

Editorial Introduction to Issue 46 of CSIMQ: Advances in Modeling and Analysis of Socio-Technical Systems

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Complex Systems Informatics and Modeling Quarterly (CSIMQ) continues to publish research that deepens our understanding of complex socio-technical systems and advanced modeling practices. This issue contains five contributions that collectively highlight current developments in enterprise modeling, organizational behavior, socio-technical analysis, and systems architectures. All articles have undergone the journal’s standard peer-review process.

The issue starts with two studies examining systemic structures and organizational ecosystems.

The article “Modeling a Business Ecosystem from the Point of View of a Particular Participant” applies concepts from biological cybernetics – such as autopoiesis and structural coupling – to the modeling of business ecosystems surrounding a focal enterprise. Using the Fractal Enterprise Model, the authors propose modeling patterns that help organizations identify missing activities and improve internal and external alignment.

In “A Bibliometric and Contextual Analysis of Technology-Related Stressors in Flexible Working Arrangements: A Socio-Technical Perspective”, the authors present a socio-technical analysis of technology-related stressors emerging in hybrid and flexible work environments. Their bibliometric and contextual findings highlight a shift toward human-centric outcomes, reveal methodological gaps, and outline future research priorities for understanding cross-subsystem stressor interactions in digitally mature and emerging economies.

The next article, “Advancing a Speech Act-Based Model to Improve Future Quality of Information Security Policies Using Large Language Models”, develops a conceptual model grounded in speech-act theory to evaluate and improve the communicative clarity of information security policies. Analyzing 600 policy statements, the authors identify key quality dimensions (semantic, empirical, physical, and deontic) that can guide future LLM-supported information security policy refinement.

The final two articles shift attention to enterprise architecture and intelligent environments, addressing new challenges related to organizational adaptability and knowledge-intensive infrastructures.

In “Advancing Enterprise Architecture Debt: A Work System Theory Perspective on Modernization and Resilience”, the authors argue that Enterprise Architecture Debt (EAD) extends

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beyond traditional technical debt. They identify Work System Theory as a strong foundation for understanding the socio-technical impacts of architectural misalignments on modernization and organizational resilience.

The issue concludes with “A Hybrid LLM–Knowledge Graph Architecture for Information Retrieval in Smart Buildings”. Addressing the complexities of integrating IoT data with Building Information Models, the authors propose a dual-paradigm architecture combining knowledge graphs with LLM-mediated interaction. Through design-science iterations, they evaluate and compare the architectural alternatives and highlight opportunities for adaptive building information environments.

The articles in this issue demonstrate the continued evolution of modeling practices, socio-technical analysis, and decision-support mechanisms across multiple domains. They show how conceptual insights, empirical evaluations, and design-science methodologies can jointly address challenges in organizational ecosystems, information security, and enterprise architecture.

We thank all authors and reviewers for their contributions and are pleased to present this issue of CSIMQ to our community.