

Bermuda Insurance Sector Artificial Intelligence and Machine Learning Survey — **2022 Report**

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ABOUT THE AUTHORITY

The Bermuda Monetary Authority (Authority or BMA) was established by statute in 1969. Its role has evolved over the years to meet the changing needs in Bermuda's financial services sector. Today it supervises, regulates and inspects financial institutions operating in the jurisdiction. It also issues Bermuda's national currency, manages exchange control transactions, assists other authorities with detecting and preventing financial crime, and advises Government on banking and other financial and monetary matters.

The Authority develops risk-based financial regulations that apply to the supervision of Bermuda's banks, trust companies, investment businesses, investment funds, fund administrators, money service businesses, corporate service providers, insurance companies, digital asset businesses and digital asset issuances. It also regulates the Bermuda Stock Exchange and the credit union.

BACKGROUND

In late 2021, the BMA conducted a market-wide survey with commercial insurers and insurance groups to gather information about the sector's use of Artificial Intelligence (AI) and Machine Learning (ML) technologies in their respective operations. The survey was also extended to small commercials, innovative insurers and intermediaries, which usually employ a digital-first approach in their operations, frequently utilising AI/ML systems.

For the survey and this report, the BMA used the terms AI and ML interchangeably as a collective term for the capability of computers to learn, which humans perceive as intelligence, and make logical decisions accordingly. Typical AI/ML capabilities include speech, image and video recognition, Natural Language Processing (NLP), conversational agent capacity (e.g., chatbots), predictive modelling, augmented creativity, smart automation, advanced simulation, and complex analytics and predictions.

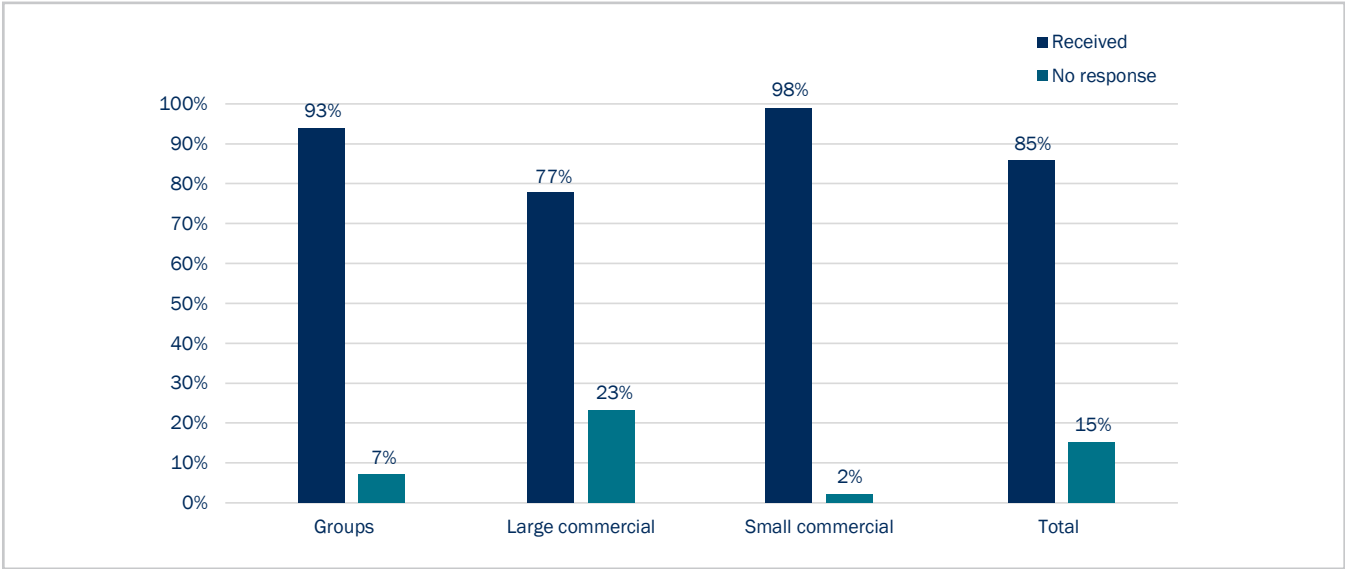
The survey aimed to assist the Authority in assessing Bermuda Insurers' current state and future direction regarding the use of AI and ML. Responses were held in strict confidence, and only members of the relevant working group had access to raw data.

This report summarises the survey responses and provides market insights into how these technologies might impact the Authority's future approach to regulating and supervising Bermuda's insurance sector.

