



Artificial Intelligence and the Lloyd's Actuary: A Snapshot of Opportunity and Risk

Talking about AI

I expect everyone reading this has a shared experience: Artificial intelligence (AI) is mentioned in every strategy meeting, at almost every market function, and it's always in the press. It seems like everyone – actuaries, underwriters, leadership, claims, even HR – is talking about AI. It gets more airtime than blockchain ever did.

It is important to break through the noise, and ensure we start the right conversations to reap the potential benefits of AI in a risk-controlled manner. Our aim with this publication is to provide conversational fodder by considering three important questions through the lens of a Lloyd's market actuary:

- What counts as AI, and according to whom?
- How can it help actuaries and the insurers we work for?
- What are the risks?

Everything that follows comes with a critical health warning: our conclusions could change by the time you've finished reading it. Just as a hurricane that threatens Miami may suddenly veer off harmlessly into the open Atlantic, changing expectations of its impact, technology trends – and especially the current 'next big thing' – have a tendency to make dramatic course corrections. When that occurs, all bets are off.

Changes of direction for AI are possible, and possibly likely. We know that it will significantly impact the way actuaries work no matter what, because AI is already changing some of our routines, and driving change in the whole world of work. In some areas of actuarial work, components of the cluster of technologies we now call AI have already been in use for a decade or so.

We've been here before, of course, with technological revolutions. I mentioned blockchain. It promised to be the biggest accounting innovation since double-entry bookkeeping, and such was the hype that everyone wanted some. That led to the perverse implementation of blockchain development programmes that did not set out to solve an identified problem. Instead, they went out searching for one. Unsurprisingly, they were a bust.

That experience should inform our adoption of AI. We must consider it as a tool – one of many – that we may usefully deploy to extract additional value from data, inform and improve decision-making, create greater value for stakeholders, and streamline day-to-day processes. It may prove to be highly effective, and a significant driver of our profession's evolution, but it won't be a panacea.

With that, I encourage you to read this document; please treat it as the beginning of a conversation. I would very much like to hear about Lloyd's market members' adventures with AI. Reach out any time.

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AI and the Lloyd's actuary

Booming interest in artificial intelligence, or AI, has naturally led individuals across the professions to wonder about its possibilities and impacts on their sector. Alongside optimism about its potential, the recent wave of AI awareness has raised concerns about the absence of safeguards, and sparked discussions about regulation.

AI will inevitably drive tremendous change within the insurance industry, including for actuaries. It will fuel improvements in data processing, drive up the efficiency of analysis, and enhance predictive power. Given the rise of insurTech, the expansion of big data, and the massive extension of computing power, only those leveraging AI across their operations will be deploying all possibilities to excel.

Various use cases encourage the actuarial community to embrace AI, but risk concerns, including potential bias and the “black-box” nature of some models, may have slowed the actuarial community’s adoption relative to others, such as diagnostic healthcare and retail. Regulation too may have had a braking effect. But given the potential benefits of AI, a balance between risk and reward must be found; AI’s opportunities should be embraced while deploying appropriate risk management strategies.

Safe adoption of AI will deliver competitive advantages, especially when it is applied to high-value problems. To realise these benefits, actuaries will need to embrace AI-driven change, but must focus at least in part on AI-risk mitigation and management. We must consider the development of governance structures, the transformation of decision-making, and the streamlined integration of data into the insuring process.

This document provides a current snapshot, ideas and questions to promote conversation.



Defining AI

The AI awareness boom has been driven by step-changes in the performance of generative AI (one of its types), and particularly in a sub-type known as large language models (LLMs). But the underlying definition of AI continues to be heavily debated, often differing between institutions. Under some definitions, AI may have far-reaching consequences for actuarial work.

For example, the Institute and Faculty of Actuaries (IFoA) defines AI as “an umbrella term for a range of technologies and approaches that includes the use of data science and machine learning models to solve complex tasks.” Its September 2023 Risk Alert entitled [The development and use of Artificial Intelligence \(AI\) techniques and outputs by actuaries](#) refers to “data science and machine learning approaches” and “nascent third-party large language models.”

Actuarial teams have already used AI, and particularly machine learning, as outlined in a 2023 report by the Financial Reporting Council (FRC) entitled [The use of Artificial Intelligence and Machine Learning in UK actuarial work](#). Most actuarial work in the Lloyd’s market is likely to fall under the headings of data science or machine learning, given our role in modelling. In addition, use cases have emerged for LLMs, including coding support and explaining code, generation of technical reports, and summarisation of lengthy documents.

