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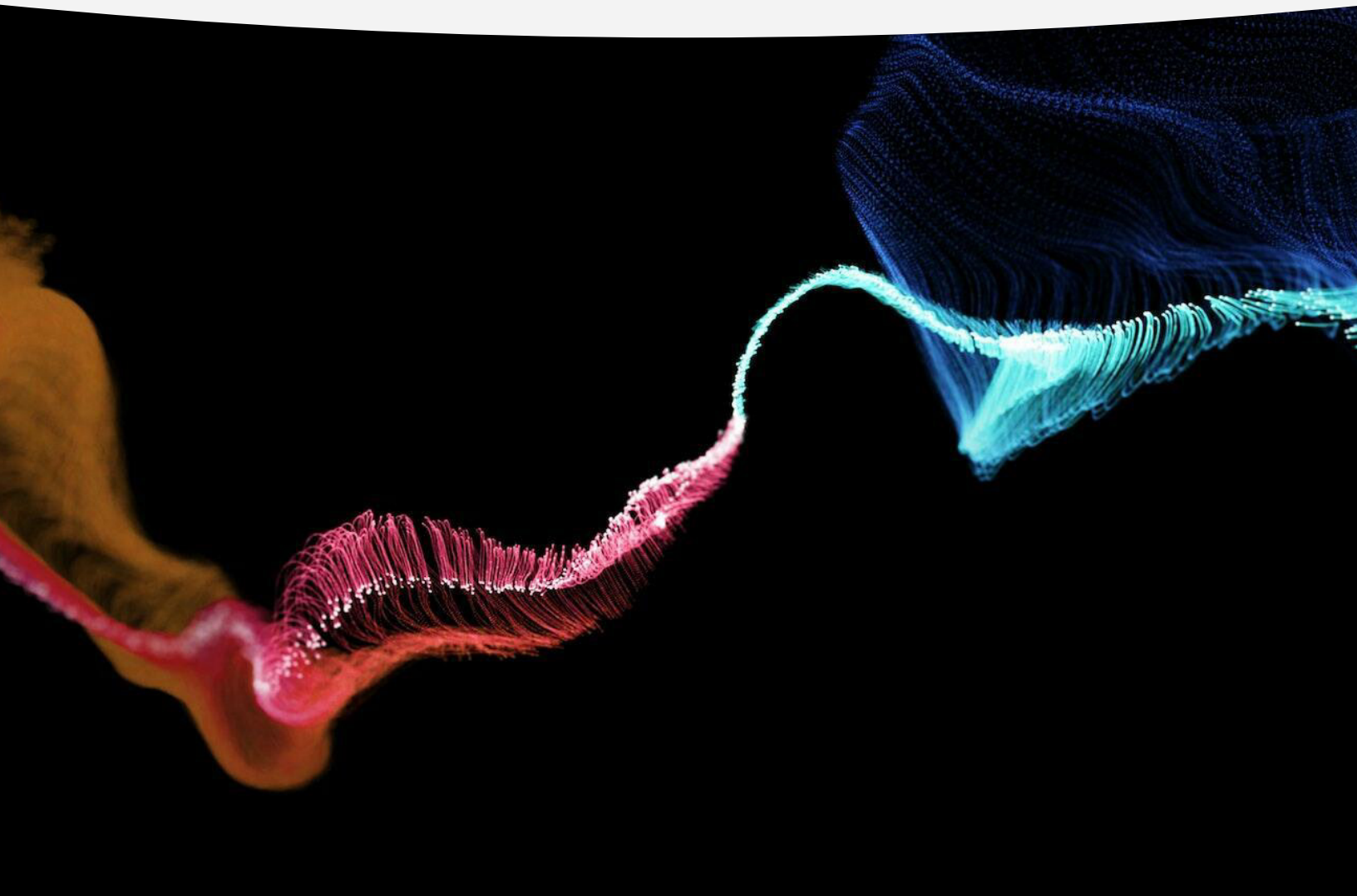
Insurance Data & Analytics 2025: Five Trends on the Journey to Transformation

The year of 2024 has delivered new twists and turns for industry data science teams. As the journey to the future is an uncertain one but innovative carriers are embracing the potential with a steady hand on the wheel.



