The Prevailing Narrative: A Symbiotic Partnership

For decades, the relationship between Information Systems (IS) and Artificial Intelligence (AI) has been described with a powerful metaphor: IS provides "the minds that plan," and AI delivers "the hands that build."
The IS community has asserted a guiding role, arguing it provides methodological grounding and clarifies research questions for the technical advances of AI.
This narrative suggests a deeply collaborative, bidirectional partnership where each field critically enables the other.
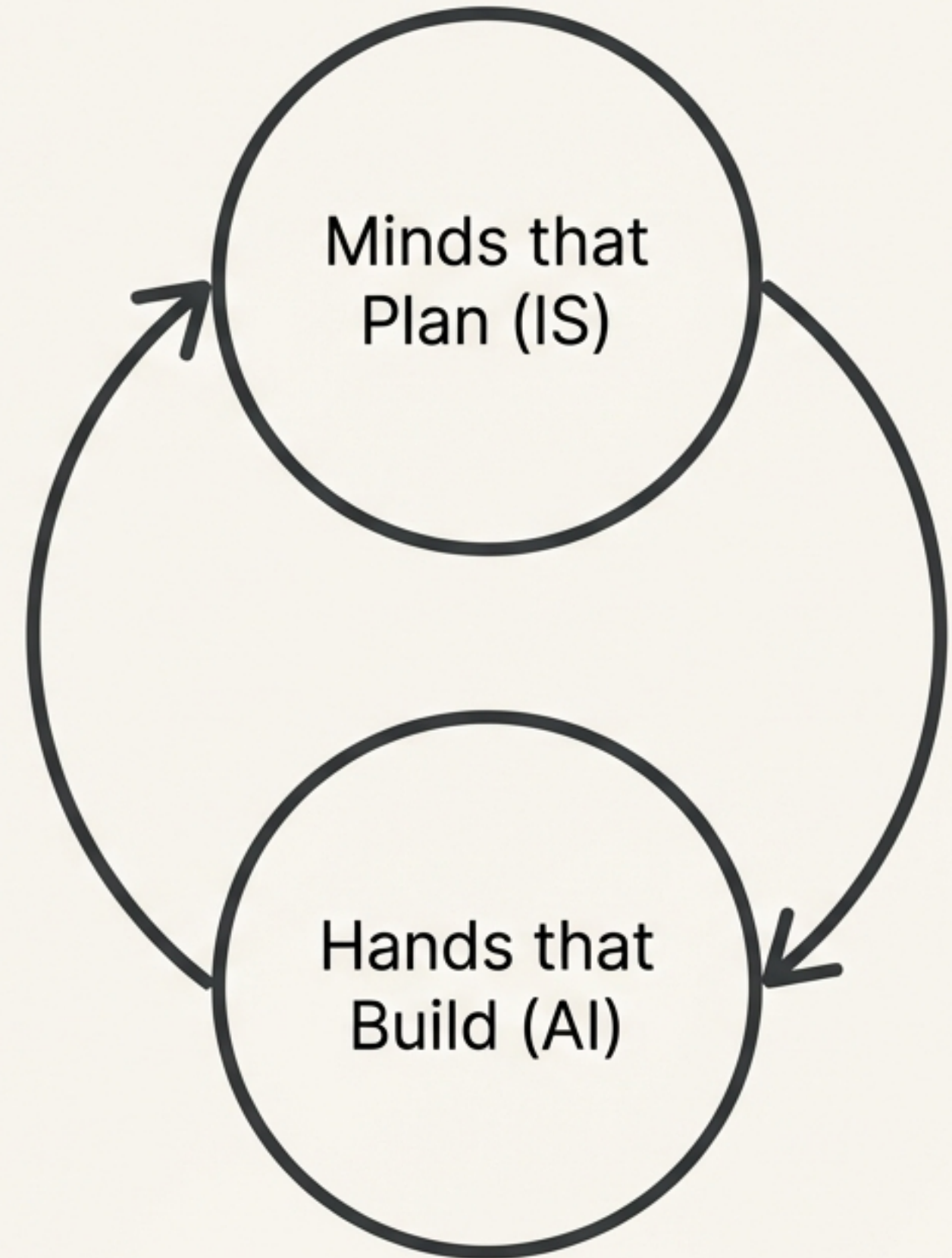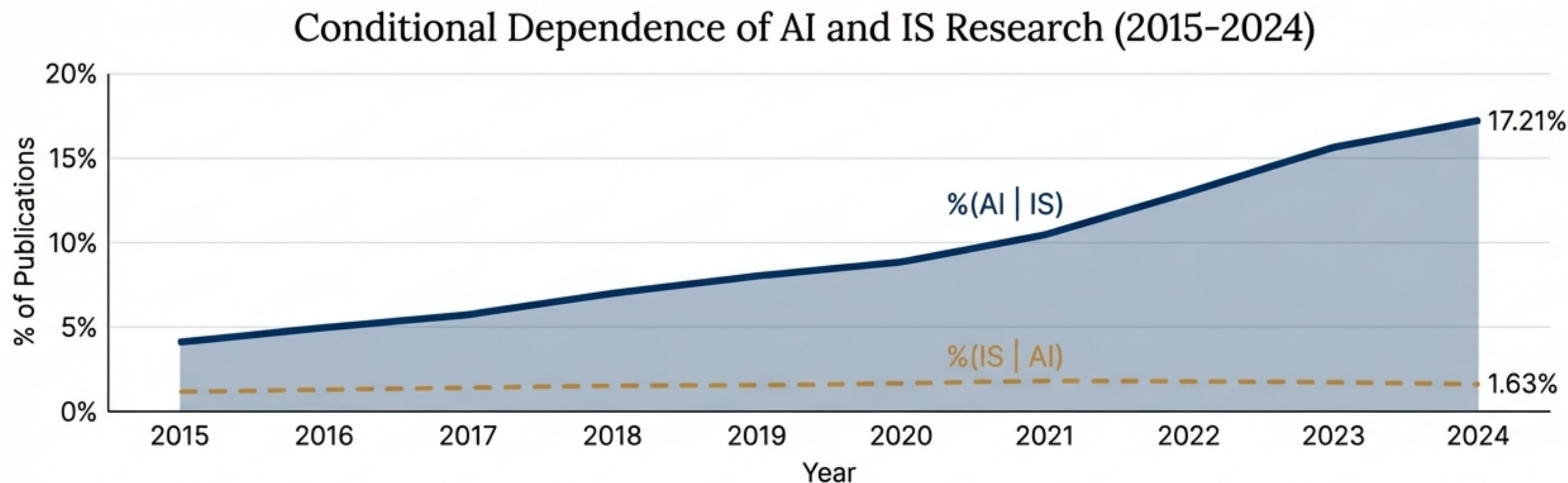
But Does This Narrative Withstand Quantitative Scrutiny?

