Asian Actuarial Conference 2025 Bangkok

Reimagine Health and Risk: from Food as Medicine to Food as Underwriting

12 Nov | 16.00-16.40

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Reimagine Health and Risk:
From Food-as-Medicine to Food-as-Underwriting

Si Xie, FSA, FCIA

12 November, 2025

Asian Actuarial Conference

reimagine{risk}

The Asian Paradox: Growth and Crisis

An Unprecedented Opportunity, A Looming Threat

Opportunities

$83 Trillion – mortality protection gap

$1.8 Trillion – health protection gap

Looming Crisis

Metabolic health epidemic

	Deaths	YLLs	YLDs
Dietary risk	4th	5th	7th
High systolic blood pressure	1st	3rd	9th
High fasting plasma glucose	5th	6th	2nd
High BMI	6th	7th	3rd
High LDL cholesterol	7th	8th	15th

Blind Spot

Insulin resistance

- Precursor to diabetes and other chronic conditions
- ~30-40% of the urban adult

The Protection Gap is Data Gap

Why Our Existing Tools Are Failing Us

Traditional Underwriting

Static, Lagging Snapshot

- Blood/Urine Test at **Point-of-Sale**
- **Lagging Indicators:** HbA1c, Fasting Glucose, medical history, etc.
- **The Gap:**
  - Reactive, not predictive
  - >95% clients choose smaller policy to avoid blood test

