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Insurance 2030—The impact of AI on the future of insurance

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The industry is on the verge of a seismic, tech-driven shift. A focus on four areas can position carriers to embrace this change.

Welcome to the future of insurance, as seen through the eyes of Scott, a customer in the year 2030. His digital personal assistant orders him an autonomous vehicle for a meeting across town. Upon hopping into the arriving car, Scott decides he wants to drive today and moves the car into “active” mode. Scott’s personal assistant maps out a potential route and shares it with his mobility insurer, which immediately responds with an alternate route that has a much lower likelihood of accidents and auto damage as well as the calculated adjustment to his monthly premium. Scott’s assistant notifies him that his mobility insurance premium will increase by 4 to 8 percent based on the route he selects and the volume and distribution of other cars on the road. It also alerts him that his life insurance policy, which is now priced on a “pay-as-you-live” basis, will increase by 2 percent for this quarter. The additional amounts are automatically debited from his bank account.

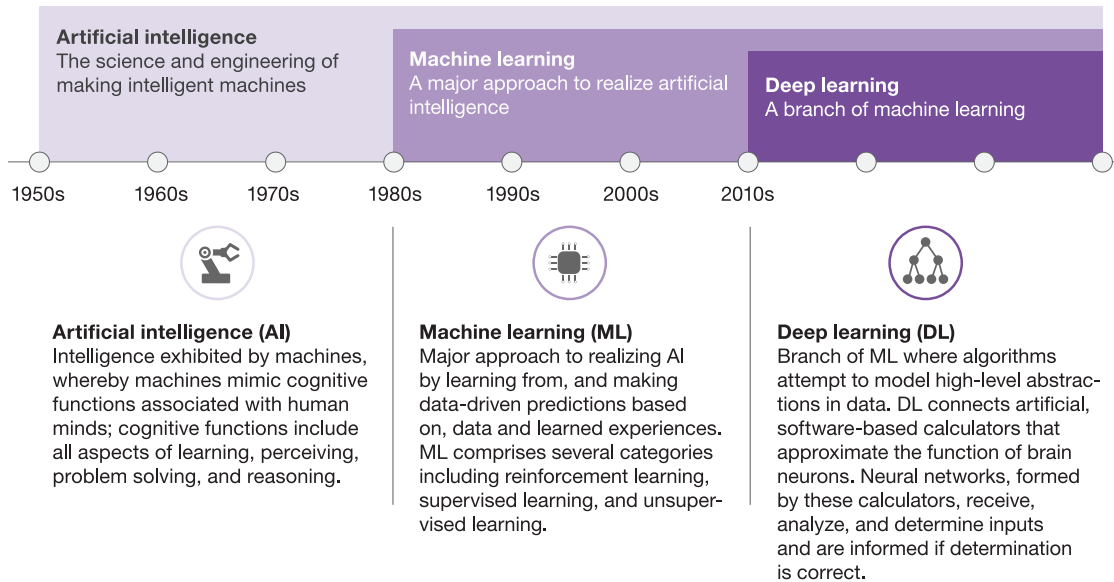
When Scott pulls into his destination’s parking lot, his car bumps into one of several parking signs. As soon as the car stops moving, its internal diagnostics determine the extent of the damage. His personal assistant instructs him to take three pictures of the front right bumper area and two of the surroundings. By the time Scott gets back to the

driver's seat, the screen on the dash informs him of the damage, confirms the claim has been approved, and that a mobile response drone has been dispatched to the lot for inspection. If the vehicle is drivable, it may be directed to the nearest in-network garage for repair after a replacement vehicle arrives.

While this scenario may seem beyond the horizon, such integrated user stories will emerge across all lines of insurance with increasing frequency over the next decade. In fact, all the technologies required above already exist, and many are available to consumers. With the new wave of deep learning techniques, such as convolutional neural networks,¹ artificial intelligence (AI) has the potential to live up to its promise of mimicking the perception, reasoning, learning, and problem solving of the human mind (Exhibit 1). In this evolution, insurance will shift from its current state of “detect and repair” to “predict and prevent,” transforming every aspect of the industry in the process. The pace of change will also accelerate as brokers, consumers, financial intermediaries, insurers, and suppliers become more adept at using advanced technologies to enhance decision making and productivity, lower costs, and optimize the customer experience.

Exhibit 1

Artificial intelligence can deliver on industry expectations through machine learning and deep learning.