While compelling, this long-held belief is rarely quantified. This raises a critical question: How much does research in the core AI domain actually depend on or get influenced by research in IS, and vice-versa? To answer this, we conducted a systematic investigation using novel semantic measures and large-scale bibliometric analysis of scientific publications from Web of Science (WOS) and Scopus. We will explore the evidence across four key dimensions.

Minds that Plan (IS)

Hands that Build (AI)
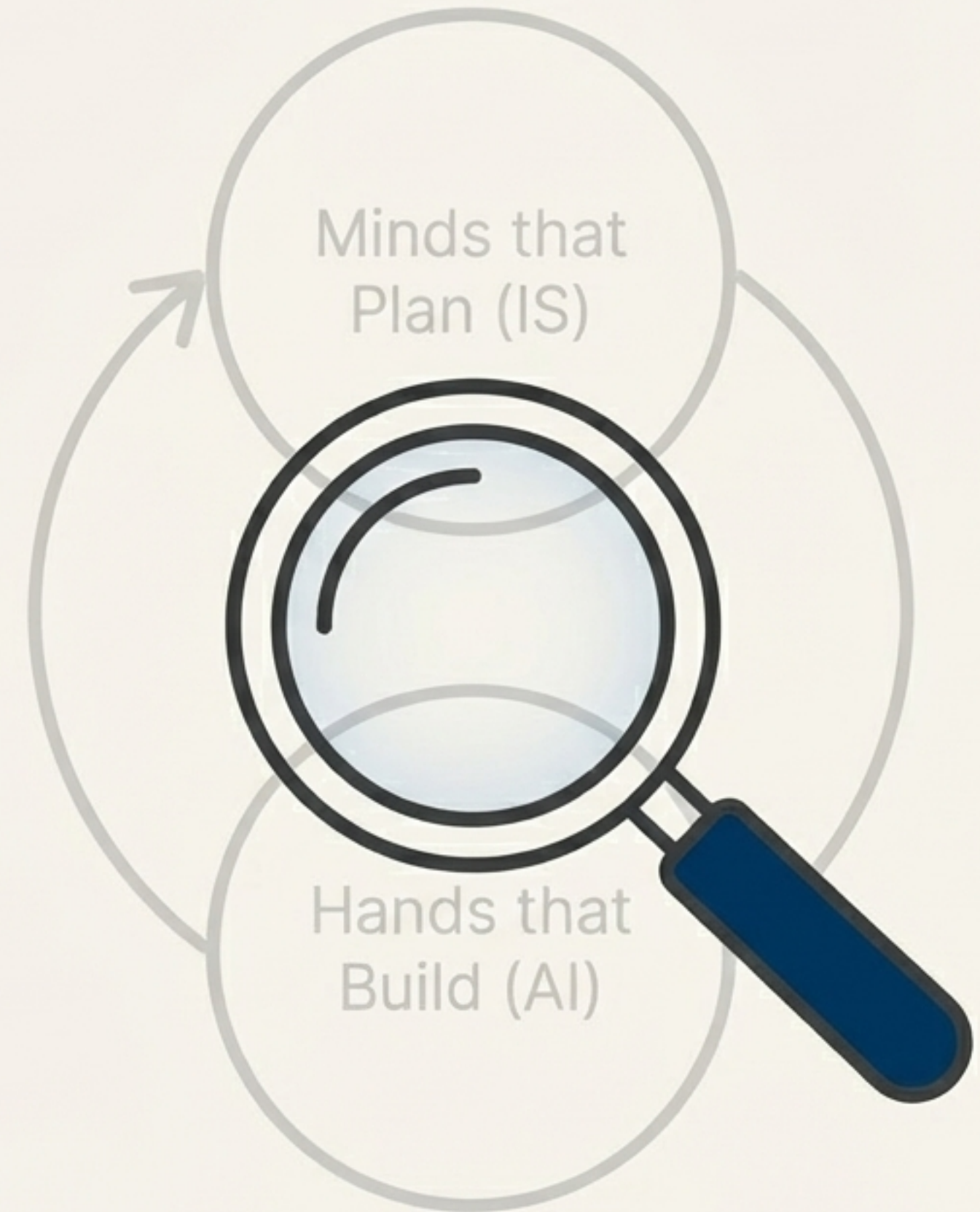
Finding 1: The Conversation is Overwhelmingly One-Sided

Conditional Dependence of AI and IS Research (2015-2024)

Our analysis of conditional dependence—how often one field is mentioned in the publications of the other—**reveals a dramatic and growing imbalance. Over the last decade, IS research has become exponentially more dependent on AI. The reverse is not true; AI's reliance on IS has remained negligible and is decreasing.**

As of mid-2024, **17.21%** of IS-classified papers mention AI, while only **1.63%** of AI-classified papers mention IS.

# Finding 2: Core AI Innovation Occurs in a Self-Contained Ecosystem

When we examine the foundational subfields of AI—the engines of its technical progress—their dependence on IS research is virtually non-existent. This suggests that the conceptual and algorithmic breakthroughs in AI are developed independently of the methodological frameworks from IS.

IS Mentions within Core AI Subfields (% of Publications)

