour. They are then offered monthly cash or rewards for safe driving.

2. A more detailed description can be found in the report *Celent Model Insurer 2017: Case Studies in Innovation and Emerging Technologies*

3.2.3. BIG DATA

The insurance industry has already been employing analytics and huge amounts of data for decades, both on the transactional and the risk management side. But this was based on restricted data, mostly concerning loss patterns and exposures. More recently, the emphasis has shifted to utilising new sources of data to get more information about the insured person or object, often referred to as big data. This has created renewed interest across the industry in data management.

Insurers do not have operations to manufacture physical products, so data is arguably one of their most important assets. Virtually every decision an insurer makes is based on some form of data: financial, actuarial, claims, risk, consumer, producer, and wholesaler. While the industry has made progress in capturing and analysing much of the structured information associated with their products and policyholders, there is still untapped value in unstructured and semi-structured information. With the growing importance of external data sources, insurers have to rethink the way they capture and process data, as well as their perceptions of data sources' business impact. Some insurers are actively using data from public sources, including social networks. For instance, Generali Switzerland has decided to leverage social media intelligence to rethink its marketing strategy. (See case study below)

New analytical methods allow insurance companies to process these huge amounts of untapped data. Predictive, statistical modelling allows insurance companies to understand what will happen in the future by measuring and understanding as much as they possibly can about what has happened in the past. Models are then built to show what is likely to happen in the future, based on the relationships between variables established by examining data collected in the past. These models are key tools for big data scientists, and insurance has, predictably, been one industry very keen to adopt them.

At the same time, the industry is undergoing a significant transformation as insurers face continually more-demanding and more-empowered consumers. They have real-time access to more-diverse insurance services than ever before, including instant insurance services. To compete and win in this dynamic environment, insurers must leverage and optimise the value of big data.

TECHNOLOGY EVALUATION

In the 2016 report, *Tackling the big data challenge in global insurance*, Celent found that unstructured or semi-structured data represents the biggest challenge worldwide. The velocity, value, and veracity of data are thus considered more difficult to deal with than the growing volume of data, which is not really an issue.

Insurers are divided into those who believe big data is already delivering value and those who don't. Globally, a significant 45 percent of insurers think their competitors have successfully adopted big data technologies, although a majority of 55 percent still see little progress to date.

Insurers in North America are the most positive: 50 percent think their competitors are already using big data to derive cost savings, provide new solutions, and demonstrate industry leadership. Insurers in North America demonstrate a strong awareness of big data's potential for the industry, with only 6 percent seeing the technology as untried and untested. Nevertheless, it is still early days for big data even in North America, and 43 percent of survey respondents still see adoption among their peers as slow.

At the other end of the spectrum, a substantial 58 percent of insurers in Europe, the Middle East, and Africa think that big data is either being adopted slowly or is untested. EMEA also has the fewest insurers of any region, just 24 percent, that think big data is currently enabling cost savings at their competitors. Still, roughly as many insurers as in other regions see big data delivering competitive advantage at their peers in the form of unique propositions or industry leadership.

Insurers in the Asia-Pacific region are nearly as gung-ho as those in North America, with 49 percent believing their competitors are deriving value from big data technology. Yet, views are more polarised in APAC. More insurers than in any other region, 20 percent, think their peers are using big data to enable new, unique propositions. At the same time, APAC has the highest proportion of big data sceptics, at 13 percent, which think the business case for the technology is still uncertain.

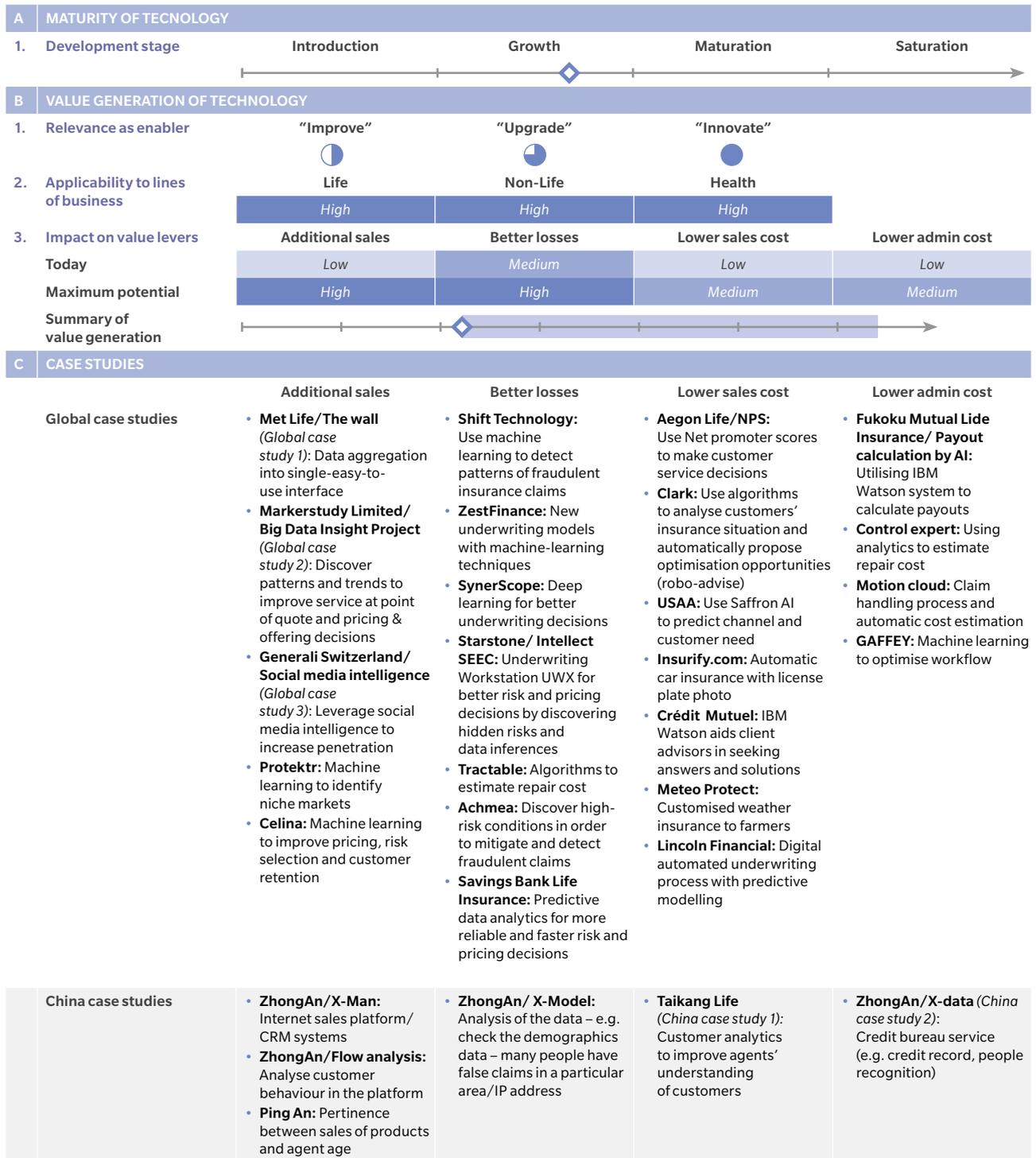
Significantly, data technologies are being adopted by insurers worldwide, and investments in these technologies exhibit similar trends across regions. The top five areas of investment globally are predictive analytics, data visualisation tools, fraud tooling, enterprise search tools, and pricing optimisation. Overall, 32 to 54 percent of insurers surveyed have invested in these five technologies.

Fewer insurers have invested in advanced infrastructure technologies like Hadoop, analytics appliances, and in-memory analytics. Each of these three technologies has attracted investments by 26 percent of insurers globally. The bottom quintile of investment is in innovation in social- and sentiment-analysis tools and cloud-based analytics solutions, with 19 percent of insurers investing in both those technologies.

While investment trends are fairly close across regions, it is possible to make some comparative observations. Insurers in Asia-Pacific and Latin America lead in investment and in-memory analytics as well as cloud-based analytics solutions. The investment in cloud computing, in particular, suggests that insurers in these regions are seeking agility in order to support innovative strategies. At the same time, insurers in Asia-Pacific and Latin America are somewhat less active in enterprise search, which may reflect less-siloed legacy systems in emerging regions. Hence, IT transformations in emerging countries and regions are likely to be easier and more successful than in mature countries and regions, where connectivity with legacy systems is a burden in terms of both cost and complexity.

The EMEA region leads in investment in pricing optimisation and social and sentiment analysis. Insurers in Europe have explored ways to leverage social media for some years now, and their concern with pricing reflects a competitive market.

Exhibit 13: Technology evaluation framework: Big Data



Relevance degree: Low ↔ High Applicability/Impact: Low Medium High Value: Today Potential

Source: Oliver Wyman analysis

DEVELOPMENT IN CHINA AND GLOBALLY

Insurers across the four global regions are closely aligned in the uses to which they intend to put big data analysis. Nevertheless, we can detect some differences of emphasis between continents.

Insurers in Asia-Pacific and Latin America put the highest priority on customer segmentation analytics, both in absolute terms and in comparison to EMEA and North America. This reflects an emphasis on maximising growth in these markets.

Insurers in Asia-Pacific and Latin America are also putting slightly higher emphasis on catastrophe simulation. Given the susceptibility of some countries in these regions to natural disasters, we might actually expect more of an emphasis on catastrophe simulation than our survey responses indicate.

Insurers in North America are more focused on applying big data analysis to underwriting than insurers in EMEA, Latin America, or Asia-Pacific. By this measure, insurers in North America are comparatively more concerned with profitability in this mature market.

Insurers in EMEA are significantly more focused on use cases for big data related to regulation and compliance reporting. EMEA also shows more emphasis on fraud detection than the other regions. As discussed above, this is not surprising given the heavy emphasis on regulation in the eurozone.

