

Applications of Agent-Based Modeling and Simulation in Organization Management

Abstract

This dissertation applies agent-based modeling and simulation (ABMS) in examining organization management with the objective of developing a novel means to overcome the constraints in existing approaches and add value to the study of organization management. I achieve this goal through the applications of ABMS in three studies addressing the specific contexts of team and organizational dynamics. After introductory information, in Chapter 2, I systematically review and objectively analyze articles published during 2001–2019 by using the bibliometric mapping technique. I identify four clusters of the ABMS research within the organization management domain—microdynamics and emergence, dynamically coevolved relationships, complex organizations, and interorganizational processes—that serve as the backbone for later three studies.

Chapter 3 through 5 addresses the key question: “How can ABMS be applied to overcome the limitations in existing approaches used to study organization management?” The first study (Chapter 3) focuses on the potential negative effects of transactive memory system (TMS) on team performance. This study theorizes and examines how two effects—the information concentration on experts and the transaction cost incurred in TMS information processing—interplay across levels, magnify over time, and ultimately override the benefits of TMS. This study further explores two countermeasures to mitigate the coevolved effects; adds theoretical precision to TMS theory by proposing a three-stage model of TMS effectiveness. The second study (Chapter 4) addresses the research question of how intragroup conflicts evolve across levels over time to make an impact on team decision-making. This study extends the

current research model of intragroup conflict; develops a multilevel and dynamic model of intragroup conflict that explicitly includes (a) the role of time and (b) the feedback loops to encompass the dynamic aspect of intragroup conflict. This study applies the extended model in the context of team decision-making to investigate how two types of intragroup conflict—task and relationship conflict—interplay with cross-level antecedences, interrelate and develop nonlinearly over time, and affect team outcomes. The third study (Chapter 5) focuses on complex organizations. This study integrates the means of the activity-system map and NK model; probes how strategic activities of two companies interplay for achieving organization performance through different paths of the organizations' exploration strategy over time. This study also applies the computational model to simulate business shock and resilience to overcome methodological challenges. Moreover, the study proposes a four-step dynamic analysis of the activity-system map by connecting the theoretical framework to the practical usage; extends organization management research to be integrally embedded with the dynamic view. Results, limitations, and directions for future research are discussed.

By presenting these findings, this dissertation concludes that ABMS shows considerable promise as a novel means to resolve tough questions in the organization management field.