KEY FINDINGS

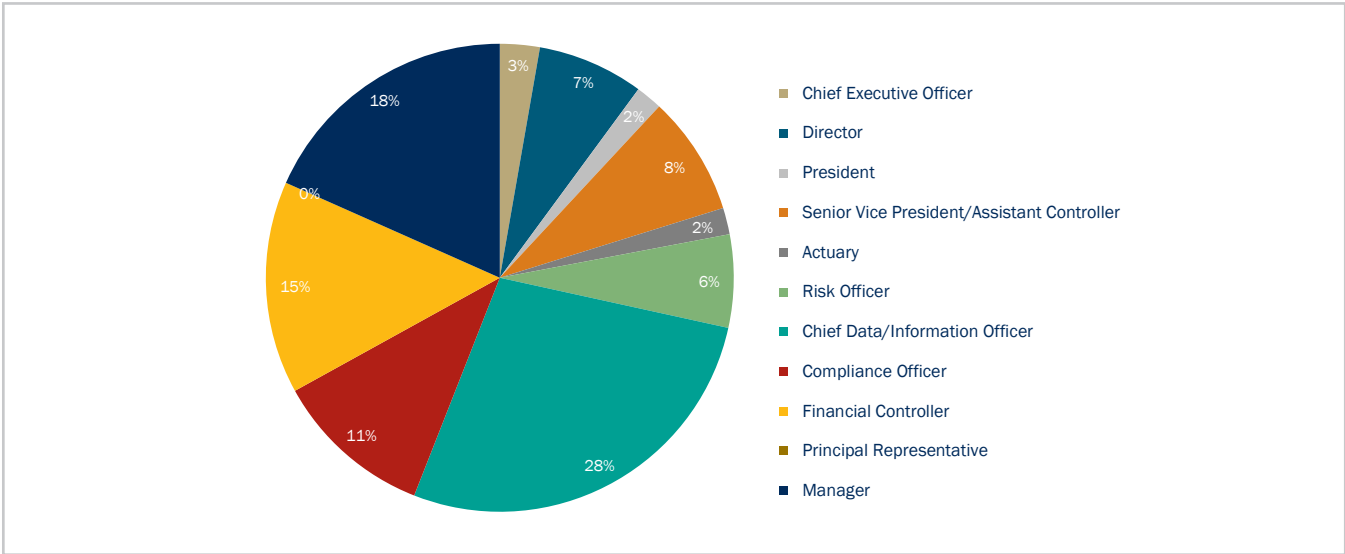
The survey was well-received by the market, with a high overall response rate of 85%, split among the respondents as follows in graph 1:

1. Status of Filing Submission



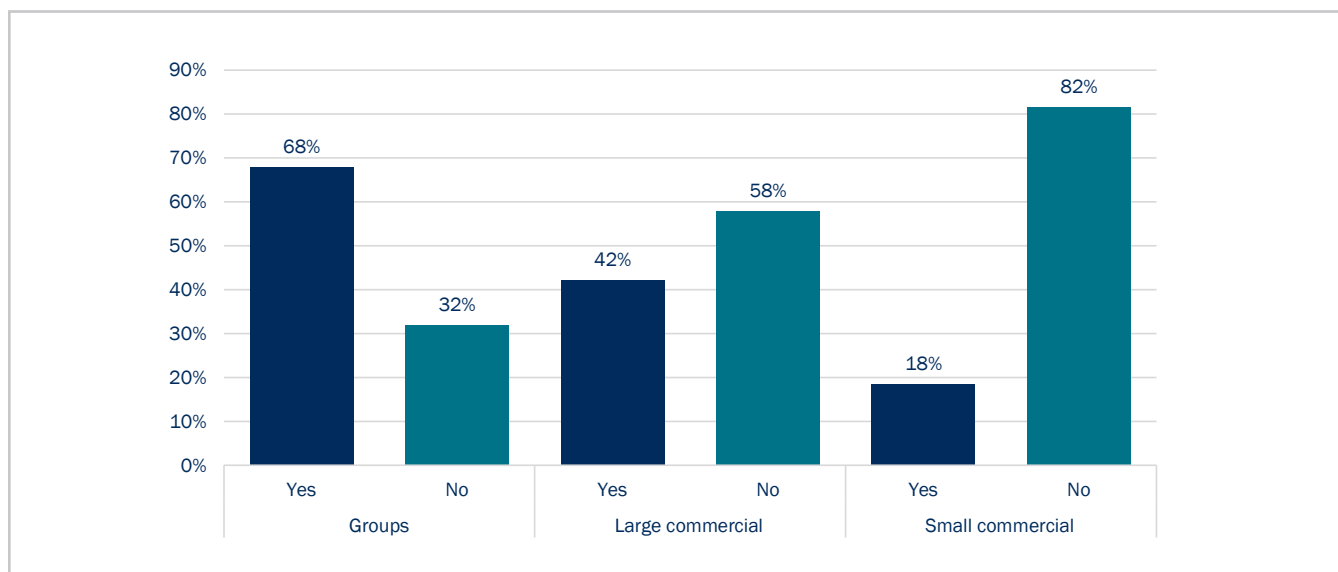
Chief data/information technology officers, insurance managers, compliance officers and financial controllers accounted for a large percentage of the survey responders (Chart 2).