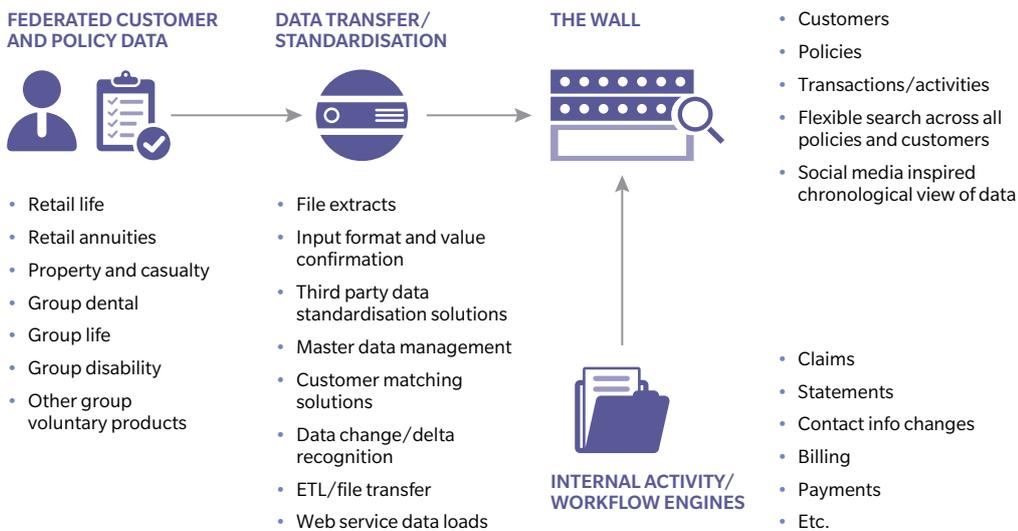
China is leading innovation and application in this area. One reason is the large quantity of big data generated from a large number of ecosystems. Another is a relatively more open attitude towards data sharing and usage. In addition, insufficient infrastructure, such as credit bureaus, means there is demand for new solutions.

CASE STUDIES

Global Case Study 1: The MetLife Wall is a data aggregator that captures customer data across millions of policies and transactions from multiple legacy systems, and then presents them in a single, easy-to-use interface. The application provides a complete view of all the products a customer holds and all their prior transactions, increasing the quality of customer service while also speeding resolution. In addition to static data, it produces a history of all interactions across multiple service channels, including call centres and face-to-face consultations with agents and claims adjusters. The application uses fuzzy logic and matching functions to pull together information from multiple lines of business and combine them in a single customer record.

The user interface follows a formatting convention popularised by Facebook to simplify presentation of the information. This layout also includes a timeline, providing a visual expression of a customer's service journey in chronological order.

Exhibit 14: Case study of MetLife Wall



Source: MetLife and Celent

Real-time workflow updates are posted to the MetLife Wall. This ensures that the customer service representative has the most up-to-date information at the time of customer contact. Relatively static data, such as a customer’s date of birth, is only updated on a 24-hour cycle, after being modified in the source system. The Wall has been extended to users outside the United States, including Europe and Asia.³

Global Case Study 2: Markerstudy Limited markets and distributes insurance products in the UK for, among others, private and public car hire, fleets, motorcycles, private cars, and commercial vehicles.

Markerstudy’s Big Data Insight Project 2014 uses big data technologies to store, analyse, and report on large datasets in a range of diverse formats to gain new insights by linking internal and external data. The platform is built on Cloudera’s Enterprise Data Hub, an enterprise-grade installation based on Apache Hadoop.

The Big Data Insight Project uses a data platform providing low-latency, indexed searches across hundreds of millions of records in close to real time. The platform also provides Apache Hadoop batch processing. These capabilities are enhanced by enterprise-level security and management tools across multiple virtual and physical servers, providing high availability and distributed processing. A web-based visualisation portal provides charts showing drilled-down data. This can include certain types of quotes received via a particular broker, the number of policies that convert, and in-depth customer profiling. An online toolset identifies trends and patterns to help analyse information by looking at 12 datasets. These include internal information from across the business, as well as external factors such as weather reports, significant dates in the year, and the performance of financial markets.

3. A more detailed description can be found in *Tackling the big data challenge in global insurance – Celent Report 2016*

Machine-learning algorithms help to analyse the differences between groups of customers according to external factors, customer behaviours, and profiles. They identify previously undiscovered patterns and trends that can be used to provide better service at the point of quote, and inform decisions over pricing and product offering.⁴

Global Case Study 3: Generali Switzerland decided to use social media intelligence to better penetrate the life protection and health insurance market. The objective was to identify media, such as newspapers and magazines, and communities that influence opinion in these domains and to find out how competitors were positioning their products and offerings.

Generali Switzerland planned to use this information to try to increase the visibility of its insurance product offerings. Working with Linkfluence – a French vendor specialised in social media intelligence – it identified influencers in the Swiss market by screening and analysing offline and online media. The analysis was performed in three languages, German, French, and Italian. Continuous monitoring of external data sources captured and analysed more than 2 million conversations every month. With this approach, Generali has been able to learn some important lessons.

First, language and cultural differences structure social activities. Generali identified clear differences between the various language regions in Switzerland, which lead to communities that are relatively small and have low cohesion. However, Generali also observed that some large newspapers with leading positions in each region had the power to federate communication activities within their region.

Another lesson was that insurance and protection are secondary topics on social media. Generali identified more than 300 relevant websites and 50 communities. However, these communities were not really active on mainstream social media such as Twitter and Facebook.

Based on these findings, Generali Switzerland decided to focus its communication on specific media and communities in each region of Switzerland. It has made its marketing activities more granular and specific to certain customer segments.⁵

China Case Study 1: Taikang Life Insurance is one of the largest life insurance companies in China, but its sales agents had a limited understanding of the customers. That made it difficult for the agents to recommend appropriate products and to judge which customers to focus on to improve retention.

Taikang embarked on an ambitious project to integrate and analyse massive amounts of customer-related data to give agents insight into the customers. The firm created a distributed platform to integrate data on 45 million policyholders. This customer data contained more than 600 attributes, such as demographics, financial situation, and policy information. A model was built to capture customer characteristics from these attributes, a task that required expertise in data mining and big data analytics, as well as business acumen from the sales agents.

4, 5. A more detailed description can be found in *Tackling the big data challenge in global insurance – Celent Report 2016*

Taikang’s big data infrastructure involved a 40-node Hadoop platform and an Apache Hive data warehouse. Logistic regression, associative analysis, and cluster analysis are performed on the data to predict individual customers’ product preferences and churn probability.

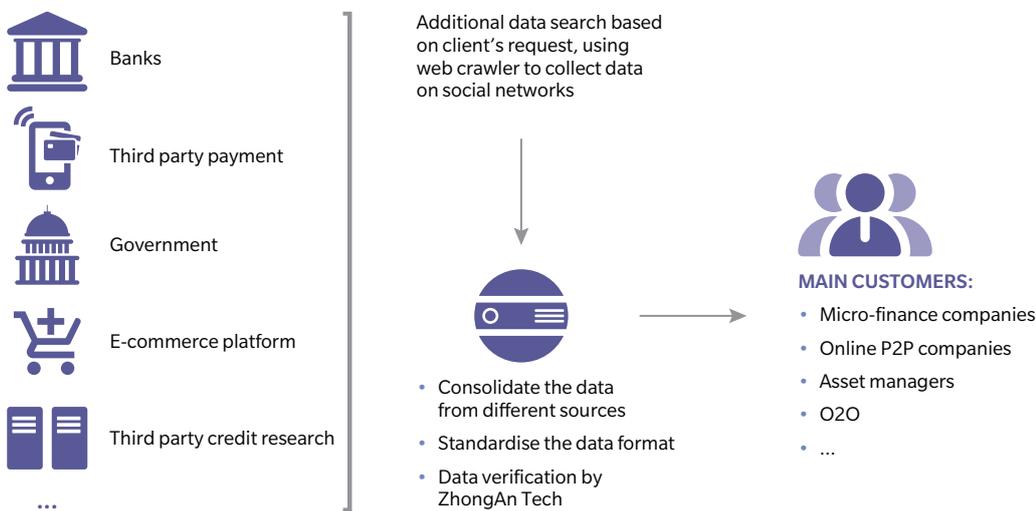
Taikang created a mobile platform to deliver this information to agents to support their sales activities. The mobile application provides agents with insights into customer characteristics and recommended products, and alerts agents about customers they are at risk of losing. Agents can provide feedback through the application, which is used to improve the analytic models.

Taikang’s massive customer analytics initiative is generating results. Premium renewal income has increased 18 percent year on year. Furthermore, the customer churn rate has dropped to a very low 0.1 percent. Taikang Life is deriving real value from big data as it makes its sales activities less experience-driven and more data-driven.⁶

China Case Study 2: ZhongAn Insurance captures and aggregates data from various sources, including third-party credit research, banks, third-party payments, government, e-commerce platforms, and other data providers. Thanks to this big data, ZhongAn Insurance can price the credit risk of hundreds of millions of consumers and has therefore built a competitive advantage in consumer credit insurance.

China Case Study 3: ZhongAn Technology is providing a one-stop information check service for financial institutions. ZhongAn can assist lenders that meet its client selection criteria from pre-loan approval to loan collection. When the clients fail to contact the borrower, ZhongAn Technology can recover the applicant’s information to minimise the potential loss.

Exhibit 15: One-stop information check services



Source: ZhongAn Technology, Oliver Wyman analysis

PingAn Group has also set up a credit investigation company, which provides services based on the vast amount of data accumulated by its insurance and other businesses.

6. A more detailed description can be found in *Tackling the big data challenge in global insurance – Celent Report 2016*

3.2.4. ARTIFICIAL INTELLIGENCE (AI)

The insurance industry is ripe for further automation as it is based primarily on the analysis and processing of information. Low-level claims processing and some standardised underwriting have already been automated, with the expectation that more processes will follow.