Wellness Program

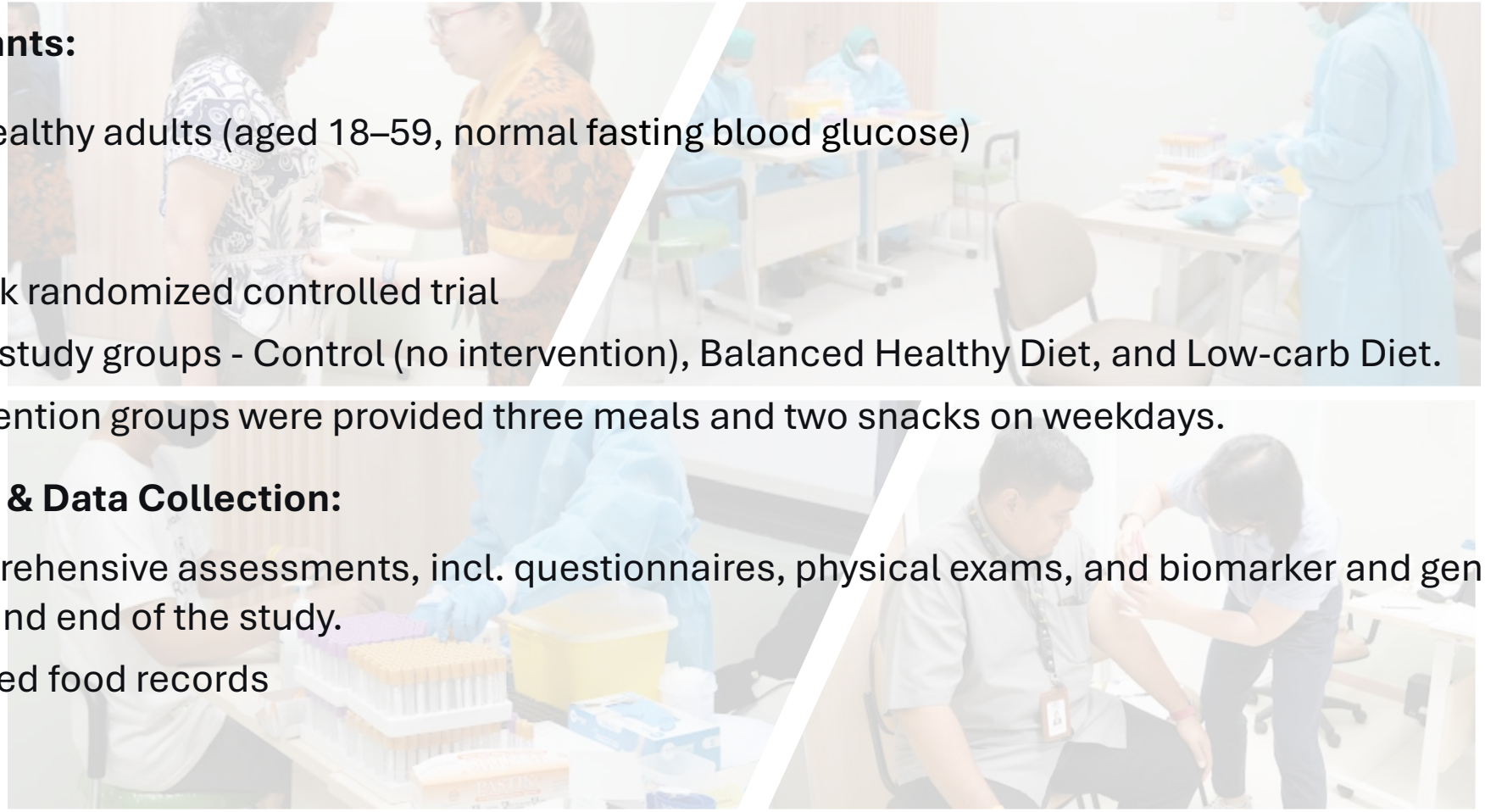
Engagement Over Insight

- Wearable devices, APP trackers after sales
- Physical activity, gamification, persistency
- Use step counts for premium discount
- **The Gap**:
  - Ignores diet (#1 IR driver)
  - Easy to game, unreliable data

	Deaths	YLLs	YLDs
• Low physical activity	16th	17th	19th

Proprietary Research:

How dietary patterns affect insulin levels, insulin resistance, and key diabetes biomarkers



Participants:

- 181 healthy adults (aged 18–59, normal fasting blood glucose)

Design:

- 4-week randomized controlled trial
- Three study groups - Control (no intervention), Balanced Healthy Diet, and Low-carb Diet.
- Intervention groups were provided three meals and two snacks on weekdays.

Protocol & Data Collection:

- Comprehensive assessments, incl. questionnaires, physical exams, and biomarker and genetic testing - start and end of the study.
- Detailed food records

Research Insight:
Dietary Intervention Directly Improves Insulin Resistance

1 Baseline Findings

- Insulin levels and HOMA-IR were positively correlated with BMI and waist circumference
- **21%** participants showed insulin resistance (HOMA-IR ≥ 2.5mU/L)

