AAE | ACTUARIAL ASSOCIATION OF EUROPE

Navigating Europe's AI Act: Insights for Actuaries and the Insurance Sector

Understanding the World's First Comprehensive AI Regulatory Framework

Bogdan Tautan

24-06-2025

Agenda

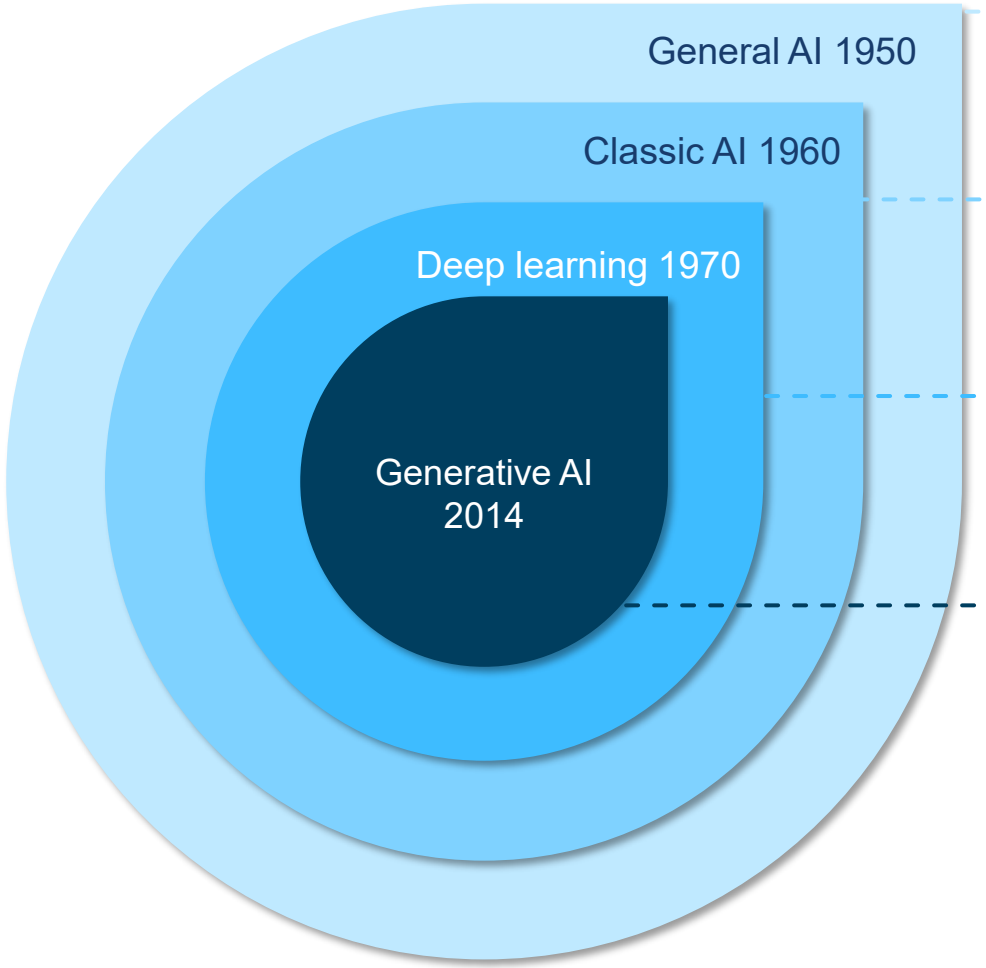
1. Why the AI Act matters
2. International context
3. Key features
4. Interconnection with other regulations
5. Ongoing governance and compliance

AAE | ACTUARIAL ASSOCIATION OF EUROPE

1. Why the AI Act matters

ADVISING • ACHIEVING • ENGAGING

Evolution of AI



- Human mimicking actions and intelligence

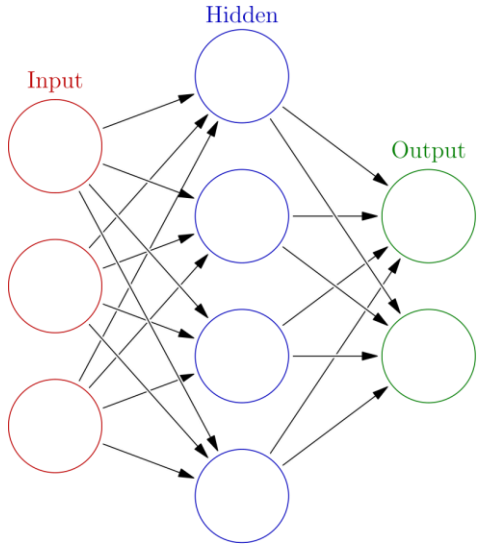
- Machine Learning techniques, later on seen as supervised, unsupervised, etc.
- Used in risk assessment, predictive analytics