The next steps might be enabled through AI, leading to a significant change in how insurance companies generate value. The labour market will be disrupted through the direct substitute of employees by computers, transforming the way work is conducted and reducing the cost to consumers.

Leveraging AI allows insurance companies to interact in a faster and more consistent way with their customers. For example, virtual customer service representatives can be leveraged in the following ways.

- **Deal with more-complicated inquiries at contact centres:** Contact centre staff receive a large number of inquiries from customers, potential customers, agents, and others. These inquiries could be from various touch points, such as telephone, website, short message service (SMS), social platforms, and mobile apps. Contact centre staff spend a large amount of time dealing with basic inquiries. AI solutions will be able to take over these tasks. That will make human resources available to deal with more complicated inquiries, or it will enable insurers to reduce labour costs at the contact centre
- **Provide consistent advisory services at an affordable cost (Robo advisors):** Quite often, potential customers might not know what insurance protection they really need; and even if they do know their needs, they may not know what product will best fit these needs. The advice they receive depends heavily on the experience, knowledge, and product preference of the agent or contact centre employee they talk to. That means that the recommendations will not be objective, and recommendations from different channels will not be consistent. As a result, consumers will have less trust and confidence in the advisory services that insurers provide. Robo advisors, in contrast, can provide consistent advisory services at an affordable cost
- **Guide processes and related transactions:** Nowadays consumers are exposed to too much information. The new challenge for insurers is to help consumers quickly find the information they want and need. When a potential customer navigates an insurer's website, they may get lost in too much information provided through multiple links. This could make them frustrated, so they finally give up their search and make no purchase. Even when they have started to fill in the online application form, they may still give up just because of a single question in the form that they do not understand. Optimising user experience is one of the key challenges for insurers. Insurers can increase their conversion rate by deploying a virtual assistant across various customer-facing channels, such as websites or mobile apps. The virtual assistant can guide a prospect to find what they need quickly and intuitively, or help them complete the purchase process, such as filling out forms

AI does not only have an impact on client-facing processes. Leveraging artificial intelligence, insurers are also able to optimise the following:

- Products and pricing
- Marketing and sales strategies and efforts
- Underwriting models, by further automating their underwriting process
- Claims processing and fraud detection, by focusing more strongly on risk management and risk prevention services rather than claims pay-outs after incidents
- Business operations and management

TECHNOLOGY EVALUATION

Today AI is composed of many technologies, such as big data, machine learning, and natural language processing. Thanks to these technological advancements, AI systems are now able to perform tasks that would have sounded like science fiction 10 years ago. From self-driving cars to automated assistants, AI is rapidly evolving and finding its way into surprising daily use cases, leading people to underestimate how much it is fundamentally transforming our world.

Still, AI is just emerging. We can hardly understand its full potential and it can be expected that our understanding of AI will further develop over time as technological development progresses. Especially in the insurance context, AI has so far been put to very limited use compared to its huge potential.

Exhibit 16: Technology evaluation framework: AI

A MATURITY OF TECHNOLOGY				
1. Development stage	Introduction	Growth	Maturation	Saturation
B VALUE GENERATION OF TECHNOLOGY				
1. Relevance as enabler	“Improve”	“Upgrade”	“Innovate”	
	●	●	●	
2. Applicability to lines of business	Life	Non-Life	Health	
	Medium	High	Medium	
3. Impact on value levers	Additional sales	Better losses	Lower sales cost	Lower admin cost
Today	Low	Medium	Low	Low
Maximum potential	High	High	Medium	High
Summary of value generation	◆			
C CASE STUDIES				
	Additional sales	Better losses	Lower sales cost	Lower admin cost
Global case studies	<ul style="list-style-type: none"> • Usecover.com uses image recognition to provide instant quotes • Optimal Global Health: Dynamic insurance forms based on algorithms 	<ul style="list-style-type: none"> • Swiss RE: Use IBM Watson for underwriting optimisation 	<ul style="list-style-type: none"> • ManuLife (Global case study 1): Biometrics for user authentication 	<ul style="list-style-type: none"> • USAA (Global case study 2): Use virtual assistant Nina for customer service
China case studies	<ul style="list-style-type: none"> • ZhongAn/Intelligence health: Health app (photo taking app to calculate the calories of the food by AI) 	<ul style="list-style-type: none"> • ZhongAn/Phone screen detection technology (China case study 1): Detect whether the phone screen is broken or not 	<ul style="list-style-type: none"> • ZhongAn/AI customer services: Provide customer services via chat bot • CPIC/Jixiang Life (China case study 2): Using AI Cloud before and during purchase • PingAn Direct automatic system performs regulation: Required callback after new policy delivery 	<ul style="list-style-type: none"> • ZhongAn/OCR+ Facial recognition: Identify the word/number in the picture/identity prove • Ant Financial: AI customer service • Union Life: AI robot for call centre • CPIC/Jixiang Life: Using AI Cloud • Ant Financial: AI to provide self-claim service • PingAn: Speech analysis to conduct quality control of call centre • Union Life: AI to analyse call quality

Relevance degree: Low ○ ↔ ● High

Applicability/Impact: Low □ Medium □ High □

Value: Today ◆ Potential □

Source: Oliver Wyman analysis

DEVELOPMENT IN CHINA VS. GLOBAL

While AI is developing at the same pace in China and the global market, it is possible that China will nurture the most advanced AI technology and applications. One reason is its relatively open attitude towards data sharing compared to the United States and Europe. Another is that it has a larger, faster-growing pool of data compared to other markets.

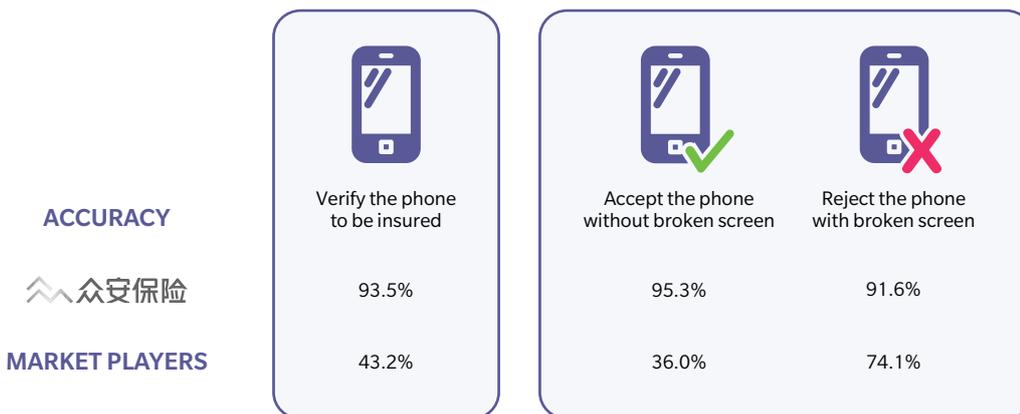
CASE STUDIES

Global Case Study 1: Manulife Canada launched some voice recognition software in cooperation with Nuance Communications. Manulife created individual “voiceprints” for customers by analysing their unique voice characteristics, which include more than 100 behavioural and physical traits of a person’s voice. When a customer calls, the system compares their voice with the stored voiceprints. In case of a match, access is granted. The software also recognises the customer’s spoken instructions, so that it can quickly route them to the right spot. The software has been available since 2015.⁷

Global Case Study 2: The US insurance company USAA integrated the virtual assistant Nina from Nuance Communications into its mobile customer service app. The virtual assistant utilises natural language understanding technology to engage with customers in natural conversations by voice or text. Nina then directs customers to the right customer service person. It monitors every customer interaction and adapts to the customer, so that the virtual assistant stays relevant and effective.⁸

China Case Study 1: ZhongAn Technology has improved phone-screen detection technology, which can be used for phone-screen protection insurance. First, the technology verifies more accurately that the phone in photos sent by a user is the phone to be insured. Second, the technology checks the screen of the phone more accurately.

Exhibit 17: Comparison of the phone screen detection technology



Source: ZhongAn Technology, Oliver Wyman analysis

7, 8. A more detailed description can be found in *Artificial Intelligence in Insurance: Use Cases from Early Adopters – Celent report 2016*

China Case Study 2: China Pacific Insurance (CPIC) and Jixiang Life Insurance implemented an intelligent customer service system using the open cloud platform AI Cloud. The system is able to answer inquiries from various channels, such as WeChat, mobile apps, the Internet, and company internal instant messaging. It is applied to answer customer inquiries before and during the insurance purchase process. Based on natural language understanding, the system can understand a customer's question and reply quickly and precisely. It can answer and ask questions based on the conversation context and, if necessary, direct customers to customer service staff.⁹

China Case Study 3: ZhongAn Technology has expanded the application of AI to other areas, such as the recognition of marathon runners. Images of the event are collected and checked by AI to see whether there are "human faces" inside the photo. Then, optical character recognition is used to identify the athlete's number. Facial recognition technology is finally applied to verify the athlete's face. ZhongAn Technology achieves a recognition rate of more than 90 percent and reduces labour costs by an average of 40 percent. The system's efficiency should increase with machine learning.

3.2.5. BLOCKCHAIN

As a distributed ledger, blockchain is a technological solution that can instil trust in transactions between parties who do not know each other. It is largely discussed in the financial services industry, with a focus on banking applications. Nevertheless, it is conceivable that insurance companies will also be able to leverage blockchain technology for their purposes.