| Subfield	Value
Convolutional Neural Networks (CNNs)	0.76%
Deep Learning (DL)	0.92%
Generative Adversarial Networks (GANs)	0.13%
Artificial General Intelligence (AGI)	0.00%
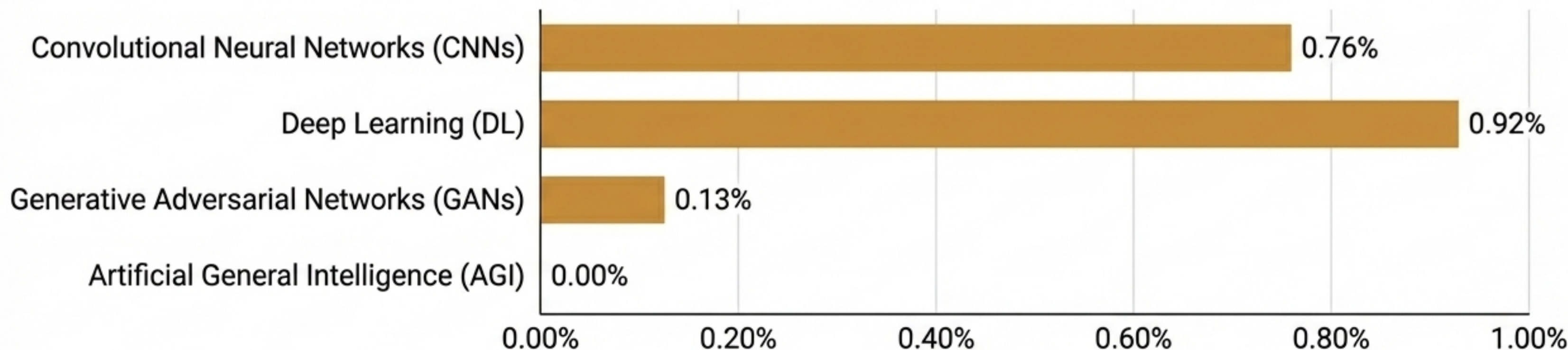
Finding 3: Citation Influence Flows From AI's Elite, Not To Them

An analysis of the top 10 most-cited papers in each field confirms the asymmetry. The most influential AI papers are heavily cited within IS research, demonstrating their foundational impact. Conversely, the most influential IS papers are almost invisible within the core AI literature.
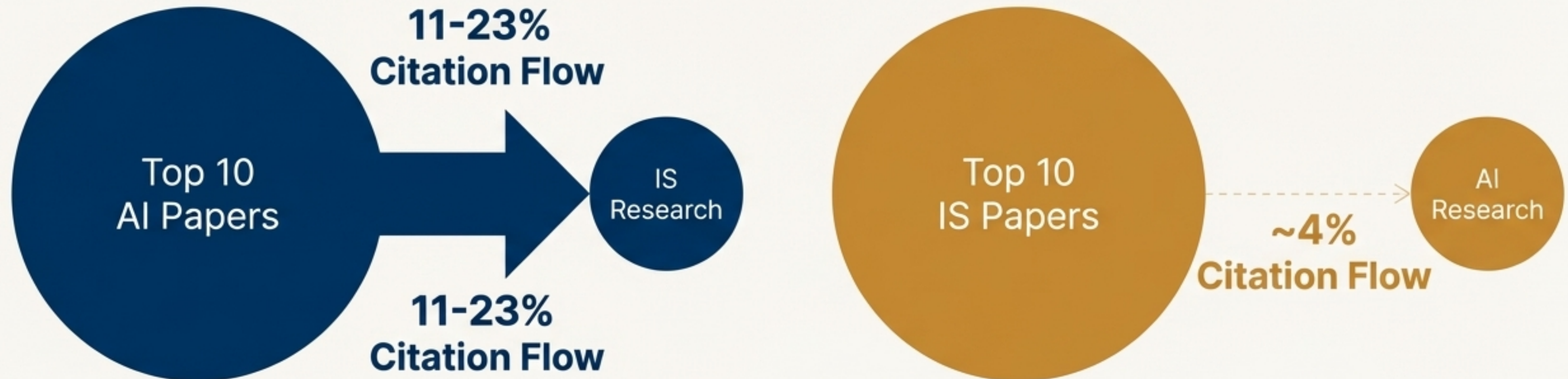
Finding 4: The Publishing Record Shows Divergent Trajectories

