Gathering25

Realising vision, advancing automation

reddy a+u

CitA25

Driving Digital Construction for 25 years

Implementing AI in architectural practice

Problem definition

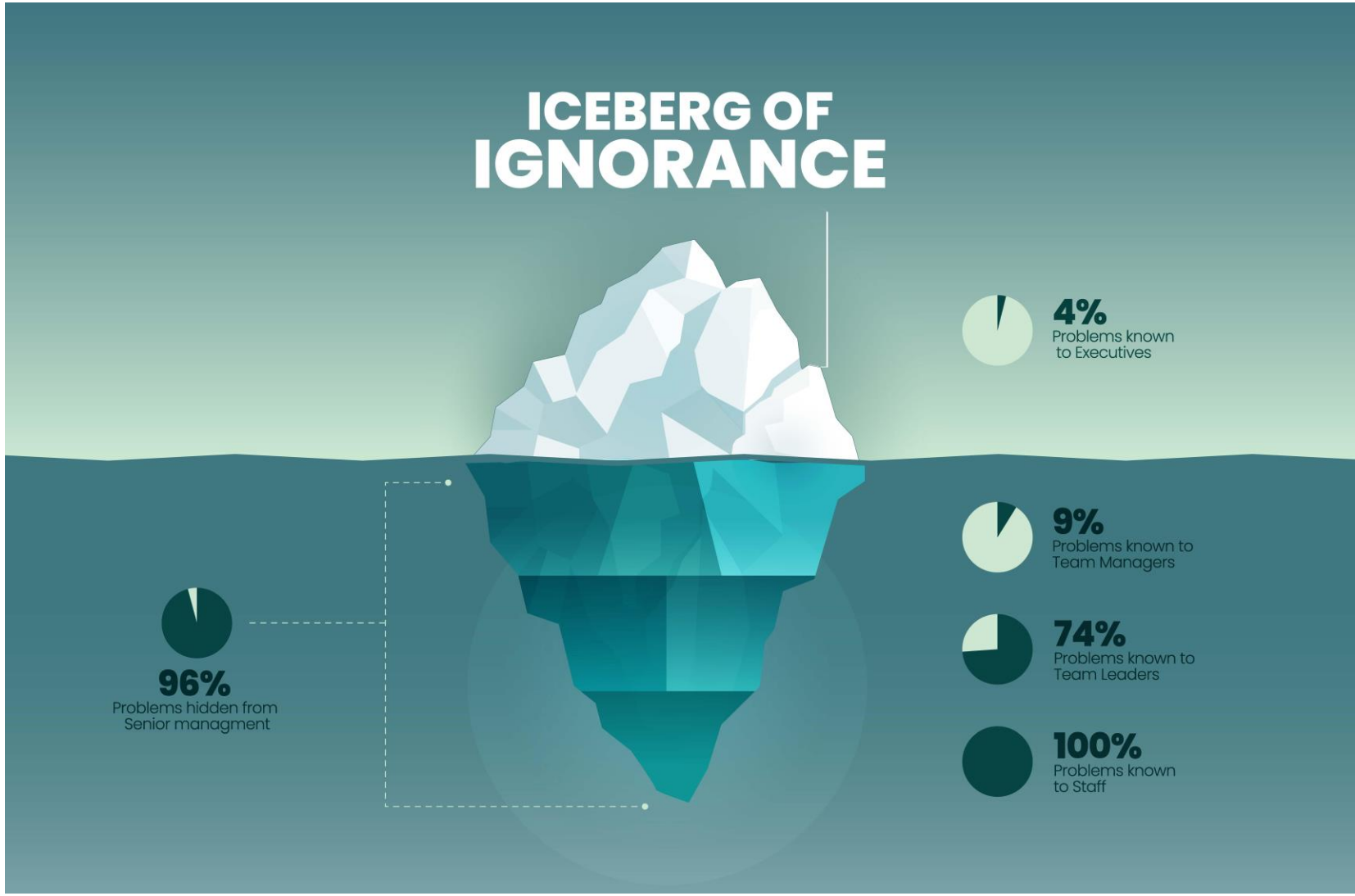
96% of problems are hidden from Senior Managers

