

The real problem isn't AI. It's your software.

Evidence from 50 radiologists and 46,000 AI-assisted examinations shows the true barrier to clinical AI adoption is usability — not fear.

Usability and Operational Maturity Predict Artificial Intelligence Adoption in Academic Radiology Practice



BACKGROUND

"**Fear of AI**" is a recurring narrative in radiology. Yet behavioural science consistently shows that resistance to technology stems from **poor usability and workflow friction** — not intrinsic skepticism.

The **Technology Acceptance Model (TAM)** provides a validated framework in which **perceived usefulness (PU)** and **perceived ease of use (PEOU)** predict behavioural intention to adopt a technology.

No prior study had combined TAM instruments with **objective operational performance data** in a high-volume radiology department. This study addresses that gap directly.

OBJECTIVES

- Quantify AI acceptance using validated TAM instruments across an entire radiology department (n = 50 · 100% response rate)
- Map operational maturity via retrospective support ticket analysis across ~46,000 AI-assisted examinations
- Test whether professional seniority predicts AI resistance — junior residents vs. senior attendings
- Identify the structural determinants of sustained AI integration in a mature clinical ecosystem

METHODS

Design Retrospective observational · single tertiary academic centre (>250,000 exams/yr) · IRB waiver

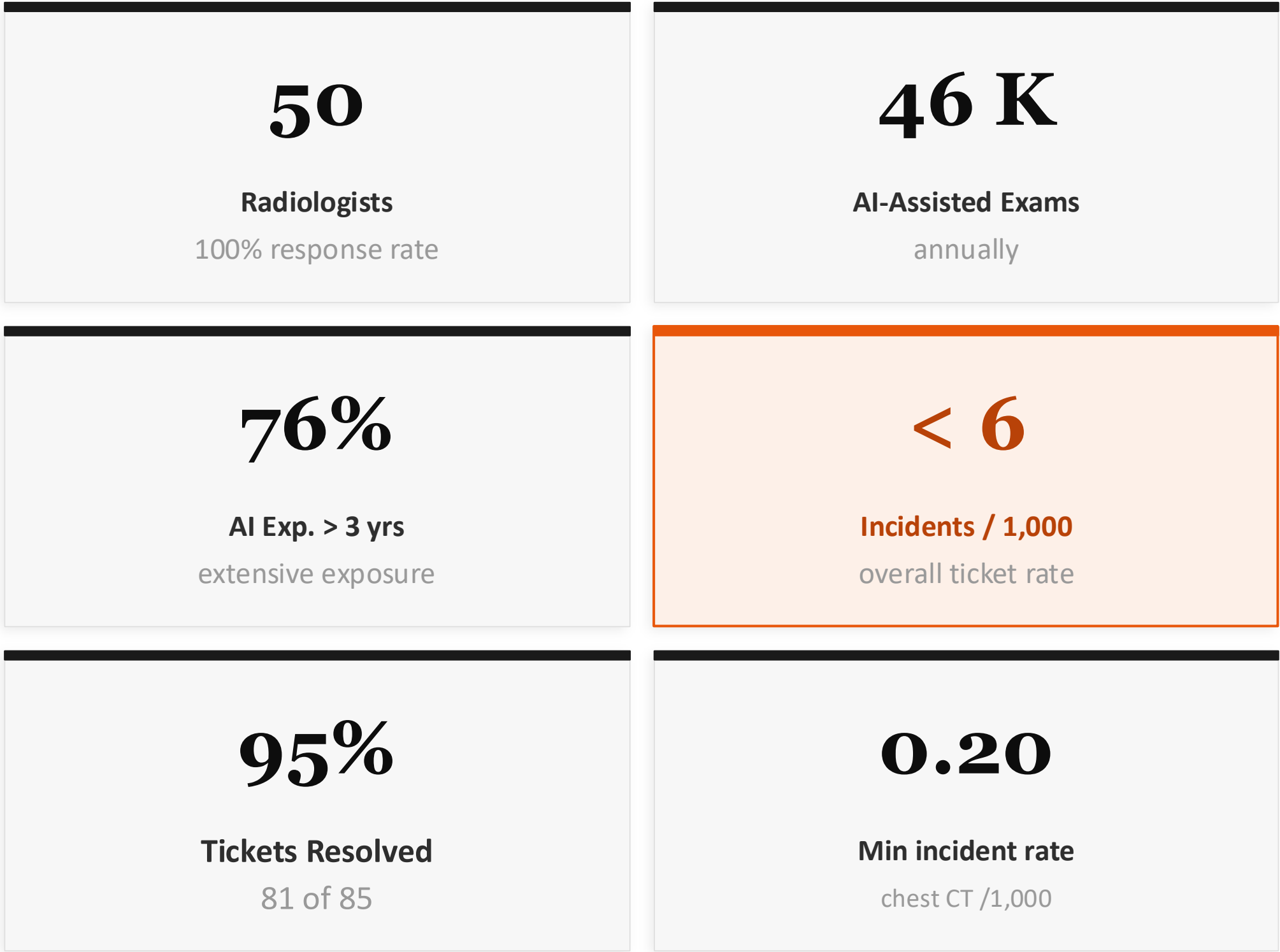
Cohort 50 radiologists (residents + attendings) · 100% response · ~46,000 AI-assisted exams across 9 solutions