We also see potential in areas such as robotic process automation (RPA), natural language processing (NLP) and even explainable AI (XAI). These could prove useful to actuaries; XAI in particular holds promise, given its potential uses for models, documentation and communication principles outlined in the Technical Actuarial Standards (TAS), particularly [TAS 100](#). Initiatives by the IFoA, the Centre for Data Ethics and Innovation (CDEI) and various regulators aim to address some of these challenges of definition.

As the pace of change accelerates due to the competitive advantages AI proffers, how will policymakers and regulators need to evolve and adapt to stay ahead of the technology?

Opportunities and benefits

AI-driven tools to support reserving, capital modelling and pricing have not yet fundamentally changed actuarial processes. However, the computational advances that led to the development of more powerful AI-driven tools have delivered incremental improvements in processes, such as trend identification and more intuitive, dynamic dashboard displays.

That said, we're on the cusp of a major change in the nature of AI's impact. Tools such as generative AI promise to alter the ways that knowledge is created, utilised and shared with others, just as machine learning is driving deeper insights gleaned from data. Henceforth, AI is set to accelerate the entire insurance policy cycle, from pricing to claims settlement. In their report the FRC notes that they expect adoption of AI to increase, particularly in the general insurance, and finance and investment sectors.

AI will also affect how we as actuaries do our jobs, possibly influencing even the scope of our professional responsibilities. For example, data scientists will perhaps become more involved in actuarial processes, as we focus more on extending even further the value actuaries add across different functional areas for insurers, and for other companies in the risk transfer sector.

AI thrives on data, which is becoming much richer and more granular, more swiftly available, and therefore more easily and accurately segmented. AI will soon allow underwriters and pricing actuaries to price risks based on a much larger number of variables and utilising a much greater understanding of the relationships between those variables, which will be profoundly more informed than was ever before possible. Data may also be analysed to identify sectors underserved by insurance, and therefore to identify new opportunities.

The benefits for insurers will be broader than such immediate and direct wins, though. A look to other industries reveals significant, highly desirable indirect benefits arising from their application of AI. In healthcare, for example, AI has improved diagnoses and reduced care costs. Reported benefits for organisations and the wider healthcare sector include:

- better workflow management
- performance improvement
- fraud detection
- time saving
- reduced resource consumption
- enhanced professional training
- industry-wide data sharing.

It is not difficult to imagine similar benefits accruing to the insurance sector.

How can Lloyd's organisations embrace AI within the value chain to earn a competitive advantage in the global insurance market?

Overcoming risks

With benefits come risks. Actuaritech established a transregional, interdisciplinary industry focus group. The group identified key regulatory and conduct risks that actuaries must overcome when implementing AI-driven modelling techniques. The key risks discussed in this paper are outlined in this section, and the full paper is available on request from info@actuaritech.com.

Many insurers will wish to adopt AI tools to stay ahead of competitors. They will require that implementation is responsible and ethical, and the relevant risks controlled. The focus group identified the following key themes to encompass the main challenges of adopting AI within an actuarial context:

- Bias, fairness and discrimination.
- Individualisation of risk assessment.
- Interpretability and explainability.
- Transparency, reproducibility and replicability.
- Validation and governance.
- Lack of relevant skills.

Regulation and actuarial guidance help in the management of some of these areas, but disparate guidance can be difficult to consolidate, and even more challenging to implement in practice. Based on available regulation, guidelines and industry resources, the group set out the following practical steps to overcome each of these areas of challenge, and therefore to manage some of the key risks associated with the use of AI.

Guidance on managing the key risks associated with the use of AI

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Bias, fairness and the potential for discrimination

It is important first to define these notions, then to set clear measures and highlight acceptable levels of each. This may be an internal action, but the industry would benefit from standard metrics. Once the definitions and measures are agreed, suitable techniques can be implemented to limit additional bias, unfairness (algorithmic or otherwise) and unethical or unacceptable discrimination.



Individualisation of risk assessment

A similar sentiment holds: to what extent is it fair – and to whom is it fair – to individualise risk? It may be more feasible now to individualise risk, given the amount of data available and our ability to analyse it, but doing so may or may not be in the public interest. We as actuaries and insurers must balance the best interests of the public, direct consumers and the business. Market pressures and legislation may demand regular adjustment of the balancing point.