Source: Nvidia; *Science in the news*, "The history of artificial intelligence," blog entry by Rockwell Anyoha, August 28, 2017, sitn.hms.harvard.edu

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As AI becomes more deeply integrated in the industry, carriers must position themselves to respond to the changing business landscape. Insurance executives must understand the factors that will contribute to this change and how AI will reshape claims, distribution, and underwriting and pricing. With this understanding, they can start to build the skills and talent, embrace the emerging technologies, and create the culture and perspective needed to be successful players in the insurance industry of the future.

Four AI-related trends shaping insurance

AI's underlying technologies are already being deployed in our businesses, homes, and vehicles, as well as on our person. Four core technology trends, tightly coupled with (and sometimes enabled by) AI, will reshape the insurance industry over the next

decade.

Explosion of data from connected devices

In industrial settings, equipment with sensors have been omnipresent for some time, but the coming years will see a huge increase in the number of connected consumer devices. The penetration of existing devices (such as cars, fitness trackers, home assistants, smartphones, and smart watches) will continue to increase rapidly, joined by new, growing categories such as clothing, eyewear, home appliances, medical devices, and shoes. The resulting avalanche of new data created by these devices will allow carriers to understand their clients more deeply, resulting in new product categories, more personalized pricing, and increasingly real-time service delivery. For example, a wearable that is connected to an actuarial database could calculate a consumer's personal risk score based on daily activities as well as the probability and severity of potential events.

Increased prevalence of physical robotics

The field of robotics has seen many exciting achievements recently, and this innovation will continue to change how humans interact with the world around them. Additive manufacturing, also known as 3-D printing, will radically reshape manufacturing and the commercial insurance products of the future. By 2025, 3-D-printed buildings will be common, and carriers will need to assess how this development changes risk assessments. In addition, programmable, autonomous drones; self-driving cars; autonomous farming equipment; and enhanced surgical robots will all be commercially viable in the next decade. By 2030, the proportion of autonomous vehicles on the road could exceed 25 percent, having grown from 10 percent just four years earlier.² Carriers will need to understand how the increasing presence of robotics in everyday life and across industries will shift risk pools, change customer expectations, and enable new products and channels.

Open source and data ecosystems

As data becomes ubiquitous, open source protocols will emerge to ensure data can be shared and used across industries. Various public and private entities will come together to create ecosystems in order to share data for multiple use cases under a common regulatory and cybersecurity framework. For example, wearable data could

be ported directly to insurance carriers, and connected-home and auto data could be made available through Amazon, Apple, Google, and a variety of consumer-device manufacturers.

Advances in cognitive technologies

Convolutional neural networks and other deep learning technologies currently used primarily for image, voice, and unstructured text processing will evolve to be applied in a wide variety of applications. These cognitive technologies, which are loosely based on the human brain's ability to learn through decomposition and inference, will become the standard approach for processing the incredibly large and complex data streams that will be generated by "active" insurance products tied to an individual's behavior and activities. With the increased commercialization of these types of technologies, carriers will have access to models that are constantly learning and adapting to the world around them—enabling new product categories and engagement techniques while responding to shifts in underlying risks or behaviors in real time.

The state of insurance in 2030

AI and its related technologies will have a seismic impact on all aspects of the insurance industry, from distribution to underwriting and pricing to claims. Advanced technologies and data are already affecting distribution and underwriting, with policies being priced, purchased, and bound in near real time. An in-depth examination at what insurance may look like in 2030 highlights dramatic changes across the insurance value chain.

Distribution

The experience of purchasing insurance is faster, with less active involvement on the part of the insurer and the customer. Enough information is known about individual behavior, with AI algorithms creating risk profiles, so that cycle times for completing the purchase of an auto, commercial, or life policy will be reduced to minutes or even seconds. Auto and home carriers have enabled instant quotes for some time but will continue to refine their ability to issue policies immediately to a wider range of customers as telematics and in-home Internet of Things (IoT) devices proliferate and

pricing algorithms mature. Many life carriers are experimenting with simplified issue products, but most are restricted to only the healthiest applicants and are priced higher than a comparable fully underwritten product. As AI permeates life underwriting and carriers are able to identify risk in a much more granular and sophisticated way, we will see a new wave of mass-market instant issue products.

Smart contracts enabled by blockchain instantaneously authorize payments from a customer's financial account. Meanwhile, contract processing and payment verification are eliminated or streamlined, reducing customer acquisition costs for insurers. The purchase of commercial insurance is similarly expedited as the combination of drones, IoT, and other available data provides sufficient information for AI-based cognitive models to proactively generate a bindable quote.

