Facilitating a better future

lloyd's market association

AI and ML in Actuarial and Risk

In partnership with Barnett Waddingham

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Foreword

The transformative potential of artificial intelligence (AI) and machine learning (ML) continues to capture the imagination of the Lloyd's market. I am pleased to share this report, which showcases the findings from our latest survey of chief actuaries and chief risk officers from across the market, produced with the support of Barnett Waddingham.

This report is built on insights from 30 respondents, representing approximately 55% of the market stamp capacity, alongside six in-depth interviews. It highlights the progress made since we previously discussed this topic in our discussion paper, *Artificial Intelligence and the Lloyd's Actuary: A Snapshot of Opportunity and Risk*. There is a growing sense of optimism in the market, with organisations taking meaningful steps to integrate AI and ML into their operations.

Survey findings reveal a gradual but steady adoption of AI/ML technologies, driven by their ability to enhance decision making, improve operational efficiency and unlock new opportunities across actuarial and risk management. However, challenges such as model transparency, governance frameworks and ethical concerns remain central to discussions. As we embrace these technologies, it is clear that their successful adoption will depend on striking a balance between innovation and risk management.

While AI tools are not yet ubiquitous, over the last year they have evolved in such a way that they are more often than not the first thought to swift and effective problem solving. Current reported benefits of utilising this technology are more centred around automation. As the market and beyond progress along the technology adoption curve, benefits such as enhanced decision-making capabilities hold the key to developing and maintaining a competitive advantage.

Technological advancements in the past have enabled actuaries to increase their value to the industry; enabling them to deliver deeper, faster and more accurate insights by automating routine tasks, analysing vast and complex datasets and enhancing predictive modelling for better risk assessment and strategic decision making. Technological change has supercharged what we are able to do, the insight we are able to bring and has increased the need for actuaries to 'translate' the complex to the understandable. I am confident that as AI advances and becomes embedded, the role of the actuary will be amplified, adding greater strategic value through intelligent use of advanced analytics and AI tools.

I hope this report serves as a useful resource for actuaries and risk professionals navigating this exciting yet complex landscape. I would like to extend my gratitude to Barnett Waddingham for their invaluable support and expertise in delivering this study. I would also like to thank all respondents who have shared their vital insights through the surveys, interviews and discussions held as part of this study. These have been vital in forming our view of the market and our recommendations.

Sanjiv Sharma, Head of Actuarial & Exposure Management, Lloyd's Market Association

Cutting through the AI and ML hype

Artificial intelligence (AI) and machine learning (ML) are not entirely new concepts. However, the rapid evolution of AI and increase in maturity of ML have positioned these technologies at the forefront of discussions across many industries, with insurance being no exception. From boardrooms to conferences, AI and ML are dominating discussions, signalling a shift in how insurers approach technology and innovation.

The insurance industry is therefore at a pivotal moment. AI and ML usage has gone from theoretical potential to providing real-world impact. What once seen as a futuristic 'wow' factor is now driving efficiency, enhancing risk assessment and reshaping traditional processes. As AI-driven innovations transforms the insurance industry, actuarial and risk professionals must navigate both the opportunities and challenges these advancements can bring.

Key questions remain:

- How can insurers balance innovation with regulation and ethical considerations?
- What is the general perception of AI and ML across the Lloyd's market?
- How are AI and ML being applied in actuarial and risk management?

This report aims to break through the noise and reveal key insights based on our recent Lloyd's market survey.

Opportunity in all areas

This report follows another recent LMA survey designed to gauge the extent to which Lloyd's and London market firms have experimented with AI and, if so, in what areas of their business.

This was completed by over 80 firms, including responses from 80% of Lloyd's managing agents. A summary of results can be found here.

Data availability and quality were referenced as barriers to AI adoption by almost half of respondents, a message echoed by the actuarial and risk communities. If human resource can be trained to cope with and adapt to those data vagaries and shortcomings, then so can AI – in-time, probably better and faster. Data will never be perfect, so why let it be a reason not to embrace the opportunity.

Historically, the complexities of the Lloyd's and London specialty insurance subscription market have often been cited as a challenge or barrier to innovation and operational advancement. The latest wave of AI is positioning those complexities as a magnet for employment of AI capability to aid growth as well as delivering efficiency gains.

