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### Artificial intelligence across the insurance value chain

Business across sectors are embracing artificial intelligence (AI) as an important tool. In insurance, AI is reshaping business processes, from underwriting to claims management and customer engagement. Benefits include its potential to help reduce protection gaps by improving the availability, affordability and accessibility of insurance<sup>1</sup> on the back of increased personalisation and improved cost-efficiency.<sup>2</sup>

**FIGURE 1: AI USE CASES ACROSS THE INSURANCE VALUE CHAIN**

	 Marketing	 Product development	 Sales & distribution	 Underwriting	 Customer service & policy administration	 Claims management
Use cases	<ul style="list-style-type: none"> <li>Predictive analytics</li> <li>Automated demand analysis</li> </ul>	<ul style="list-style-type: none"> <li>Analysis of customer preferences</li> <li>Product innovation</li> </ul>	<ul style="list-style-type: none"> <li>Tailored product advice</li> <li>Sales process automation</li> </ul>	<ul style="list-style-type: none"> <li>Image analysis</li> <li>Natural language processing (NLP)</li> </ul>	<ul style="list-style-type: none"> <li>Predictive analysis</li> <li>Voice recognition</li> <li>NLP</li> <li>Risk prevention and mitigation</li> </ul>	<ul style="list-style-type: none"> <li>Prediction of claim patterns</li> <li>Image recognition</li> <li>Anomaly/fraud detection</li> </ul>
Benefits	<ul style="list-style-type: none"> <li>New marketing channels</li> <li>Tailored outreach</li> </ul>	<ul style="list-style-type: none"> <li>Accurate pricing</li> <li>Tailored products</li> <li>Rapid product adjustment</li> </ul>	<ul style="list-style-type: none"> <li>Reducing sales costs, thus enhancing affordability</li> </ul>	<ul style="list-style-type: none"> <li>Improved quality/speed of risk analysis, including complex risks</li> </ul>	<ul style="list-style-type: none"> <li>Personalised service</li> <li>Improved customer engagement</li> <li>Increased resilience of insureds</li> </ul>	<ul style="list-style-type: none"> <li>Accurate claims assessments</li> <li>Fraud reduction</li> <li>Faster responses</li> </ul>

Source: The Geneva Association, adapted from Eling et al. and Accenture

AI can be applied across the insurance value chain. Specific use cases include speech recognition, pattern and image recognition and data-driven decision making. Depending on the area it is used, it provides customers with an enhanced and more tailored experience, innovative products, such as use-based insurance, and fast and efficient claims processing. It allows insurers to enhance their value proposition,<sup>3</sup> by being able to predict and prevent risks,<sup>4</sup> and thus helps societies become more resilient, improve fraud detection, and have a more granular view on risks.<sup>5</sup>

1 The Geneva Association 2020.  
2 Eling et al. 2022; Accenture 2018.  
3 Kelley et al. 2018.  
4 The Geneva Association 2020. Author: Benno Keller.  
5 McKinsey 2021.


## AI and insurance: What is new?

While AI helps insurers getting better at their core business, AI as such is not changing the core business of insurance. Underwriting is a core process and involves assessing and pricing risks, a process that is based on data,<sup>6</sup> such as those related to past experiences. AI strengthens this process, by allowing rapid data processing and analysis capabilities, finding correlations, tapping new sources of data, and allow underwriters to make more accurate risk assessments.<sup>7</sup> Interviews with experts from the insurance firms have shown that insurers not blindly rely on AI outcomes, but that AI augments human decision making.

## Risks and concerns related to AI

Recently, the rise of generative AI tools like ChatGPT has brought the risks and challenges of AI into the spotlight. Within the insurance industry, key concerns include a lack of transparency and explainability, discrimination, bias, unfairness, unaffordability, exclusion, and data-related issues.<sup>8</sup> These issues are not necessarily new to insurance, but emerge through a different channel as a result of the use of AI. Insurers are adopting various measures to address these AI-specific risks, such as methodologies for detecting and preventing unwanted correlations in AI models, following AI governance principles such as those issued by EIOPA,<sup>9</sup> self-imposed limitations on the number of rating factors used in underwriting, and governance structures tailored to manage AI-related risks. Importantly, the reversible nature of AI decisions in insurance means that the associated risks differ significantly from those in other domains.

