



Modernizing insurance data to drive intelligent decisions

To thrive during a period of unprecedented volatility, insurers will need to leverage artificial intelligence to make faster and better business decisions – and do so at scale. For many insurers, achieving what we call “intelligent decisioning” will require them to modernize their data foundation to draw actionable insights from a wide variety of both traditional and new sources, such as wearables, auto telematics, building sensors and the evolving third-party data landscape.

Executive summary

Data has always been an important asset in the insurance industry, which is largely built on algorithms and financial models. Today, that is truer than ever before. Data can be analyzed to provide insurers with deeper business insights and the ability to target the right customers through the right channels with the right offerings in the right sequence. It also has opened the door to a growing group of digital natives and insurtechs that bring innovative ideas and solutions to help accelerate and improve the customer journey.

Today, the advent of artificial intelligence (AI) is increasing the importance of data across the industry. AI is widely recognized for its potential to bring greater efficiency and innovation to the entire insurance value chain, from customer acquisition to claims processing, and for all stakeholders, including customers, agents and employees. However, effective AI depends on current, accurate and relevant data. AI is key to competitiveness, and data is key to AI.

In our experience, mainstream insurers often fall short when it comes to using data effectively. They struggle with data governance and management and are therefore severely constrained in their ability to leverage AI to inform better decision-making. Legacy systems, siloed and inconsistent data and growing volumes make it difficult to manage and harness data effectively to reinforce strategies and achieve business results. The increased importance of nontraditional data from third-party sources creates additional challenges, as companies often find it difficult to align this information with their existing company data stores.

To address the problem, insurers need to fundamentally rethink the technology foundations that underpin their data-management efforts. While the appropriate mix of processes and technologies will vary from insurer to insurer, change will typically involve designing responsive data architectures that can leverage both traditional and nontraditional sources of data; using intelligent data-management tools and techniques to streamline and automate data governance and management processes; and applying advanced IT service delivery methods, such as Agile, DevOps and MLOps.¹

AI is not only driving the need for better data management; it is also a key part of the solution. AI can help insurers understand the data requirements of customers, operations and products, and accelerate and automate a range of tasks. It can also help insurers contend with large amounts of data by quickly assessing the value and relevance of various data sets to allow the organization to precisely focus on the most valuable data sources.

In our experience, insurers need to take a systematic approach to building their data foundations. To do so, they can follow a number of key data-architecture design principles (detailed throughout this report). For example, data architectures should use cloud

technology to enable the organization to scale up and down as computing requirements change. They also should encompass and integrate a wide range of data from internal and external sources. And they should use AI and machine learning (ML) to automate the integration of data to more easily and quickly apply new data sources.

The creation of a modern data foundation is a critical strategic initiative that will require an adjustment to the entire organization's culture to make it more "data-centric." This type of culture enables organizations to take a fresh, forward-looking approach to metrics and key performance indicators, processes and tools, and talent and leadership. It has the power to reshape the fabric of the company.

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AI-driven decision-making

AI is changing the face of competition and innovation in the insurance industry. New insurtechs are using data and AI to enable a fully digital, innovative, customer-centric experience, with automated processes and more efficient operations providing real-time solutions to customers. Some of these startups are focused on customer-facing processes – witness Friendsurance, for example, which uses a peer-to-peer insurance model to connect groups of customers and facilitate annual cash-back payments when those groups remain claims-free.² Others are using the technology to leverage large amounts of data, such as Oscar Health, which is drawing on AI and ML to compile and synthesize patient data into actionable insights for physicians, and to power a health-tracking app for customers.

Still others are providing back-end solutions to other companies. For example, TrueMotion offers a platform that collects smartphone data to assess driver behavior and risk levels; this is embedded in insurers' products, including Progressive's Snapshot mobile app.

Industry executives are keenly aware of these shifts and the need to modernize and enhance the use of data and AI to fuel profitable growth. Our recent research indicates that this is a key area of focus and investment in the industry.