2. Role of Responders



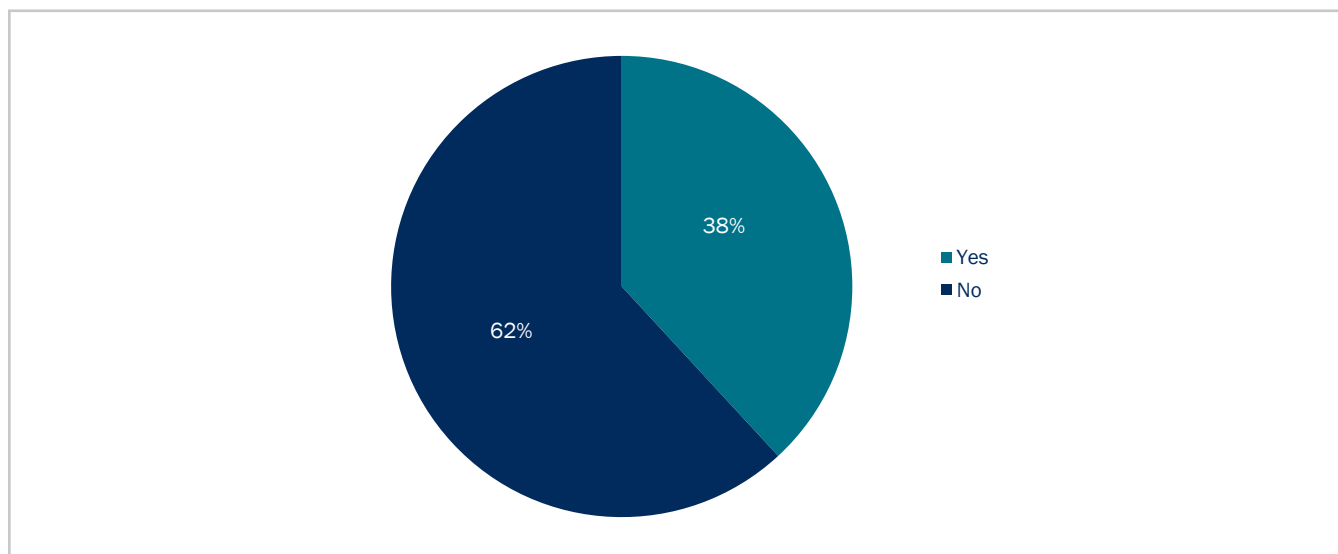
Varying responses were received regarding whether companies currently use AI and ML technologies, as shown in Graph 3. For example, insurance groups reported that 68% are using AI/ML systems; this outcome is expected due to the scale of business operating internationally. Nevertheless, the opposite is true for small commercial insurers. Furthermore, over half of the large commercials do not currently use AI/ML technologies.

3. Filing by Class

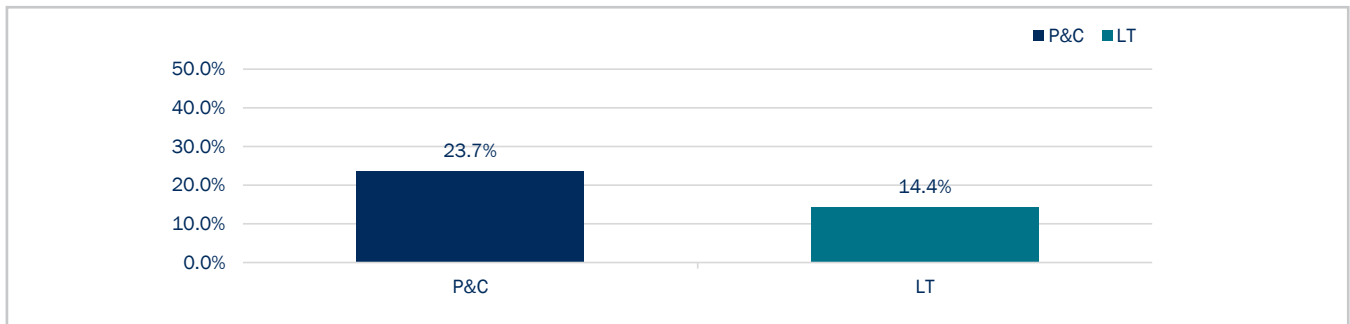


Overall, 38% of the respondents (Chart 4) currently use AI and ML systems in their operations and only a limited number of the Long-Term (LT) and Property and Casualty (P&C) insurers presently use AI/ML systems (Graph 5).