Definitions of AI and ML

For the purpose of this report, we define AI and ML as follows:

Artificial intelligence (AI)

- Technologies that develop machines with the ability to imitate intelligent human behaviour.
- Can be seen as ‘black box’ where decisions are not easily interpretable by humans.
- Includes generative AI and large language models.

Machine learning (ML)

- Form of intelligence that enables a machine or system to learn and improve from experience.
- Uses algorithms to analyse large amounts of data and learn from insights to be able to form decisions.
- Includes generalised linear models (GLMs), neural networks and image recognition algorithms.

There are still sceptics

AI and ML as a ‘black box’

One of the greatest challenges indicated is the difficulty to validate the outputs of AI and ML tools. The main reason for this is due to the 'black box' nature of such models. This obscurity can make communication of the outputs to stakeholders challenging.

Quality of output

There were concerns around the reliability of AI and ML models given the immaturity of these models. In particular, AI models require training over a period of time so that they can generate more accurate and stable results that are able to add value to the business. Without sufficient training and testing, such models are prone to hallucinations, which undermine the reliability of the outputs. The availability and quality of data has restricted the effectiveness of AI and ML.

Lack of AI and ML skills

Most respondents flagged that there is a lack of AI and ML skills across all levels within their organisation. This leads to the need for training and additional resources, increasing the cost of implementation of these models. There is also a risk that time and resources are wasted in case the models are not deemed useful. This risk may reduce as the technology matures and there are more models available to be licensed across the market.

Governance

The rapid pace of technological advancements necessitates frequent updates to IT and risk policies, which can disrupt the use of live models. Additional concerns include challenges in realising anticipated benefits, resistance to adoption due to cultural factors and the growing risk of litigation. Fears surrounding generative AI further amplify these challenges, underscoring the need for adaptive strategies and robust governance.

Regulatory compliance

Insurers are sceptical about many things, but one concern stands out: **regulatory compliance**.

This should come as no surprise as this is a relatively new piece of technology and users are still getting to grips with the potential risks. When asked about explaining the regulatory challenges, chief risk officers and chief actuaries responded:

> *Vague, yet strict*

> *Concerns over data regulations when using third-party AI tools, particularly when using client data*

> *Generative AI is unpredictable and there are challenges for validation and governance*

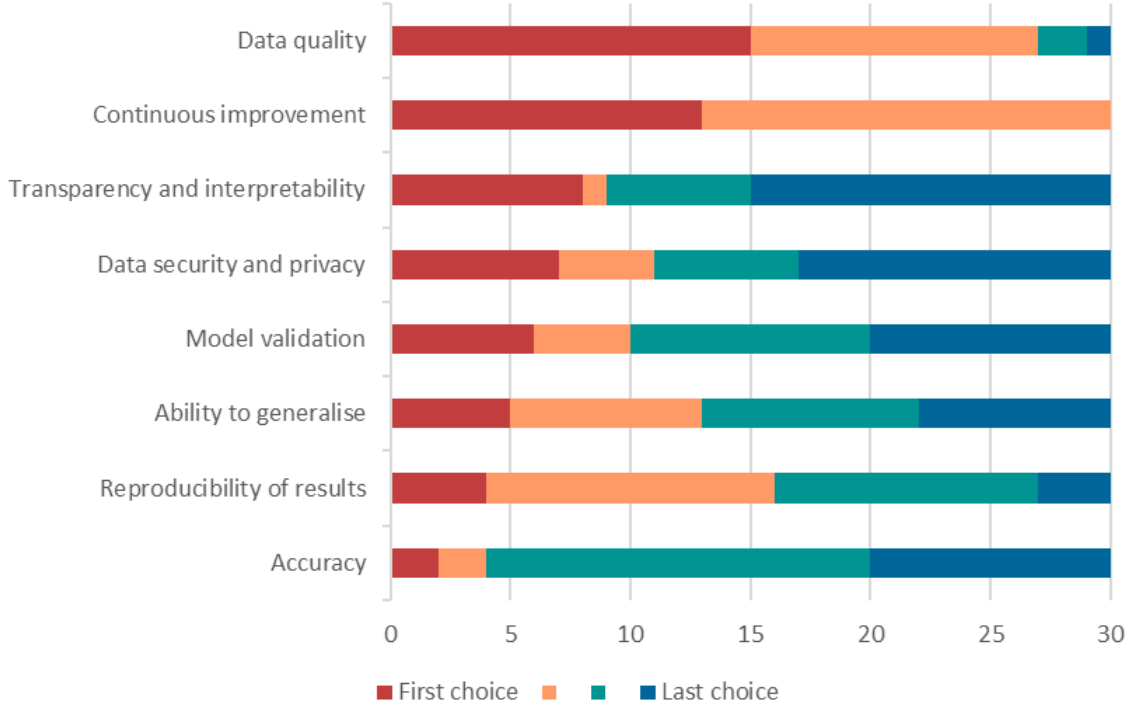
The survey highlighted the significant uncertainty and major concern among insurance professionals about how AI and ML applications will be governed in the future. There is a general hesitancy that adopting these solutions today could inadvertently put insurance professionals at a significant risk in years to come. There is increased exposure to heightened regulatory scrutiny, accidental compliance violations, confidentiality risks, security breaches or even legal challenges.