4% of problems known to Executives

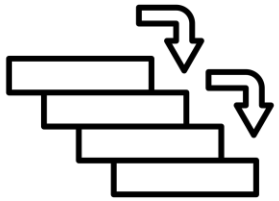
9% of problems are known to Managers

74% of problems are known to Supervisors

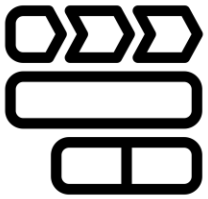
100% of problems are known to front-line staff



How is the Construction industry currently approaching the Problem?

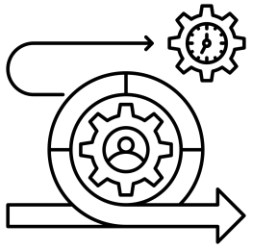


Waterfall



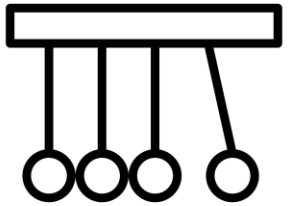
Prince2

Agile/Iterative



Lean/Just in time

Six Sigma



Theory of Constraints/System Thinking

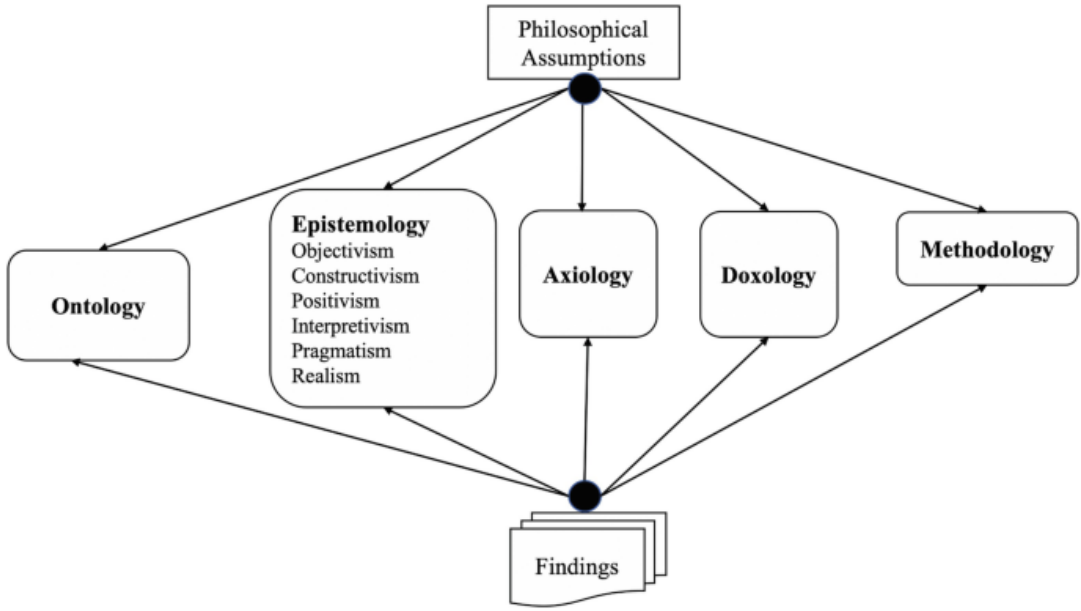
How is AI approaching the problem?

Ontological Assumptions – Concerned with the **nature of reality**. For example, does reality exist independently, or is it shaped by human perception?