A potential roll-out of blockchain in the insurance industry would benefit from blockchain's trust-instilling capability, transparency, and immutability. The following four applications represent potential use cases with many more being conceivable (e.g. for claims):

- Identity management, including know-your-customer and anti-money laundering
- Fraud detection
- Peer-to-peer insurance
- Multiple risk participation

IDENTITY MANAGEMENT

Blockchain has the potential to generate substantial cost savings. Identity management in know-your-customer and anti-money-laundering processes is a challenge for insurers, just as it is for banks. Insurers, in order to provide their services, need to identify their counterparties. Today, information on these is typically scattered across multiple systems and vendors, which include agents. Validation logic is contained in systems both at the insurer and at various other providers. In contrast, mutualising know-your-customer processes through a shared, distributed ledger between insurers and service providers makes them easier to carry out, thus lowering the expense of customer onboarding. Improved data quality results in better matching between the needs of the insured party and the qualifications of the person or company providing the service. It is also conceivable that a central, know-your-customer utility would provide identity management for a number of insurance companies, so that they could share the cost.

9. A more detailed description can be found in *Artificial Intelligence in Insurance: Use Cases from Early Adopters – Celent report 2016*

FRAUD DETECTION

Fraudulent claims for obvious reasons represent a cost which insurance companies attempt to reduce. If a blockchain solution is applied as a distributed ledger across industries, insurance companies can use it to validate the following:

- Goods' and documents' authenticity, ownership, origin, and path through the supply chain
- The identity of persons engaging in the transactions
- The date and time of policy issuance

However, to capture the benefits of this application, broad adoption of blockchain technology along common technological standards with deep cooperation is required from all relevant value chain parties – meaning insurers, manufacturers, intermediaries, and customers.

PEER-TO-PEER INSURANCE

While blockchain is not necessary to create a peer-to-peer business model, it might turn out to be crucial if consumers are to participate in peer-to-peer insurance. The specifications of blockchain technology make a blockchain-based solution transparent and trustable for consumers, so insurance companies could automate the administration of peer-to-peer smart contracts.

MULTIPLE-RISK PARTICIPATION

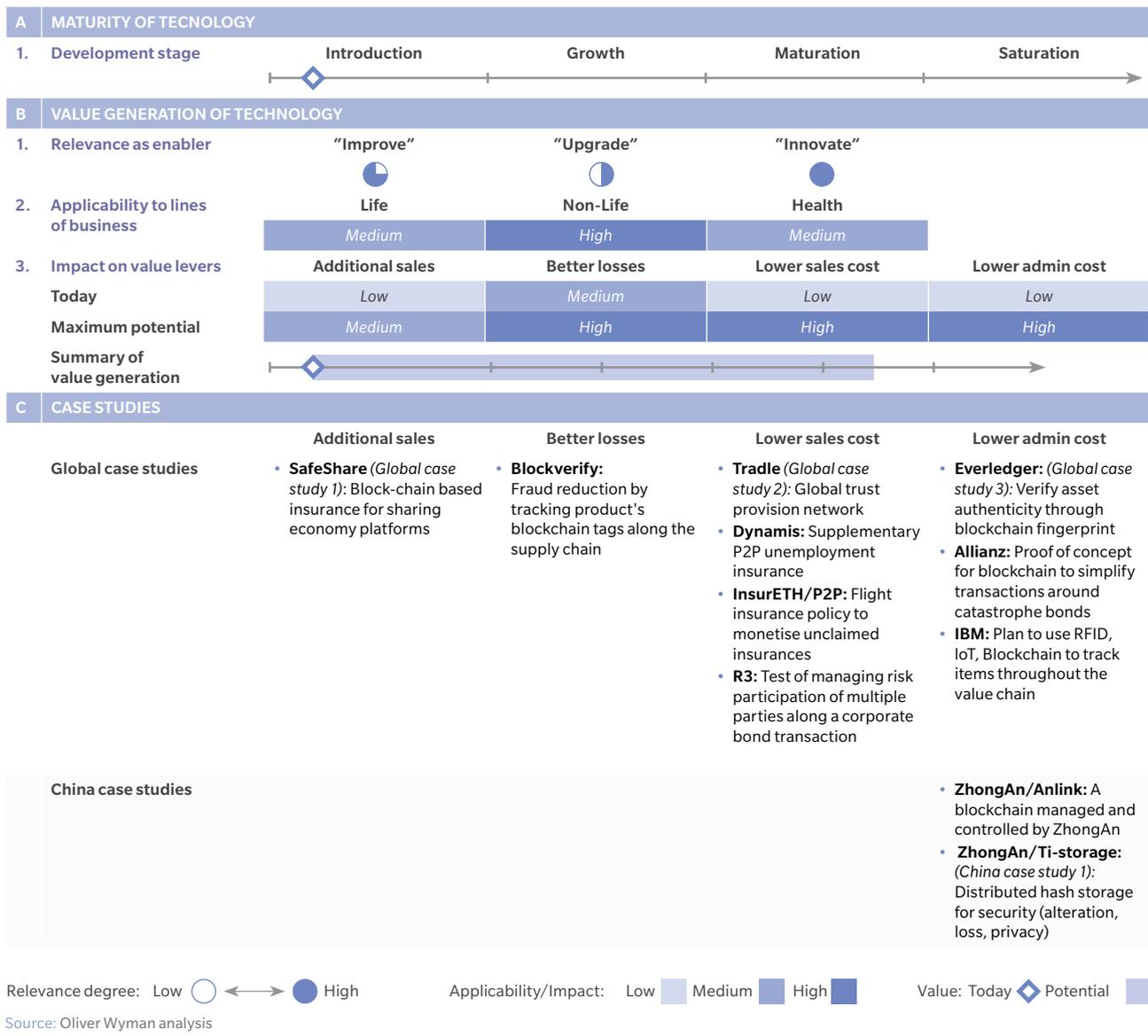
In the case of multiple-risk participation, multiple insurers agree to take a portion of the responsibility for a large potential loss. In the traditional model, the coordination of these multiple insurers is prone to error and inefficiency due to the variety of communication modes – phone, email, fax, paper – and the number of iterations between parties. In some cases, this leads to disagreement regarding the final terms, resulting in claim settlement delays, additional expenses, and in some cases litigation. Applying blockchain technology, participants could register their reference data, including their participation level, and state their commitment in a transparent and immutable form without using a central clearing authority.

TECHNOLOGY EVALUATION

Blockchain in the insurance industry is in the very early stages. Recently, insurance companies' interest in the technology has increased, and more insurance companies are testing its application for their internal processes through pilots. B3i, the Blockchain Insurance Industry Initiative, grew in a few months from five founding members in October 2016 to 15 members in February 2017, and will test the potential of blockchain for the insurance industry.

Blockchain is positioned to enable innovative business models adjacent to the traditional business model without a specific focus on a certain part of the insurance profit pool. We expect strong opportunities for value generation by blockchain in internal processes for operations and administration, as well as in managing claims costs. Furthermore, blockchain has the potential to generate business models with new products and offerings.

Exhibit 18: Technology evaluation framework: Blockchain



DEVELOPMENT IN CHINA AND GLOBALLY

Generally speaking, blockchain is developing in China at the same pace as in the global market. China's central bank is driving the development of digital currency, and many private companies such as Alibaba, ZhongAn and DianRong, are investing heavily in blockchain. Therefore China has a chance to lead the blockchain wave.

CASE STUDIES

Insurers are testing blockchain actively, but no significant adoption has been observed so far. The following case studies are from both insurance industries and other industries.

Global Case Study 1: The start-up SafeShare Global develops insurance for sharing-economy platforms. For instance, for Vrumi, a start-up for office space sharing, SafeShare provides an insurance product for property landlords against losses related to damage and theft inflicted by tenants. Lloyd's is the underwriter for the insurance and provides a claims hotline. SafeShare utilises blockchain to validate and facilitate the transactions and can coordinate the counter-parties.

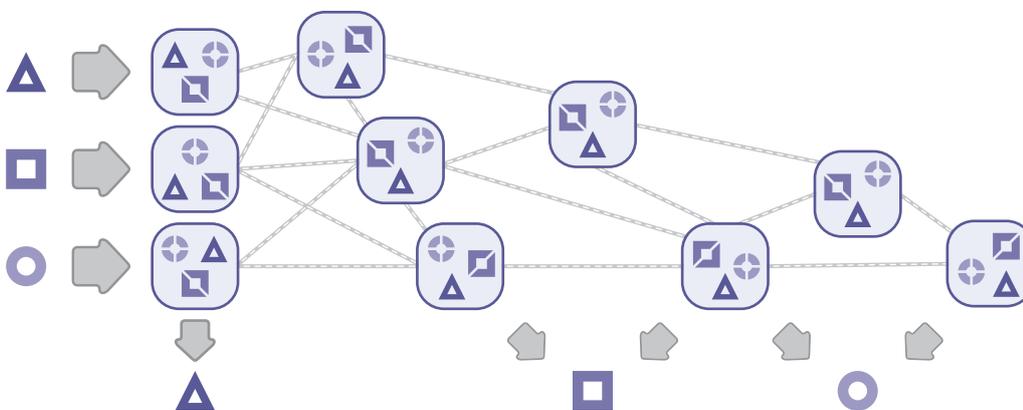
Global Case Study 2: The start-up Tradle (tradle.io) is building a global trust provision network with the aim of lowering know-your-customer costs and accelerating the customer journey in all sectors of banking and insurance. It is using blockchain technology to build a know-your-customer network. The advantage for customers is that they remain in control of their data, as they have power over which personal data they share with whom.

Global Case Study 3: The start-up Everledger (everledger.io) tracks and protects valuable assets through their lifetime. An asset's characteristics, history, and owners are recorded on the blockchain, forming a permanent ledger of its certification and transaction history. Insurance companies, owners, law enforcement authorities, and claimants use the blockchain as a thumbprint throughout the value chain or asset lifespan to verify the authenticity of the asset. Thus, Everledger contributes to a reduction in risk and fraud.