Highly dynamic, usage-based insurance (UBI) products proliferate and are tailored to the behavior of individual consumers. Insurance transitions from a "purchase and annual renewal" model to a continuous cycle, as product offerings constantly adapt to an individual's behavioral patterns. Furthermore, products are disaggregated substantially into microcoverage elements (for example, phone battery insurance, flight delay insurance, different coverage for a washer and dryer within the home) that consumers can customize to their particular needs, with the ability to instantaneously compare prices from various carriers for their individualized baskets of insurance products. New products emerge to cover the shifting nature of living arrangements and travel. UBI becomes the norm as physical assets are shared across multiple parties, with a pay-by-mile or pay-by-ride model for car sharing and pay-by-stay insurance for home-sharing services, such as Airbnb.³

The role of insurance agents has changed dramatically by 2030. The number of agents is reduced substantially as active agents retire and remaining agents rely heavily on technology to increase productivity. The role of agents transitions to process facilitators and product educators. The agent of the future can sell nearly all types of coverage and adds value by helping clients manage their portfolios of coverage across experiences, health, life, mobility, personal property, and residential. Agents use smart personal assistants to optimize their tasks as well as AI-enabled bots to find potential deals for clients. These tools help agents to support a substantially larger client base while making customer interactions (a mix of in-person, virtual, and digital) shorter and more meaningful, given that each interaction will be tailored to the exact current and future needs of each individual client.

Underwriting and pricing

In 2030, manual underwriting ceases to exist for most personal and small-business products across life and property and casualty insurance. The process of underwriting is reduced to a few seconds as the majority of underwriting is automated and supported by a combination of machine and deep learning models built within the technology stack. These models are powered by internal data as well as a broad set of external data accessed through application programming interfaces and outside data and analytics providers. Information collected from devices provided by mainline carriers, reinsurers, product manufacturers, and product distributors is aggregated in a variety of data repositories and data streams. These information sources enable insurers to make ex ante decisions regarding underwriting and pricing, enabling proactive outreach with a bindable quote for a product bundle tailored to the buyer's risk profile and coverage needs.

Regulators review AI-enabled, machine learning-based models, a task that requires a transparent method for determining traceability of a score (similar to the rating factor derivations used today with regression-based coefficients). To verify that data usage is appropriate for marketing and underwriting, regulators assess a combination of model inputs. They also develop test policies for providers when determining rates in online plans to ensure the algorithm results are within approved bounds. Public policy considerations limit access to certain sensitive and predictive data (such as health and genetic information) that would decrease underwriting and pricing flexibility and increase antiselection risk in some segments.

Price remains central in consumer decision making, but carriers innovate to diminish competition purely on price. Sophisticated proprietary platforms connect customers and insurers and offer customers differentiated experiences, features, and value. In some segments, price competition intensifies, and razor-thin margins are the norm, while in other segments, unique insurance offerings enable margin expansion and differentiation. In jurisdictions where change is embraced, the pace of pricing innovation is rapid. Pricing is available in real time based on usage and a dynamic, data-rich assessment of risk, empowering consumers to make decisions about how their actions influence coverage, insurability, and pricing.

Claims

Claims processing in 2030 remains a primary function of carriers, but head count associated with claims is reduced by 70 to 90 percent compared with 2018 levels.⁴ Advanced algorithms handle initial claims routing, increasing efficiency and accuracy. Claims for personal lines and small-business insurance are largely automated, enabling carriers to achieve straight-through-processing rates of more than 90 percent and dramatically reducing claims processing times from days to hours or minutes.

IoT sensors and an array of data-capture technologies, such as drones, largely replace traditional, manual methods of first notice of loss. Claims triage and repair services are often triggered automatically upon loss. In the case of an auto accident, for example, a policyholder takes streaming video of the damage, which is translated into loss descriptions and estimate amounts. Self-driving vehicles that sustain minor damage direct themselves to repair shops for service while a self-driving replacement car is dispatched in the interim. In the home, IoT devices will be increasingly used to proactively monitor water levels, temperature, and other key risk factors and will proactively alert both tenants and insurers of issues before they arise.

Automated customer service apps handle most policyholder interactions through voice and text, directly following self-learning scripts that interface with the claims, fraud, medical service, policy, and repair systems. The turnaround time for resolution of many claims is measured in minutes rather than days or weeks. Human claims management focuses on a few areas: complex and unusual claims, contested claims where human interaction and negotiation are empowered by analytics and data-driven insights, claims linked to systemic issues and risks created by new technology (for example, hackers infiltrate critical IoT systems), and random manual reviews of claims to ensure sufficient oversight of algorithmic decision making.