Most respondents would appreciate more practical guidance on how AI and ML could be responsibly and effectively integrated into their professional work. Other ethical concerns around data handling amplify the hesitation of the industry to incorporate these models into their daily work.

Data quality remains of utmost importance

- The results highlight that **data quality** is the top priority for most respondents when considering AI and ML implementation in insurance. This aligns with the industry concerns that AI models are only as reliable as the data they are trained on.
- **Continuous improvement** follows as the second most important factor, suggesting that professionals realise the need for ongoing improvement and development of AI/ML models, given the risks raised in this report. The adoption of these tools should not be a static exercise and should keep up with new emerging technologies.
- While **transparency and interpretability** was ranked as the third most important factor, survey respondents also recorded this as an area of low priority. A similar trend was observed for **model validation**. The general sense is that there is a preference for robustness of outputs in favour of speed of implementation.
- Opinions were also divided for **data security and privacy**. This point was raised several times during the course of the survey, but a significant proportion of the respondents didn't mark this as a high priority. One reason could be due to the slower uptake of these models in the participants' organisations.
- Another interesting insight is that **accuracy and reproducibility of results** were not ranked among the highest priorities. This may reflect an underlying expectation that these aspects will be sufficiently addressed as AI/ML models mature and are integrated into mainstream solutions.

