Book review:
From System Complexity to Emergent Properties
Aziz-Alaoui, M.A. and Bertelle, C. (eds.)

This book contains a variety of perspectives on simulation models of complexity and emergence. It aims to give the reader new ways for studying emergence by using ‘complexity modeling’. It is the second volume by these editors in the series on Understanding Complex Systems and contains 18 chapters by 38 authors. The authors are mostly from French and other European universities. The chapters are grouped in five parts: the first deals with concepts for complexity modeling and the others with applications in the domains of geography, networks, transport and decision support.

Focusing on the JASSS audience, the question rises what this book will bring to complexity modeling in social simulation. Overall, it is a useful set of chapters for the JASSS audience that is looking for new approaches and promising developments. The title may be confusing, because the focus on modeling is stronger than one would expect.

As mentioned, the volume has a strong focus on the simulation of complex systems, also in the first, theoretical, part which is called concepts for complexity modeling. The advice for modeling and dealing with complexity (mainly from Sitte, ch. 2) is very useful and can be helpful for many modelers. Furthermore, the first part provides a variety of definitions, typologies and overviews of core concepts related to complexity and simulation (e.g. complexity, model, simulation, emergence, self-organization and chaos). The first part, however, does not read as an introduction into complexity, emergence, or complexity modeling. Also interesting is the attempt of Chen et al. (ch. 4) to develop a formalism incorporating multiple levels of scale, rather than just observing the emergent properties from a lower modeled level. Applications of such an approach still need to show its merits. The chapters in this first part are, lack connections to the parts presenting applications (expect for ch. 5 and 10, which are both by Gecow).

The other four parts deal with case studies of complexity modeling. Many of the models are still at a conceptual level and present the results of work in progress. Some of the developments are well-structured, well-written, innovative and insightful (amongst others chap. 11 by Corson et al., chap. 13 by Bertelle et al., and chap. 15 by Ramaekers et al). In addition, most of the chapters are well-embedded in their scientific context: they are clearly relevant from a scientific point of view.

Only a few chapters report on implementations, and present promising but preliminary results. What is lacking is the linkage to society. Especially in complexity modeling, parts of the research should have a strong focus on problem-solving applications in real-world situations. There is a huge potential on the domains described (e.g. planning, collaboration, etc.). Not a single chapter describes the issues that ‘emerge’ when complexity modeling is applied in practice: when problem-owners need to use the tools that are proposed. That would lead to many new issues that need to be tackled or incorporated in the setup of complexity modeling studies: privacy of medical data, dealing with information withholding, coupling of ICT systems, incomplete data, etc.

A volume containing a variety of modeling studies could benefit from a common chapter structure, i.e. prescribing a number of modeling components in their presentation. That would prevent that vital modeling aspects are lacking, which is the case in some of the chapters in
In conclusion, the four points of critique mentioned earlier are: 1. Most of the work remains on a conceptual level and conclude in a lot of potential. 2. The model presentations are sometimes incomplete (for instance lacking a clear modeling objective, validation of models and sound interpretation). 3. No connection is made to applications in the real-world. 4. No attempt is made for synthesis between the different parts in this volume. Nevertheless, this volume brings the JASSS audience a variety of new perspectives on complexity and emergence and a portfolio of approaches that can be used for complexity modeling.

Emile J. L. Chappin, MSc
Energy and Industry Section
Faculty of Technology, Policy and Management
Delft University of Technology
P.O. Box 5015
2600 GA Delft
The Netherlands