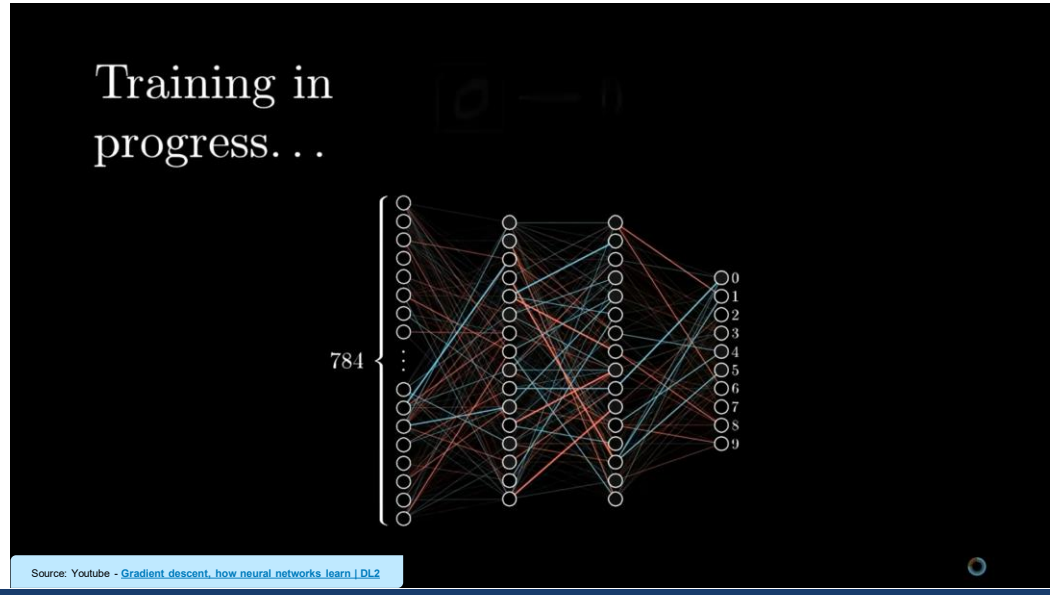
- Complex neural networks using semi-supervised and reinforced learning
- Natural language processing tasks, chatbots etc.

- Transformer based deep neural networks, seen as Large Language models
- Video, Image, Text and Speech recognition

Concepts

- biological neural networks – animal brain
- each node receives a weight (signal strength) that contributes to the achieved output
- the weight adjusts during the learning process
- from **input layers** to **output layers**, neurons are aggregated, sometimes forming **hidden layers** (intermediate layers), that help in achieving the desired goal/output.
- **Deep neural network**: 2 or more hidden layers
- **Training**: risk reduction - minimize the difference between the predicted output and the actual target values.
  Backpropagation: gradient-based method to estimate the optimal set of parameters for a model





Core focus of the AI Act

Pioneering regulation

- Establishing a comprehensive governance framework
- No national transposition needed
- Uniformity and maximum harmonization across EU states

Responsible use of AI

- Through AI system categorization
- Risk-based structured framework
- Prioritizing fundamental human rights, ethics and precautionary risk management.

Synergy with regulations and directives

- Allows actuaries to align compliance efforts and responsible AI deployment
- Adapting to rapid technological advancements

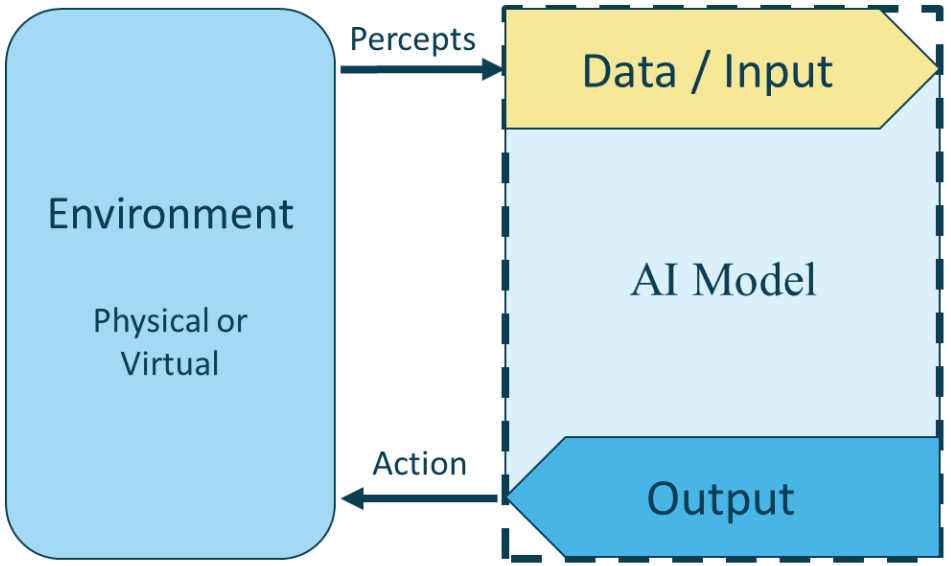
AAE | ACTUARIAL ASSOCIATION OF EUROPE

2. International context

Definition

"An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment."

OECD Definition of an AI System



The global perspective

United States

- Innovation, decentralized approach
- Definition from ‘National Artificial Intelligence Initiative Act of 2020’
- Not yet approved, relying on sector specific guidelines from various agencies such as NAIC

European Union

- Recital 12 of the acts: definition should align internationally
- Legislation
- Legal certainty
- Comprehensive glossary
- Human-centric approach

Definition AI Act:

”Machine-based system that is designed to **operate with varying levels of autonomy and that may exhibit adaptiveness after deployment**, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments”

China

- Complex definition, tailored to (security) specific applications
- Administrative provisions and measures on algorithm recommendation, deep synthesis and management of Gen AI services
- Providing broad definitions on algorithm, data security and deep synthesis

AAE | ACTUARIAL ASSOCIATION OF EUROPE

3. Key features

Initiation phase

The **HLEG** presented an Assessement List for Thrustwothy Artificial Intelligence (**ALTAI**) and developed a first set of guidelines:

Accountability	Ensuring responsibility for development, deployment and use of AI systems
Fairness, non-discrimination, diversity	Transparent, socially responsible applications of algorithms
Transparency	XAI, or explainability of AI algorithms, what the algorithms do
Human oversight	Documenting the roles of those responsible of AI algorithms
Data governance and record keeping	Comply with data protection laws such as GDRP
Robustness and safety	Minimize potential to cause harm and have sound IT infrastructures
Societal and Environmental well-being	Assessing positive and negative impacts of AI to the environment and society