4. AI and ML Usage

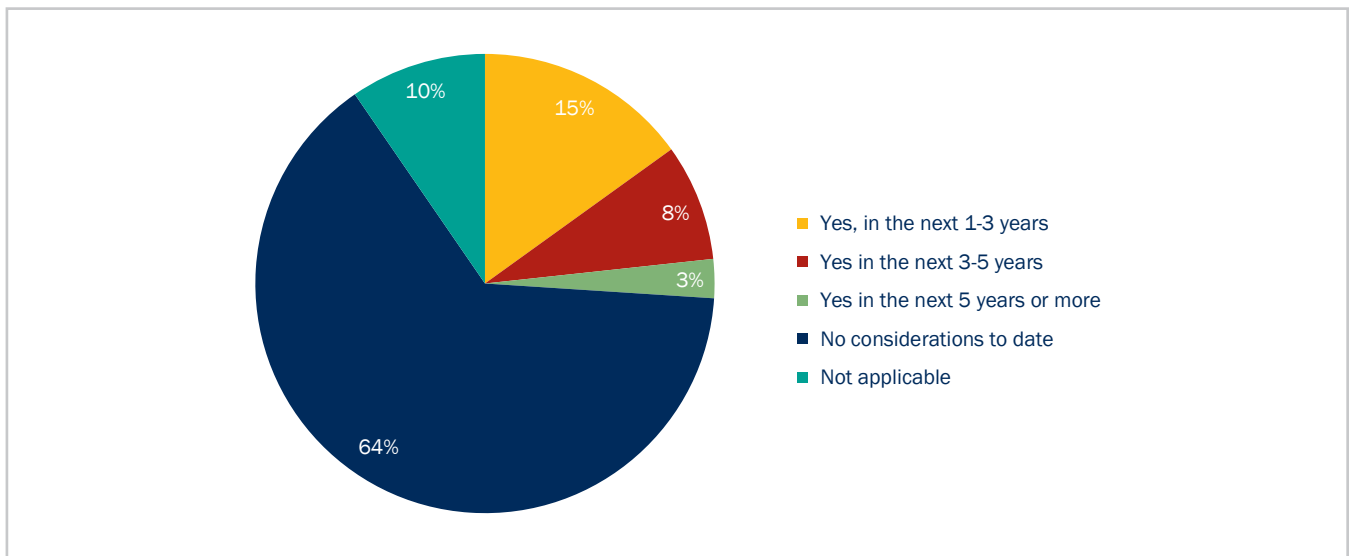


5. AI and ML Usage by P&C vs LT

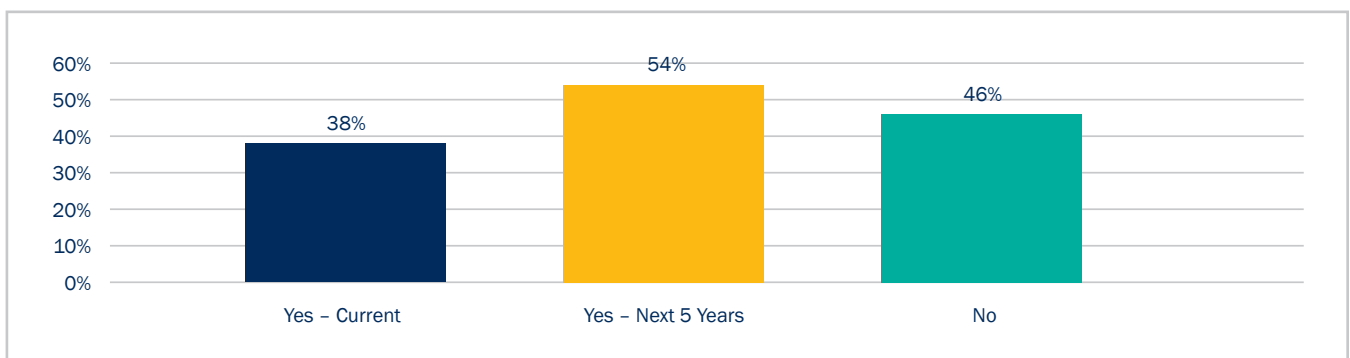


Among the 62% of respondents that do not use AI/ML technologies, 23% indicated that they plan to adopt AI/ML in the next five years or less. These survey results suggest that 54% of insurance groups and the broader commercial market plan on using AI/ML within the next five years, allowing the Authority and the Bermuda insurance market sufficient time to develop a creditable and fit-for-purpose AI/ML framework.

6. AI/ML Adoption Plan



6a. Planning to Adopt AI/ML

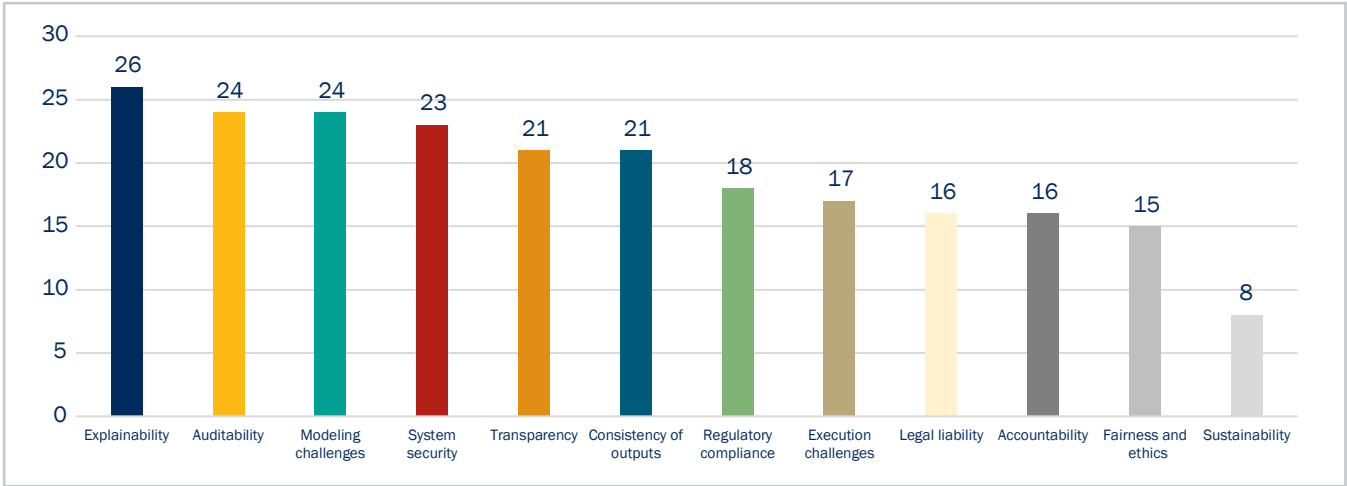


Accordingly, the top challenges and obstacles preventing the adoption and usage of AI/ML systems include:

- AI/ML systems not being critical to current business offerings
- Presently, no viable business case
- Lack of requisite skills and expertise to implement these technologies
- Limited budget

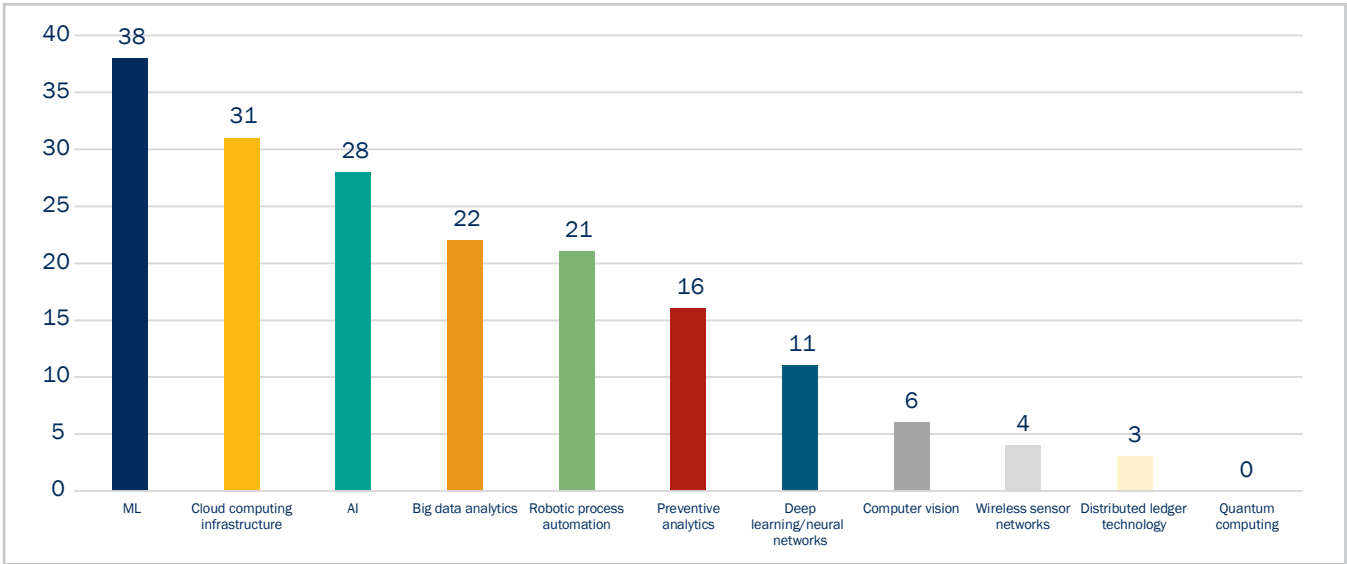
When asked about the areas of concern insurers have when considering adopting AI/ML systems, the top responses, as shown in Graph 7 below, were explainability, auditability, modelling challenges, system security, transparency and consistency of outputs.

7. AI and ML Implementation Concerns



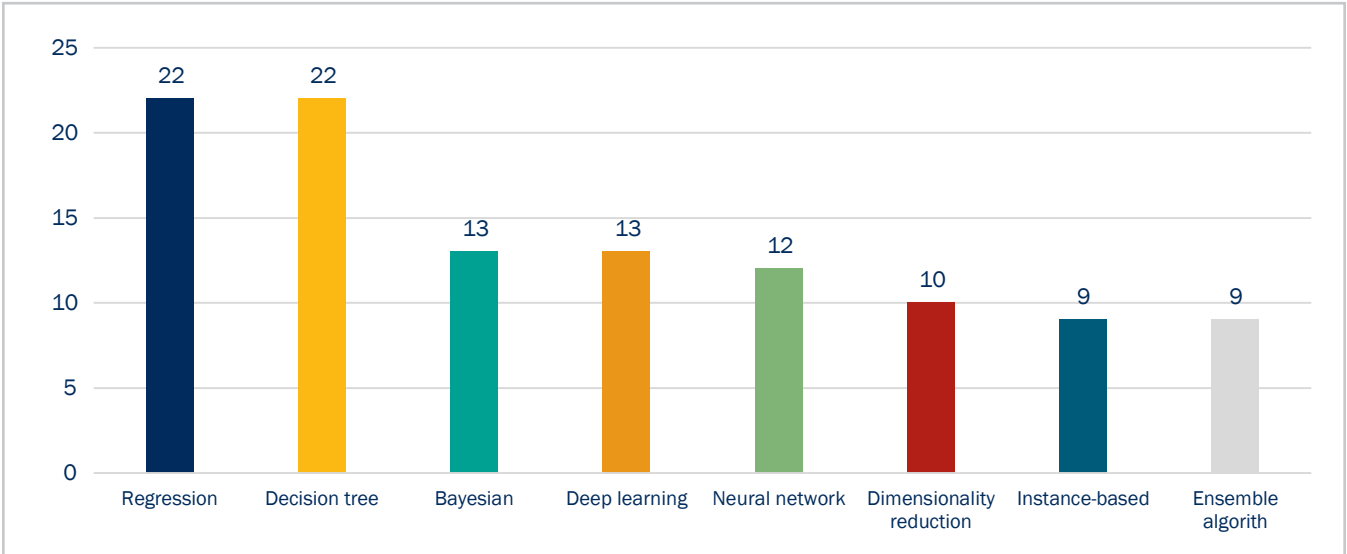
Graph 8 shows the distribution of currently adopted technologies utilised by respondents. Topping the list are machine learning, cloud computing infrastructure and AI.