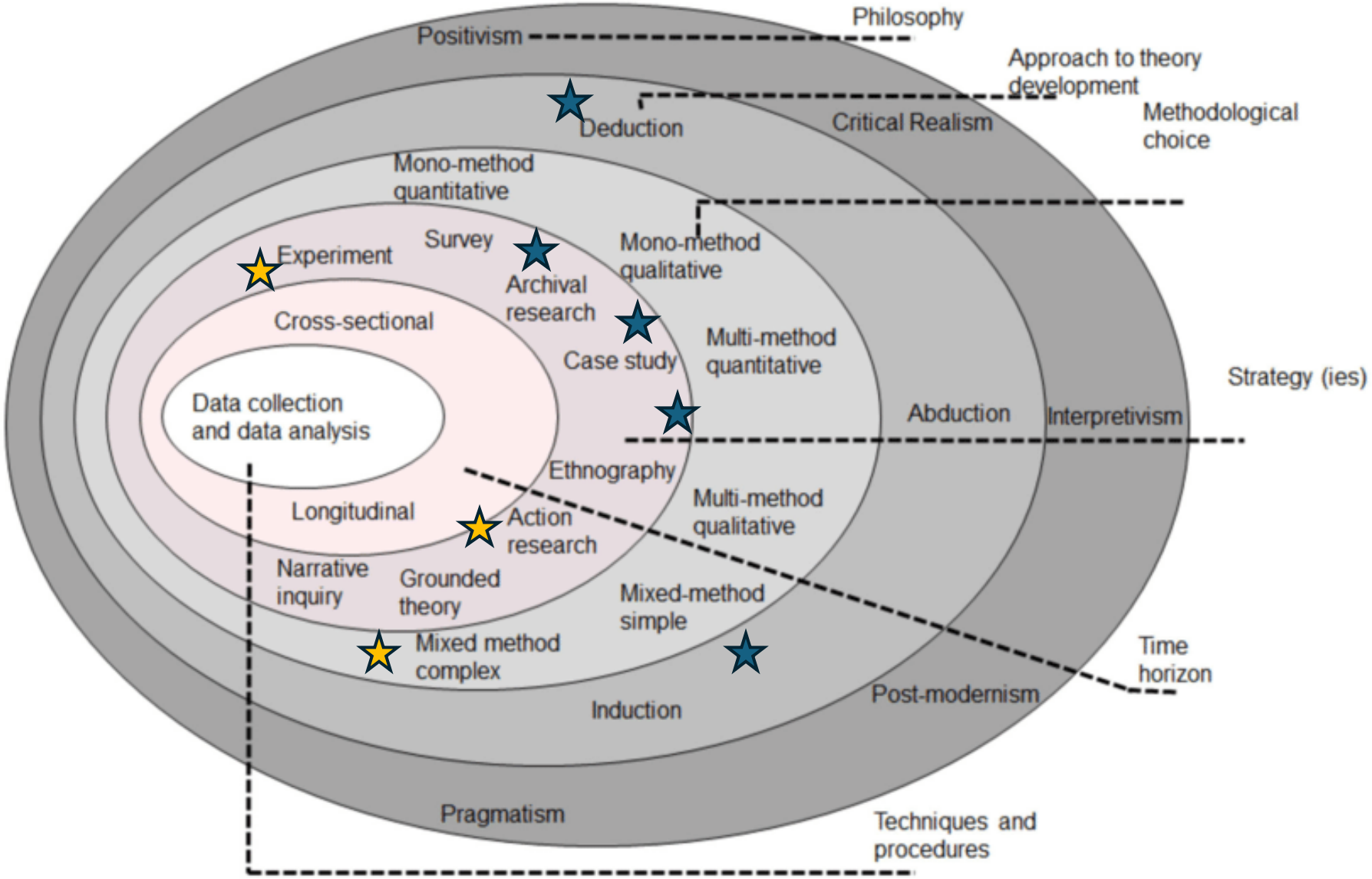
Epistemological Assumptions – Related to **the nature of knowledge**. It asks, "How do we know what we know?" and deals with questions about truth and justification.

Axiological Assumptions – Focus on **values and ethics**. This includes questions about what is good, what is valuable, and how values influence our thinking.

Methodological Assumptions – Concerned with **how we investigate reality.** These assumptions shape how we choose research methods, such as whether to use qualitative or quantitative approaches.



Doxology – focus on common standards



How do humans approach the problem?

Our strategy is to use a scientific approach to data collection and analysis.

We are at the **Data collection and analysis** stage.

Our time zone is cross-sectional for projects.