Explainability and interpretability

Various guidelines and actuarial standards require practitioners to explain and interpret model outcomes. Techniques to do so are available, but their effectiveness hinges on the practitioner's ability to implement them appropriately and communicate the results.



Transparency, replicability and reproducibility

Techniques for explanation and interpretation may help to ensure model transparency, but true transparency requires clarity also around data collection and management. To achieve this clarity, actuaries should maintain detailed documentation. This could encompass a model ID-card system, wherein each model ID code is linked to detailed information regarding the model, including data sources, model limitations, data storage and security and other relevant factors.



Validation and governance requirements

A model ID-card system will also support validation, since all information is stored in a central place, while version-control practices will also contribute to good governance. Misleading results are another concern; the practitioner must implement measures to help combat falsehoods. Competence and care standards must be upheld. Governance frameworks are being reconsidered across sectors to account for AI, including the use of external data, cross-departmental work, fairness, and transparency and explainability.



Lack of relevant skills

Many of these tactics to overcome the challenges of adopting AI for actuarial modelling and analytics require specialist skills, particularly computing skills. The 2023 FRC report mentioned that actuaries with AI/ML skills were in short supply, which made the review of AI/ML work difficult, and sometimes resulted in key person risk. It is imperative that training resources respond to shortfalls to help overcome such challenges. Additionally, a lack of formal and governed training may make it difficult to validate and verify skills and ensure that the skills learned align with actuarial education. As such, structured programmes and qualifications need to be developed to enable such training and assessment.

While many of the risks and challenges considered are not new risks to the actuary, in many cases AI has amplified them. New or amplified, they must consider and resolve how these risks can be managed and overcome.



AI regulation and governance

In some areas, organisational governance of AI risks can be guided by regulations, policies, institutions and standards, for instance, the [European Union's AI Act](#), the [UK's pro-innovation approach](#) and the [OECD's AI Principles](#).

Wider guidelines include the EU's General Data Protection Regulation (GDPR), legislation from the UK's Equality and Human Rights Commission and other technical and professional standards with which actuaries must comply. Singapore's Personal Data Protection Commission and the Australian Actuaries' Institute have issued useful practical development and implementation guidelines which can help actuaries navigate the adoption of AI.

Actuarial standards should of course be met when AI is applied to actuarial work (as defined by TAS 100), and clarity will be required on industry-specific technical standards to follow when an actuary's work is not in a traditional actuarial area – as this may become more common going forwards. Sector-specific UK regulation continues to evolve, which creates opportunities for actuaries to contribute to the development of appropriate corporate governance frameworks and industry standards.

The implications of AI on Lloyd's

The Lloyd's market is an innovative environment. It has been and remains at the vanguard of the evolution of risk underwriting and stands at the forefront of societal transitions. Lloyd's is at the leading edge of the assessment of new technology and the risks it brings, but introduction to the market's own operations and practices can be a different story. Its structural complexity, combined with commercial concerns and the heterogeneity of business underwritten in the market, have sometimes hindered market-wide adaptation to technological change. This contrasts with retail insurance, for example, where the large volume of homogenous risks provides sufficient data to parameterise models.

Lloyd's is not standing still, of course. For example, significant technological change is under way through the [Blueprint Two initiative](#), which is set to deliver dramatic advances in the digitalisation of business processes at Lloyd's, and to greatly enhance the richness of data available. That progress is set to make transacting in the market faster and cheaper. Meanwhile, internally, many managing agencies and brokers have and continue to adopt digital systems which will dramatically increase their own efficiency, and that of their trading partners.

That's all the more reason to consider adoption of AI at the business and market level. AI will create significant opportunities for Lloyd's through its ability to model outcomes based on a much greater number of variables, and to link those outcomes with greater complexity than is possible without AI.

Opportunities for Lloyd's actuaries

AI thrives on data, which is becoming much richer and more granular, more swiftly available, and therefore more easily and accurately segmented. AI may allow underwriters and pricing actuaries to price risks based on a much larger number of variables, utilising a much greater understanding of the relationships between those variables, which will be more informed than was ever before possible. Data may also be analysed to identify sectors underserved by insurance, and therefore to identify new opportunities.