2 Post-Intervention Findings

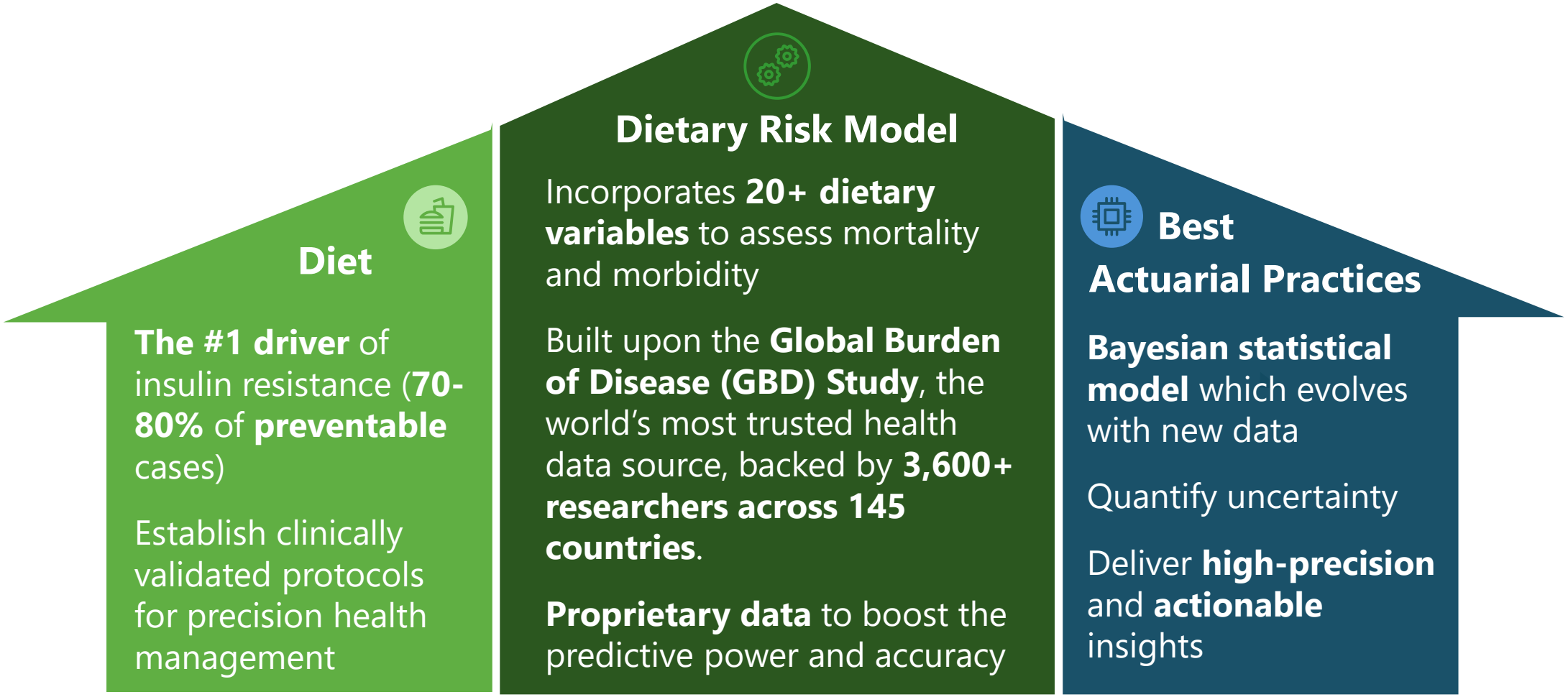
- The Balanced Diet group showed significant reduction in insulin resistance (ΔHOMA-IR = -0.40 vs. 0.00 in Control; p = 0.028) and a **61.5%** decrease in high-risk individuals (HOMA-IR ≥ 2.5)
- Both intervention groups showed significant reductions in BMI and Waist Circumference compared to the Control group (p < 0.001)

3 Conclusion

- Targeted dietary interventions can reduce life and health insurance risk in just 30 days.
- Structured protocols can deliver scalable and measurable health improvements