Claims organizations increase their focus on risk monitoring, prevention, and mitigation. IoT and new data sources are used to monitor risk and trigger interventions when factors exceed AI-defined thresholds. Customer interaction with insurance claims organizations focuses on avoiding potential loss. Individuals receive real-time alerts that may be linked with automatic interventions for inspection, maintenance, and repair. For large-scale catastrophe claims, insurers monitor homes and vehicles in real time using integrated IoT, telematics, and mobile phone data, assuming mobile phone service and power haven't been disrupted in the area. When power goes out, insurers can prefile claims by using data aggregators, which consolidate data from satellites, networked drones, weather services, and policyholder

data in real time. This system is pretested by the largest carriers across multiple catastrophe types, so highly accurate loss estimations are reliably filed in a real emergency. Detailed reports are automatically provided to reinsurers for faster reinsurance capital flow.

How insurers can prepare for accelerating changes

The rapid evolution of the industry will be fueled by the extensive adoption and integration of automation, deep learning, and external data ecosystems. While no one can predict exactly what insurance might look like in 2030, carriers can take several steps now to prepare for change.

1. Get smart on AI-related technologies and trends

Although the tectonic shifts in the industry will be tech-focused, addressing them is not the domain of the IT team. Instead, board members and customer-experience teams should invest the time and resources to build a deep understanding of these AI-related technologies. Part of this effort will require exploring hypothesis-driven scenarios in order to understand and highlight where and when disruption might occur—and what it means for certain business lines. For example, insurers are unlikely to gain much insights from limited-scale IoT pilot projects in discrete parts of the business. Instead, they must proceed with purpose and an understanding of how their organization might participate in the IoT ecosystem at scale. Pilots and proof-of-concept (POC) projects should be designed to test not just how a technology works but also how successful the carrier might be operating in a particular role within a data- or IoT-based ecosystem.

2. Develop and begin implementation of a coherent strategic plan

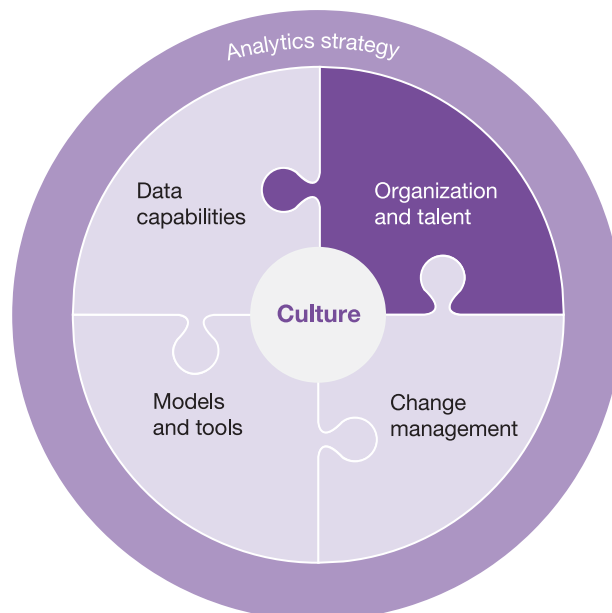
Building on the insights from AI explorations, carriers must decide how to use technology to support their business strategy. The senior leadership team's long-term strategic plan will require a multiyear transformation that touches operations, talent, and technology. Some carriers are already beginning to take innovative approaches such as starting their own venture-capital arms, acquiring promising insurtech

companies, and forging partnerships with leading academic institutions. Insurers should develop a perspective on areas they want to invest in to meet or beat the market and what strategic approach—for example, forming a new entity or building in-house strategic capabilities—is best suited for their organization.

This plan should address all four dimensions involved in any large-scale, analytics-based initiative—everything from data to people to culture (Exhibit 2). The plan should outline a road map of AI-based pilots and POCs and detail which parts of the organization will require investments in skill building or focused change management. Most important, a detailed schedule of milestones and checkpoints is essential to allow the organization to determine, on a regular basis, how the plan should be modified to address any shifts in the evolution of AI technologies and significant changes or disruptions within the industry.

Exhibit 2

There are four core elements in defining a successful artificial-intelligence strategy.