For the data to become AI usable, we would need to implement Longitudinal

We need to add to our strategy – **Action research**

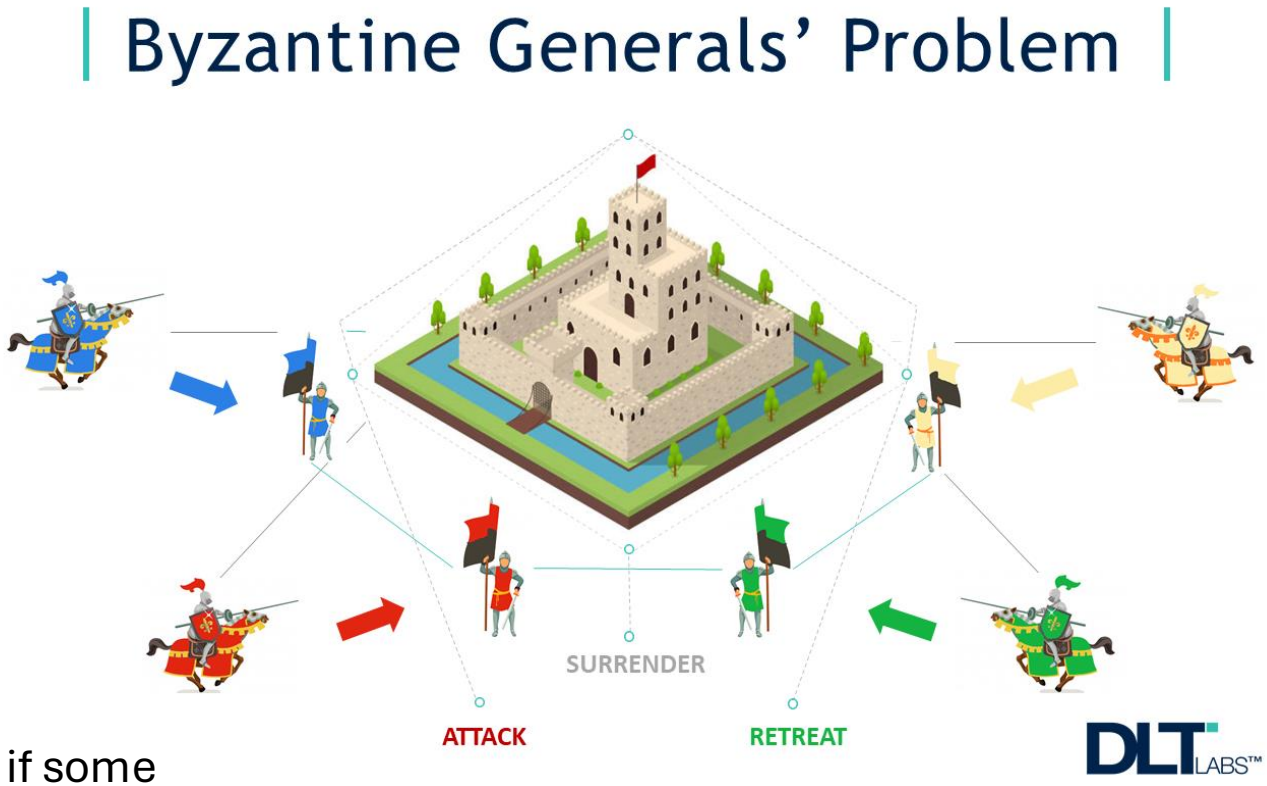

What does any of
it have to do with
the construction
industry?!