Overview

Final agreement on 13th of March 2024 agreement

- **Safeguards human oversight**
- **An iterative risk-management process**
- **Risk classification of AI systems**

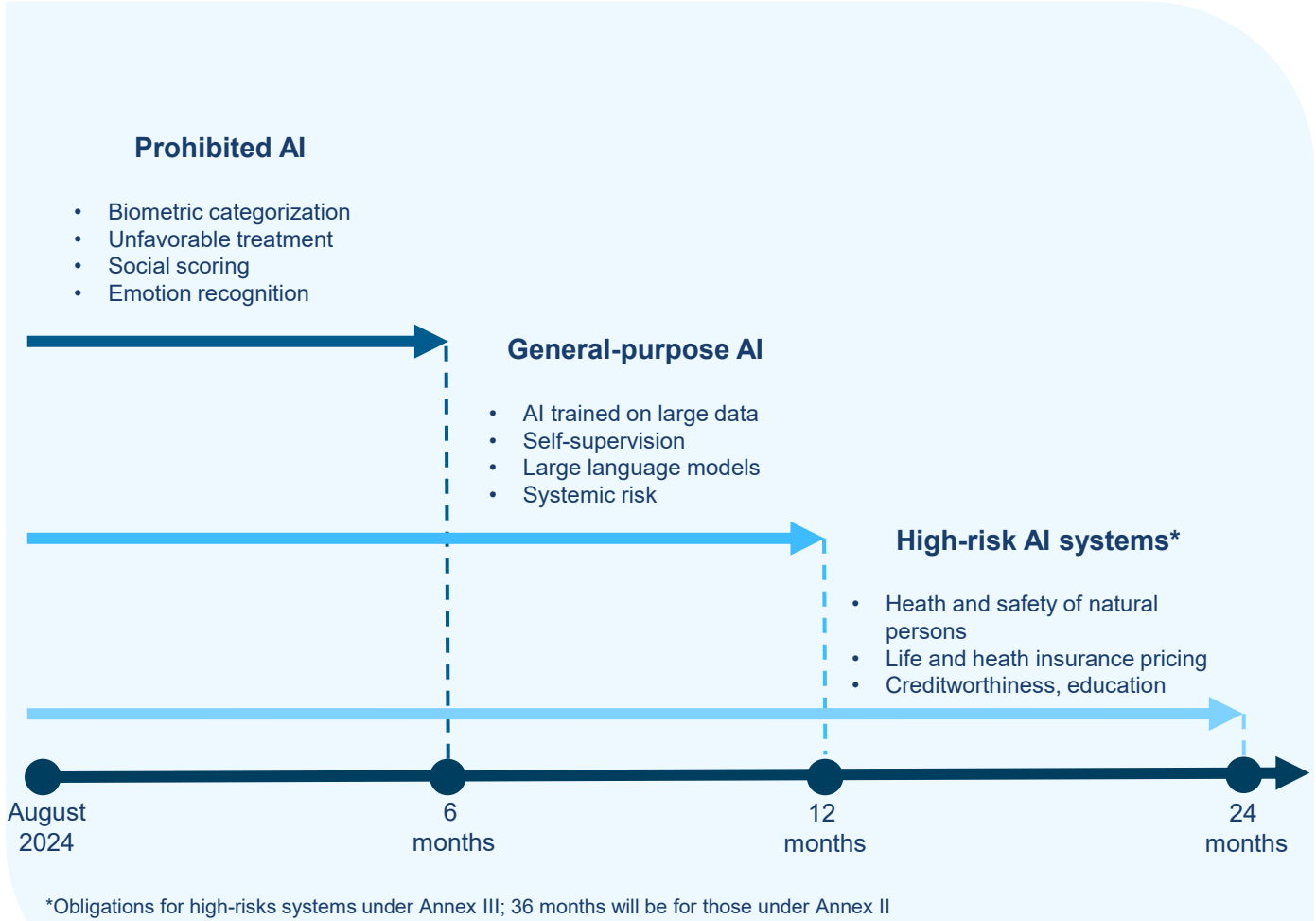
European AI Office – the center of AI expertise across the Union:

- **AI Board**
- **Scientific Panel**
- **Advisory Forum**

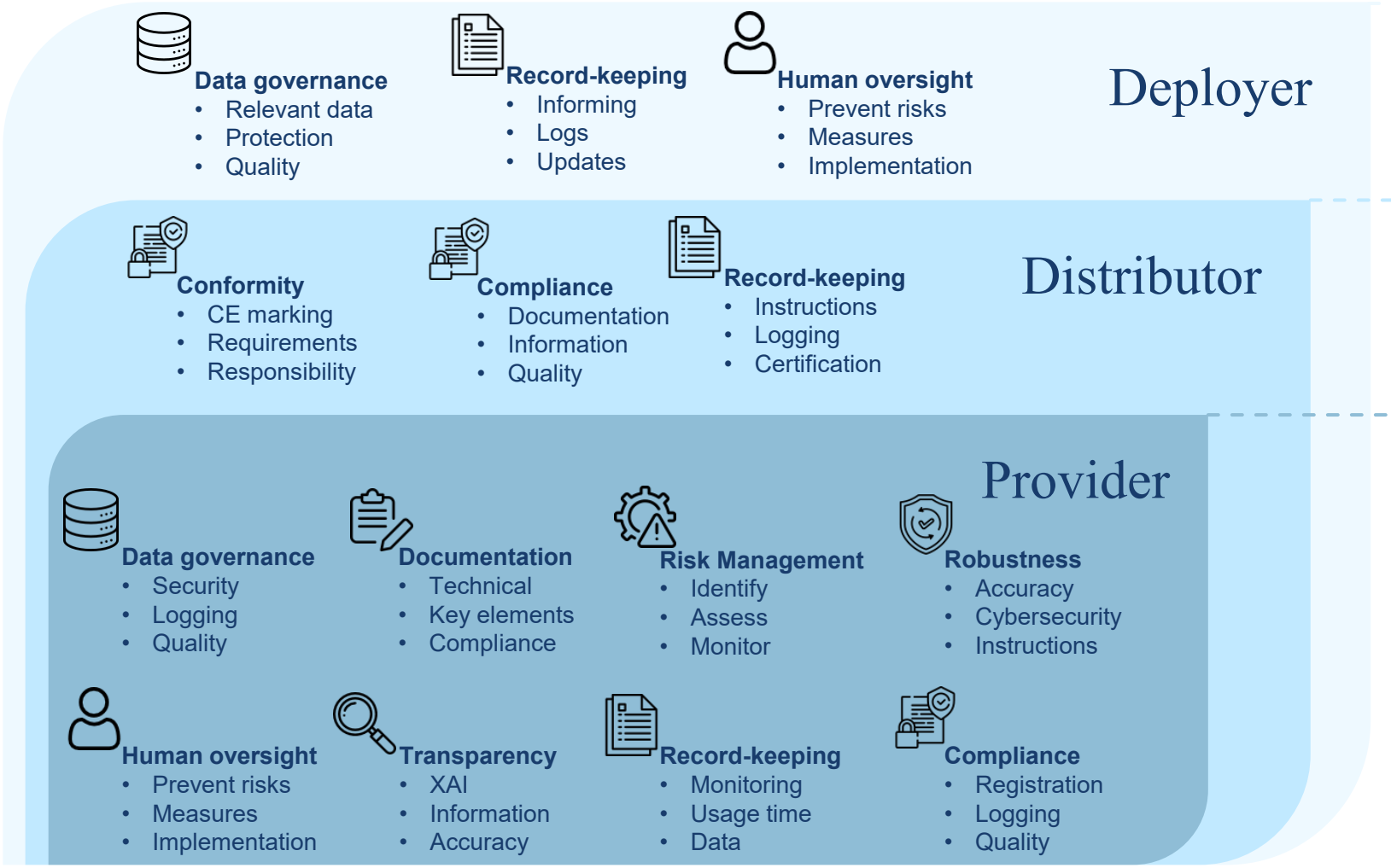
Penalties up to:

- **Non-compliance:** 7% of annual turnover or 35 mln. EUR
- **Violations:** 3% of annual turnover or 15 mln. EUR
- **Misleading information:** 1% of annual turnover or 7,5 mln. EUR

Operators: Provider, Distributor, Importer, Deployer



Operators



User of the AI system, ensuring right use of data, safeguarding human oversight and monitoring of the system

Makes the AI system available to the market, ensuring the standards, compliance and storage.

Develops the system and ensures the appropriate operation of an AI system, including the conformity and qualitative assessment, technical documentation and registration within the EU Database (high-risk).

AAE | ACTUARIAL ASSOCIATION OF EUROPE

4. Interconnection with other regulations

Common principles and alignment

Solvency II

- Actuaries can leverage expertise in risk management, documentation, monitoring, stress testing and compliance
- Article 9 (RM systems), 17 (Quality Management System), 18 (Documentation), 19 (Logs), 26 (Deployer Obligations)
- Derogations for undertakings in areas like risk management systems and post-market monitoring

GDPR

- Protect individuals' fundamental rights, especially personal data
- Processing of personal data is relevant for AI systems
- GDPR principles (lawful, fair, transparent, accountability) are reflected in AI Act transparency and accountability requirements for high-risk systems processing personal data

DORA

- Strengthens IT security of financial entities
- Mandates robust ICT risk management framework, third-party risk management, operational resilience testing, incident reporting
- Indirectly applies to AI-powered systems in finance. Overlaps with AI Act in data protection, accountability, ICT resilience

- Safeguarding personal data
- Challenge: Overlapping compliance requirements and reporting obligations

Classifying AI systems

EC's guidelines[1] on the definition of AI systems – determining if a system falls or not under the act

- **Classical heuristics** – which are problem-solving techniques that rely on experience-based methods to find approximate solutions
- **Mathematical optimisation** – used to accelerate and approximate traditional, well established optimisation methods, such as *linear or logistic regression methods*
- **Prediction systems** – basic statistical learning rule, *may* fall out of scope even if they use machine learning methods. Examples include light financial forecasting, benchmarking, regression etc.
- **Data processing systems** – predefined, explicit instructions or operations, executing tasks based on manual inputs or rules, without learning or reasoning

[1] Link Guidance

Classifying AI systems

Some remarks

- Categorizing systems remains challenging
- Actuaries and their organizations might want to look closely at the *definition of a model*
- Is it out of the scope of the Act?
- Which category does it fall into?
  - **Not high-risk**: detecting fraud, undertaking's capital requirements etc.
  - **High-risk:** risk assessment and pricing in relation to natural persons in the case of life and health insurance.
  - In need for a **fundamental rights impact assessment**.

(63) Only certain AI systems are subject to regulatory obligations and oversight under the AI Act. The AI Act's risk-based approach means that only those systems giving rise to the most significant risks to fundamental rights and freedoms will be subject to its prohibitions laid down in Article 5 AI Act, its regulatory regime for high-risk AI systems covered by Article 6 AI Act and its transparency requirements for a limited number of pre-defined AI systems laid down in Article 50 AI Act. The vast majority of systems, even if they qualify as AI systems within the meaning of Article 3(1) AI Act, will not be subject to any regulatory requirements under the AI Act.