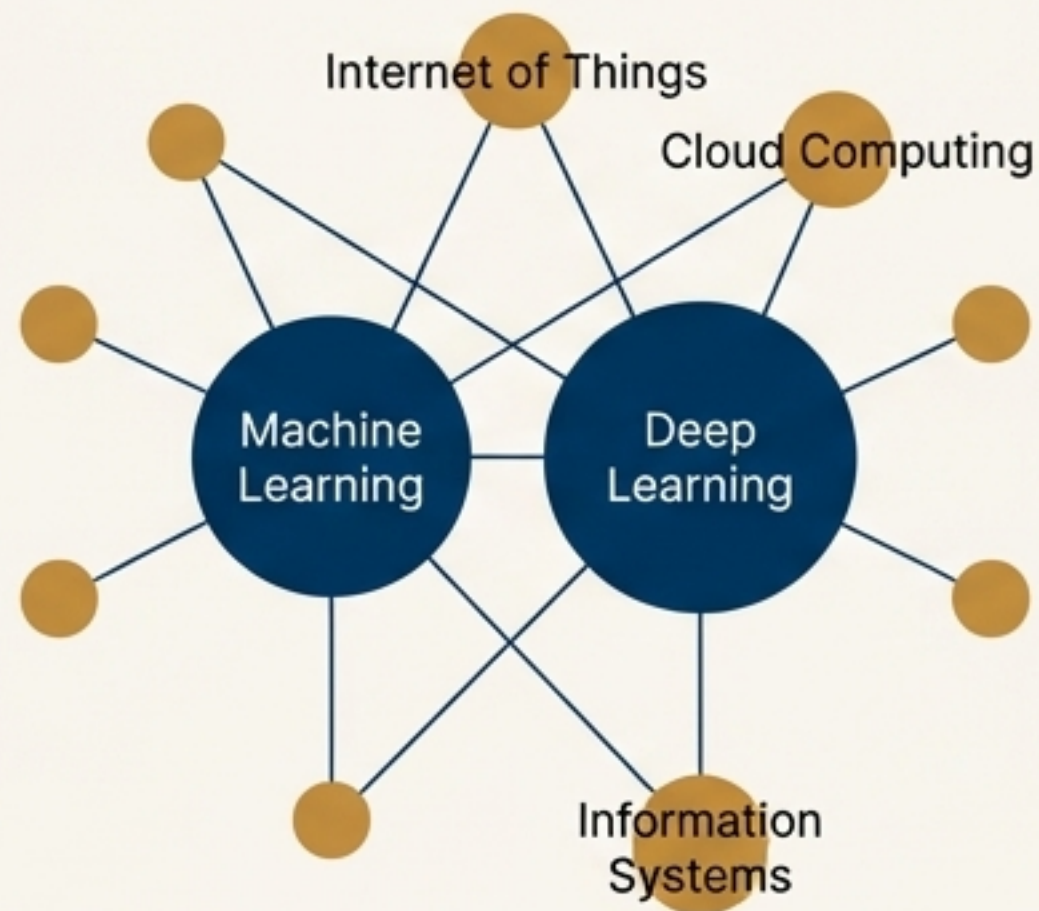Examining publication trends within the top journals of each field provides a final confirmation. The number of AI-focused papers published in top IS journals shows explosive, linear growth. Meanwhile, the number of IS-focused papers in top AI journals remains flat and marginal.