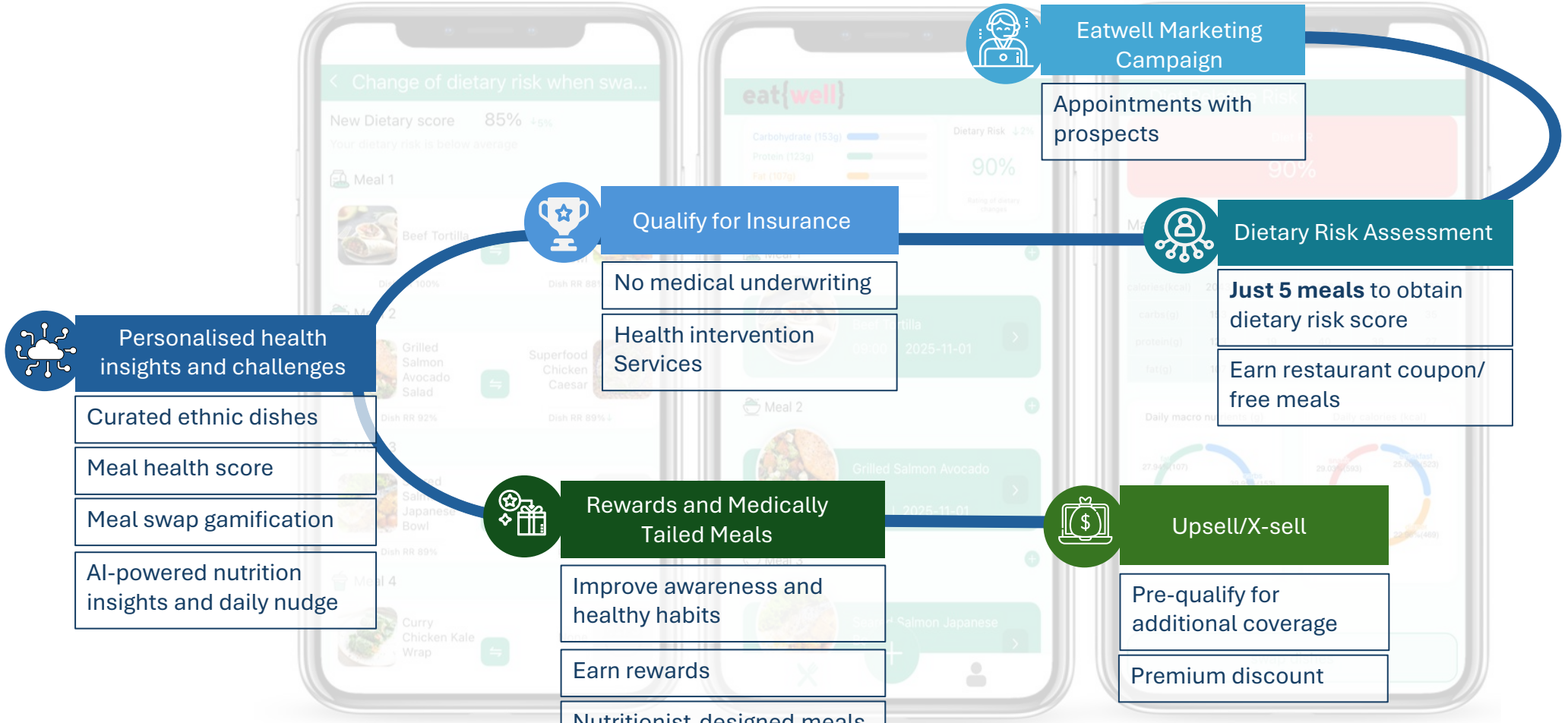
New Paradigm: Dietary Risk Model

Food as Underwriting + Food as Medicine



The New Customer-Centric Journey:

AI-driven lifestyle underwriting and Insurance-as-a-Service Product Innovation



The Future of Insurance

Proactive and Personalised

The Largest Risk is the One We Don't Measure

Excluding dietary data leads to underestimating chronic disease and future claims

The Protection Gap is a Data Gap

Traditional underwriting cannot solve the metabolic health crisis

Winning Product Design: Food-as-Medicine + Food-as-Underwriting

Ingrain dietary data into the core of product design to create dynamic, personalized policies.

Enhancing predictive accuracy through dietary data and AI

Driving behavior change with data-driven personalized interventions

New Business Model

Dynamic, AI-powered lifestyle insurance

A viable path to achieve profitable growth

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Reimaging Health and Risk :- Risk Management and Operationalisation Considerations

Fei Xie, FSA, FCIA

12 November, 2025

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Disclaimer:

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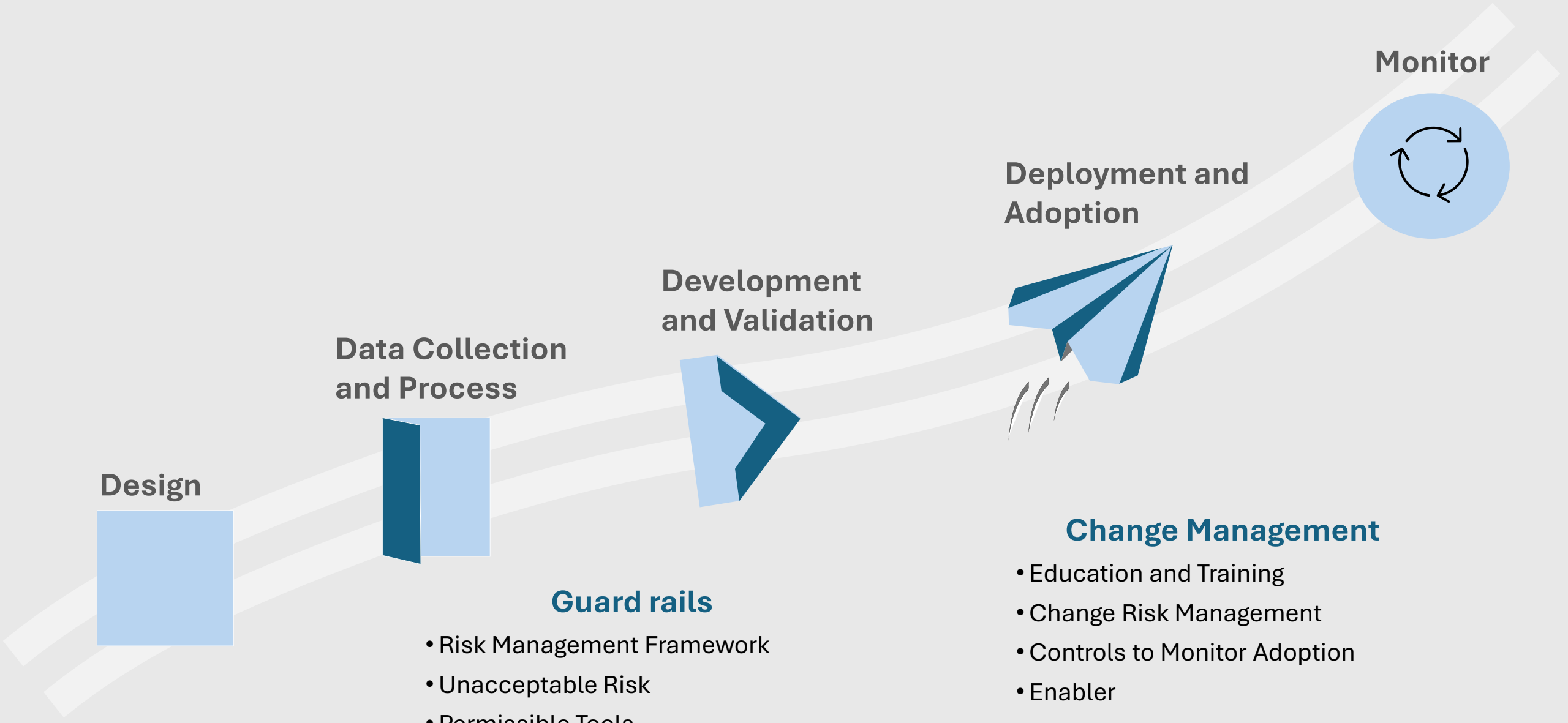


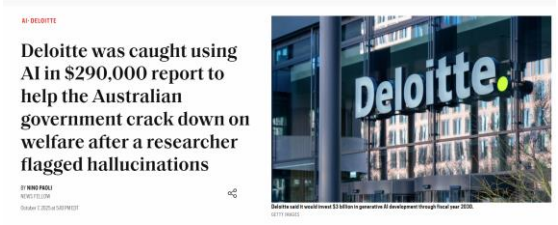
Guard rails

- Risk Management Framework
- Unacceptable Risk
- Permissible Tools
- Regulatory Considerations

Change Management

- Education and Training
- Change Risk Management
- Controls to Monitor Adoption
- Enabler

AI Governance Frameworks Are Essential, Not Optional



Inappropriate use of AI led to financial and Reputational Damage

Deloitte partially refunded the Australia government for a report littered with apparent AI-generated errors, including fabricated quotes and references to nonexistent academic research papers

AI regulations coming into force

EU AI Act brings significant requirements and penalties for violations, second enforcement phase took effect in Aug 2025

AI-related enforcement actions are happening

SEC fined company for misleading statement about their AI use in their services resulting in civil penalties and consent orders. FTC charged company with false advertising their AI tool accuracy

Employees utilizing AI technologies without company knowledge or consent

This phenomenon has become increasingly common as employees seek to enhance productivity and streamline processes using readily available AI tools like ChatGPT and other generative AI applications.