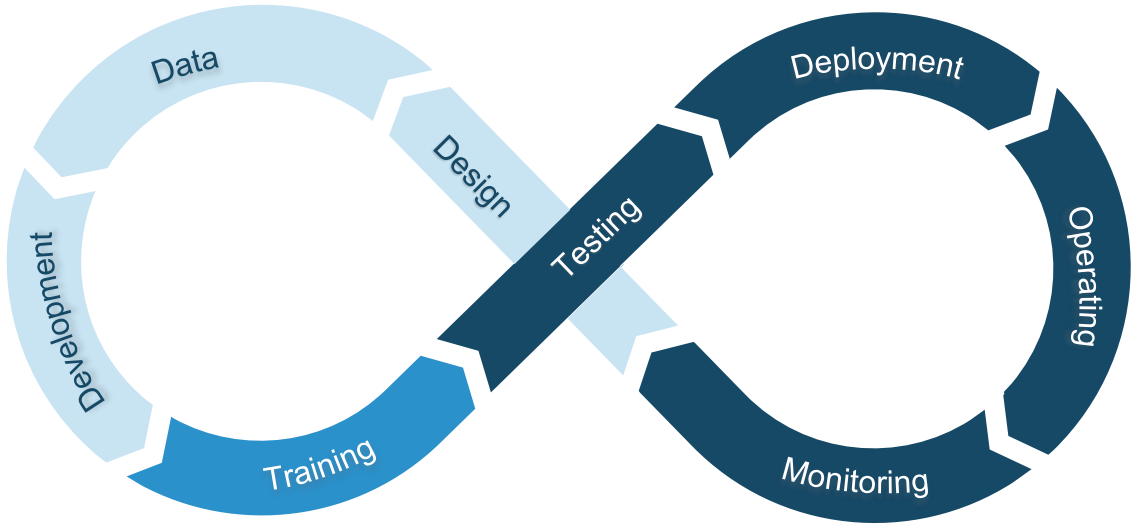
AAE | ACTUARIAL ASSOCIATION OF EUROPE

5. Ongoing governance and compliance

Continuous monitoring and risk management

- Management
- Quality
- Completeness
- Accuracy
- Security
- Synthetic assumptions

- Scalability
- Reporting
- Robustness and Security
- XAI and Transparency
- Business alignment



- Assumptions
- Parameters
- Bias and drift
- Model scorecards
- Fitting
- Test vs Training

- Not a one-time obligation
- Risk and documentation management
- Interaction with regulators
- Corrective measures and incident handling: swift action on non-compliance, reporting serious incidents
- Research, testing, development prior to production are excluded from the Act

Benefits and opportunities for actuaries:

- Can contribute to society and public trust
- Align actuarial standards and governance frameworks
- Adopt AI transparency and explainability
- Collaborate cross disciplinary and address skill gap
- Risk modelling innovation and leadership in ethical AI

AAE | ACTUARIAL ASSOCIATION OF EUROPE

How to approach the EU AI Act – An industry perspective

Jonas Hirz

24-06-2025

ADVISING • ACHIEVING • ENGAGING

An industry perspective | How insurers are approaching the EU AI Act

Illustrative

	1 EU AI Act inventory	2 Governance	3 Tooling
	Foundation for successful approach towards EU AI Act	**Enrichment of existing governance set-up**	**Integration in existing risk tooling landscape**
Baseline	1a **Impact analysis** of EU AI Act and link to other regulations 1a **List of AI systems** as of EU AI Act	2a **Review** of current organisational setup with focus on structure, processes, roles/responsibilities	3a **Assessment** of current tool selection process
Design	1b **Requirements** for permissible use cases, categorisation, mitigation	2b **Design** of future AI governance structure	3b **Definition** of requirements, creation of shortlist
Align	1c **Alignment on group-wide standards** (and local BU top-ups)	2c **Alignment** with key stakeholders and implementation	3c **Tools selection** and roadmap development

Note: This is no legal advice
Source: BCG analysis

x Deep dive next slides

1a. Impact analysis | Start with understanding the relevance of EU AI Act articles for your company

Illustrative

List all EU AI Act Articles		Derive relevance			Derive relevant risk categories			Derive link to other regulations
Art.	Name	Rele-vance	Pro-vider	Depl-oyer	Prohibi ted	High-risk	Non-high-risk	Link to other regulations
9	Risk management system	Yes	X	-	-	X	-	E.g., Solvency II
17	Quality management system	Yes	X	-	-	X	-	E.g., Solvency II
18	Documentation-keeping	Yes	X	-	-	X	-	E.g., Solvency II
19	Automatically generated logs	Yes	X	-	-	X	-	E.g., Solvency II
26	Obligations of deployers of high-risk AI systems	Yes	-	X	-	X	-	E.g., Solvency II

Illustrative

Beyond the EU AI Act

- Check with requirements from further regulation
- If needed: Identify further relevant international AI regulation and derive minimal standards

Article 41 Solvency II: Insurance undertakings need to have in place an effective system of governance which provides for a sound and prudent management of the business

Article 25 IDD: Requires undertakings to maintain, operate and review a process for the approval of insurance products

Note: This is no legal advice
Source: BCG analysis

2b. Design of future AI governance structure | Six common themes that should be considered

Not exhaustive

1 Accountability (e.g., Article 17)

- Establish accountability for AI results
- Ensure compliance of all AI systems with relevant laws, regulation, ethics
- Modify governance to mitigate AI-related risks

2 Transparency (e.g., Article 13/50)

- Ensure all AI-driven communications are being labeled as AI-generated
- Inform users when interacting with AI
- Understand purpose of AI systems
- Maintain documentation

3 Fairness & equity (e.g., Article 10)

- Take measures to prevent data bias and ensure quality, accuracy
- Involve diverse group in design phase
- Detect and mitigate biases in AI algorithms and training data

4 Data protection (e.g., Article 10)

- Ensure compliance with GDPR, etc.
- Implement measures to safeguard user data processed by AI systems
- Integrate privacy considerations into system design and workflows

5 Human centricity (e.g., Article 14/26)

- Establish human oversight to allow for intervention and override mechanisms
- Train employees on the use of AI
- Implement feedback mechanisms to report inaccuracies, biases, etc.

