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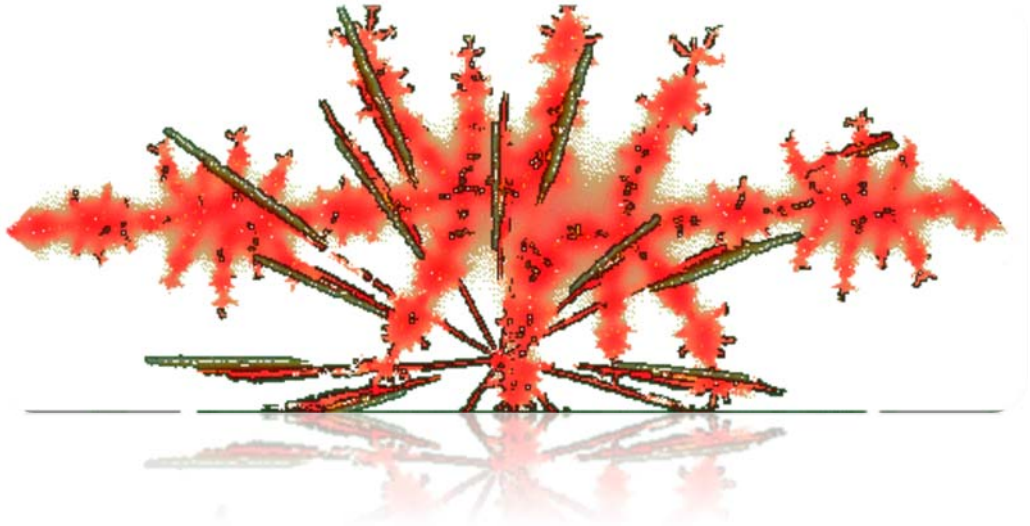

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pp. 385-394.

From Bounded Rationality to Collective Behavior

Andrea Ceschi, *University of Verona, Italy*, and **Guido Fioretti**, *University of Bologna, Italy*

Abstract: Since the pioneering work of Herbert A. Simon, bounded rationality (BR) constitutes a viable alternative to utility maximization in settings characterized by uncertainty about the possible emergence of novel events, missing information, and limitations to human reasoning. Because of its realism, BR gained consensus in organization and management studies. However, BR is a theory of individual decision-making. Substantial extensions are required in order to turn it into a tool to analyze collective decision processes. Following an intuition by the late Simon himself, we submit that organizations channel information flows in ways that alleviate human BR. Thus, analysis and reconstruction of their structure as well as differential degrees and qualities of individual BR within organizations is key to extend this concept to collective decision-making. In this special issue we collected contributions where instances of BR couple with interaction structures to yield collective behavior. Tools range from mathematical models to experimental settings to computational models, testifying to the value of multiple approaches and perspectives.

Key Words: collective rationality, organizational rationality, information structures

pp. 395-406.

Individual Rationality and Market Efficiency

Steven Gjerstad, *Chapman University, Orange, CA and* **Jason Shachat**, *University of Durham, Durham, UK*

Abstract: Smith's (1962) demonstration that prices and allocations quickly converge to the competitive equilibrium in the continuous double auction (CDA) remains one of the most important results in experimental economics. Market experiments and exchange models have added considerably to our knowledge of how markets reach equilibrium, and how they respond to disruptions. Perhaps the best-known model of exchange in CDA market experiments is the random behavior "zero-intelligence" (ZI) model by Gode and Sunder (1993). They argue that the CDA generates efficient allocations and "convergence of transaction prices to the proximity of the theoretical equilibrium price,"

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provided only that agents meet their budget constraints. We demonstrate that prices do not converge in their simulations. Their budget constraint requires that a buyer's currency never exceeds her commodity value, which is an unnatural restriction. Their conclusion that market efficiency results from the structure of the CDA independent of traders' profit seeking behavior rests on their claim that the constraints that they impose are a part of the market institution. We show that actually they impose individual rationality. Misinterpretation of this behavioral constraint has led to unproductive debate on market adjustment processes.

pp. 407-425.