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In addition to being able to understand and implement AI technologies, carriers also need to develop strategic responses to coming macrolevel changes. As many lines shift toward a “predict and prevent” methodology, carriers will need to rethink their customer engagement and branding, product design, and core earnings. Auto accidents will be reduced through autonomous vehicle usage, in-home flooding will be prevented by IoT devices, buildings will be reprinted after a natural disaster, and lives will be saved and extended by improved healthcare. Likewise, autonomous vehicles will break down, natural disasters will continue to devastate coastal regions, individuals will require effective medical care, as well as support when a loved one passes. As these changes take root, profit pools will shift, new types and lines of products will emerge, and how consumers interact with their insurers will change substantially. Winning carriers of the future will create and enact strategic plans that position their brand, products, customer interactions, and technology successfully to take advantage of the new economic structure on the horizon.

All of these efforts can produce a coherent analytics and technology strategy that addresses all aspects of the business, with a keen eye on both value creation and differentiation.

3. Create and execute a comprehensive data strategy

Data is fast becoming one of the most—if not the most—valuable asset for any organization. The insurance industry is no different: how carriers identify, quantify, place, and manage risk is all predicated on the volume and quality of data they acquire during a policy’s life cycle. Most AI technologies will perform best when they have a high volume of data from a variety of sources. As such, carriers must develop a well-structured and actionable strategy with regards to both internal and external data. Internal data will need to be organized in ways that enable and support the agile development of new analytics insights and capabilities. With external data, carriers must focus on securing access to data that enriches and complements their internal data sets. The real challenge will be gaining access in a cost-efficient way. As the external data ecosystem continues to expand it will likely remain highly fragmented, making it quite difficult to identify high-quality data at a reasonable cost. Overall, data strategy will need to include a variety of ways to obtain and secure access to external data, as well as ways to combine this data with internal sources. Carriers should be

prepared to have a multifaceted procurement strategy that could include the direct acquisition of data assets and providers, licensing of data sources, use of data APIs, and partnerships with data brokers.

4. Create the right talent and technology infrastructure

In augmented chess, average players enabled by AI tend to do better than expert chess players enabled by the same AI. The underlying reason for this counterintuitive outcome depends on whether the individual interacting with AI embraces, trusts, and understands the supporting technology. To ensure that every part of the organization views advanced analytics as a must-have capability, carriers must make measured but sustained investments in people. The insurance organization of the future will require talent with the right mind-sets and skills. The next generation of successful frontline insurance workers will be in increasingly high demand and must possess a unique mix of being technologically adept, creative, and willing to work at something that will not be a static process but rather a mix of semiautomated and machine-supported tasks that continually evolve. Generating value from the AI use cases of the future will require carriers to integrate skills, technology, and insights from around the organization to deliver unique, holistic customer experiences. Doing so will require a conscious culture shift for most carriers that will rely on buy-in and leadership from the executive suite. Developing an aggressive strategy to attract, cultivate, and retain a variety of workers with critical skill sets will be essential to keep pace. These roles will include data engineers, data scientists, technologists, cloud computing specialists, and experience designers. To retain knowledge while also ensuring the business has the new skills and capabilities necessary to compete, many organizations will design and implement reskilling programs. As a last component of developing the new workforce, organizations will identify external resources and partners to augment in-house capabilities that will help carriers secure the needed support for business evolution and execution. The IT architecture of the future will also be radically different from today's. Carriers should start making targeted investments to enable the migration to a more future-forward technology stack that can support a [two-speed IT architecture](#).

Rapid advances in technologies in the next decade will lead to disruptive changes in the insurance industry. The winners in AI-based insurance will be carriers that use new technologies to create innovative products, harness cognitive learning insights from new data sources, streamline processes and lower costs, and exceed customer expectations for individualization and dynamic adaptation. Most important, carriers

that adopt a mind-set focused on creating opportunities from disruptive technologies—instead of viewing them as a threat to their current business—will thrive in the insurance industry in 2030.

1. Convolutional neural networks contain millions of simulated “neurons” structured in layers.
2. *Deep shift: Technology tipping points and societal impact*, World Economic Forum, September 2015, weforum.org.
3. Some insurtech companies are already beginning to design these types of products; Slice, for example, provides variable commercial insurance specifically tailored for home sharing.
4. This shift to a more automated claims function has already begun. Fukoku Mutual Life Insurance, for example, has been using IBM’s Watson Explorer since January 2017 to do the work of 34 claims adjusters—30 percent of its claims staff.