Respondent priorities when using AI and ML models



Actuarial is ahead of risk on adoption

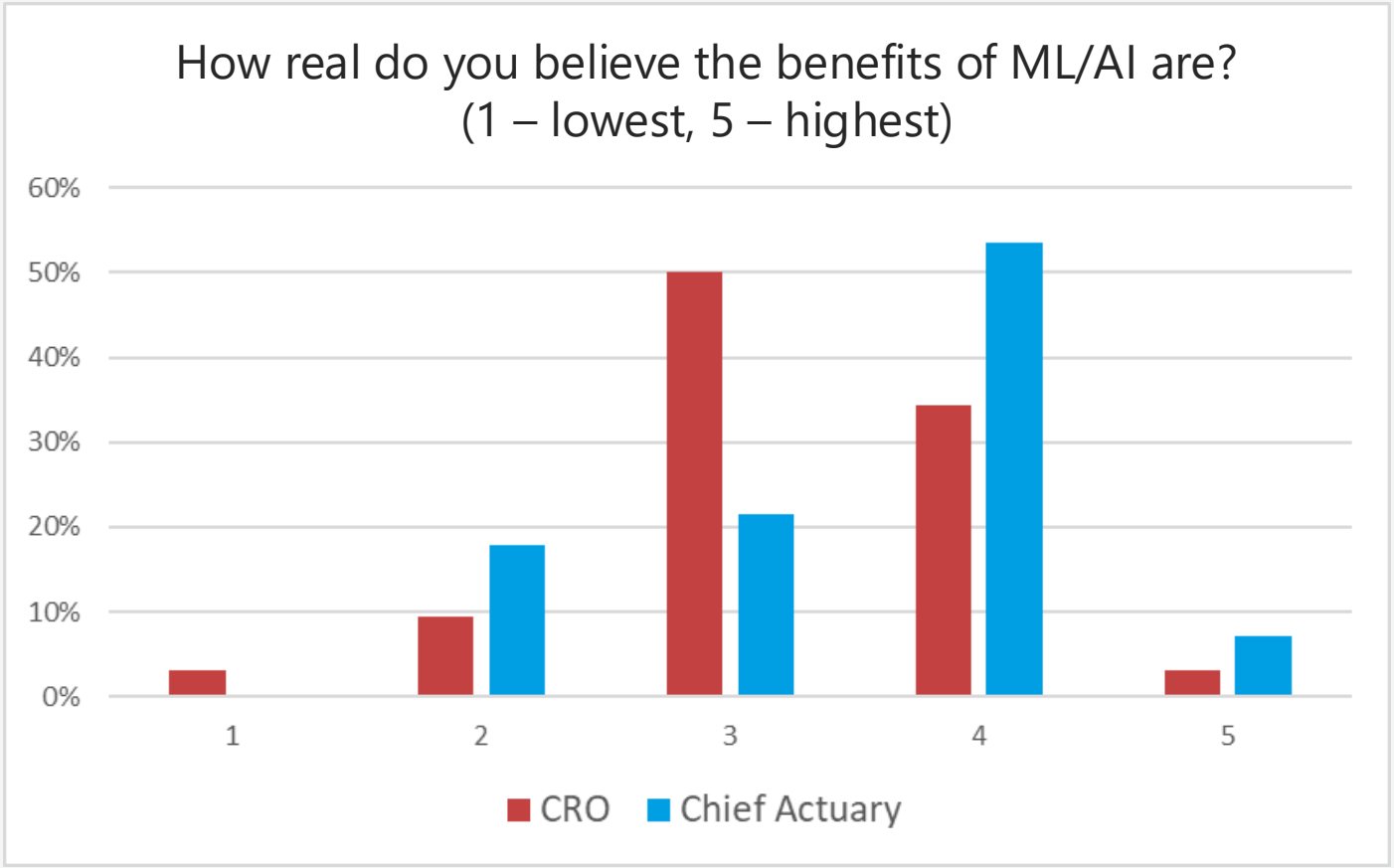
Opinions on the potential applications and benefits of AI and ML vary widely across the Lloyd's market. Our survey results revealed that actuarial professionals are more optimistic about integrating AI and ML in their work compared to those in risk functions. The primary reason for this difference lies in the fundamental nature of their work.

Actuarial work, which is inherently quantitative in nature, makes AI and ML models particularly valuable, as these technologies excel at data manipulation and automation of complex calculations. By leveraging AI-driven tools, actuaries can significantly enhance efficiency and accuracy, reduce time spent on routine computations and allow them to focus on areas that require more expert judgment.

On the other hand, the risk function aims at identifying and mitigating long-term risks, which are significantly influenced by various external factors, including regulatory landscapes, economic fluctuations and geopolitical risks.

As a result, historical data alone does not necessarily reflect future experience, resulting in an increased reliance on professional judgment. Given this uncertainty, risk practitioners are more hesitant to invest significant time and resources into developing AI-driven tools, fearing that these models may not offer substantial improvements over their own expertise at this point in time.

The above sentiments have resulted in a higher adoption thus far of AI and ML within actuarial work relative to risk work.


How real do you believe the benefits of ML/AI are?
(1 – lowest, 5 – highest)
60%
50%
40%
30%
20%
10%
0%
1
2
3
4
5
CRO
Chief Actuary

The full potential of AI and ML remains largely untapped

The survey revealed the following current uses of AI and ML:

AI applications:

- Large language models to classify claims information.
- Large language models for data ingestion from unstructured forms such as slips to enable faster modelling and response times.
- Data augmentation to improve operational efficiency and data capture.
- Generative AI assistants (Copilot, ChatGPT) to support idea generation, coding assistance and summarise reports.