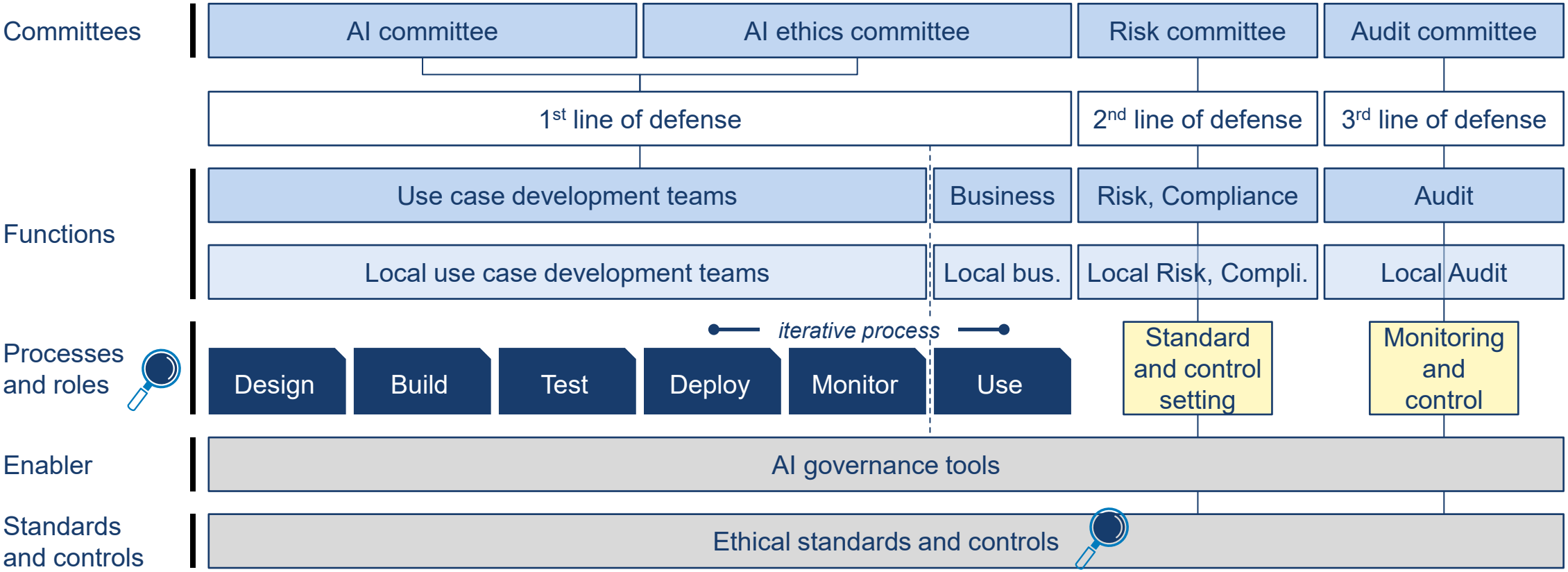
6 Reliability & security (e.g., Article 15)

- Implement risk mgmt. across lifecycle
- Enforce oversight for high-risk AI
- Test AI for reliability and safety
- Address security gaps
- Prepare response plans for AI failures

Note: This is no legal advice
Source: BCG analysis

2b. Design of future AI governance structure | Example for AI governance design building blocks

Illustrative



Deep dive next slides

Note: This is no legal advice
Source: BCG analysis

2b. Design of future AI governance structure | Risk mitigation measures needed along entire lifecycle

Illustrative

iterative process

Design	Build	Test	Deploy	Monitor	Use
Risk assessment	Data quality check (incl. AI Act provisions)	Technical testing	Approval process	Performance monitoring	User instruction and training
Fundamental rights impact assessment	GDPR assessment	User testing	Inclusion in list of AI systems	Logging & tracing	Feedback loop
	Technical documentation		Audit	Regular outcome validation	
			Registration in EU Database		

Potentially multiple roles engaged throughout the process
(e.g., business, actuaries, compliance, data scientists, data experts, software engineers)

Note: This is no legal advice
Source: BCG analysis

AAE ACTUARIAL ASSOCIATION OF EUROPE

2b. Design of future AI governance structure | Key risk indicators (example for fairness & equity)

Illustrative

	Risk Description	Key Risk Indicator
Bias	AI could produce biased responses in a convincing manner	**User feedback** # of feedback received on 'biased statement' outputs **Calculated similarity between prompt / answer over time** Similarity scores of prompts and AI responses over time **Word count** (e.g., gender-related, biased terms etc.) # of bias-related words detected
Unfairness	AI could put certain groups and individuals at disadvantage and/ or serve stereotypes	**Group representation analysis** # of diverse cultural perspectives & languages represented used in training dataset **Cultural sensitivity** # of instances of cultural insensitivity or bias in outputs **User feedback** # of complaints received regarding unfairness
Unsafe language	AI reflects the content it was trained on - including all its biases and errors. Thus, it could generate content that is not appropriate for certain groups (e.g., children) or is offensive.	**Keyword detection for unwanted words** # of 'unsafe language' keywords detected **Sentiment analysis** # of negative, harmful, or inappropriate sentiments detected **Contextual analysis** # of unsafe language incidents detected within an understood context **User feedback** # of feedback received on 'offensive language' outputs