8. Types of Technologies Used by Insurers



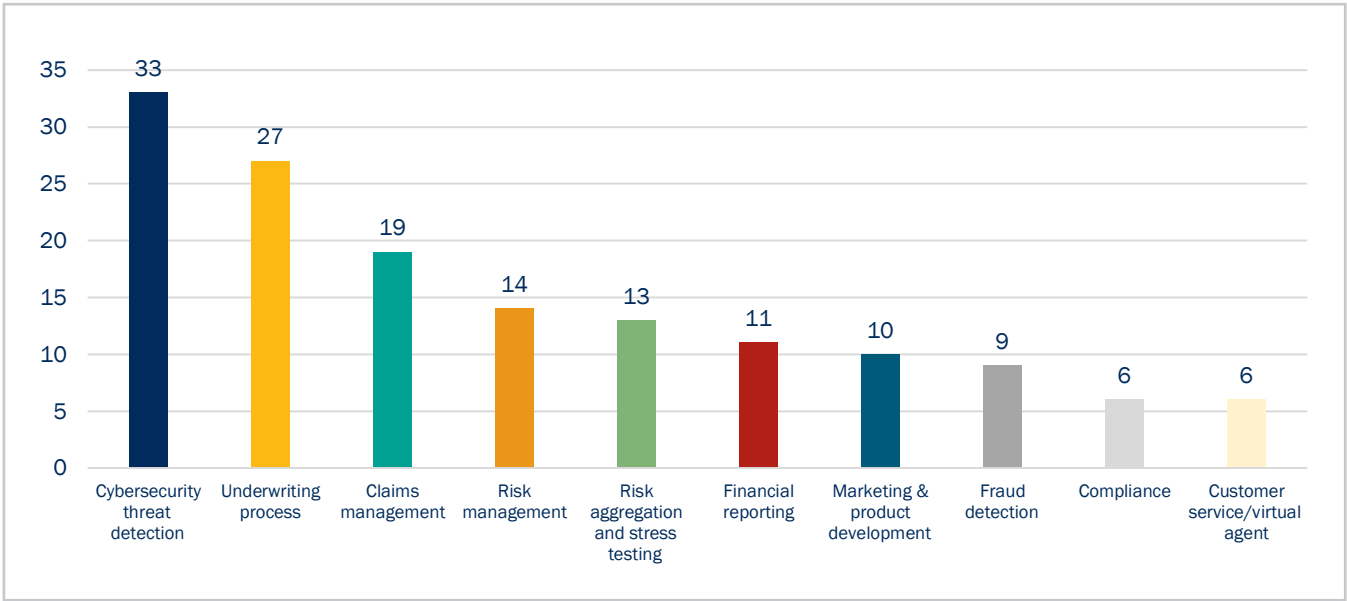
Focusing on the types of algorithms widely used by insurers for their AI/ML systems, the survey results revealed that the top responses were regression and decision trees. This indicates that Bermuda insurers who use AI/ML systems employ a combination of both supervised and unsupervised learning algorithms, implying various levels of adoption among the respondents (Graph 9).