**FIGURE 2: ADDRESSING AI RISKS AND CONCERNS**

	 Lack of transparency & explainability	 Discrimination, bias & lack of fairness	 Unaffordability and exclusion	 Data
Risks	<ul style="list-style-type: none"> <li>AI algorithms are considered black boxes due to their complexity</li> <li>Difficulty in explaining causation and the role of each variable used and, therefore, in checking whether algorithms are fair and unbiased</li> </ul>	<ul style="list-style-type: none"> <li>Bias, errors, or inaccuracies in AI outcomes can lead to unwanted correlations and indirect discrimination</li> <li>Difficulty in manually assessing numerous rating factors and their combinations in AI-driven insurance</li> <li>Tension between correlations found and actuarial fairness/acceptability</li> </ul>	<ul style="list-style-type: none"> <li>AI-enabled granularity of risk assessments leads to a shift away from solidarity-based risk pools towards individualised pricing</li> <li>Some customers may benefit, while others face higher premiums</li> <li>In the extreme, certain customers may become uninsurable</li> </ul>	<ul style="list-style-type: none"> <li>Risk of data quality and accuracy: different data types (provided, observed, derived, inferred, and synthetic) have varying levels of reliability and accuracy which all affect AI outcomes in their own way</li> <li>While provided and observed data enhance AI models' explainability and accuracy, they may compromise privacy protection</li> </ul>
Insurer approaches	<ul style="list-style-type: none"> <li>Define use-case-specific transparency requirements, including on data sources feeding into AI models</li> <li>Implement audit trails for AI models</li> </ul>	<ul style="list-style-type: none"> <li>Develop methodologies to detect and prevent unwanted correlations in AI models</li> <li>Limit the number of rating factors used by AI models</li> <li>Develop AI training programs for employees</li> </ul>	<ul style="list-style-type: none"> <li>Establish guidelines and policies around high-impact AI systems (such as those making underwriting/pricing decisions)</li> <li>Build specific governance structures to address AI risks and dilemmas</li> </ul>	<ul style="list-style-type: none"> <li>Data-cleaning and imitation, insurers rigorously check and clean data and limit data points</li> <li>Mitigate bias by employing robust governance frameworks and oversight</li> <li>Focus on data security</li> </ul>

Source: The Geneva Association

6 Cummins and Doherty 2006.  
 7 Guelman 2015.  
 8 IMD 2022.  
 9 EIOPA 2021.




























## Regulation of AI

Public concerns about the risks and downsides of AI have put pressure on policymakers and regulators worldwide to take action. This has led to a variety of regulatory initiatives, some specific to insurance and others that are cross-sectoral, particularly in the European Union. The latter could stifle innovation in insurance, as it does not consider the unique characteristics of the insurance business model and existing regulatory frameworks. In contrast, some jurisdictions have adopted a principles-based approach, issuing guidelines on how existing, technology-neutral regulations can be applied to manage AI-specific risks in insurance. Crafting specific and prescriptive AI regulations is like trying to hit a moving target, given the rapid pace of AI developments. This poses the risk of regulations becoming quickly outdated, while limiting innovation. The key challenge for policymakers is to strike a balance between minimising AI risks to protect consumers

and citizens, while also allowing enough room for innovation to benefit society at large.

AI in insurance is already subject to rules such as data protection and insurance distribution regulation. In particular, risks and concerns around the use of AI in insurance such as bias and discrimination are well captured by existing sectoral and cross-sectoral regulation. Regulatory frameworks in key insurance markets such as the EU, U.K., U.S., and China include laws and regulation addressing anti-discrimination, gender equality protection, and consumer protection provisions. They also emphasise transparency in data usage and processing, as well as the necessity for human oversight in automated decision-making. These existing, technology-neutral regulations are often not fully understood by policymakers who are tasked with developing AI regulation in today's context, yet they offer a robust foundation for managing AI-related risks in the insurance sector.