Note: This is no legal advice
Source: BCG analysis

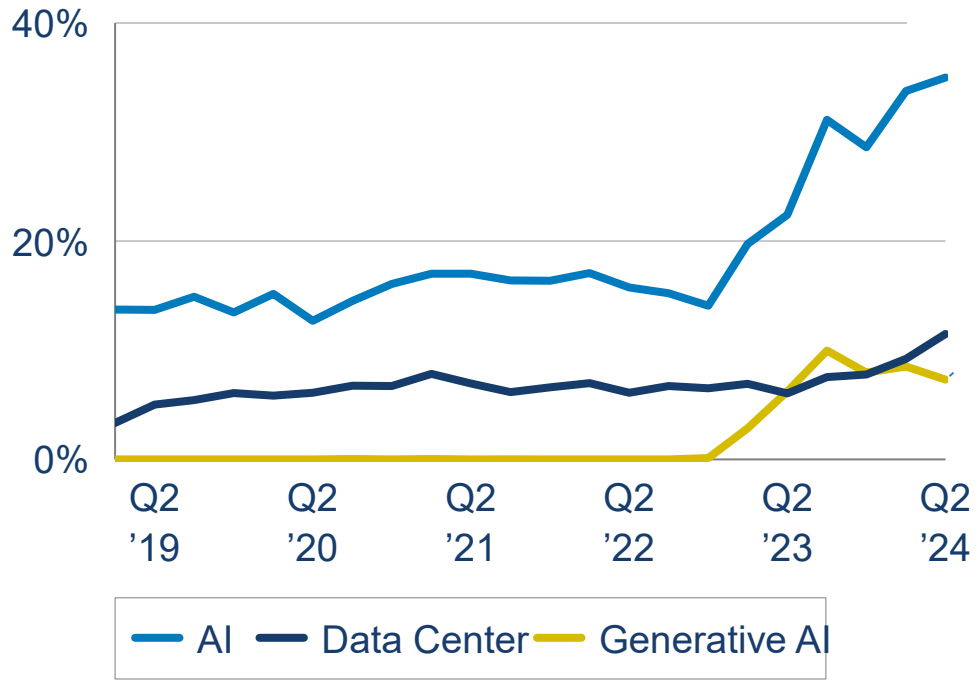
AAE | ACTUARIAL ASSOCIATION OF EUROPE

Why the EU AI Act is an opportunity for actuaries

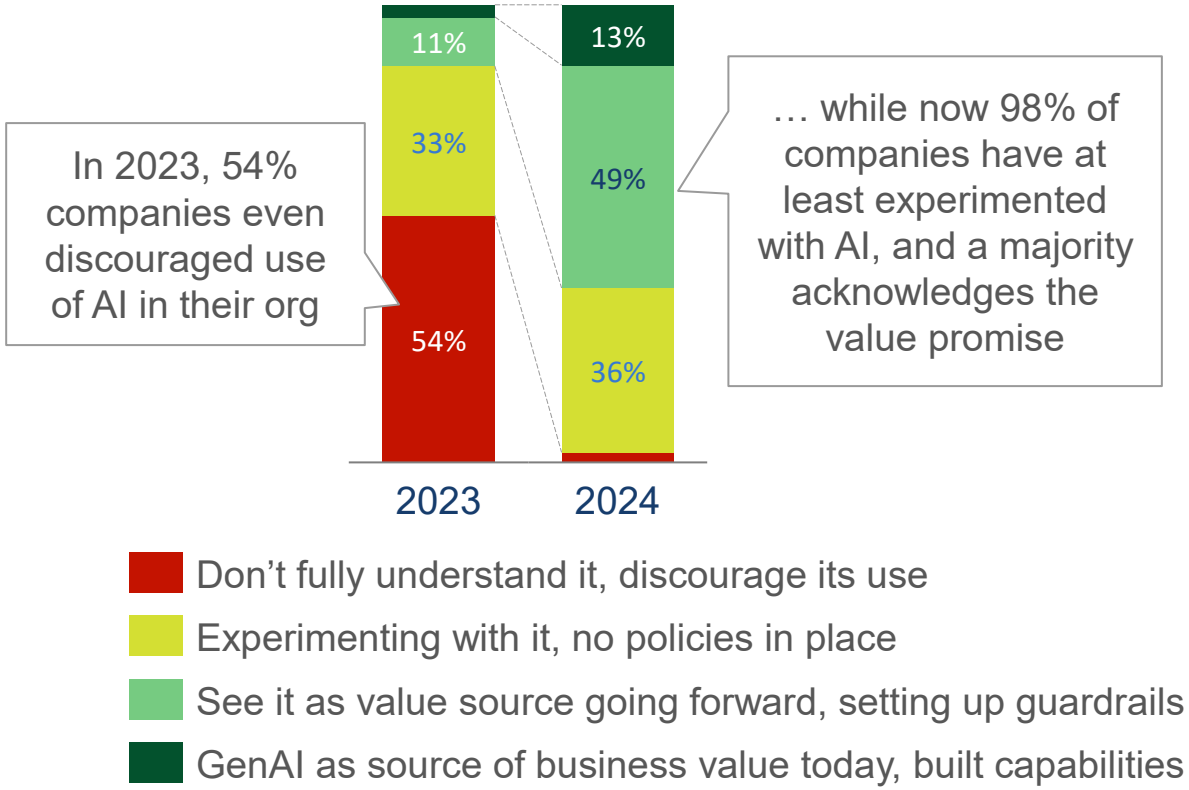
ADVISING • ACHIEVING • ENGAGING

Not just a perception: AI has gained importance in the insurance industry

Companies mentioning "AI" in earnings calls surged to 35% in 2024 from 14% in 2023