China Case Study 1: ZhongAn Technology has applied blockchain technology and developed Ti-storage, a peer-to-peer, secured-data storage system. A document stored in Ti-storage is secured through a hash method and cannot be modified. The document is decomposed and stored in different places with at least two copies, so the data will not be lost even if there is an attack on one data centre. External parties cannot recover the information even if data is leaked. So, crucial documents such as those containing customer information, proofs of assets, and e-contracts can be securely stored with Ti-storage.

ZhongAn Technology helped a Chinese supply chain finance company to build a blockchain for supply chain finance, using ZhongAn Technology's blockchain platform.

Exhibit 19: Blockchain – Ti-storage



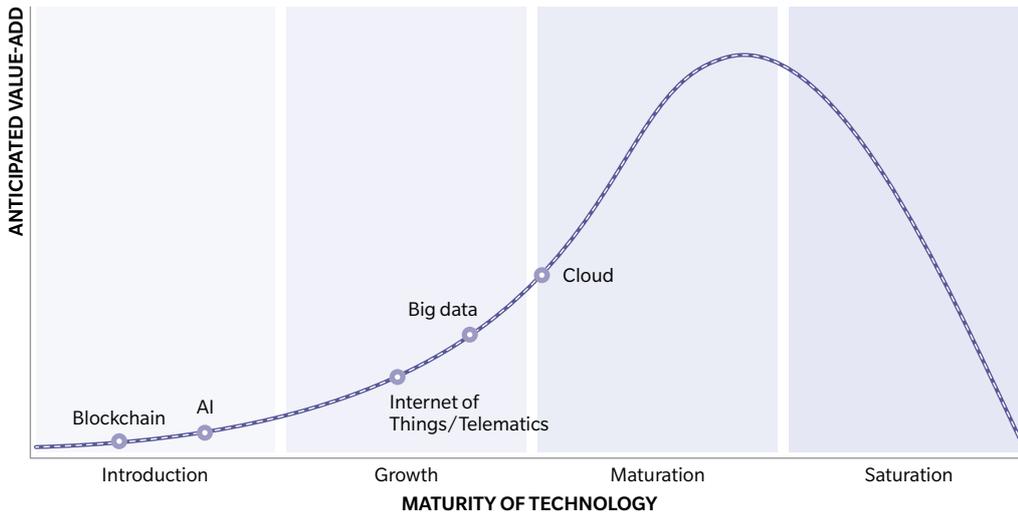
Source: ZhongAn Technology, Oliver Wyman analysis

3.3. SUMMARY OF TECHNOLOGY VALUE GENERATION

After assessing each key technology, four conclusions can be drawn:

- 1. Maturity:** Not all technologies are at maturity with respect to their application in insurance. That is, they are more in an introductory or growth phase, while cloud is a slightly more mature technology

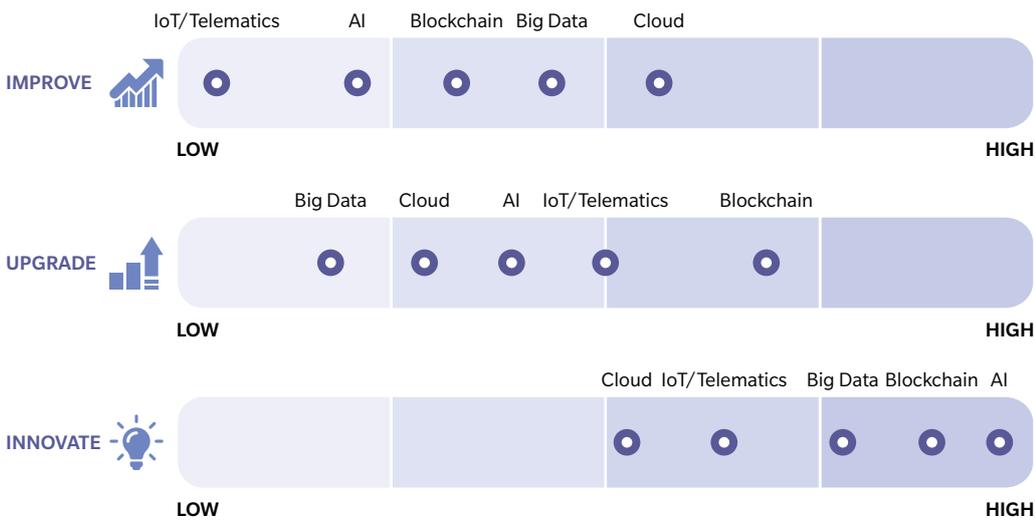
Exhibit 20: Maturity levels of technology



Source: Oliver Wyman analysis

- 2. Potential to Enable:** The changes the mentioned technologies can bring about are geared towards innovation, which is important for tapping into new – not yet existing – profit pools. To some extent they could also support upgrades of insurance propositions, but they have less scope to improve traditional insurance business models

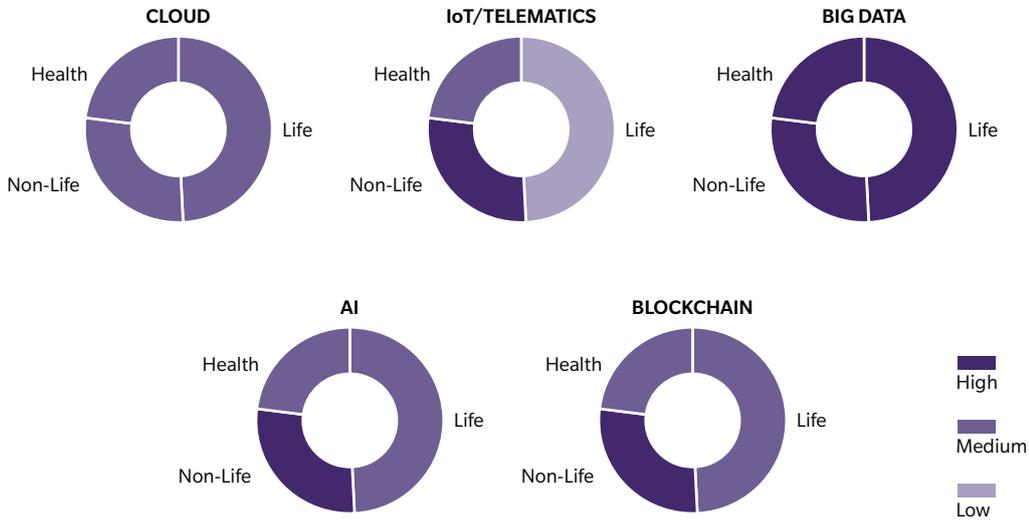
Exhibit 21: Relevance as enabler



Source: Oliver Wyman analysis

3. Reach of Application: The applicability of technology to various lines of business is of particular relevance since it ultimately determines the magnitude of impact on profit pools. The technologies vary in applicability, but all five are of fairly high relevance to the non-life business line – though cloud computing is of only medium-high relevance

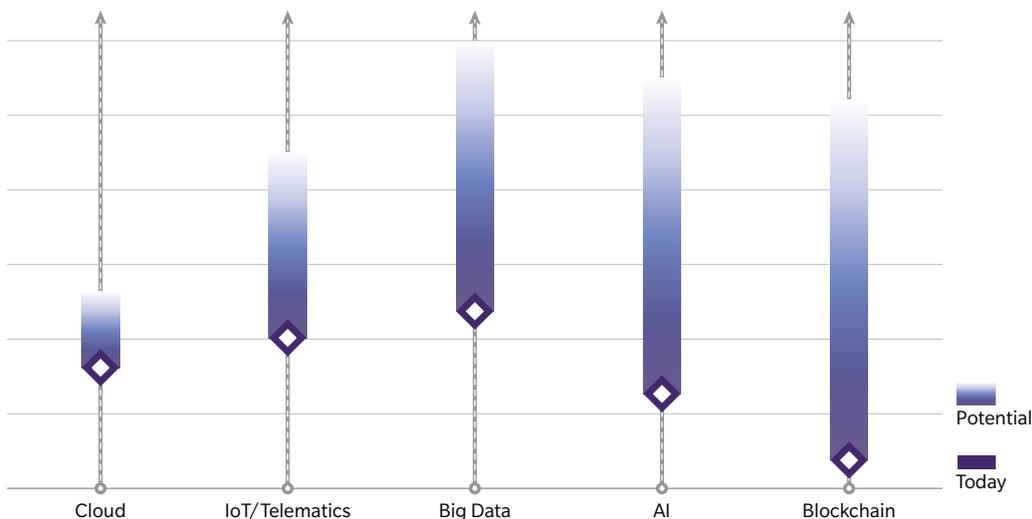
Exhibit 22: Lines of business applicability



Source: Oliver Wyman analysis

4. Impact: Ultimately, the five key technologies are expected to have some impact on the insurance industry. The following chart compares the impact assessments detailed in the previous chapter, showing today’s impact and each technology’s range of value-creating potential

Exhibit 23: Indicative range of potential premium pool impacts of technologies



Source: Oliver Wyman analysis

The value generation capabilities of the five key technologies in the insurance industry depend on their relevance as enablers of change, their degree of impact on different business lines, and identified value levers.

In a nutshell, AI and big data provide the highest-impact potential to improve competitiveness and create additional sales. They could help generate new ways of translating risk into insurance premiums and hence generating income streams. In addition, they provide ways to gain higher market share from existing profit pools. Moreover, given their large applicability to the non-life line of business and their high potential to reduce indemnity costs, they have the potential to generate fairly significant value.

The assessment of blockchain suggests a relatively large impact potential from improving indemnity in the non-life line of business, something that AI and big data will also provide. Blockchain could also have a potentially significant impact on the distribution and administration side by minimising transaction costs. However, the value observable today is very limited, so the jury is still out on whether the technology will live up to its potential.

Cloud technology's impact on an insurer's performance is likely to be limited to an improved administrative cost base.