INTRODUCTION

Generative AI has been the most hyped trend of 2024 but data scientists in the cautious, complex insurance industry have its number. They recognize the infinite potential for GenAI and large languages models (LLM) to radically transform the end-to-end insurance value chain. Equally, they worry about hallucinations, data quality, ethical implications, risk of bias and how it will be regulated. The challenges are not insignificant – vast unstructured datasets, how to measure data quality and integrity and, not least, prepare for the necessary culture change as this game-changing technology permeates every corner of the organization.

Support for GenAI is, however, coming from the top. According to a **Deloitte/Fortune survey**, 79% of CEOs see GenAI changing their businesses within three years, and with potential for a "significant and tangible" impact on the bottom line - from growth to cost savings.

Caught in this technological whirlwind, and in an unpredictable and complex risk landscape, the business of protecting people's assets, health and livelihoods depends on robust data science. The industry recognizes this. By the end of September 2024, according to new research, investment into data analytics in the insurance industry had recorded growth of 220%.

While GenAI stabilizes and new models, tools and techniques continue to emerge data science leaders know too that there is still more to do with traditional AI, advanced machine learning (ML) and predictive analytics. In the pages ahead, data science leaders from Prudential Financial, CSAA Insurance Group, and blended healthcare company Highmark Health share their insights into how they are striving better model, assess, analyze and mitigate risk.

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1. Traditional vs Generative AI: a reality check

The GenAI hype machine is at full throttle but the speed at which GenAI advances is likely to be more plodding. Gartner predicts that at least 30% of GenAI projects will be abandoned after proof of concept by the end of 2025, due to poor data quality, inadequate risk controls, escalating costs or unclear business value.

Highly regulated and data rich, the insurance is well-placed to deliver a reality check. Nina Edwards, Vice President, Emerging Technology & Innovation at Prudential Financial, says: "There's been a lot of talk about GenAI but I don't think it is the answer for all AI opportunities. Traditional AI remain an important part of the AI strategy".

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While the "big picture obstacles" may be the same, Bipin Chadha, Vice President, Data Science at CSAA Insurance Group, sees three new twists. The first is the vast number of unstructured datasets that, until now, have not been looked at from a quality or governance perspective. Two is how to test and validate GenAI applications when there are "50-trillion ways you can ask a question, and then for each of those questions there are 50 ways it will give you an answer". Finally, there is the timeless issue of culture, and preparing the organization and its workforce to take advantage of new emerging AI capabilities.

These are not insignificant obstacles to overcome but there is reason for excitement. "It opens up whole new use cases which just weren't there with traditional AI," says Ian Blunt, VP Advanced Analytics at Highmark Health. However, he does not see the industry leveraging the real benefits of large language models "unless we're comfortable with some things going direct-to-consumer".

CSAA is investigating use cases around claims handling, although this is not something Chadha intends to be customer-facing. "It's more to assist our own employees in handling things better and faster," he says. Other generic use cases are around general communication and content creation, and should deliver some productivity and efficiency improvements though "it won't be anything dramatic".

Longer term, the hope is that steady traditional AI and its' creative generative cousin, will be a complimentary force for delivering better business and customer outcomes. "Together, the strength of each individual technology is amplified," Edwards says.

In the meantime, however, she sees is still plenty more to do with traditional AI, which remains the backbone for structured data processing and interpretability. "What springs to mind the claims process, specifically claims triage and using AI to prioritize claims based on complexity, severity or the likelihood of fraud," she says. This can also be extended to enable faster payouts for simple claims and specialized handling for complex cases.

2. Data quality & advancing tech: the quest continues

Insurers continue to work diligently on shaping and centralizing structured datasets, and are making good progress in bringing a unified view of the customer into focus. Those that are succeeding are seeing higher levels of engagement and retention and the possibility to upsell new products and services. "With all the unstructured datasets coming into play, there is more work to be done," says Chadha, not least in measuring data quality and detecting bias. One strategy is to extract structured information from unstructured data and measure that quality. "That probably gives you maybe 70%, but there's still 30% remaining that needs to be figured out". It's a similar story with bias.

The implications for bias are significant. "If somebody is asking a policy question and the answer is wrong, or based on policies or procedures from two years earlier, that can lead to bad outcomes. If the answers are biased in different ways, it is hard to test for the wide variations that can happen," Chadha explains.

