MISQ Archivist

The Evolution of Information Systems Architecture: An Agent-Based Simulation Model

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Abstract

Understanding how information systems (IS) architecture evolves and what outcomes can be expected from the evolution of IS architecture presents a considerable challenge for both research and practice. The evolution of IS architecture is marked by management's efforts to keep local and short-term IS investments in line with enterprise-wide and long-term objectives, so they often employ coercive mechanisms to enforce enterprise-wide considerations on local actors. However, an organization is shaped by a multitude of heterogeneous local actors' actions that pursue their own, sometimes conflicting, goals, norms, and values. This study offers a theory-informed simulation model that explores how IS architecture evolves and with what outcomes in various types of organizations. The simulation model is informed by institutional theory to capture various types of organizations that are characterized by different combinations of coercive, normative, and mimetic pressures, and by complex adaptive systems theory to capture the emergent character of IS architecture's evolution. First, we outline the insights from simulation experiments. Then, building on the simulation model and theoretical insights, we discuss implications for both research and practice.

Keywords: Information systems architecture, complex adaptive systems, institutional theory, agent-based modeling, simulation