Last but not least, IoT/telematics will have – and to some extent already has, due to its maturity level – an impact on lowering indemnity, since it is also largely relevant to the non-life line of business. It may also play a vital role in gaining market share from existing profit pools. But IoT/telematics has relatively less potential to tap into new profit pools, because it has a slightly lower potential to drive innovation than newer technologies such as AI and big data.

4. HOW TO CAPTURE THE VALUE OF TECHNOLOGY

Solutions integrating all the advanced technologies are becoming a reality nowadays. Three recent development areas can be observed.

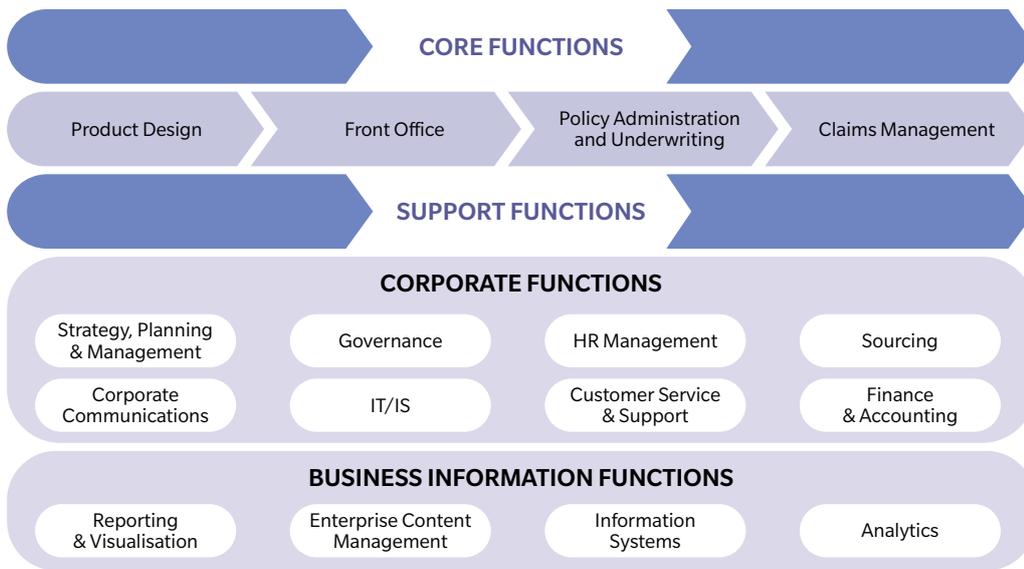
- Next-generation core systems for insurance: Expanding from cloud-based, non-core systems, both technology providers and insurance companies are building cloud-based core systems
- AI-based comprehensive risk management for cloud: AI-based comprehensive risk management is ready to support cloud-based core systems, in addition to augmenting the security of servers that host core systems
- Cloud-born and proven enterprise solutions: Successful adoption in a big, complex company will encourage smaller companies to adopt. Therefore technology providers with a background in enterprise solutions will likely acquire business easily

4.1. NEXT-GENERATION CORE SYSTEMS FOR INSURANCE

Currently, software as a service has been widely piloted or applied to the non-core, supporting systems of the insurance industry. It has streamlined the operating efficiency of customer-relationship-management systems, sales systems, and even non-core books of business. Historically the insurance industry has been very wary of leveraging cloud computing for the bulk of its business with customers. At first this was due to fears over security, and then due to real challenges in evaluating and selecting cloud propositions from a perspective of security and pragmatism. In more recent times, insurers in certain markets have shown willingness to adopt new technology for core systems, pointing to a need for an open regulator and the availability of strong SaaS solutions to drive demand.

From a long-term perspective, insurers are gradually adopting a cloud-based, next-generation core system based on a combination of various maturing technologies. Advances in cloud computing can make it more operationally and economically efficient to move a core system into the cloud. If blockchain can be applied, it will likely ease safety issues for data storage and transmission. Big data and AI can provide further sparks for the development of next-generation core systems. According to a recent survey, 16 percent of respondents show interest in applying SaaS to their core systems in future, and 58 percent recognise its value now. (See Exhibit 24)

Exhibit 24: Applying cloud computation to insurance systems

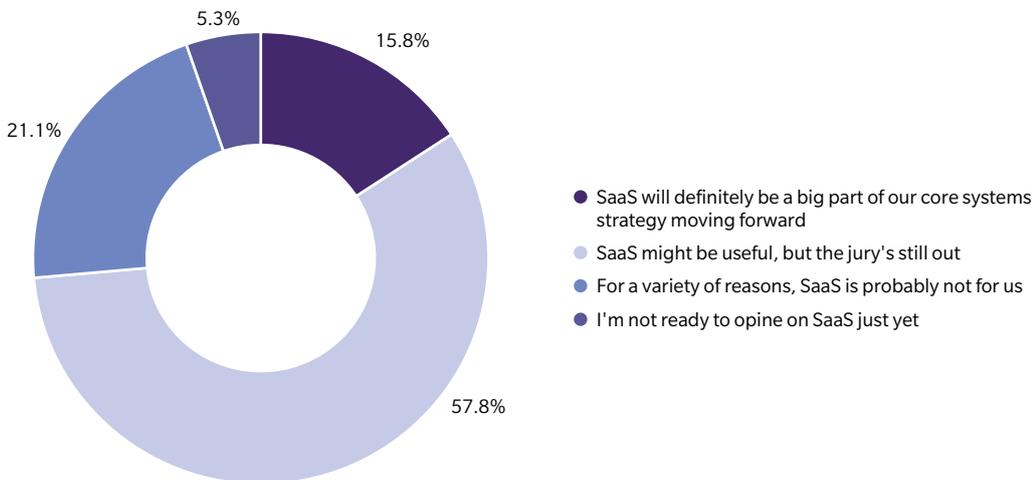


Source: Capgemini, Oliver Wyman analysis

Exhibit 25: View on SaaS application to core system

CELENT SURVEY 2015

WHICH OF THE FOLLOWING BEST SUMMARISES YOUR VIEW ON SAAS APPLICATION TO INSURANCE CORE SYSTEMS?



Source: Celent – A member of the Oliver Wyman Group

Several benefits can be expected from next-generation core systems:

- **Better economies of scale:** Cloud computing enables insurers' IT organisations to commoditise IT infrastructure and related services, such as development systems and applications for storage and email. This removes the complexity of on-premises deployment and management. For example, ZhongAn Insurance's existing system can support exponential business growth for the next five years

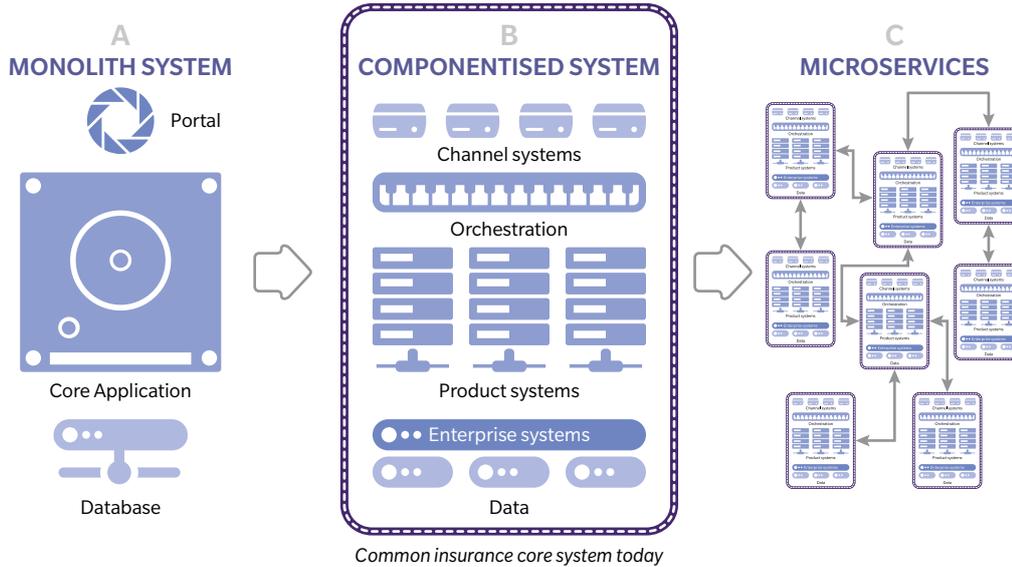
- **Scalable and flexible storage and processing:** Many insurers' IT organisations face the challenge of providing system resources that meet peak-time data requirements. Cloud computing enables them to avoid over-provisioning IT resources and to increase their storage or processing capacity by orders-of-magnitude at a more affordable cost
- **Higher productivity and collaboration:** Cloud computing can help insurers provide their agents, brokers, and underwriters with a common platform, allowing them to gain faster access to real-time data, and increasing productivity. Such collaboration may also reduce conflicts between traditional and alternative channels
- **Standardisation:** Cloud computing provides insurers with the ability to standardise and roll out systems consistently across multiple geographies and connect easily with various ecosystems. For example, ZhongAn Insurance has connected with various online ecosystems – more than 200 in less than four years – to obtain data and provide tailored insurance solutions
- **Shortened time to implementation:** Due to intensifying competitive pressures, insurers need to increase their speed to market. In a cloud-enabled insurance organisation, the business and IT project implementation timelines are drastically reduced, as the infrastructure to meet business needs is available upfront, tailor-made, and scalable

The above benefits are further enhanced by the development of new technologies based on cloud computing, such as microservices and DevOps (software development and information technology operations). The application of microservices is discussed below as an illustration. In the early stages, the core system was built on a monolithic architecture, which had only one core application. Once built, it was difficult to add or integrate new applications and machines to the architecture. This met the insurers' early needs but made the core system very rigid, so that it could not meet demands for more channels of business, more automation, and more integration. As technology advances, most insurance core systems today are based on a multi-tier componentised model. Under this architecture, applications are built to scale to meet demand from the Internet, increase reusability, and make them easier to integrate. However, the components themselves are still large, monolithic applications. While it is possible to deploy a claims system separately from policy processing, the whole claims system still has to be deployed, and all the servers supporting it must be maintained to run that one component.