AI-related Publications in Top IS Journals

$y = 8.9818x - 1.4$

IS-related Publications in Top AI Journals
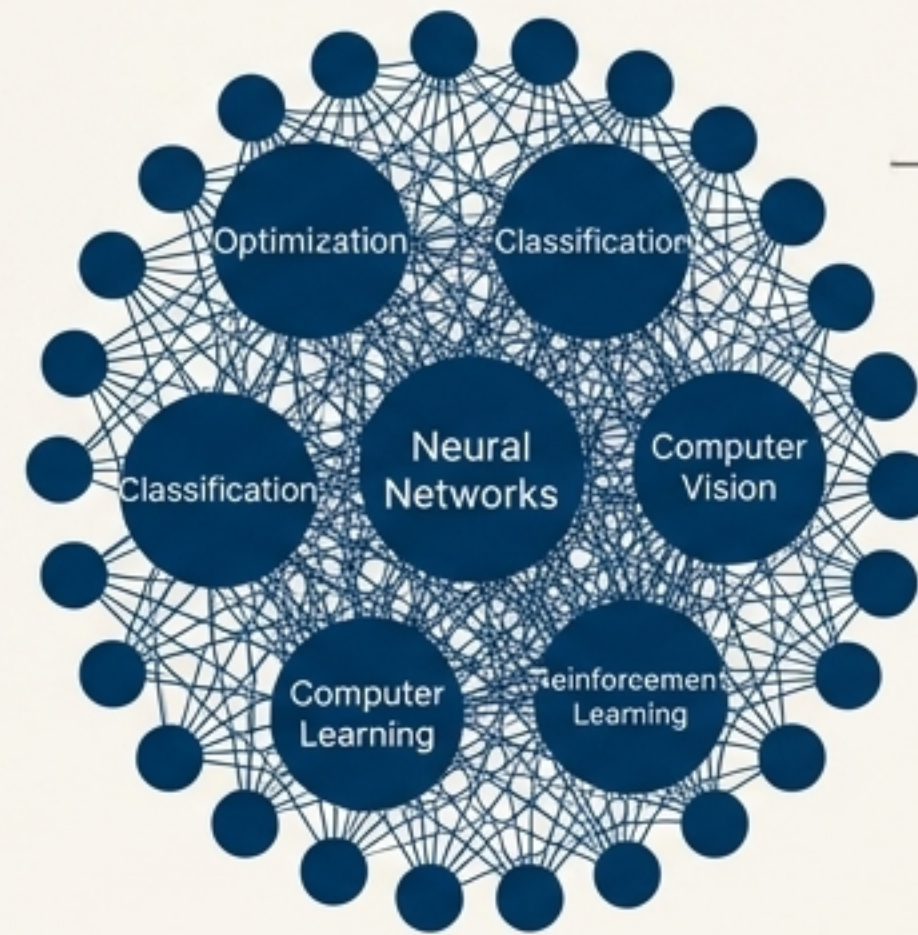
