Summary of *Artificial Intelligence in Information Systems Research: A Systematic Literature Review and Research Agenda*

This document provides a structured summary of the research paper by Christopher Collins, Denis Dennehy, Kieran Conboy, and Patrick Mikalef (published in *International Journal of Information Management*, 2021). The paper conducts a systematic literature review (SLR) of AI in IS research from 2005–2020, analyzing 98 primary studies.

Paper Metadata

Abstract Summary: Reviews AI's role in IS, highlighting business value, practical implications, and future research agenda amid fragmented knowledge building.

Overview

- AI is positioned as transformative across sectors (supply chains, medicine, automobiles).
- Global spending projected at \$98 billion by 2023.
- IS research shows fragmented approaches and inconsistent definitions.

Key Motivations:

- AI's historical "summers and winters," resurgence since 2010 due to algorithms, hardware, and big data.
- Concern: fragmented knowledge creation in IS.

Comparison to Prior SLRs:

- Broader in scope than earlier domain-specific reviews (e.g., AI in radiology, AI-blockchain).

Background and Related Work

Evolution of AI Definitions

- Origin: 1950s (Turing, Dartmouth Conference).
- Variations: Strong AI vs. Weak AI; rule-based vs. neural networks.
- No universal definition; 28 variations found in reviewed studies.
- Common theme: AI as systems mimicking human cognition.

AI Functions (Dejoux & Léon, 2018)

- **Expert Systems:** Simulate problem-solving (e.g., DENDRAL).
- **Machine Learning (ML):** Learns from data (recommendation systems).
- **Robotics:** Computer-controlled physical motions (service robots).
- **Natural Language Processing (NLP):** Analyzes language (Siri, Alexa).
- **Machine Vision:** Image analysis (autonomous driving).
- **Speech Recognition:** Converts speech to text (Google Dictate).

Use Cases: Manufacturing (automation), healthcare (monitoring), marketing (forecasting).

Research Methodology

- Followed Okoli's (2015) 8-step SLR approach.
- **Research Questions:**
- RQ1: How is AI defined in IS?
- RQ2: Current state of AI in IS (trends, channels, methods, contributions, functions)?
- RQ3: What is AI's business value?

Search Strategy:

- Databases: AIS eLibrary, Scopus, Web of Science.
- Journals: 9 top IS journals.
- Conferences: ICIS, ECIS.
- Results: 1,877 studies → 98 primary (2005–2020).

Validity Threats Mitigated: Protocol, bias reduction meetings, audit trail.
Limitation: Focused on IS outlets (possible publication bias).

Key Findings

RQ1: AI Definitions

- 54/98: No definition.
- 7/98: Self-defined.
- Most cited: Russell & Norvig.
- Concern: inconsistency hinders cumulative knowledge.

RQ2: Current State of AI in IS

- **Trends:** Surge post-2015 (esp. 2019–2020).
- **Channels:** ICIS (41), ECIS (24), IJIM (14), MISQ (3).
- **Methods:** Quantitative (44), Qualitative (31), Reviews (13), Mixed (8).
- **Contributions:** Lessons (40), Methods (26), Tools/Models (low).
- **AI Functions:** ML dominant (69). Other functions far less studied.

RQ3: Business Value (Davenport & Ronanki, 2018)

- **Process Automation:** 49 studies.
- **Cognitive Insight:** 32 studies.

- **Cognitive Engagement:** 17 studies.

Discussion

- **Definitions:** Lack of cohesion, often tied to human intelligence.
- **Resurgence:** Driven by technology; societal impacts underexplored.
- **Contribution Gaps:** Overemphasis on lessons; little on tools/models.
- **ML Dominance:** Robotics, NLP, vision lag behind.
- **Business Value:** Most focus on automation, least on engagement.

Implications:

- **Theoretical:** Identifies IS AI research gaps.
- **Practical:** Guides investments (e.g., ML for agility).

Future Research Agenda

- **AI Definition:** Consensus-building.
- **Resurgence:** Explore societal/personal impacts.
- **Machine Learning:** Effectiveness evaluation.
- **Expert Systems:** Hybrid vs. classical methods.
- **Robotics:** Long-term/psychological impacts.
- **NLP:** Value of advanced chatbots.
- **Machine Vision:** Leveraging hardware/AI advances.
- **Additional gaps:** Sustainability, public sector, diffusion studies.

Limitations and Conclusion

- **Limitations:** Publication bias; IS-only outlets.
- **Conclusion:** AI transforms IS but research is fragmented. Clearer definitions and cumulative, rigorous research needed.