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If somebody is asking a policy question and the answer is wrong, or based on say policies or procedures from two years earlier, that can lead to bad outcomes. Even with traditional AI, where there may be more standardized approaches, "there are multiple different scores you can look at to detect bias and accuracy", Blunt acknowledges. Similarly, there is a gold standard for supervised learning that you can judge the outcome against, but many traditional AI models are unsupervised learning. "These aren't new challenges. We're doing them in a bit of a new way, especially when we've got three texts or even multimodal output," Blunt says.

This shift that will enhance human-AI interaction and make differentiation with GenAI models easier, a subject that Edwards believes needs more consideration. AI tools are becoming more responsive to detecting nuance and emotion, so interactions may become more natural and intuitive. "This is particularly useful in call and contact centers," she says.

Potentially, more dramatic turns lie ahead. By 2028, says Gartner, 33% of enterprise software applications will include agentic AI, up from less than 1% in 2024. If this pans out,15% of day-to-day work decisions could be made autonomously. Less work, means fewer employees and lower costs – all good news for an industry that must balance profitability with keeping the claims promise.

Weighing in on this trend, Edwards says: "While AI agents might be the darling of the moment, the true game changer lies in combining AI agents with well-designed agentic workflows. On their own, AI agents are impressive but not inherently revolutionary; their transformative potential is unlocked when seamlessly integrated into workflows that empower users to achieve meaningful outcomes."

The hype machine may be in high gear, but Chadha also sees unsolved challenges around how to actually build a good digital twin or agentic model. What he is seeing, however, is models beginning to converge and merge with large language models..

However, with performance tools like BLEU and human reinforced feedback techniques emerging, Blunt expects to see "leading best practices emerge pretty rapidly". There are many eyeballs on the problem, not least regulators and Big Tech. For this reason, Highmark Health's partnership with Google is for more than cloud services. "They're very interested in how some of the healthcare issues work, and we benefit from their expertise, delivery, AI and all sorts of other computing too," he says.

Tech top of the watchlist

- Quantum computing is steadily moving up the list to tackle complex actuarial calculations, as well as cybersecurity where it has the potential to detect cyberattacks much earlier than current methods. Stronger cryptography standards should follow.
- Edge computing, is another, particularly around being able to monitor compliance with regulations in real time. This will improve data security by processing it locally on edge devices, enabling faster data analysis and offering a more personalized customer experience. On property & casualty (P&C) front, this could enable remote vehicle inspections and integrate inspection reports with claims processing.

3. Predictive models & the power of prevention

Advanced data and analytics capabilities that drive underwriting excellence and sophisticated pricing, as well as driving more personalized and tailored offerings, is becoming table stakes for carriers.

According to a survey of property & casualty (P&C) providers by global advisory firm **Willis Towers Watson (WTW)** nearly half (49%) of carriers have incorporated AI into their analytics processes. However, progress has been slow, even non-existent. Like traditional analytics, new models are being used most widely in pricing and underwriting functions but insurers progress in other areas such as claims, marketing and distribution is slow. IT bottlenecks are cited as the biggest challenge.

Edwards sees predictive modelling delivering the biggest impact on underwriting and risk assessment – but only if the regulation can be tackled. "The challenge will be ensuring that predictive models remain accurate over time with changing data patterns," she says.

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An early adopter of predictive models and AI, Highmark Health is seeing benefits across many areas of the organization – from optimizing prior authorization processes to enhancing customer engagement.

The group is in a unique position. Part financial institution, it must on the one hand predict the future costs of members to support the underwriting process. On the other, as a healthcare provider, by continuously monitoring interactions between members and the healthcare system through claims or providers, it is also able to deliver a more personalized and relevant service. "We're trying to be in that quarterback role making the services members receive more personalized, more proactive and helping them through frustrations," he says.

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In the fragmented and beleaguered U.S. healthcare landscape, this is a different approach. Although Blunt recognizes that the crack down on covered procedures and treatments may deliver immediate results, "what it potentially does is then store up need, which is going to cost more down the line," he says.

Highmark Health's long-term view is one rooted in the belief that the highest quality care is usually the most cost effective. Members with significant healthcare needs are already receiving the best care, so "impactable spend" is particular area of focus – in other words. In other words, providing more guidance to members who have potential to go in different directions on their care journey. By effectively managing healthcare needs, "they're getting the best experience possible, and it's also managing healthcare costs for the best outcomes". Prevention is a win for both member and the organization. Over several years of good experiences, this should lead to customer retention and "we should really start to reap the benefits", Blunt says.