$y = 2.6x - 4.8$
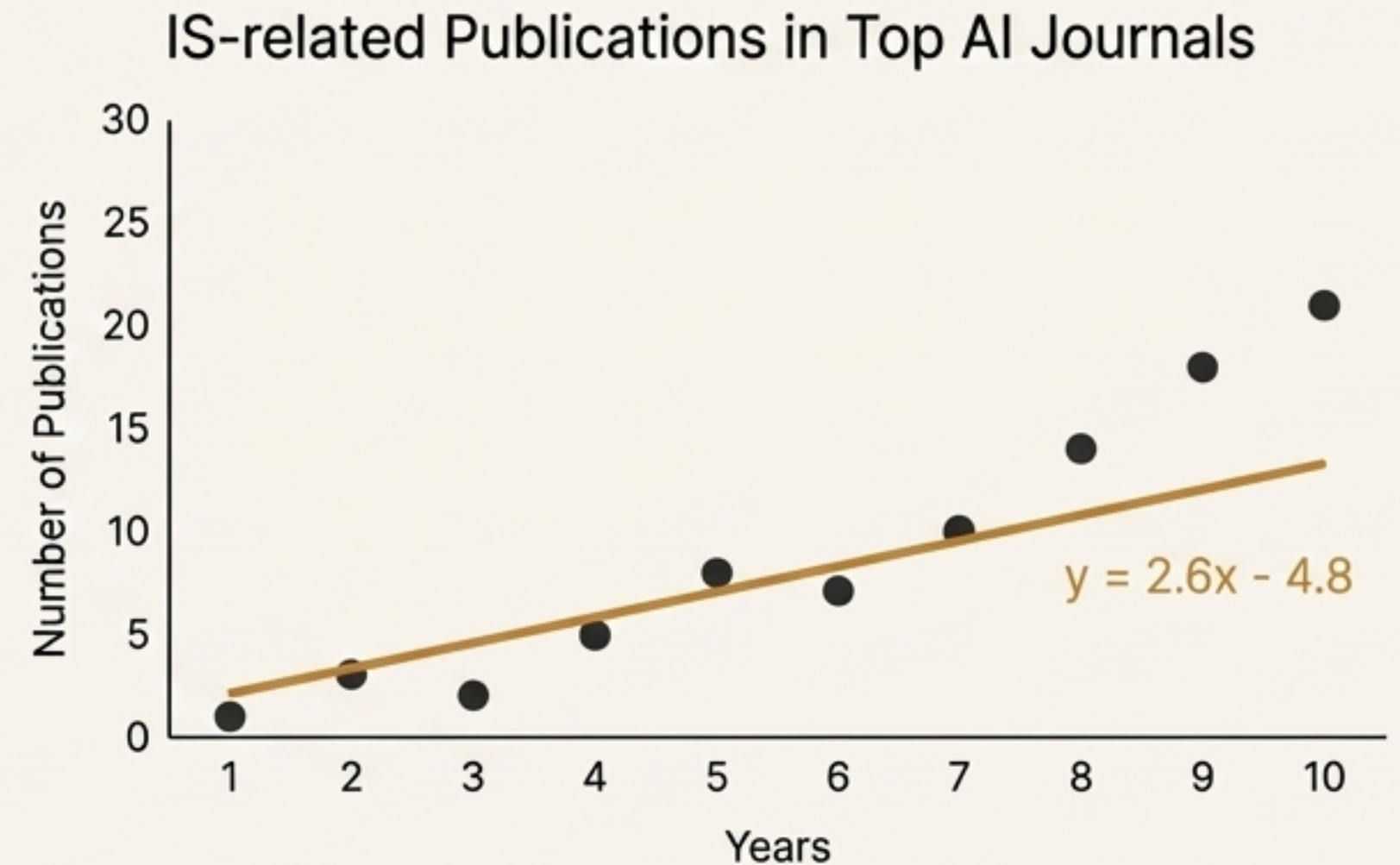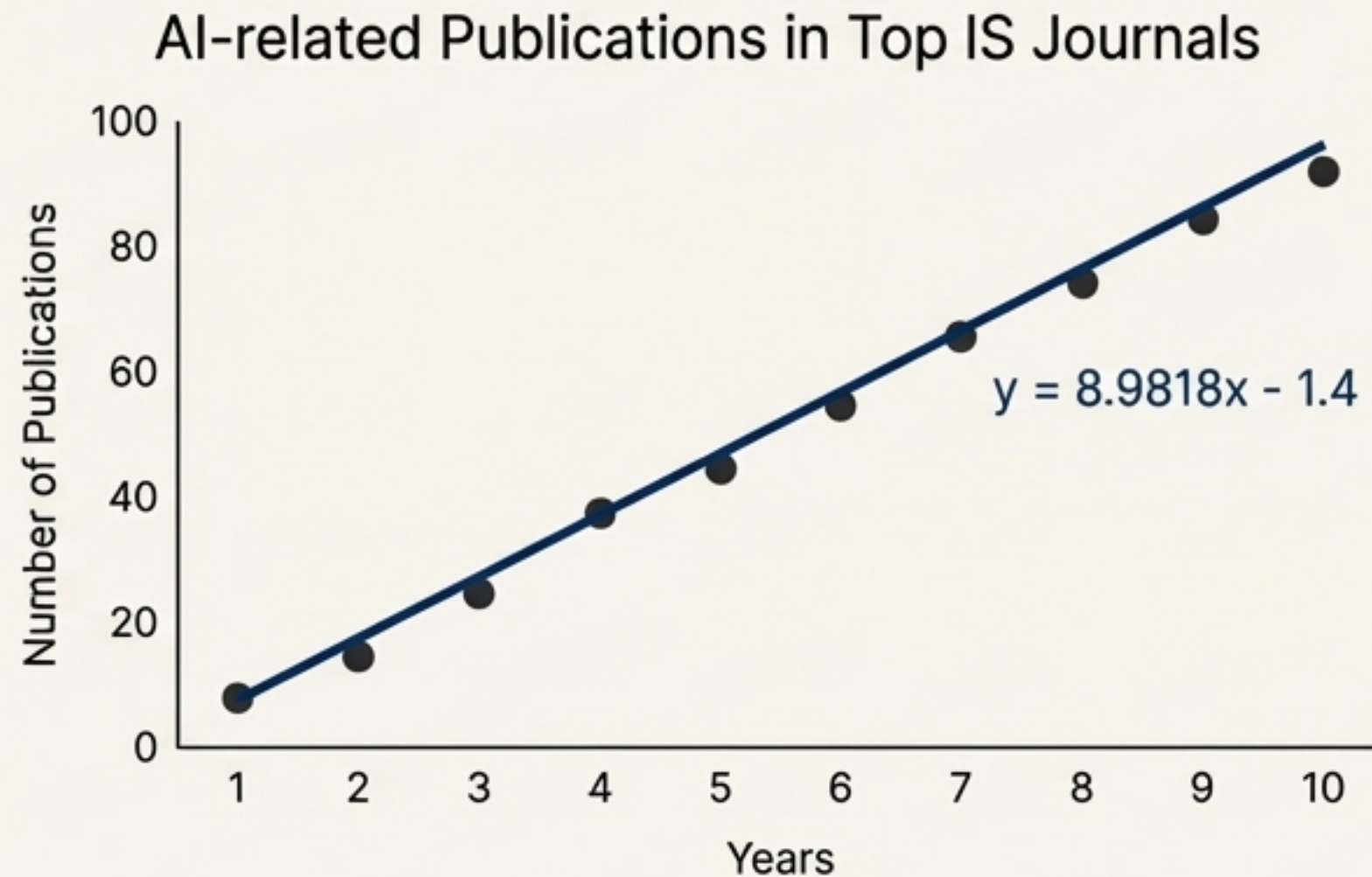
Finding 5: Keyword Networks Reveal Separate Intellectual Worlds