As this paper has outlined, AI also brings significant challenges. For Lloyd's and the wider London market, these may emerge as internal risks, but AI will also impact the risks we assume. We have identified the following risks, opportunities and challenges:

- As the industries we insure adopt AI, the nature of existing risks and claims will change, and new risk-types will emerge. This will create opportunities for the market to provide extended or new coverage to existing and new clients, both during the emergence of AI and into the future. Naturally, there is increased uncertainty in estimating the ultimate claims experience as change takes place.
- The increased extensiveness of data analysis abilities delivered by AI will allow insurers to identify gaps in insurance coverage more effectively, fuelling growth. It may allow types of risks previously considered uninsurable to be priced with greater confidence and insured at Lloyd's.
- The greater predictive capability engendered by AI will increase the accuracy of automated actuarial reserving processes, resulting in relatively smoother results year on year. That in turn will allow more efficient allocation of capital, all else being equal. Things change constantly, of course, but AI can power increasingly comprehensive horizon-scanning exercises, which will help to identify unanticipated claims sources earlier than current processes allow.
- Increasingly complex and accurate modelling will be available to determine capital-requirements. The time required to produce and approve figures will be reduced, which may enable a more dynamic and efficient capital structure for Lloyd's overall.
- Reduced acquisition costs and more responsive pricing can be expected as AI enables faster underwriting, with much of the analysis performed by complex models. Algorithmic underwriting is already being used by some syndicates, such as Brit's Ki syndicate, to inform their follow strategies. As the predictive power of AI is enhanced and revealed, more syndicates may adopt AI models as part of their overall underwriting strategy.
- As underwriting becomes more automated, AI will enable customers to adjust policies more efficiently and frequently to reflect their exposures. That will generally improve the appropriateness of the coverage we provide.

The potential benefits of AI are enormous and game-changing, but we will have to remain alert to ensure fairness, and to ensure we adhere to all applicable regulatory requirements.

AI is already in use in some parts of the market, particularly in some functions; how much further could AI technology drive improvements in Lloyd's organisations?

Challenges for Lloyd's actuaries

Along with the benefits, significant challenges arise with the adoption and deployment of AI. For Lloyd's and the wider London market, these may emerge as internal risks, but AI will also impact the risks we assume. Risks may include:

- incompatibility or interoperability of legacy systems
- market constraints
- regulation, professional requirements and standards
- lack of support from management or other stakeholders
- high up-front costs
- insufficient skills or infrastructure.

None of these challenges are insurmountable. Nor are the several additional AI-related risks faced by Lloyd's. These include:

- The nature of some liability claims is likely to change, as AI has an increasing impact on the world around us. We have already seen disputes over the use of generative AI, for example. The evolution of liability may change the development profile of some classes of business, and increase the uncertainty of ultimate claims costs.
- For certain classes of business, the potential aggregations of risk may increase. Both reserving and capital modelling actuaries will face new challenges arising from these changes in the claims environment.
- Premium and claims development patterns alike are likely to change – in general, accelerating – as the infrastructure supporting the underlying policy and claims payment processes is improved by AI.
- Advances in automation come with a warning label. In a market environment, care must be taken to ensure industry-leading practices are maintained and digital collusion does not arise.
- Given the pace of AI development, it is inevitable that actuaries will have to address the risks it brings, as well as the potential benefits. The opportunities to enhance current processes, and even for radical innovation, are vast, but how will risk management need to develop to ensure the future rewards are realised in an appropriate way?

Looking ahead

As AI becomes more prevalent, we as actuaries must do our part to ensure that all quarters of the Lloyd's market embrace the benefits of this advancing technology in our ongoing digital journey. Doing so is critical to the maintenance and improvement of the relevance and competitiveness of our insurance and reinsurance offering.

It is clear that actuaries need not just to adapt, but to embrace AI in a risk-controlled manner. And while we will have to remain alert to ensure we adhere to applicable regulatory requirements, to move forward into the world of AI is a key component in ensuring that we – and our various organisations, and our market – remain at the forefront of the industry.

How can Lloyd's organisations successfully adopt new and evolving AI technologies, in actuarial and beyond, to drive improvements in the insurance value chain and our market's operations?

The benefits of advancing technology, adopted appropriately, can only aid in the upholding of the Lloyd's market's valuable, complex competitive advantage.

If you're interested in further exploring the nature of AI risk in the Lloyd's market and in actuarial, please contact me, Sanjiv Sharma, at sanjiv.sharma@lmalloyds.com.



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