9. AI and ML Algorithms Used



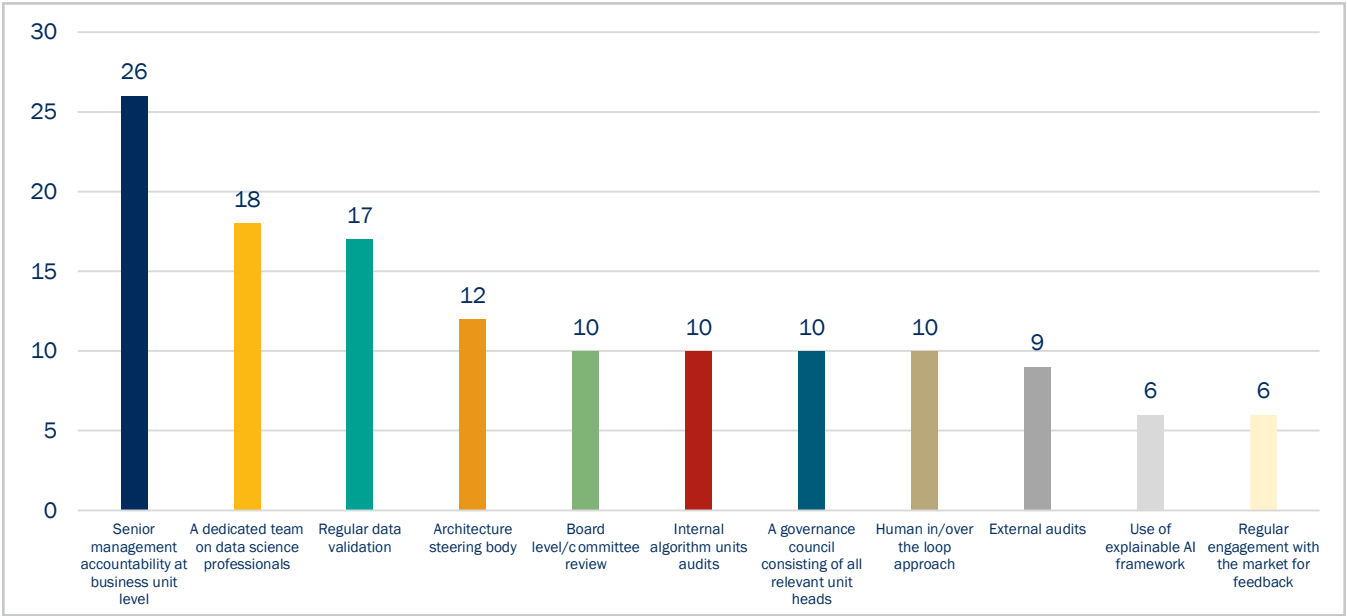
Among the use cases, cybersecurity threat detection topped the list of applications for companies using AI/ML models. Accordingly, the respondents also use AI/ML technologies to enhance their underwriting, claims and risk management processes, among others (Graph 10).

10. AI and ML Application Details



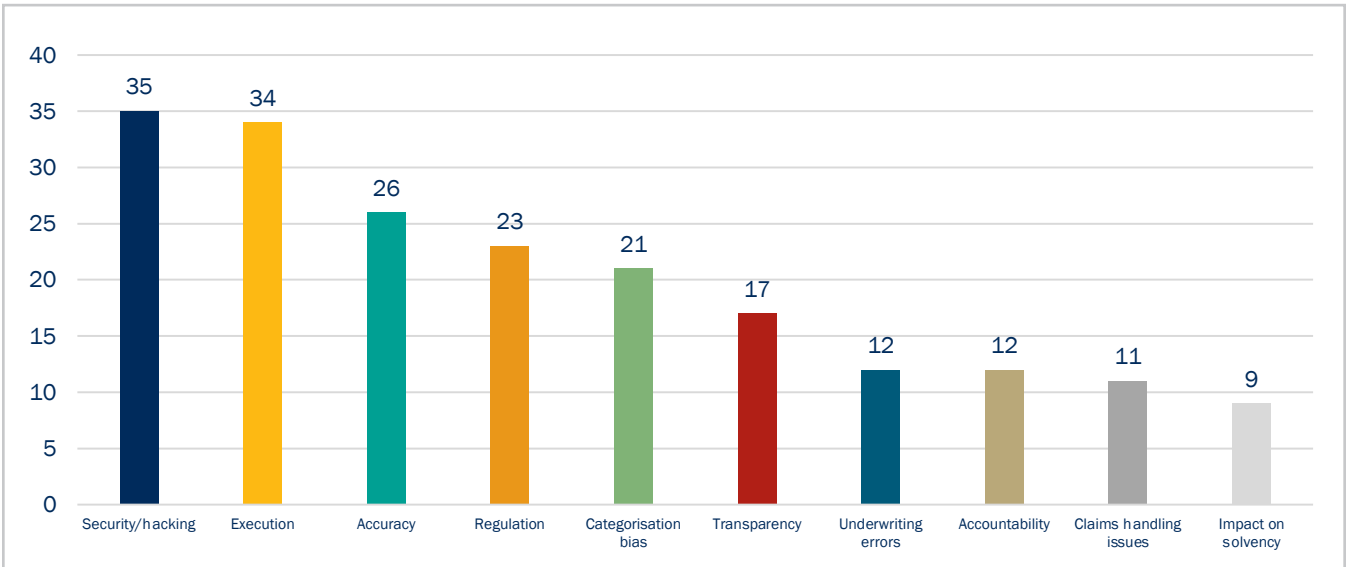
When asked what governance and control measures are currently in place for the respondents' AI/ML systems, top control measures include senior management accountability, dedicated data science team, regular data validation and steering bodies (Graph 11). A small percentage of the respondents indicated the use of independent governance boards, external certifications and alignment with a specific standard.

11. Top AI and ML Governance and Control Measures



Graph 12 summarises prominent concern areas, indicating where respondents believe they would benefit from further regulatory and supervisory guidance from the BMA. Topping the list are security/hacking risks, execution risks, accuracy of outcomes, regulation of systems in general, categorisation bias and transparency.

12. AI and ML Top Risks



FURTHER INSIGHTS:

Most respondents indicate third-party or off-the-shelf services as the primary sources of AI/ML infrastructures, followed by full in-house developments and customised third-party services.