A bibliometric analysis of author-provided keywords in the most influential papers reveals the conceptual landscape of each field. While IS research heavily incorporates AI terminology like "deep learning" and "machine learning," the core AI research landscape shows no reciprocal integration of IS concepts like "design science" or "research methods."

IS Research Keyword Landscape

Internet of Things
Cloud Computing
Machine Learning
Deep Learning
Information Systems

AI Research Keyword Landscape

Optimization
Classification
Classification
Neural Networks
Computer Vision
Computer Learning
Reinforcement Learning

Absence of IS concepts like "Design Science" or "Research Methods".

Case Study: The Genesis of a Foundational AI Technology

The development of Convolutional Neural Networks (CNNs)—a pillar of modern AI—provides a clear example of this dynamic.

- **Semantic Distance**: The Normalized Index Distance (NID) between 'CNN' and 'Information Systems' is over 1.0, indicating the terms appear in distinct, separate forums.

- **Influential Works**: An analysis of the seminal CNN papers (e.g., LeCun et al. 1998, Krizhevsky et al. 2012) and their citing works reveals they are published in, and cited by, core AI journals and authors.

- **Conclusion**: There is no bibliometric evidence to suggest that IS research or methodologies played a role in the invention or evolution of this transformative technology.

1980: Neocognitron

1998: LeNet-5

2012: AlexNet

Bibliometric analysis shows no significant IS influence at any stage.

NotebookLM

The New Reality: A Unidirectional Flow of Influence

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Foundational Field: AI → **Applied Field: IS**

The cumulative evidence refutes the "minds and hands" metaphor. The relationship between AI and IS is not a balanced partnership but a **unidirectional flow of influence** from a foundational, technical field (AI) to an applied one (IS). This pattern is a classic case of **"methodological importation,"** where an applied discipline borrows tools and techniques to operationalize complex systems, while the core science develops independently. The interaction is not reciprocal.

Why This Re-evaluation Matters: Aligning Strategy with Reality

Understanding this asymmetric relationship has critical implications for academic and research strategy. Acknowledging the actual dynamics of knowledge transfer allows for more effective:

Curriculum Design

Ensuring IS programs properly equip students to be sophisticated consumers and implementers of foundational AI technologies.

Research Evaluation

Accurately assessing the nature of contributions, distinguishing between foundational invention (primarily in AI) and innovative application (primarily in IS).

Strategic Planning

Guiding institutional investment and fostering collaborations that reflect the true unidirectional mode of interdisciplinarity.

A Note on Nuance & Limitations

This analysis provides a macro-level view based on bibliometric data. It is important to acknowledge the inherent limitations of this approach:

- **Keyword & Classification Ambiguity:** The terms 'AI' and 'IS' can be used inconsistently, and database classification schemes (WOS vs. Scopus) differ in scope and granularity.
- **Citation Context:** Our metrics measure the volume of cross-disciplinary referencing but not the context. Citations can be for support, critique, or background, which this analysis does not distinguish.

Despite these limitations, the consistency of the findings across multiple metrics and datasets presents a robust and compelling case.

The Next Frontier: Moving from 'Use' to 'Integration'

Our findings confirm that IS research is increasingly using AI tools. The more profound question for the future of the IS field is whether this represents a true epistemological integration.

Future research must distinguish between:

1. **Instrumental Use**: Applying AI as a tool to solve existing IS problems.

2. **Epistemological Integration**: AI methods fundamentally shifting how IS researchers conceptualize problems, formulate theories, and define validity.

Understanding this distinction will be key to charting the future evolution of Information Systems as a discipline.