The range of technology initiatives across the industry is impressive – but also deceptive. While some insurers are moving ahead rapidly, others are struggling to gain traction with employing

AI. Many insurers are taking a limited approach, using AI and enhanced data management only at the business-unit or departmental levels. Some are just beginning to move toward an enterprise-wide approach. Others are essentially pursuing a wait-and-see strategy.

Insurers struggle to scale their AI initiatives for a variety of reasons. But a key obstacle for many is that their data capabilities are unable to keep up with growing data demands and take full advantage of the wealth of untapped internal data needed to enable AI value.



The critical role of data in generating value

Large volumes of meaningful data are the raw material of the AI and analytics revolution. Sound data curation, governance and management have become key success factors in the insurance industry – especially in the use of analytics to develop insights into market trends and customer preferences. For example, Travelers is seeking to extend each customer experience by better understanding policyholders and stakeholders. The company's goal is to leverage data and analytics to enhance the experience of customers, agents and claimants, by serving users via their preferred channels. What's more, AI-fueled analytics is now transforming everything from product development to underwriting and claims processing – and opening the door to innovations such as instantly customizable life insurance and on-demand property coverage.

In today's AI-enabled age, the role and management of data has shifted dramatically. Certainly, the insurance industry has a long history of managing large amounts of data. Traditionally, that has meant keeping records, administering contracts and analyzing what has happened in the business to determine profitability. Data has been used to track performance. But now, it is used to drive performance and optimize processes, products and engagements. This means data needs to be treated as a perishable asset that is gathered, understood and made available to business processes dynamically and quickly – and in real time. Data's traditional flow has been fairly straightforward and linear, moving from source to data warehouse to reporting system. Now, data needs to move freely and securely to a variety of people and systems across the company.

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The systems that most insurers have used to manage data are not up to that task. Similar types of data are typically siloed and stored across different systems in varied formats – a problem that has been aggravated by mergers and acquisitions that leave insurers with disparate collections of legacy technologies holding vast amounts of important data. As a result, they often can't merge and organize their data to create the comprehensive insights the business needs.

These problems are exacerbated by the expanding role of nontraditional data types sourced from third-party providers. AI models now depend on data captured and flowing from online interactions, smartphones, wearable fitness trackers, connected homes, video images, inspection drones, telematics devices in vehicles, mapping and environmental satellites, and anthropological and psychological profiles of customers, to name a few sources. An effective data architecture needs to incorporate

these nontraditional data sources, put them in a consistent structure that is aligned with company-generated data, make them accessible for analysis and govern them effectively.

To achieve this, insurers need to fundamentally rethink the way they curate and manage data to create a modern data foundation. Doing so is not only critical to enabling AI and analytics. Such a foundation is also key to the successful modernization and consolidation of legacy applications and technologies currently being pursued by many companies. A modern data architecture can ensure that consistent data is readily available, helping to smooth and accelerate the transition to newer systems that power the digital business. These efforts are driven largely by the fact that companies cannot get the data they need from their older systems – and the right data architecture and strategy will be fundamental to their efforts to consolidate and modernize legacy technology systems.

Building a modern data foundation

Building a modern data foundation should be approached as an enterprise-level, business-driven strategic initiative, rather than a technology and data architecture project. It should look beyond point solutions, fragmented programs and the idea that the company needs to create another large, monolithic data platform.

Instead, companies should adopt a structured approach to transforming the ways they source, interpret and consume data to consolidate disparate data sources and support data modernization while they look to modernize their source systems (see Figure 1). This more flexible and loosely coupled architecture uses “fit for purpose” storage, compute and distribute strategies, while leveraging the power of ML to accelerate the process of drawing actionable insights from data and to do so at scale. Proof of concept projects can be used to rapidly test data sources and drive immediate value, enabling an iterative rather than big-bang approach to data and AI solutions.