AI Risk Management Framework Consideration

Key Principles

OECD AI Principle

UNESCO Recommendation on AI Ethics

ISO/IEC 42001

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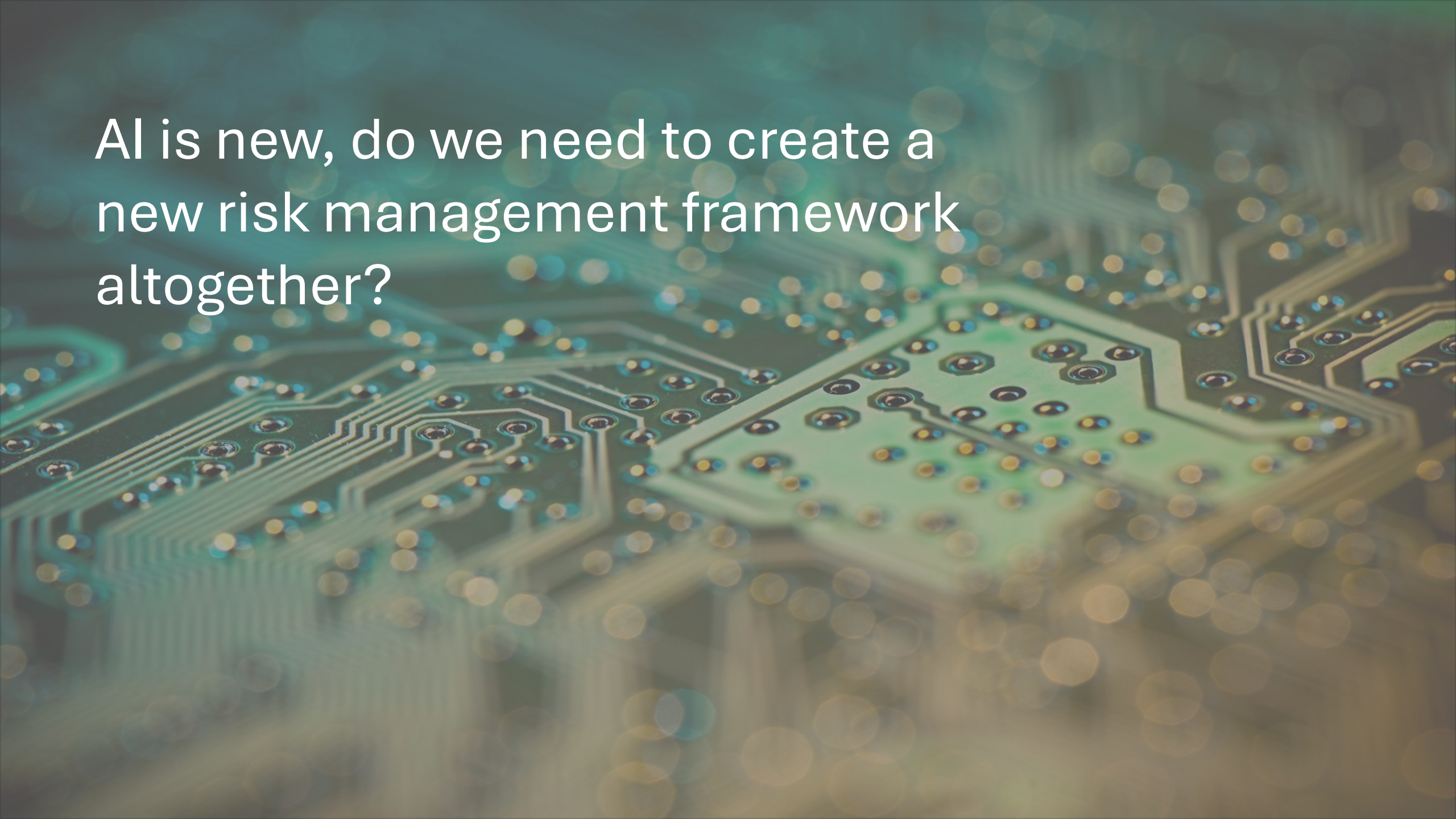
Microsoft / IBM etc. Standard