Byzantine General's Problem

James A. Donald once said, *"It is not sufficient that everyone knows X. We also need everyone to know that everyone knows X, and that everyone knows that everyone knows that everyone knows X — which, as in the Byzantine Generals' problem, is the classic hard problem of distributed data processing."*

BY DEFINING THE TYPE OF THE PROBLEM FIRST

A **Byzantine Agreement Protocol** ensures that even if some participants are dishonest or faulty, the system can still reach a consensus.



https://knnx.medium.com/the-byzantine-generals-problem-8552e24abe02

Empowering small and medium-sized architectural practices to embrace the benefits of AI

Research question:

'*How are different departments in the Architectural practice, as a part of the AEC industry, affected by the developments in the AI landscape?*'

LITERATURE REVIEW – GAP ANALYSIS

Reddy reviewing the impact of the merging: EU AI Act (2025), NIS2(cyber compliance checklist) and potential behind the ISO 19650 framework

→

The sample of 160 papers of literature confirms some measurable efficiency and compliance gains in AEC. Many challenges seem to lie in the realm of skills, clarity of the road map and investment

↓

Our 300-person practice is moving from analysing to small MVP pilots next year

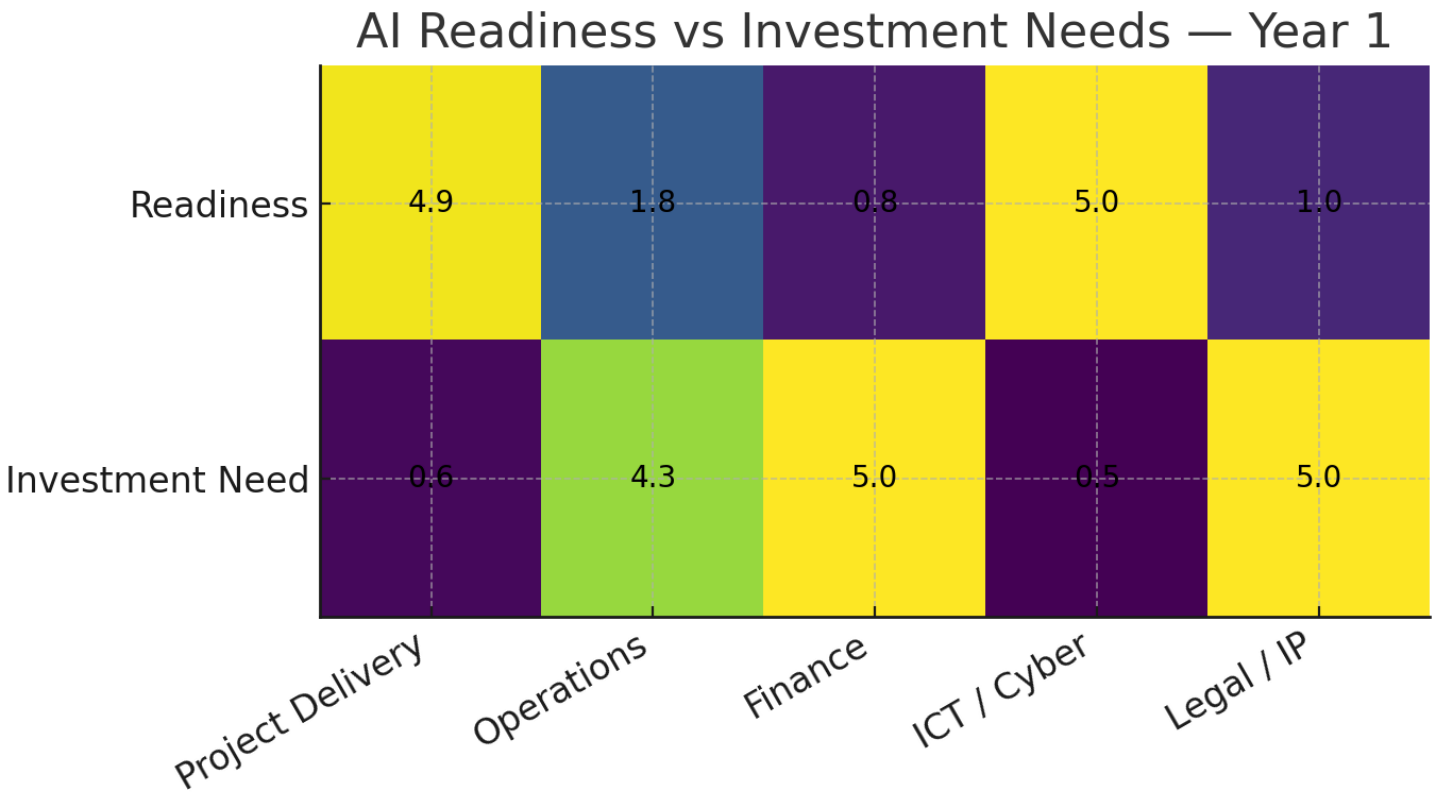
←

Message from the board: AI is no longer a future trend — it's an operational imperative.

