

# MISQ Archivist

## Taming Complexity in Search Matching: Two-Sided Recommender Systems on Digital Platforms

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### Abstract

We study digital multi-sided platforms as complex adaptive business systems (CABS) where multiple sides have different and evolving objectives, preferences, and constraints. CABS are characterized by irreducible uncertainty which cannot be reduced by the traditional approaches of collecting and processing data. Irreducible uncertainty in the system gives rise to a complex search matching problem between agents and value enhancing transactions. This paper presents a recommender systems-based approach for taming the complexity by allowing agents to co-evolve and learn in the system. We propose a novel two-sided recommender system framework that considers emergence on both sides of the platform and adapts to the changing environment to influence agents. An agent-based simulation model is developed based on popular internet-based educational platforms to study this complex system and test our hypotheses. Our results show the value of a two-sided recommender system to tame complex search matching in platforms. We discuss implications for information systems and complexity science research.

**Keywords:** Complex adaptive business systems, recommender systems, two-sided recommender system, digital platforms, complex search matching problem, agent-based simulation modeling