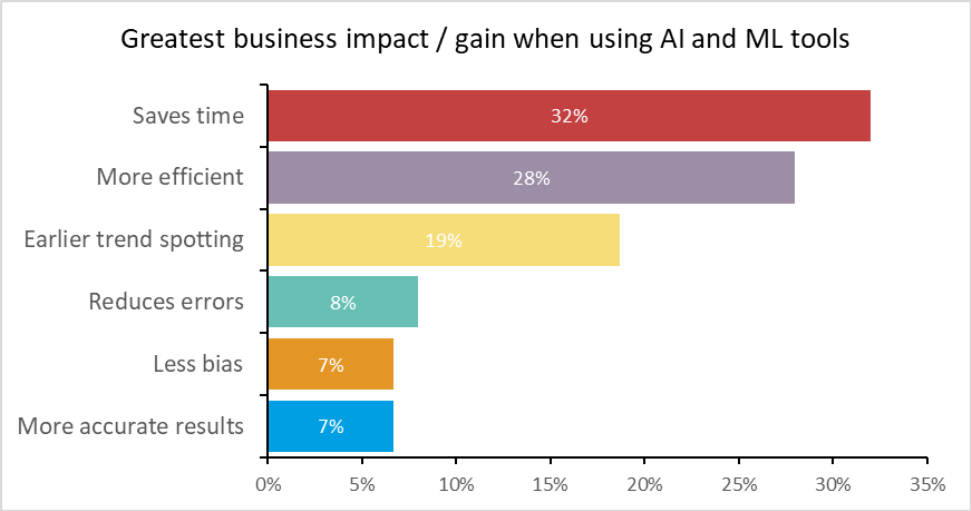
ML applications:

- ML tools to improve efficiency and to identify trends in reserving and pricing work.
- GLMs traditionally used heavily in pricing.

AI and ML adoption among LMA members remains in its infancy, with around 50% of respondents reporting limited or no implementation.

This is not surprising, as AI and ML tools are relatively limited in the market and the existing solutions are still in their infancy. The examples provided above represent just a fraction of AI and ML's potential applications in the insurance industry. While these are beginning to gain traction, most organisations are adopting a selective and cautious approach towards AI and ML.

The current use cases are primarily around supplementing and automating existing processes. There were limited examples of use cases where AI and ML were readily being used to drive decisions and to provide analytical insights. This suggests that the full potential of AI and ML remains largely untapped.



Recommendations for future integration

How do we move beyond experimentation and towards sustainable, scalable integration of these technologies within organisations?

Acquire relevant knowledge

- Invest in staff training to enhance AI expertise within the team and improve understanding around AI capabilities, limitations and best practices.
- Consider the employment of subject-matter experts to oversee AI and ML implementation, offer support and validate results.

Improve governance

- Respondents often felt it is necessary to establish a comprehensive AI/ML framework and policy to reduce exposure to external risks and limit data sensitivity concerns.
- This could be expanded by establishing dedicated internal oversight processes to strengthen governance by closely monitoring AI and ML usage.

Unlocking AI/ML benefits

- The key benefits of AI/ML include operational efficiency, automation and enhancement of decision making.
- While in initial stages the benefits are more centred around automation, longer term benefits should also be taken into consideration.

Resource management

- Once AI and ML models are more embedded into processes, internal resources could be redeployed to maximise the benefits of such tools (e.g. reskilling of staff to focus on more value-added tasks).
- The key to success going forward will be dependent on the effective interaction between humans and AI.

Key conclusions

To summarise, the five key takeaways from the surveys are:

1. There remains scepticism in the industry around the integration of AI and ML.
2. Regulatory compliance is noted as a significant issue
3. Data quality is of high importance when dealing with AI and ML tools.
4. Actuarial is ahead of risk on the adoption of AI and ML tools.
5. AI and ML use cases are picking up across the market but the full potential of such tools remain largely untapped.

Call to action

Looking ahead, insurers should consider expanding the role of AI and ML beyond automation and efficiency gains. The future of these technologies lies in their ability to enhance decision making, identify emerging risks and provide deeper analytical insights. We encourage chief actuaries and chief risk officers to actively explore the AI and ML opportunities within their organisations. While recognising the initial implementation comes with challenges, we recommend leveraging industry best practices and the provided recommendations as guiding framework to support this adoption process.

Organisations that successfully integrate AI and ML into their actuarial and risk functions can gain a competitive edge and make more informed strategic decisions. Despite the obstacles, AI and ML have the potential to reshape actuarial and risk functions in meaningful ways. The key will be for insurers to move beyond small-scale, cautious experimentation and instead focus on harnessing AI and ML to drive real innovation. Those that do so will be better positioned to navigate an increasingly complex and data-driven insurance landscape.

As AI-driven innovations continue evolving, insurers must balance **efficiency gains, regulatory compliance and ethical considerations** to harness these technologies effectively. The next phase will not just be about **automation** but about **enhancing decision making and unlocking new business value**.