Literature review – an opportunity analysis

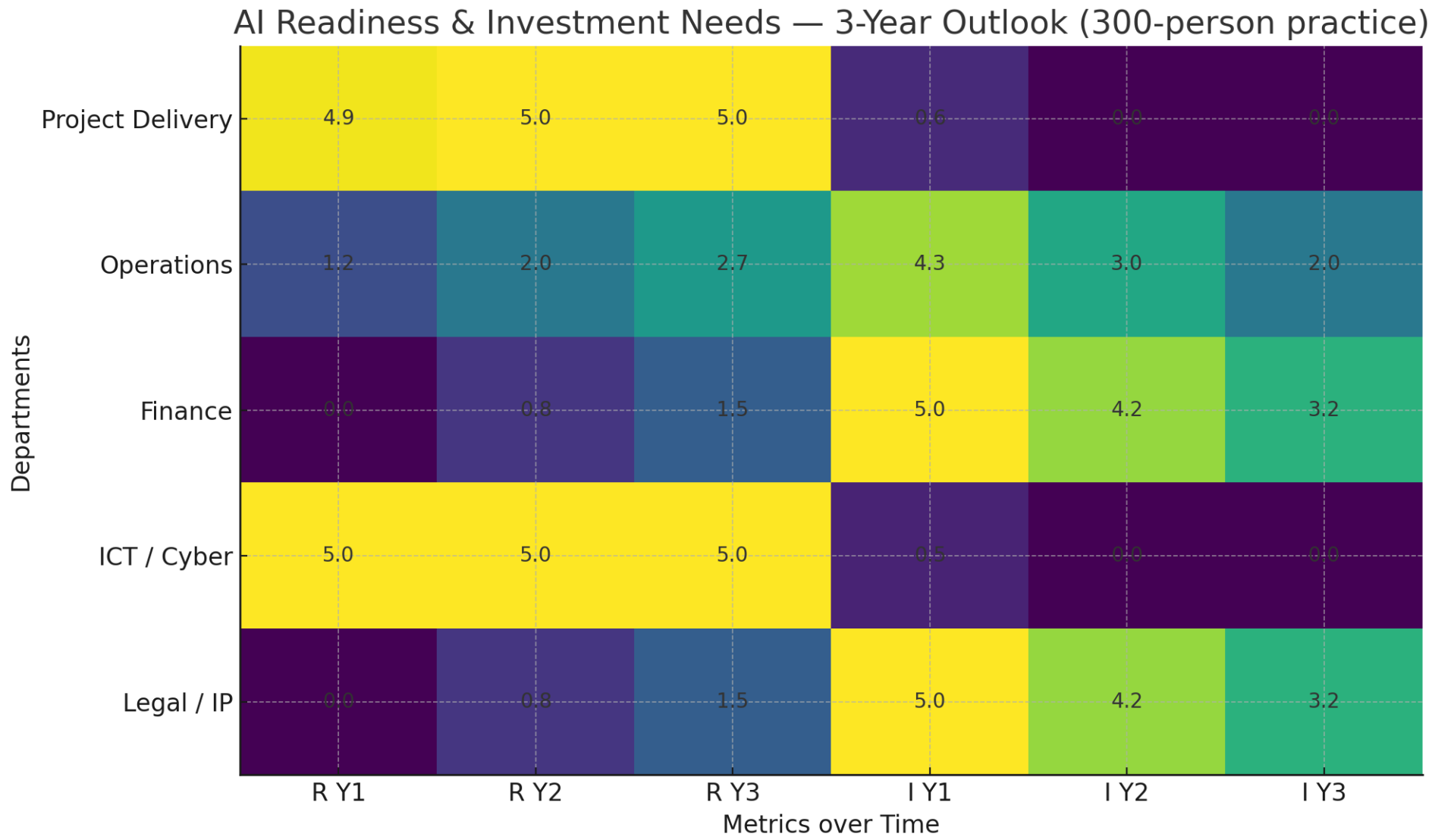
Sources: MDPI (2025), ScienceDirect, Emerald, ENISA, Reuters (2025)
Message: Literature backs the feasibility — but calls for real-world, audited deployments.