TAM survey PU · PEOU · trust · behavioural intention (BI) on 5-point Likert scales · Cronbach's α

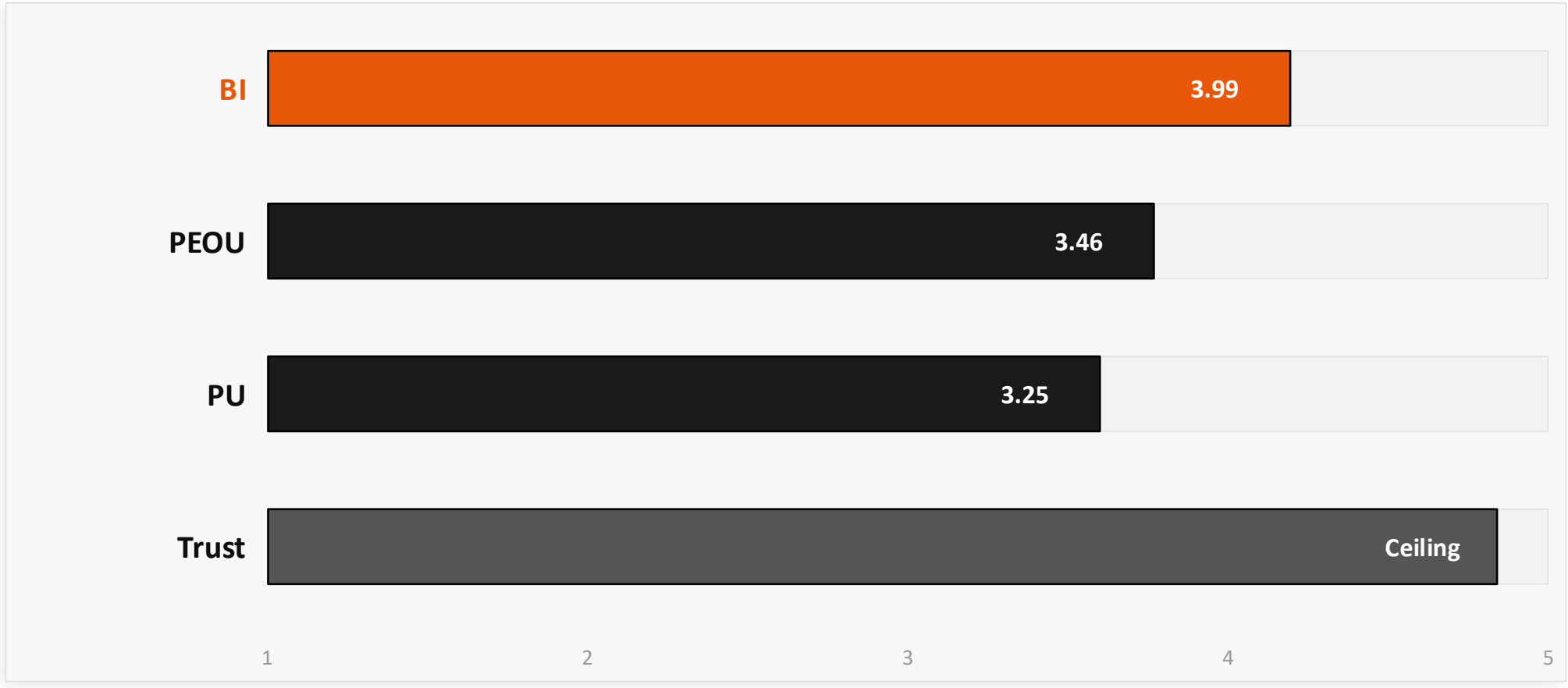
Statistics Welch two-sample t-tests · Cohen's d effect sizes · 95% confidence intervals