**FIGURE 3: HOW AI-RELATED RISKS ARE CAPTURED BY EXISTING REGULATORY AND LEGAL FRAMEWORKS IN THE EU, CHINA, U.K. AND U.S.**

Aspect	Regulation/article	Description	
Bias, discrimination & fairness	 Racial Equality Directive  Equality Act  Several state-level statutes	Prohibits discrimination based on ethnic origin	
	 Gender Directive  Equality Act  Several state-level statutes	Prohibits gender discrimination	
	 GDPR Art. 5  U.K. GDPR Art. 13–21  California Consumer Privacy Act (CCPA)	Ensures the lawful, fair, and transparent use and processing of personal data	
	  IDD Art. 20  NAIC Unfair Trade Practices Act  Measures for the Regulation of the Internet Art. 17	Requires insurance products to meet consumer demands and needs	
	Transparency and data governance	 IDD Art. 20	Requires insurers to provide customers with objective product information
		  GDPR Art. 5, 13, 14  Personal Information Protection Law Art. 5	Mandates openness and transparency in data usage and processing
  GDPR Art. 5  Gramm-Leach Bliley Act, Fair Credit Reporting Act, CCPA		Outlines principles related to data processing, including data adequacy, relevance and accuracy	
 GDPR Art. 30  U.K. GDPR Art. 35		Requires maintaining records of processing activities	
Human oversight		  GDPR Art. 22  Personal Information Protection Law Art. 24	Provides the right to object to automated decision-making
	 S-II Directive Art. 41  Insurance Law Art. 5	Requires an effective system of governance for sound and prudent management of the business	

Source: The Geneva Association

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## Conclusion and recommendations

Risks such as bias, discrimination and exclusion existed in insurance long before the emergence of AI. Novel risks associated with the use of AI in insurance are the speed at which effects of AI can propagate as well as the scope of the potential consequences of their misuse.

Even in the absence of AI-specific regulation, AI in insurance is not in a vacuum; for example, it is already subject to data-protection and insurance-distribution regulation. When developing their approach to AI in insurance, policy-makers and regulators should leverage and build on these regulations in order to strike the right balance between protecting consumers and enabling innovation.

Considering this, we present the following recommendations for policymakers and regulators:

- 1. Carefully define AI:** There is an ongoing debate surrounding the definition of AI for regulatory purposes. A workable definition should limit AI to self-learning applications, focusing on machine learning to avoid over-regulation of established practices in insurance.
- 2. Apply existing regulations:** When addressing AI-related risks, it is crucial for regulators to leverage existing, technology-neutral frameworks and update guidance on applying these regulations in an AI context.
- 3. Develop principles-based regulation:** The rapidly evolving nature of AI makes regulating it a complex and shifting task. Principles-based regulatory approaches that build on current regulations provide the most promising approach to managing AI risks without stifling innovation and competition.
- 4. Consider the specific characteristics of AI in insurance:** Due to the reversibility of decisions in insurance and the proven effectiveness of existing regulatory frameworks, cross-sectoral regulation will be far less effective compared to less regulated sectors, such as technology, or in areas where AI decisions are irreversible with severe potential consequences.
- 5. Focus on customer outcomes:** While data governance frameworks can play an important role in ensuring actuarial fairness and preventing discrimination, it is important not to overemphasise the regulation of individual rating factors used to assess risks and determine premiums. A balanced approach to data governance with a focus on customer outcomes will help promote innovation in a fair and non-discriminatory manner.
- 6. Collaborate internationally:** Jurisdictions should cooperate to develop use-case-specific guidance for AI in insurance. Harmonised regulations and guidance across jurisdictions would enable insurers to more effectively navigate the challenges and opportunities presented by AI.

Insurers also have a major role to play in building trust around the responsible use of AI. They should take the concerns that exist around the use of AI seriously; for example, by embracing transparency and by clearly communicating the way AI is used in consumer-facing areas of their business such as underwriting and claims handling. In addition, it is important for insurers to monitor the outcomes of AI models. While it is currently challenging to test outcomes for bias, insurers could work with stakeholders such as regulators, supervisors and consumer organisations to develop testing methods and address broader concerns related to the use of AI in insurance.

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