AI is new, do we need to create a new risk management framework altogether?

Embedding AI Risk into ERM Framework

Key Element of ERM Framework

AI Risk Alignment

Commitment to Responsible AI	Policy, public disclosure, communication
AI governance committee, roles and responsibilities	Cross functional AI oversight forums **Role-specific** responsibilities and accountabilities • AI system developer (teams) • AI system owner • AI system user • AI leads/ business leaders • Legal and Compliance • AI privacy and security
AI strategy and risk appetite	Define unacceptable risk, permissible use of AI tools Develop AI risk metrics and thresholds for escalation
AI risk identification and exposure	**Financial risks**: e.g., poor accuracy of AI used could lead to poor risk assessments and consequent financial losses, model drift **Operational risks:** e.g., unexpected behaviour of AI used could lead to operational disruptions or errors in critical processes **Regulatory risks**: e.g., breaches of data privacy (GDPR, PDPA) **Reputational risks:** e.g., potential ethical lapses, unfair outcomes or bias concerns could lead to customer complains, negative media attentions
Track AI performance and changes	Continuously monitor AI risk indicator, audit AI log, monitor drift, review lifecycle process
Incorporate AI risk in regular reporting	Maintain AI model inventory, integrate AI KRIs

Practical Example - AI Risk Management Framework Alignment

Risks may not always be mutually exclusive

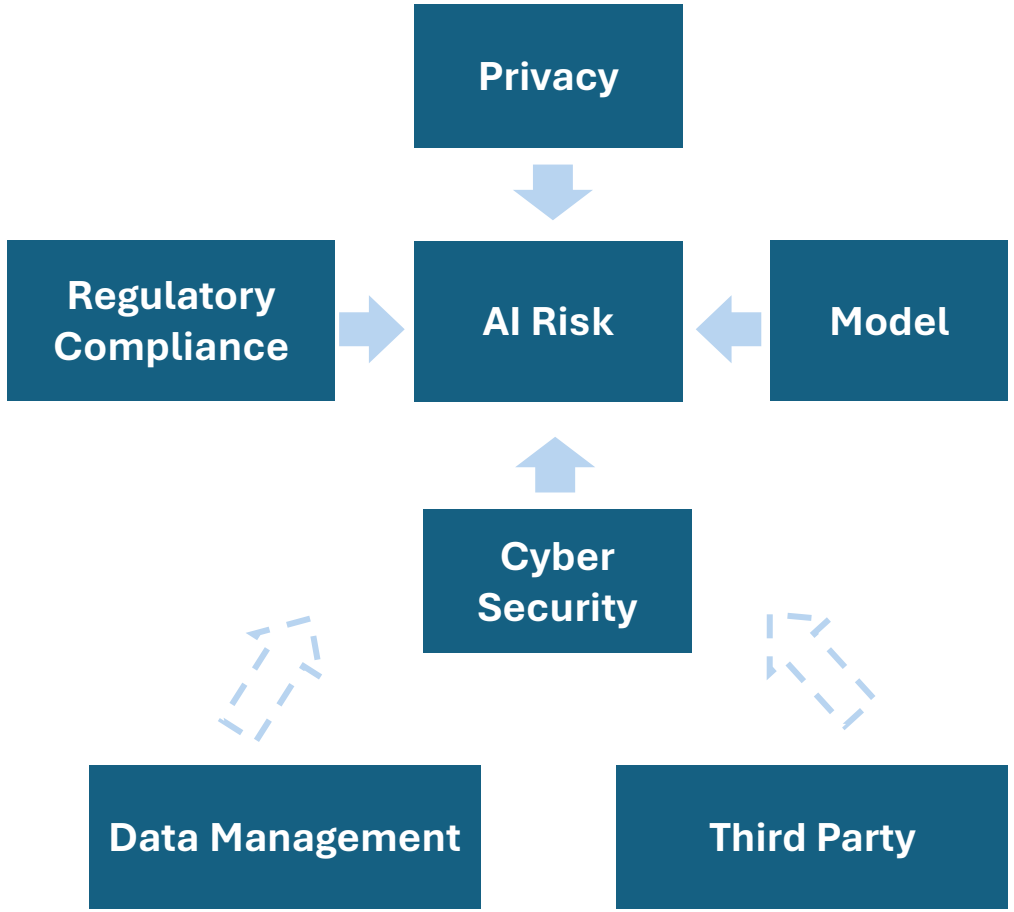
AI Risk as a new risk in the taxonomy

- Visibility
- Resource allocation

Alignment with ERM Framework and Business Processes

Embed AI Risk in existing risk types

- Highlight cross-processes, cross-risk connectivity
- Similar to Climate Risk and Reputational Risk



Practical Example - AI Model Risk Management

Model Risk Management	AI Model Risk Alignment
Model Definition	• Machine- based system • Varying level of autonomy • Adaptive after deployment • Implicit / Explicit Objectives *New* • Input inference • Output with environment impacts
Model Inventory	• Identify AI usage across the organization • Develop AI inventories
Model Risk Assessment	• Model selection and new AI tools intake process *New* • Key risk dimensions to assess materiality of risks that AI poses *New* • Stakeholders and the organization **impact**, **complexity** of the AI, **reliance** on AI, degree of **autonomy** and influence, **scale** and scope of deployment • Assign risk rating for each AI model