Data modernization addresses the tsunami of opportunities

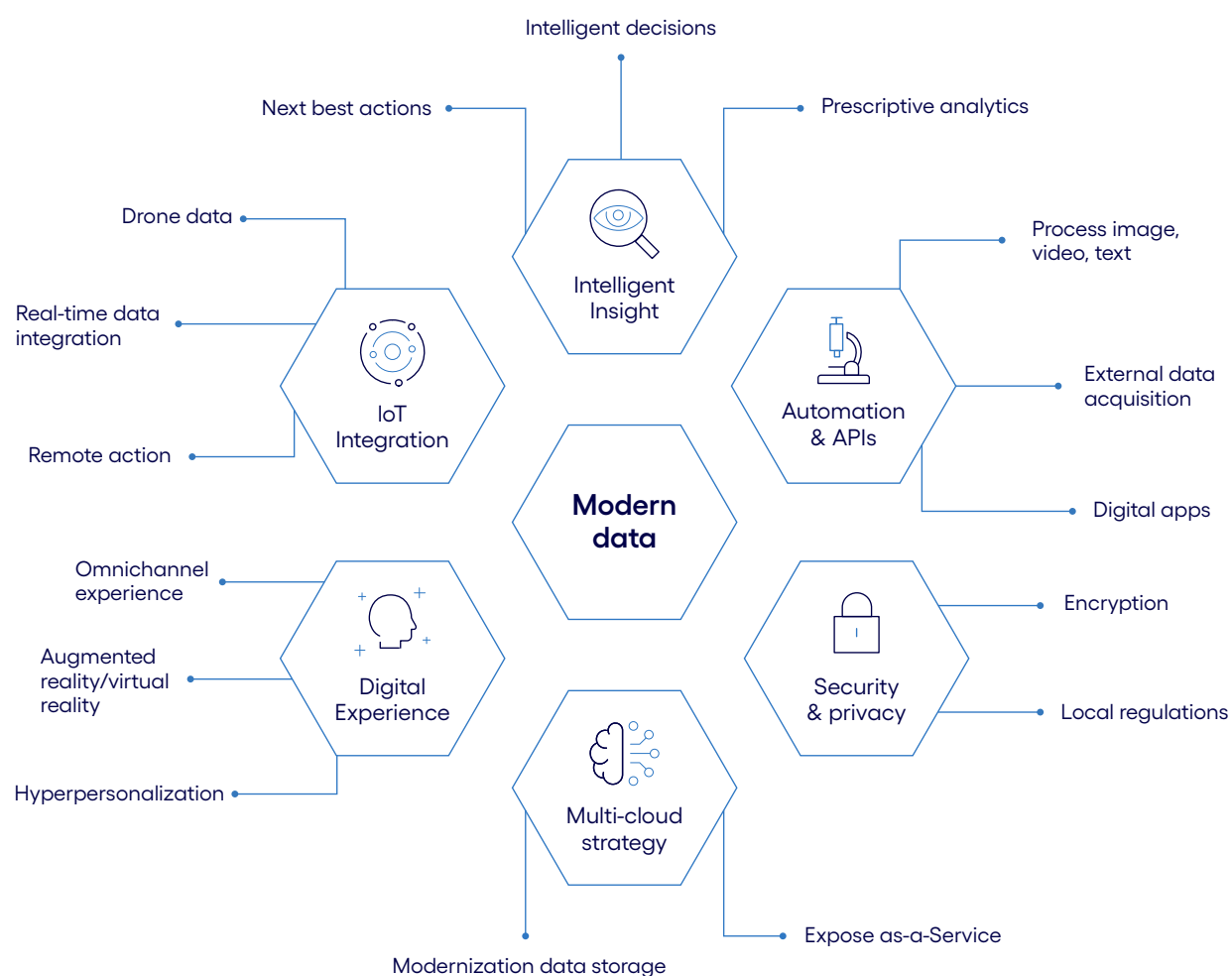


Figure 1

Three core concepts can offer a valuable framework for insurers as they shape new approaches to their data:

- 1. Employ a responsive data architecture:** Data architectures are often rigid and hardwired, and built around large, relatively inflexible data warehouses and fragile legacy source systems. They are not built for robust data curation or architected with today's data needs in mind. This makes it difficult to bring in new and varied types of data and use it to develop insights – a critical ability in digitally enabled operations. Next-generation data architectures can simplify, augment and transform the data landscape to enable insurers to harness existing data more efficiently, draw in different types of data and quickly deliver data in a suitable form to AI and analytics applications and business processes. This is especially important, but it can also be particularly challenging when dealing with nontraditional data originating from sources such as wearables, building sensors and drones.

To address those problems, we have developed solutions and accelerators such as our [Customer Journey AI \(CJAI\)](#) platform, which sifts through unstructured data from local governments to help business teams understand household composition and risk characteristics to identify up-selling opportunities for coverage. This can be done without involving the IT team to integrate such data sets, eliminating a step that might take weeks or months. Thus, insurers can more easily experiment with the data to uncover insights.

- 2. Leverage intelligent data management:** Traditional data management processes are not designed to handle dynamic data and changing business demands. The management of metadata, data quality, security and regulatory compliance are labor-intensive processes that often can't keep up with changing data sources and applications. With third-party data, insurers face the additional challenge of having to incorporate data in three distinct layers: a raw

data layer, a curated layer (that is, cleaned and organized for improved consumption) and a consumption layer (that is, having an interface for access to the data).

These obstacles can be overcome by streamlining and automating many processes – especially time-consuming manual tasks such as reconciling entries in multiple data sources. This approach enables organizations to more rapidly tap its data stores to create and deliver actionable information and insights – which can also help companies respond to change. For example, as business conditions and data sets evolve over time, [Cognizant's Learning Evolutionary Algorithm Framework \(LEAF\)](#) can help avoid “model drift” by dynamically identifying the relative importance of the most predictive variables and factors, enabling insurers to proactively adjust their models for accuracy.

- 3. Enable delivery at scale:** The processes used to develop and modify data management systems have not leveraged the advances that have overturned application development – which limits the ability to change and improve. Insurers can take advantage of advanced delivery methods, such as Agile, DevOps, DataOps and MLOps, to optimize and simplify processes.³ Asset-based development models can enable standardization and the efficient reuse of solution components. And continuous integration/continuous delivery techniques can help ensure that new capabilities are easily and quickly included in systems. These types of approaches can dramatically reduce time-to-market for new capabilities – and, in effect, enable the data organization to release such capacities almost continuously. For example, Uber can support millions of weekly analytical queries.⁴ Without being able to deliver insights at scale, insurers will find it difficult to use data to flexibly launch new capabilities and products.

It's important to recognize that AI is not only a key reason that many insurers need to enhance their data foundation, but it can also play a vital role in making that possible. For example, in designing and creating a responsive architecture, ML and natural language processing can be used to analyze data to understand customers, operations and products and help determine what insights and data the architecture needs to deliver. And ML can automatically scale environments to optimize performance and cost, configure backups, and monitor and manage workloads and resources.

AI can also be used to automate data management processes such as managing metadata and data quality throughout the data management lifecycle, helping to make operations “self-driving and self-healing.” In ongoing operations, it can be used to automate the integration of data with applications and databases, generate data models and deliver data to downstream applications, external systems and end-user reports.

In an era when insurers are inundated by data, AI can also help them identify and focus on the right data – that is, on the data that has the highest business value. For example, we developed an AI-based framework called DatalQ, which performs an up-front assessment of various data sets to determine which attributes are relevant and will provide the intelligence needed to support a given purpose – say, improving the insurer's claims - loss ratio or identifying the most predictive values of risk in the underwriting process. This allows engineers to home in on delivering what the business requires.