Recently, the adoption of microservices can make the insurance core system flexible, adaptable, and cost-efficient. Each component is an independent application that is scaled dynamically. Moving one step forward, the microservices architecture can further support agility and adaptability by enabling concurrent development at scale. For example, when an insurer has a sudden increase in quote activity and so needs more rating capacity, the independent components can be integrated automatically to increase the scale of the rating application. When the insurer's activity volume is down, only certain components are running, so no expenses are wasted on unused capacity or hardware.

In the future, core systems will increasingly make use of the server-less paradigm combined with microservices. This will enable business to be automatically scaled, and the infrastructure management will be completely controlled in the cloud.

Exhibit 26: System architecture examples



Source: Celent – A member of the Oliver Wyman Group

Global development: Currently, there are various examples of adopting SaaS to insurance non-core systems, and the idea of adopting SaaS to core systems has gained attraction recently. In some territories and markets, the adoption of SaaS has been very strong. For instance, in the Dutch market insurers are well served by systems built for a SaaS or SaaS-like delivery model. Speciality insurers globally have looked to vendor-hosted and SaaS offerings for some time. Many leading tech vendors are now offering SaaS solutions such as Guidewire, Unirix, and CapGemini. More recently, there is a new generation of “born SaaS” core systems, which are not brought to the cloud, but are designed and developed from scratch in the cloud.

For example, IBA was recently selected by Munich Re Digital Partners as a backbone for its cooperation with InsurTechs. Guidewire has launched a cloud-based, all-in-one solution called Guidewire InsuranceNow™ that supports property and casualty insurance throughout a policy’s lifecycle. Unirix also provides system solutions covering functions such as product configuration, quotation, policy underwriting and management, and claims.

China Case Study: ZhongAn Insurance is the first insurance company in China that deploys all systems in a public cloud, as mentioned previously. The core business system in property insurance, Non-border Mountain, now stores 10 billion items of data, including 6 billion related to policies, and performs real-time data analysis. It is estimated that the system can handle 200 million transmissions per day. ZhongAn Technology has also started to develop a life insurance core system, which will be implemented in a new life insurer in Hong Kong.

4.2. AI-BASED COMPREHENSIVE RISK MANAGEMENT FOR CLOUD

Another area for realising the value of new technologies is risk management. In the cloud environment, there are six main types of risk that need to be managed: those related to the Internet or networks, systems, applications, business performance, data, and fraud. Examples of causes of risk events are security breaches or attacks, viruses, malicious software, break-ins, and phishing.

Traditional risk management is based on a passive, detection-to-prevention approach. Rules and mitigation measures are developed by learning from what has happened in the past. As the level of automation is relatively low, traditional risk management often involves a high degree of human judgment and reaction, which could result in failure due to delayed response or human error. Furthermore, some characteristics of the six types of risk imply that traditional risk management is no longer enough and needs to be made smarter and more intelligent:

- **Quick-changing:** The techniques used for security breaches and system attacks change frequently, so attacks are hard to predict until launched. Some new frauds will happen after a new product is launched for a while and some customers or groups of professional defrauders discover the loophole in the design of a new product or new process
- **Global source of risks:** Due to global connectivity through the Internet, firms are now vulnerable to security breaches and attacks from any region or country at any time
- **Strong and sudden attack:** As attacks to networks, systems, applications, or data usually come in a sudden and disruptive way, vulnerable firms need to dedicate extensive systems resources and capacity to defensive actions
- **Severe impact on business:** Any delay or failure in reacting to security attacks may result in unauthorised access; the interruption of business operations; or the misappropriation, theft, or leakage of data or client information. All of these can have a significant negative influence on the firm's reputation, as well as its financial performance

One solution is a smart, intelligent risk management approach combined with the adoption of cloud computing, big data, and AI. Such a risk management approach uses a minimal level of human intervention in one or more of the following activities: learning normal behaviour and alerting on exceptions; smart risk prediction; automatic testing, response, and action; and dynamic inference, analytics and reporting. (See Exhibit 27) Strange behaviours will be detected and analysed, and relevant actions will be taken to minimise loss and ensure continuity of business. These could include increasing the security level, lowering the straight-through ratio, suspending sales of a new product, and notifying the system managers.

Exhibit 27: Traditional vs. AI-based comprehensive risk management

**TRADITIONAL
RISK MANAGEMENT**



- Risk detection and prevention
- Scripted automation
- Limited process automation based on static rules
- Individual metrics based on structured data in lifecycle silo
- Limited insight
- Passive: What happened in the past?

**AI-BASED COMPREHENSIVE
RISK MANAGEMENT**



- Risk prediction
- Adaptive automation
- Intelligent process automation based on dynamic inference
- Analytics based on large scale data across the lifecycle
- Focus on Insights
- Proactive: What would happen?



Source: Oliver Wyman analysis

Server security is still very critical, and measures need to be taken to safeguard servers and data, such as the following:

- Performing due diligence with high security standards on server providers
- Supervising and regularly visiting the hosting facility
- Backing up and storing data in multiple locations to prevent data loss and ensure business continuity

Global development: Insurance companies are adopting more-rigorous risk management tools, but as most of their business is not written or handled in the cloud, the complexity of risk brought by technological transformation is moderate and quite similar to that of traditional insurance companies. Human intervention still remains the key to detect and prevent potential risk events or fraud cases. If necessary, insurance companies will purchase IT solutions or firewalls from specialised security service providers, such as McAfee, PAN, and Symantec.

China Case Study 1: China has been a global leader in the adoption of new technologies like cloud and big data to alter the way in which traditional insurance companies do business. Some leading, innovative Chinese insurance companies have begun to recognise the new security risks that come with these technologies. China Pacific Insurance Group (CPIC) recently selected McAfee as a digital partner to develop its Hawkeye big data security and control system. By automatically collecting and analysing 1.5 billion logs daily, Hawkeye can rapidly detect, alert, and respond to potential threats or unauthorised breaches before they actually happen. That allows CPIC to better prioritise and handle its risk management.

China Case Study 2: Another example is ZhongAn Insurance. Rather than seeking an external IT solution provider, it chose to develop a smart, comprehensive risk-management system internally.

Its systems can effectively manage risks in all business processes, from underwriting to credit and from operations to infrastructure. The risks can relate to networks, data, systems, applications, business performance, and fraud detection. A robot troublemaker has been invented to test the risk management system: It has been designed to attack it on a daily basis. As a result, the system can automatically and effectively identify areas that are vulnerable to attack. Immediate corrective actions can also be taken automatically. As no human is involved, the whole process is fast and operates round the clock. ZhongAn's risk management system continuously tested and enhanced, has achieved an average response time of shorter than one second to cyber-attacks.

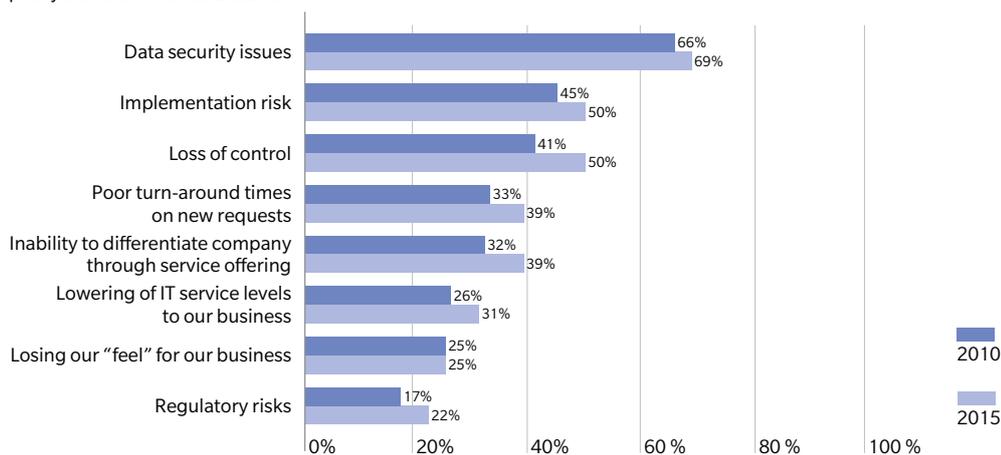
4.3. CLOUD-BORN AND PROVEN ENTERPRISE SOLUTIONS

More value will be captured by the tech provider if it supplies cloud-based, enterprise-level solutions to other enterprises. These live examples will serve as convincing evidence to attract more adopters. For example, Amazon Web Services was initially developed to satisfy Amazon's e-commerce requirements, but has gradually evolved to become a leading global provider of cloud computing services.

Still, there are concerns over the adoption of cloud-based enterprise solutions. Exhibit 28 shows that 69 percent of respondents worry about data security and 50 percent about implementation risks. A live example of a big company with a higher level of complexity will help alleviate the concerns of potential adopters. Firstly, if a more complex business with a greater quantity of big data can be operated in the cloud, then other businesses should be able to do the same. Secondly, a cloud-based company can create true cloud software, which is designed for the cloud from the beginning. Coded as a fully cloud-hosted solution, the system is managed and maintained for the user across multiple levels of redundancy.

Exhibit 28: Impediments in adopting SaaS

With regards to SaaS, what are the impediments in your organisation to adopting this model for core software such as policy administration and claims?