Outsourced functions, accordingly, are governed using service level agreement compliance reviews, third-party risk evaluations, vendor confirmation of compliance and, in some cases, third-party service audits.

It is to be noted that 66% of the respondents who use AI/ML had no written digital strategy. Nevertheless, majority of respondents with a deliberate digital strategy for AI and ML had the strategy set and written at the board level (73%).

An encouraging insight from a governance perspective is that the current controls for AI/ML digital strategies are set at all three lines of defence, including the operational and enterprise risk management levels and compliance function/internal audit.

Finally, when requested to share feedback on the BMA's regulatory and supervisory approach towards AI/ML systems, respondents recommended issuing guidance notes, best practices documents, expanding the cybersecurity rules and enhancements to the existing Insurance Code of Conduct.

CONCLUSION AND NEXT STEPS:

The acceleration of digitalisation in the financial services sector has brought about new ways and means to improve insurance companies' operations, including the use of AI/ML systems. While the survey results indicate that 38% of respondents currently use AI/ML in their operations, this area requires attention as 54% of respondents expect to be using AI/ML in their operations within the next five years. This should allow the BMA and the market sufficient time to adapt and ensure frameworks remain credible and fit for purpose.

The BMA recognises that AI/ML systems create opportunities, including discovering additional risks and perils leading to new insurance products, a more streamlined insurance life cycle brought about by increased interconnectedness and new ways to underwrite traditional lines. Alternatively, AI/ML systems carry an increased risk profile, particularly in cybersecurity, data privacy and legal and compliance uncertainty, not to mention ethical considerations and the risks of unintended outcomes.

As the degree of market adoption of AI/ML systems varies for the Bermuda market given the various subsectors (i.e., insurance groups, large commercial, small commercial, captives, special purpose insurers, intermediaries and innovative companies), the Authority must adopt a risk-based approach to regulating and supervising AI/ML systems. Each subsector is expected to have varying levels of adoption and impact on their respective risk profiles; therefore, the BMA is not looking to implement a one-size-fits-all approach.

Further, there are already existing sectoral frameworks on governance, risk management and business conduct, among others, where proportionality can be applied respectively, depending on the company's nature, scale and complexity. In addition, there is continued oversight within the annual filing data, supervisory colleges, prudential reviews, and onsite reviews conducted for each insurer. The Authority will keep up to date with the usage and implementation of these technologies within its regular supervisory cycles, and as appropriate, integrate AI/ML risks in its thematic reviews.

The BMA will build upon these existing frameworks with a view of enhancing them through appropriate avenues and, in consideration of the market's response to the survey, will include the following approaches as a starting point:

- Continuously review the Insurance Code of Conduct
- Expand upon the Operational Cybersecurity Code of Conduct to comprise specific guidelines on the use of AI/ML systems
- Strengthen the BMA oversight on outsourced services for companies that use third-party vendors to procure and maintain AI/ML systems

As the BMA's mandate continues to evolve, particularly in light of the [recent revision to the Insurance Code of Conduct](#), which now incorporates aspects relating to the conduct of business regulatory regime, the Authority will consider numerous factors where the use of AI/ML systems is expected to impact the desired outcomes. Key ethical considerations will include fair treatment of policyholders and the impact on vulnerable policyholders. Where appropriate, the Authority may likely expand and provide further guidance regarding expectations for management oversight of the effects of AI/ML usage on the insurer's sales practices, claims handling, client disclosure and communication, as well as complaints and errors handling.

Where applicable, companies that use advanced AI/ML systems will be required to demonstrate compliance with all other applicable international laws and regulations, standards and best practices relating to the technologies used, which may fall outside the BMA's insurance regulatory scope.

Further, the BMA will continue to cooperate actively, contribute to the discussions and engage with standard-setting bodies and regulatory agencies and other relevant bodies, such as the International Association of Insurance Supervisors, International Organization of Securities Commissions, Global Financial Innovation Network, National Association of Insurance Commissioners and European Insurance and Occupational Pensions Authority, among others, regarding the regulation of AI/ML systems. In addition, the BMA will continue to observe further regulatory developments from these relevant standard-setting bodies that will likely impact commercial insurers and insurance groups operating internationally.

As various jurisdictions will likely implement different approaches to address AI/ML risks, the BMA will aim to facilitate a risk-based approach for insurance groups and large commercials that operate internationally, to harmonise varying regulations that they are subject to and will engage with the relevant regulatory counterparts through the supervisory colleges to address supervisory gaps, contagion risks and avoid duplication of efforts.

Ultimately, policyholder protection, financial stability and protecting Bermuda's reputation remain the top priorities for the BMA as it performs its mandate. Simultaneously, the BMA balances its prudent approach to supervision and regulation with pragmatism, fostering an insurance ecosystem that enables innovation. Accordingly, the Authority will continue to apply a consultative approach to the industry before implementing any new standards relating to this area.

In conclusion, the BMA invites industry to engage with the Authority's Innovation Working Group or their supervisory contacts to share further insights or concerns regarding AI/ML systems. The BMA welcomes comments, suggestions and in-depth discussion on this area, allowing the Authority to continue making informed decisions as it maintains and enhances its regulatory framework and supervisory approach. Please send your feedback to iwg@bma.bm.



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