Risk Based Validation & Review	• Validation criteria reflects robustness and stability, explainability and fairness, reproducibility and auditability *New* • Legal and regulatory review (e.g. data privacy) and vulnerability testing *New* • Periodic review and revalidation requirement

Deployment and Monitoring

For successful AI operationalisation, adoption is as important as development. To ensure that AI behaves as intended when deployed and that any data and model drifts are detected and addressed; appropriate change management standards and processes should be in place.

Implementation and Adoption

(pre-production)

Model deployment without ownership = uncontrolled operational risk

- Every AI model should have a *designated business owner* accountable for its outcomes, ethical use, and performance
- Ownership ensures that AI decisions are traceable to accountable executives, **not left to data science teams alone**.

Pre-deployment checks- Transparency and Explainability

- Business owner and Executives must be able to understand *why* an AI model made a decision
- Explainability supports informed oversight, reduces reputational risk, and enables fair customer treatment
- Ensure that the AI has been correctly implemented and produces the intended results before being deployed for use

Model Validation and Pre-Deployment Assurance

- ***Independent validation* required** must be completed and **reviewed** by relevant governance committee before release
- Additional test such as **experimental runs** with production data and **live edge case** testing to verify that AI can handle improbable but plausible scenarios when deployed

Monitoring of Risk Indicators

(post-deployment)

Setting appropriate **tests and thresholds** to evaluate the ongoing **performance** of a deployed model, including the frequency of monitoring; as well as the processes to be followed for changes made to a deployed model

- **Model Drift and Bias:** Data distributions and market conditions evolve; continuous monitoring detects bias or performance degradation before they impact decisions or reputation.
- **Operational Integrity:** AI systems, when embedded in business workflows, can propagate errors rapidly across multiple touchpoints. **Contingency plan** should in place for AI use impacting critical processes or decision making with material impacts – such as a **Kill Switch should the risk tolerances be breached**

Mindset shift and essential **capabilities** built underpinned by continued **training, education and communication**

Q & A