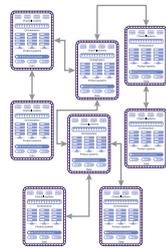
Source: Celent – A member of the Oliver Wyman Group

As an example, ZhongAn Technology can benefit from parent company ZhongAn Insurance's experience and the solutions it has nurtured. ZhongAn Technology is offering enterprise-level solutions, including AI as a service and blockchain as a service. (See Exhibit 29)

Life insurers, lenders and supply-chain finance companies in China have started to adopt ZhongAn Technology's solutions for two main reasons. One is that ZhongAn Insurance is managing 6 billion policies with a cloud-based system and can underwrite 210 million policies in one day. This generates confidence in the technology among companies with less complexity, and indicates that most businesses with smaller amounts of big data can rely on cloud-based solutions too. Another reason is that ZhongAn Technology can standardise and modularise tools developed in ZhongAn Insurance into enterprise-level solutions. Those solutions have already proven their success in ZhongAn Insurance, so they can be easily accepted by other insurance companies and broadly companies in other industries.

Exhibit 29: Cloud-born and proven ZhongAn Technology

GROUND FOR NURTURING...



- 6 billion policy data
- 200 million TXs per day
- 210 million policies on 11 November 2016

CLOUD-BORN AND PROVEN ENTERPRISE LEVEL SOLUTIONS



- Blockchain-aaS
 
- AI-aaS
 

Source: ZhongAn, Oliver Wyman analysis

5. INVESTOR APPRAISAL OF TECHNOLOGY-BASED VALUE CREATION

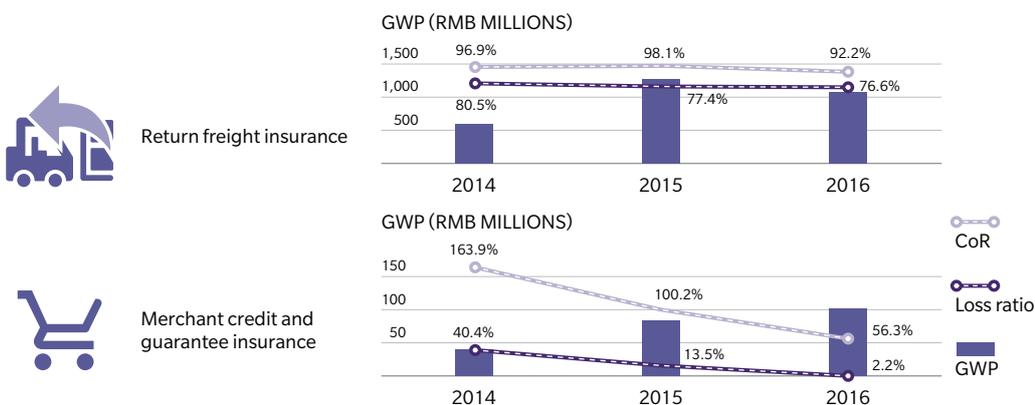
As detailed in Chapter 3, the five technologies are usually applied in an integrated way to maximise value creation. It is expected that the application of these technologies will change products, value propositions, and even business models. This will clearly generate value for insurance companies and their customers, as well as for technology providers.

Insurance companies will benefit most directly from cost savings and increased premium generation derived from, for example, more-efficient sales approaches or new products.

Customers will benefit from improved services or new products that cover their risks more specifically. They will of course have to pay a fee or premium for some of these benefits, such as health-related services. However, other benefits will simply become part of the existing insurance value proposition without affecting premiums, for example round-the-clock availability of administrative and claims services.

Already today, tech-heavy insurers are winning against their rivals. A clear example is UK motor insurance, as discussed in Chapter 3.1.1. These companies are generating a competitive advantage based on integrated technology applications. Moreover, economies of scale will be achieved quickly using cloud-based core systems and risk management systems, because the platforms can be easily expanded to handle hundreds or millions of times more policies with almost no additional human intervention. For example, in return freight insurance, the combined ratio and loss ratio fell to 92 percent and 77 percent, while gross written premiums rose to more than RMB 1 billion in 2016, two years after launching. In merchant credit and guarantee insurance, the combined ratio and loss ratio also fell to 56 percent and 2 percent, when gross written premium rose to over RMB 100 million in 2016, two years after launching.

Exhibit 30: Examples of products in Application area 3



Source: ZhongAn, Oliver Wyman analysis

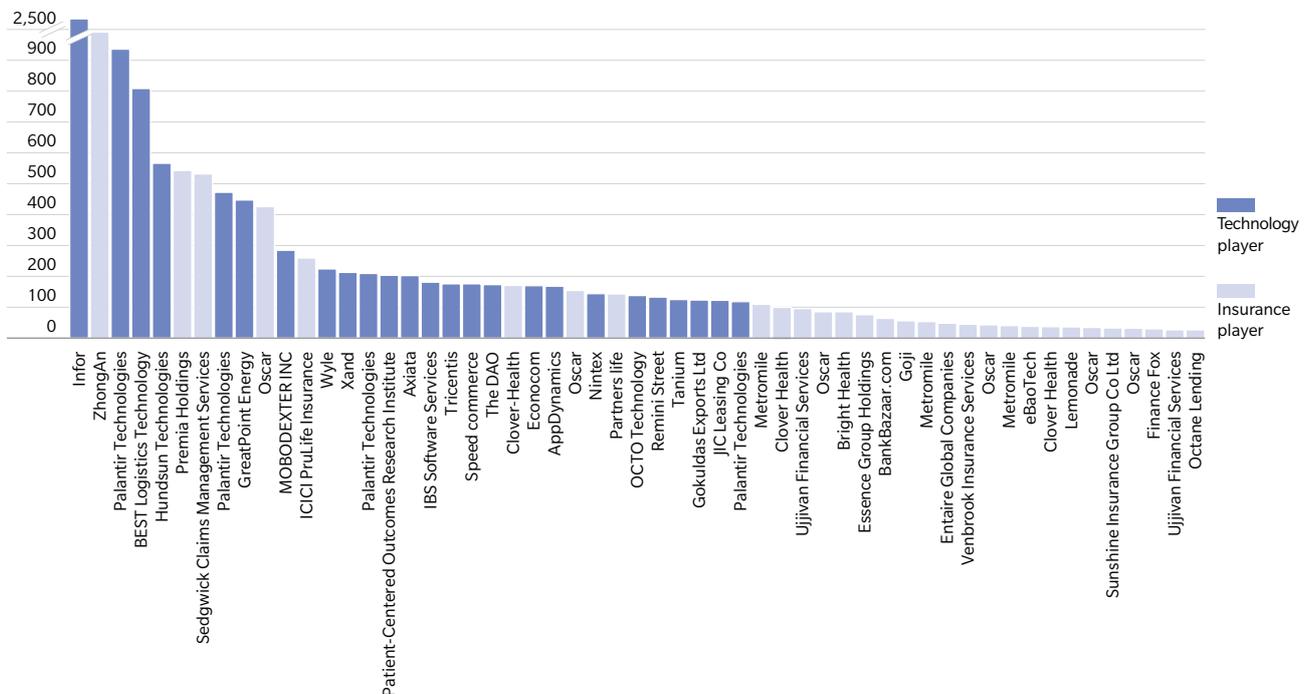
Some insurance companies will be able to develop these applications in-house. Large players, especially, will not need to rely on standard solutions provided by external providers if they have the capabilities to build a well-fitting solution of their own. This consideration will be particularly relevant for less-mature technologies, where specific insurance use cases are being created only today. Obviously, insurance companies have a huge advantage in developing game-changing technology solutions, as they have the best insight into customers' needs and application requirements. Hence, just like in the past and in some other industries, tech-heavy insurers could be in a position to become leading technology providers.

The additional and sustainable value created by technology is also highly recognised by investors. This can be observed most clearly in InsurTech, in which global investment is surging: It reached \$1.7 billion in 2016, with the volume and value of deals almost doubling since 2014. Almost half the investments in InsurTech have been earmarked for research into artificial intelligence and the Internet of Things: The combined deal volume for these two areas grew by 79 percent from 2014 to 2016, according to CB Insights. InsurTech's rapid growth can partly be attributed to investments pouring into start-ups operating outside the traditional industry. Only 14 percent of the 450 InsurTech deals that took place during this period involved an insurer or its venture arm.

Although InsurTech companies are very successful, they are not as successful as pure tech players. Tech start-ups can raise more investor capital than InsurTech players. So, pure tech players are more successful at monetising their technological capabilities than are start-ups that focus on the insurance business.

Exhibit 31: Top 30 funding rounds by Insurance player vs. Technology player

2012 – PRESENT, US\$ MILLIONS



Source: www.crunchbase.com

ABOUT OLIVER WYMAN

Oliver Wyman is a global leader in management consulting. With offices in 50+ cities across nearly 30 countries, Oliver Wyman combines deep industry knowledge with specialised expertise in strategy, operations, risk management, and organisation transformation. The firm has more than 4,500 professionals around the world who help clients optimise their business, improve their operations and risk profile, and accelerate their organisational performance to seize the most attractive opportunities. Oliver Wyman is a wholly owned subsidiary of Marsh & McLennan Companies [NYSE: MMC]. For more information, visit www.oliverwyman.com. Follow Oliver Wyman on Twitter @OliverWyman.

ABOUT ZHONGAN INSURANCE

ZhongAn Insurance is the first truly online insurance company in China, co-founded by reputable companies such as Ant Financial, Tencent and Ping An Group on 6th November 2013. Till now, ZhongAn has developed 200+ insurance products serving more than 550 million customers. ZhongAn aims to reshape traditional insurance by applying internet thinking across the insurance value chain from product design to claims servicing with its core strengths in technology. For more information, visit www.zhongan.com.

ABOUT ZHONGAN TECHNOLOGY

Established in July 2016, ZhongAn Technology is a wholly-owned subsidiary of ZhongAn Insurance specialising in cutting-edge technology research and providing technology infrastructure, products, and services. Focus areas of ZhongAn Technology include blockchain, artificial intelligence, big data, cloud computing, etc. ZhongAn Technology delivers value by equipping ZhongAn Insurance with advanced technologies and by exporting enterprise-level solutions to other financial institutions and healthcare sector. For more information, visit <https://zhongan.io>

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