To Enter or Not to Enter: Multiple Markets, Heterogeneous Customer and Exogenous Quality

Ann van Ackere, *Université de Lausanne, Lausanne, Switzerland*, and **Erik R Larsen**, *Aarhus University, Aarhus, Denmark*

Abstract: We consider a stylized model of competition between two firms who provide a local service, for instance coffee-shops or hamburger chains. These firms are characterised by their quality of service, with one firm being high quality and the other being low quality. Quality impacts both the fixed and variable costs of the firms. The firms compete for customers in two areas, which are characterised by a different customer density. Firms decide in which area(s) to locate, and what price to charge. A firm entering both areas must charge the same price in both, i.e., price-discrimination is not allowed. We analyse the impact of cost levels and quality and density differences on the resulting market structure, prices, profits, customer surplus and social welfare. We show how the balance between fixed and variable cost determine the competitive conditions ranging from highly competitive markets to local monopolies under the same regulatory environment. Furthermore, in some areas with multiple equilibria the profitability of the firms is highly dependent on which of the possible equilibria is realised. The results can help explain some of the patterns observed in the location of chain outlets.

pp. 427-453.

Making Sense of Sanctions: An Agent-Based Model of Sanction Recognition

Martin Neumann, *Johannes Gutenberg University, Mainz, Germany, and* ***Ulf Lotzmann,*** *University of Koblenz, Germany*

Abstract: Theories of norm emergence are a central building block for comprehending the emergence of society. The article investigates a central terminus in theories of norms, in particular rational choice theory: The notion of sanctions. Sanctions are an unexplained theoretical term for securing norm conformity. Agent-based models inspired by evolutionary game theory show that the evolution of cooperation can be enforced by sanctions. However, in behavioral terms, sanctions are a form of aggression. An empirical investigation of the violent collapse of a criminal group reveals that interpretation is necessary for recognizing aggression as sanction. Whereas theories of norms attempt to explain the emergence of social structure, successful sanction recognition imposes the existence of social structure in the form of normative authorities. In the absence of social structure for securing social order such as the state monopoly of violence this interpretation remains ambiguous and error prone. Simulation experiments with an agent-based model investigate the conditions for the emergence of a normative authority.

pp. 455-465.

The Garbage Can Model: A Study in (Non)Reproducible Research

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Abstract: The classic paper "A Garbage Can Model of Organizational Choice" by Cohen, March and Olsen (1972) both heralded a significant expansion of the study of organizational decision making to non-industrial settings, in particular universities, and served as a very early example of reproducible computational research, incorporating a Fortran 66 program in its appendix to permit others to reproduce their results and run further examples. In this work my extensive attempts to perfectly reproduce the original results show the inherent challenge of reproducing computational research in the presence of ever-changing computing platforms and technology. Indeed, exact values could not be reproduced in this study, nor any other published study, because of hypersensitivity. Despite this, additional statistics allowed by modern computer capabilities almost completely agree with the qualitative observations and conclusions in the original work. Finally, in light of the need for high precision, it will be worthwhile to retest and reevaluate later studies of the internal dynamics of the model that faulted the code for behavior at odds with the theory.

pp. 467-505.

Computational Modeling Approaches to Organizational Change

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Abstract: Change is ubiquitous in the study of organizations. Organizational change is characterized by multiple perspectives, both conceptually and methodologically. Computational modeling efforts are not the exception. In this work, we aim to provide an analysis of computational modeling approaches to organizational change. For that, we first review published works that directly connect to developing knowledge in organizational change from a computational lens. Second, we offer an account of unexplored topics in computational organizational change. Last, we highlight the potentialities of computer simulation models based on agent interactions in regard to how they could contribute to the understanding of central issues in this organizational research subfield.

pp. 507-522.

Identifying Rivals Among Clustered and Isolated Firms: An Empirical Investigation and a Computational Model

Cristina Boari, Guido Fioretti, *and* ***Vincenza Odorici,*** *University of Bologna, Italy*

Abstract: We carried out an empirical investigation among producers of packaging machines collecting information about their rivals, i.e., those few competitors which they closely monitor. We found interesting regularities that take geographically clustered firms apart from isolated firms, that existing theories left unexplained. By constructing an agent-based model we were able to formulate a simple and plausible heuristic for rival selection which is able to generate the empirically observed facts. We submit that this case is exemplary in showing what agent-based models can do, namely, providing sufficiency proofs that help theory-building.

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