Operational Retrospective support ticket review · categorised by priority & root cause · normalised /1,000 exams

KEY METRICS AT A GLANCE



TAM ACCEPTANCE SCORES (1 – 5 scale)



JUNIOR vs. SENIOR RADIOLOGISTS

Construct	Junior (n=14)	Senior (n=36)	p-value	Cohen's d
PU	3.25 ± 0.95	3.25 ± 0.89	1.00	—
PEOU	3.72 ± 0.64	3.37 ± 0.68	0.047 *	0.50
BI	3.97 ± 0.80	4.00 ± 0.75	0.94	—
Trust	Ceiling	Ceiling	N/A	—

* Only PEOU differed by seniority — digital fluency gap, not attitudinal resistance (d = 0.50, p = 0.047).

PARTICIPANT DEMOGRAPHICS

	Overall (n=50)	Junior (n=14)	Senior (n=36)
Age (mean ± SD)	32 ± 9	26 ± 4	34 ± 10
Female sex	28 (56%)	8 (57%)	20 (55%)
Years in radiology	8 ± 5	2 ± 3	10 ± 4
AI exp. > 3 yrs	28 (56%)	8 (57%)	20 (56%)
Daily AI use	4 (8%)	1 (7%)	3 (8%)
Weekly AI use	20 (40%)	6 (43%)	14 (39%)
Autonomous use	19 (76%)	4 (80%)	4 (67%)
Systematic verification	25 (100%)	5 (100%)	6 (100%)

OPERATIONAL MATURITY

AI Solution	Modality	Exams / yr	Inc. / 1k
Fracture detection	Radiography	~22,000	0.77
Screening assist.	Mammography	~5,000	5.20
Lung nodule detect.	Chest CT	~20,000	0.20
Stroke / perfusion	Brain CT	~8,000	1.10
PE detection	CT	~6,500	—
MRI acceleration	MRI – general	~1,200	4.20
Diagnostic assist.	MRI – prostate	165	—
Spine analysis	MRI – lumbar	1,454	—

SUPPORT TICKET ANALYSIS



Predominant causes: display · connectivity · system integration — not algorithmic or diagnostic errors.

DISCUSSION

- ✗

Myth busted: PU and BI were statistically identical across seniority levels (p = 1.00 and p = 0.94). No generational or hierarchical resistance was detected.
- ✓

PEOU matters: The only group difference (d = 0.50, p = 0.047) was ease of use — reflecting digital fluency, not attitudinal resistance to AI.
- ✓

Trust ≠ prerequisite: Trust functioned as a stabilising background condition — arising from demonstrated operational reliability rather than enabling adoption.
- ⚠

Real barrier: Infrastructural failures (display, connectivity, integration) drove 95% of the support ticket load. Algorithmic errors were rare.
- ➔

Implication: In mature clinical ecosystems, sustained AI adoption is structurally driven by interface quality and operational robustness — not clinician attitude.

CONCLUSION

In a mature academic radiology setting, AI adoption is primarily determined by **usability and operational reliability** — not by professional seniority or attitudinal resistance. Radiologists do not fear AI; they resist **bad interfaces and broken systems**. Implementation strategies must prioritise **seamless workflow integration, interface optimisation, and robust technical infrastructure** over efforts aimed at modifying clinician attitudes.