Over the year, companies have shifted from AI skepticism to experimentation



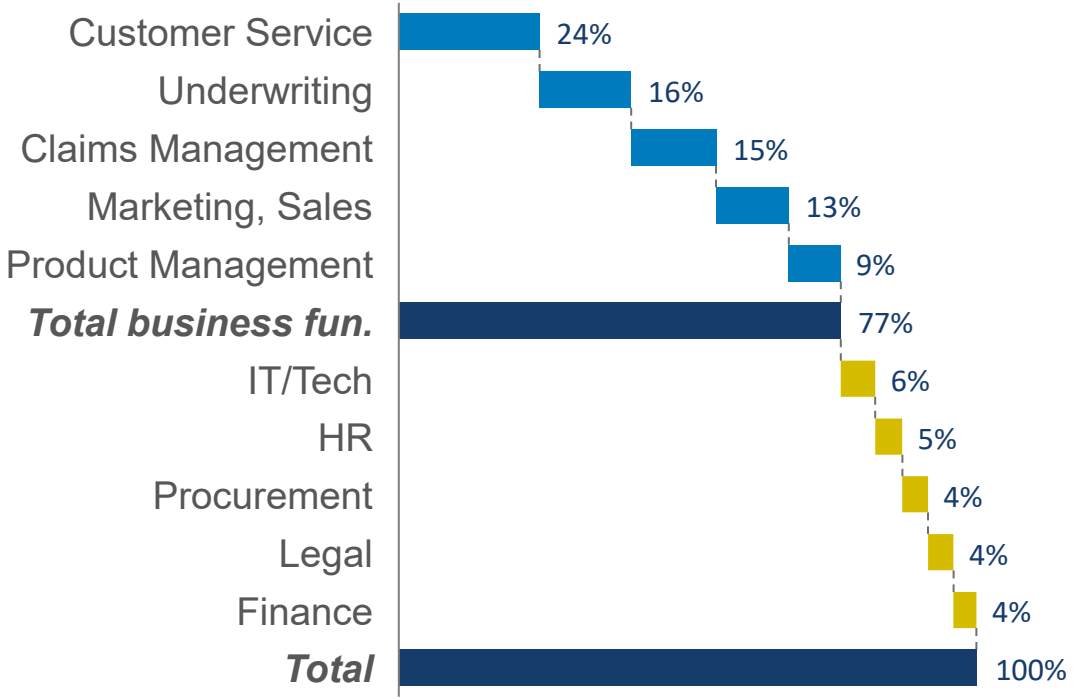
Source: BCG Build for the Future 2024 Global Study; n=1000
Question: Which of the following statements best describes the focus and degree of AI adoption in your company? - Degree of AI adoption

However, companies broadly struggle with generating value from AI

Similarly, ~26% of insurance companies have been able to extract AI value

		Avg cost savings	Avg revenue increase
26%	have created value from AI[1]	5%	5%
30%	have generated limited value from AI[3]	2%	1%
45%	have created no value from AI[2]	0%	0%

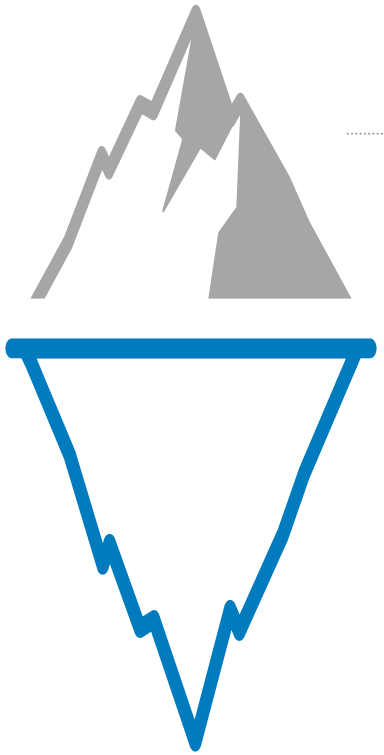
Insurance companies are generating 77% of AI value in core functions



Source: BCG Build for the Future 2024 Global Study; n=47 for insurance companies
1. 5%+ cost reduction or 5%+ revenue increase 2. No impact on revenue or cost from AI 3. Small impact of below 5% on cost or revenue
Question: (A): What % cost reduction do you expect from AI in operational expenses?; (B): What % revenue growth do you expect from AI?

Actuaries well-positioned to tackle biggest challenges for insurers, including AI literacy and establishing ROI

Focus areas



- 10% — AI Models
- 20% — Technology
- 70% — People, organization, processes

Key Challenges (% of respondents; selection)

- ☆ Lack of accuracy/reliability of models — 51%
- Lack of access to high quality data — 43%
- Difficulty integrating with IT systems — 55%
- Difficulty ensuring security/compliance — 49%
- ☆ Insufficient AI literacy — 64%
- ☆ Difficulty prioritizing opportunities — 62%
- ☆ Difficulty establishing RoI — 62%
- Difficulty reimagining processes — 55%
- ☆ Insufficient availability of talent — 53%
- …

☆ Challenges where we see fit for actuaries

Source: BCG Build for the Future 2024 Global Study; n=47
Question: As your company adopts and creates value from Generative AI, rank at least 3 challenges you are currently facing

Conclusion

AI is a **growing priority**, with usage set to increase across the full insurance value chain.

Applied professionally and responsibly, AI can unlock value, improve customer experience, drive innovation, and much more. The **EU AI Act accelerates** this professionalisation.

Companies (can) **leverage existing risk management frameworks** and build on robust actuarial workflows, making compliance easier and more effective.

The AI Act gives **actuaries a unique chance** to shape the future of AI, helping ensure its professional, safe, and ethical use across industries.

Note: This is no legal advice
Source: BCG analysis