Meanwhile, when new types of data emerge, ML can be used to quickly experiment with different uses of that data to determine if it has potential value and where there are correlations and linkages that should be explored and exploited. This helps the data management organization to perform a kind of early triage on potential data sources, before applying the rigorous controls and quality-assurance processes required when data is included in the mainstream data flow.

As they apply this framework, insurers will need to make sure that AI is “responsible” – that it does not make inappropriate or biased decisions that could limit its value and create significant damage to a company's reputation and shareholder value. Insurers will need to establish policies and procedures to ensure that their AI applications act ethically and are in compliance with regulatory requirements. Toward this end, they should consider creating AI ethics officers to oversee the design and ongoing operation of AI technology.

Overall, this framework can be used to create a flexible but industrialized approach to managing data – taking it in, processing and analyzing it, and rapidly delivering actionable information and insights to the business. Data can be delivered as a “product” tailored to processes and users across the company to drive innovation, efficiency and evolution.

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Quick take

Using data to spur innovation

At one major insurance company, data management and innovation go hand-in-hand, as the growing use of analytics opens the door to new ways to serve customers. For example, the company has started to use drones to take photographs of rooftops, which are then analyzed to predict potential leaks and water damage – allowing customers to avoid inconvenience and interruptions while helping to reduce loss for the insurer.

On another front, the company worked with us to modernize its approach to data in order to support a new “insight-as-a-service” offering for commercial fleet vehicle customers. To do so, the two companies brought together telematics data from fleet vehicles and data about driver behavior, along with various third-party data about weather risk factors on specific roads and fuel consumption. By analyzing this data, the company helps customers plan safer routes and better manage risk. One commercial fleet company, for example, reduced loss exposure by 5% or more for its 15,000 trucks. At the same time, the tool helps the insurer make more accurate underwriting and risk classification decisions.



Principles for moving forward

Each company will have its own needs and goals when rethinking its approach to data. But we have found that seven key principles can guide the development to a new, more adaptive data foundation that is ready for AI. As they work on data architectures, insurers should consider these principles:

- 1. Plan for scale and elasticity:** The data architecture should enable the on-demand performance of computations; allow the business to use data without needing to check with IT; and use cloud technology to enable the organization to scale up when additional computing horsepower is needed – and scale down when less is required.
- 2. Build in the ability to ingest all types of data:** In addition to internal company data, the architecture should provide the capability to incorporate, and draw insights from, a wide variety of third-party data sources such as social media, IoT devices, wearables, images/videos from drones and medical providers, to name a few.
- 3. Be metadata-driven from the start:** Insurers can often obtain richer analyses and additional context by leveraging their metadata – that is, information about the data they hold. Yet, most enterprises view metadata extraction as an afterthought, typically driven by compliance. However, metadata is much easier to manage early in the process rather than later, and it has value far beyond compliance. For example, by cataloging metadata, companies can create a library of data sets that everyone in the organization can access, thereby enabling wider use of insight generation and AI throughout the enterprise.
- 4. Provide open access across all layers:** As noted, platforms have three layers of data: a raw data layer, a curated layer and a consumption layer. Traditional architectures typically grant access only to the consumption layer. However, data scientists often like to examine raw data for overlooked elements that may generate more information – so it's important that all the layers are exposed and open for access.
- 5. Enable autonomous data integration:** Companies will need to integrate new data sources quickly in order to keep relevant data flowing to analytics and AI applications. However, mapping data to target usage environments is still a largely manual process. That can be addressed by using ML to automatically detect changes in incoming data and adjust integration patterns. ML can support plug-and-play architectures that leverage APIs and API gateways to provide enhanced flexibility as alternative data sources continue to evolve.
- 6. Get feature engineering right:** This transforms data into consumable forms and shapes that ML models can use. Features describe data points and serve as inputs into the learning system, so they need to be as precise as possible. Careful feature engineering is key to making ML accessible broadly within the business.
- 7. Support a unified security model for data:** Companies often rely on complex, hybrid environments that blend cloud-based and on-premises services, with data scattered in various locations and used by a variety of individuals and systems. A unified security approach lets companies consider security from the point that data is produced to all points of consumption and cycles of enrichment.