Theme	Evidence	Relevance
IFC → Uniclass automation	Early pilots proving interoperability gains	QA/RAG foundations
LLM code compliance	Revit-integrated checks emerging	Pilot 2 basis
AI clash detection, generative design	15–25 % efficiency gain	Immediate ROI
AI Act / NIS2	Legal obligations now live	Governance backbone
Carbon benchmarks (2025 CLF)	Quantified baselines	Sustainability KPIs



Department Readiness Heatmap

- **High readiness:** ICT & Project Delivery.
- **Mid readiness:** Operations.
- **Low readiness:** Finance & Legal/IP → need early investment.
  Implication: Focus Year 1 funds on governance, finance analytics, and contract frameworks.
  Hosting impact: 3× increase in data logs + backups → ICT budget uplift.


AI Readiness & Investment Needs — 3-Year Outlook (300-person practice)
Project Delivery
Operations
Finance
ICT / Cyber
Legal / IP
Departments
4.9
5.0
5.0
0.6
0.0
0.0
1.2
2.0
2.7
4.3
3.0
2.0
0.0
0.8
1.5
5.0
4.2
3.2
5.0
5.0
5.0
0.5
0.0
0.0
0.0
0.8
1.5
5.0
4.2
3.2
R Y1
R Y2
R Y3
I Y1
I Y2
I Y3
Metrics over Time

Pilots & Measurable Impact

Pilot	Focus	Metric	Timeline
P1	Legal / Business document-intelligence	Contract cycle ↓ 25 %	Q1–Q2 2026
P2	IFC + Graph-RAG (BuildingGPT)	Clash triage ↓ 30 %, QA ↑ 20 %	Q2–Q3 2026
P3	Early-stage sustainability aide	EC variance < ±10 % vs benchmarks	Q3–Q4 2026
Message: Each pilot closes a documented research gap and generates publishable ROI data.			

Potential ROI Snapshot

Firm-wide Investment (Years 1–3)

Capex ≈ €250k (initial + training + infrastructure)

Opex ≈ €80k / yr

→

Quantified Return

Efficiency: 20–30 % workload reduction (≈ €383k / yr in savings)

Net benefit: €286k (Y2) → €321k (Y3 +)

Intangibles: compliance resilience, client trust, innovation reputation.

Proposition for the business model shift

Before:

Billable hours tied to manual documentation, fragmented QA, and reactive operations.

After:

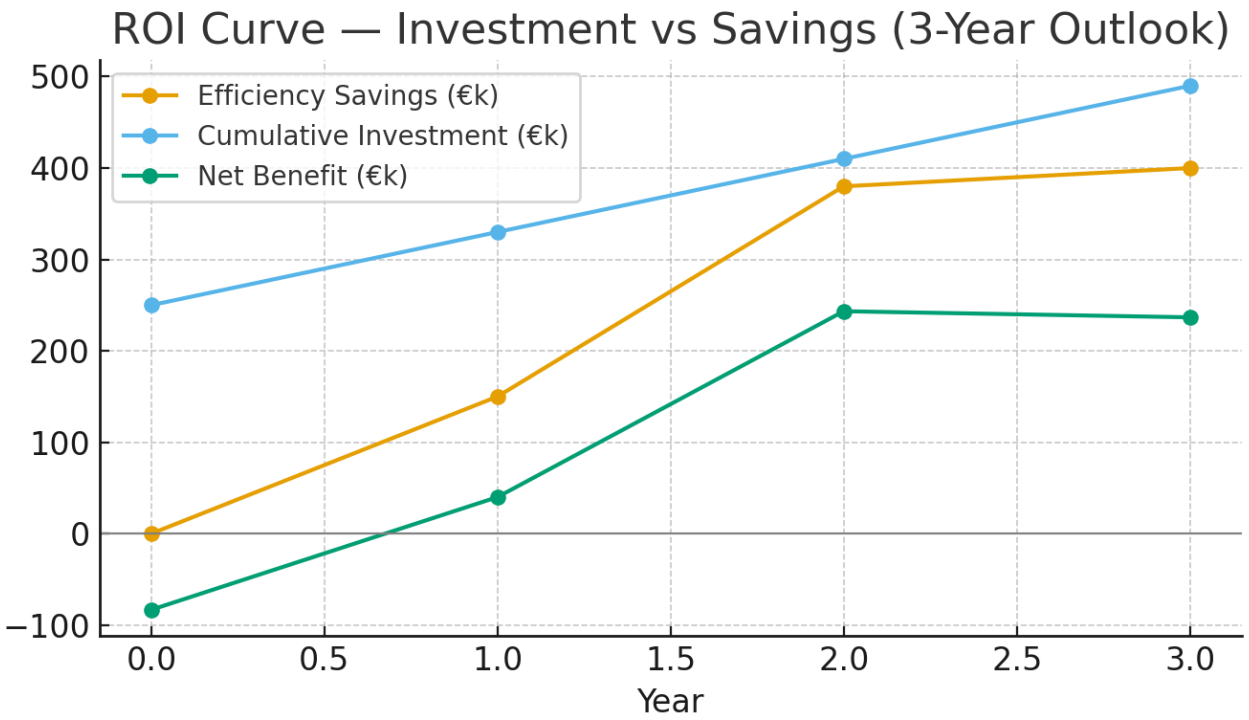
Value-based pricing on *speed* × *accuracy* × *traceability*.

New revenue lines: digital audits, AI compliance services, data-as-an-asset.

Reduced overheads through automation and cross-use of internal knowledge (RAG).

Forecast: 20–30 % workload reduction within 3 years → €300k–€500k net benefit.

Department Readiness Heatmap



Use of AI in Practice now – Midjourney
Text to Image Generation

Using text & image prompts to produce quick renders from digital clay models

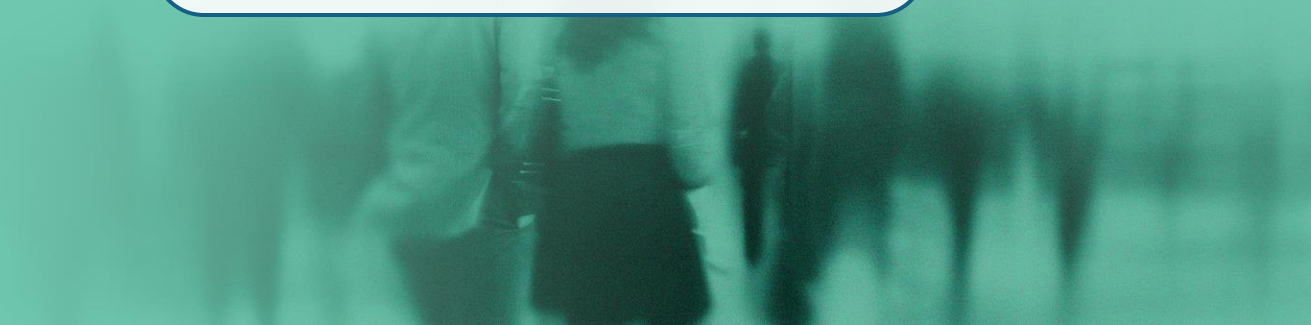
Partner with us to shape the next practice model

Participate in shared pilots and benchmarking.

Adopt consistent AI policy templates.

Join industry forums on AI ethics & compliance.

"Our goal isn't automation — it's augmentation: people empowered by intelligent, compliant systems."



Gathering25

Realising vision, advancing automation

reddy a+u

CitA25

Driving Digital Construction for 25 years

Thank you