How Highmark Health is rewriting health insurance

ID & Strat, the process of identifying high-risk patient populations, used to be a lengthy outsourced process. Like many insurers, the claim would go first to an analytics vendor for risk scoring, and then sent on to the clinical team. The whole process could take up to three months. As a blended healthcare company, motivated to provide the best possible care to its members, Highmark brought this use of analytics in house. The goal: to ensure timelier access to information so that support could be triggered almost instantaneously.

"It's been so effective we've had to build more buffer in there to give members time to get home from the emergency room, so they're actually in a good place to engage with our telephonic case management," Blunt says.

The work continues with a rolling program of evaluation to understand the impact of these interventions both for members and the organization. For this, a high-quality health services research program is used. By learning and continuous improvements, the group is managing costs and improving outcomes and hoping everyone gets a better experience.

4. Regulation & responsibility

The better insurers become at generating insights about their customers, the more surprising these may be, and trust can be very easily compromised. Given the vast quantities and growing sources of data, insurers must show transparency and fairness.

In more sensitive areas like healthcare, this is a particularly important, and one that Highmark Health, which has been focused on responsible AI for several years, takes seriously. "We have a very robust framework for how we assess new use cases and ensure they're not just legally appropriate but also ethically appropriate," Blunt says.

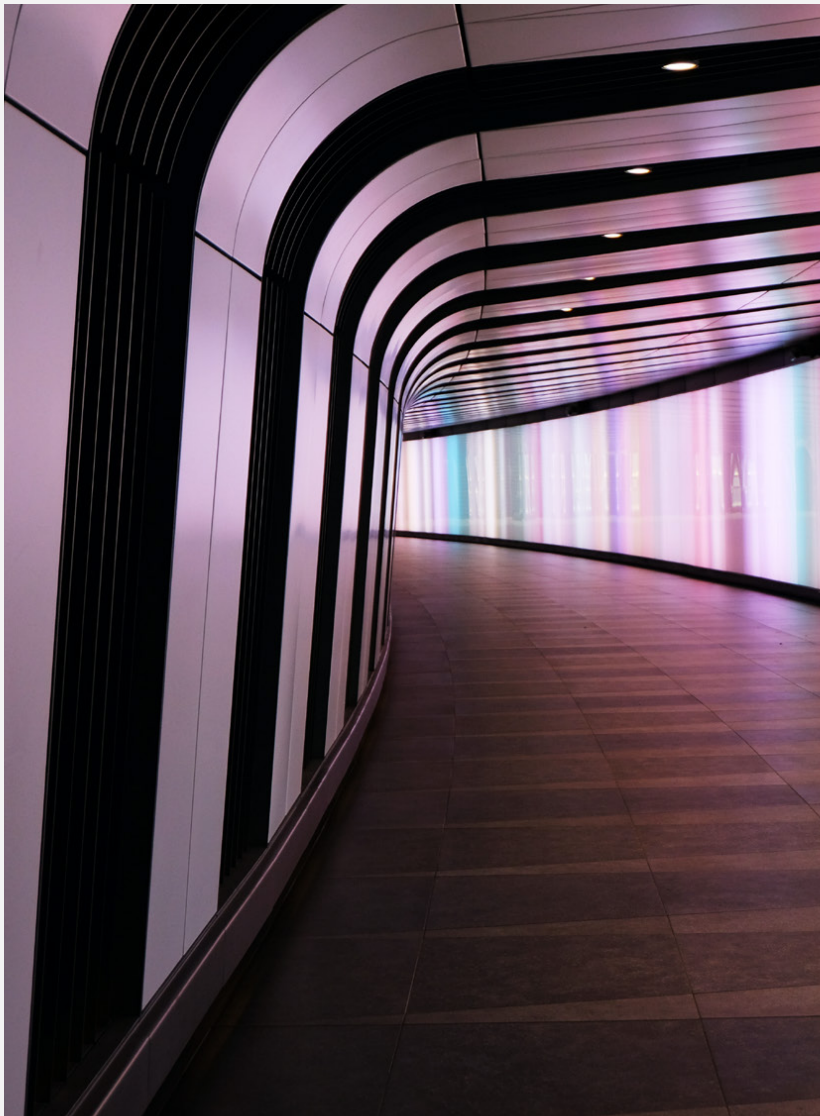
In the arena of data governance, case law and legislation has delivered relatively clear guidelines, but with advancing AI there are still grey areas. "The regulators are basically saying, 'If you use a third-party model and it's biased, then you are accountable for it, because you are the one using it," Chadha says.