Looking ahead: Transforming the data organization

Insurers need to leverage AI technologies to make faster, better informed decisions in a volatile business environment. But they also need to modernize the data organization itself if they are to take full advantage of their AI tools.

For example, most insurers need to change the culture of the data organization – to infuse a mindset that is focused on driving innovation and empowering the business, rather than merely executing technical tasks. This can start by changing the way the organization is measured. Today, data organizations are typically assessed on how efficiently they complete specific tasks. Do batch processes run as planned? Are sales reports complete and delivered on time each morning? Instead, they should be measured on the value that they deliver to the business, such as how well they support the creation of new services and customer experiences, tying their work to specific actions that can result in tangible, measurable business outcomes.

A shift in talent strategies can also support that new mindset. Most employees in data organizations have come out of the traditional data management world – one designed for tracking performance, rather than driving performance. To help change that, insurers can provide training and development to their current data professionals.

But they may also need to complement traditional staff with new types of employees – individuals who have experience using technology to support business innovation, or even those who come from the business itself. That practice should extend to the leadership level as well.

Insurers should consider having data organization leaders who have business rather than IT backgrounds. Without leadership that is focused on innovation and transformation, the data organization is likely to simply continue with business as usual.

Above all, architectures should be built with a sharp focus on understanding the data needed by AI models to meet the needs of customers, operations and products, and should deliver critical business outcomes for the company. Keeping this big picture clearly in mind, a modern data foundation is a critical enabler in the effort to unlock the power of AI to make faster and better business decisions. And it is a vital key to navigating through disruptions driven by everything from technology innovation to COVID-19 to climate change, enabling companies to thrive in an era where accelerating change has become business as usual.

This white paper is an update of an existing piece from 2019, “How Insurers Can Tame Data to Drive Innovation.”

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Endnotes

1. MLOps is the process and engineering involved in setting up systems for activating machine learning (ML) and AI models at scale using repeatable processes in short adaptation cycles.
2. <http://www.friendsurance.com/>; <https://gotruemotion.com/>.
3. DevOps and DataOps methodologies automate and accelerate processes associated with software development and data analytics, respectively.
4. Luyao Li, Kaan Onuk and Lauren Tindal, "Databook: Turning Big Data into Knowledge with Metadata at Uber," Uber Engineering, August 3, 2018, <https://eng.uber.com/databook/>.

About Cognizant Insurance

Cognizant's Insurance Practice is one of the largest industry verticals that partners with insurers to evolve their business and technology landscape and enable end-to-end digital transformation. Thirty-three of the top 50 U.S. insurers and seven of the top 10 global insurers rely on us to help manage their technology portfolio across multiple business entities and geographies. We serve the entire range of lines of business within life, annuities, and property and casualty insurance. Our consulting-led approach, deep domain expertise and partner ecosystem enable clients to address the dual mandate of "optimizing the business" while "driving digital at scale." From large-scale core system transformation to adoption of cutting-edge technologies like artificial intelligence, analytics, blockchain, automation and machine learning, we partner with insurers to envision and build the digital insurer of the future. Our partnership includes helping insurers build their own technology platform with the capabilities they need or providing one for them, incorporating digital solutions to achieve immediate results. The Digital Maturity Diagnostic (DMD) is built on an ongoing online survey of insurance companies that examines five digital maturity areas: Core business function, strategic innovation, real-time insights, human understanding and agile organization. The database that is the foundation of the DMD framework is still growing as we gather data about the experience and insights of more insurers. Learn by visiting www.cognizant.com/insurance.



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