Of course, insurance companies are no stranger to regulation. But the aim now, says Edwards, "is to see regulation do the job it intends to do, rather than hindering innovation".

To this end, forward-thinking carriers are joining the conversation alongside decision makers. This includes collaborating with policymakers and industry consortia to influence and drive regulations that are innovation friendly. One is the **US AI Safety Institute Consortium (AISIC)**, which "brings together more than 280 organizations to develop science-based and empirically backed guidelines and standards for AI measurement and policy". Companies like Anthropic, OpenAI and NVIDIA are early participants.

Best practices are emerging and include to:

- Make 'human at the helm' the standard for ensuring anything produced by an LLM is reviewed internally for accuracy before being let loose on the world
- Develop guided interfaces with controls on what people are and not able to do
- Keep a central register whenever you're using AI models
- Be transparent about how they're being used, what they do, what information feeds them, and also their accuracy
- Conduct continuous monitoring of the models if they're starting to degrade and taking relevant action to either stop use or correct them so they're producing the best results
- Develop models that prioritize explainability and accountability and/or leveraging tools like SHAP, LIME or proprietary methods to create user-friendly model explanations to address the regulation directly



5. Upskilling, training and organizational change

Insurance companies and data science teams must prepare for the culture change ahead. Previously, there was a much smaller subset of people interacting with some of these models, and then it was for a very focused, very specific purpose. "Now, literally, everybody is going to be using an AI application. It's all wide open," Chadha says.

Prompt engineering skills, or what Chadha refers to as the "ability to ask good questions," is becoming a most sought-after skill. "If you ask a bad question, you're going to get a bad answer in a very authoritative way, so that can lead you in the wrong direction," he says. But asking good appropriate questions requires knowledge and a good grasp of the business problem as well as how the models work.

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A bit like 'search', Blunt sees 'prompting' becoming part of everyday life. However, it remains to be seen how quickly organizations can train staff and establish the structures necessary to maintain a standard sets of prompts. In the future, to ensure reliability and standardization, controls are expected to emerge around how prompts are used in certain contexts.

Inevitably, data science teams of the future will be working with a much broader range of stakeholders and users. Upskilling and training will be needed, and not just for data scientists.

At Prudential, this is an "acute focus", and there is curated learning by level to ensure there is AI and emerging tech fluency across the organization. "When it comes on to upskilling and reskilling in this era – you are never done. It's not a tick the box exercise," Edwards says.

Given the level of misconception and misunderstanding out there, Chadha stresses that training needs to happen at all levels in the organization. A base level understanding of what the technology is and is not and why it matters to their role and the business will be essential for everybody.

Organizations are tackling training from multiple angles. Strategies include: in-person courses and programming; emerging technology think tanks to foster more cross-functional collaboration and awareness; townhalls focused on specific job profiles to raise awareness of the AI/GenAI tools available; a focus on sustainable learning as the technology rapidly evolves.

CONCLUSION

Amid continued geopolitical and macroeconomic turmoil, escalating climate crises, the threat of cyber and increasingly empowered consumers, the insurance industry has arrived at critical juncture. Advances in technology offer opportunities to enhance risk assessment, personalize customer experiences and streamline operations.

In recent years, the industry has already undergone significant transformation and traditional models have been disrupted by more agile insurtechs. Forward-thinking organizations have responded by investing in next generation technology. In 2024, GenAI has been at the forefront of that discussion. The question now is how quickly the opportunities can be exploited and what benefits are achievable in the near to short-term. It is early days and until a robust regulatory framework is in place, progress is likely to be slow.

As Blunt puts it, however, "it does open up whole new and fascinating use cases which just weren't there with traditional AI". What remains to be seen now is whether this is another new plateau in data science - where models will be useful for specific applications to be deployed and maintained by specialist data science teams. Or whether it will be akin to the arrival of computers in the 1980s workplace when people found ways to use technology in ways never imagined. The jury is out but one thing is certain data science teams will be playing a much bigger role in the direction travel.