

---

# Contents

---

<i>List of contributors</i>	viii
<i>List of reviewers</i>	xxiii
<i>Acknowledgements</i>	xxiv
<i>Editors' introduction by Eve Mitleton-Kelly, Alexandros Paraskevas and Christopher Day</i>	xxv
<b>PART I COMPLEXITY SCIENCE RESEARCH PHILOSOPHY</b>	
<i>Introduction to Part I by Henrik Jeldtoft Jensen</i>	
1 Introduction to the strategy and methods of complex systems <i>Yaneer Bar-Yam</i>	5
2 Complex evolving social systems: unending, imperfect learning <i>Peter Allen</i>	18
3 Information theoretic measures of causality: music performance as a case study <i>Fatimah Abdul Razak, Xiaogeng Wan and Henrik Jeldtoft Jensen</i>	45
<b>PART II CASE-BASED QUALITATIVE TECHNIQUES</b>	
<i>Introduction to Part II by Peter Allen</i>	
4 Addressing global challenges: the EMK complexity methodology <i>Eve Mitleton-Kelly</i>	61
5 Complexity informed social research: from complexity concepts to creative applications <i>Lesley Kuhn</i>	74
6 From isolation to transformation with C2 <i>Hazel Stuteley and Jonathan Stead</i>	95
7 Using complexity principles to understand the nature of relations for creating a culture of publically engaged research within higher education institutes <i>Robin Durie, Craig Lundy and Katrina Wyatt</i>	114
<b>PART III VISUAL METHODOLOGIES</b>	
<i>Introduction to Part III by Alexandros Paraskevas</i>	
8 The art of complexity: using visual artefacts and dialogue to bridge the gap between strategic plans and local actions in organisations <i>Julian Burton and Sam Mockett</i>	137

- 9 Inner complexity: using *Landscape of the Mind* to catalyse change in organisations 157  
*Kate Hopkinson*
- 10 On the visualization of dynamic structure: understanding the distinction between static and dynamic network topology 178  
*Kurt A. Richardson and Andrew Tait*
- 11 Network text analysis and social network analysis in investigating complex governance networks: applications of AutoMap and ORA 199  
*Göktuğ Morçöl and Sohee Kim*

#### PART IV MODELLING AND STATISTICAL ANALYSIS OF EMPIRICAL DATA

*Introduction to Part IV by Bill McKelvey*

- 12 Using maximum likelihood estimation methods and complexity science concepts to research power law-distributed phenomena 227  
*G. Christopher Crawford and Bill McKelvey*
- 13 Multifractal signatures of intersectionality: nonlinear dynamics permits quantitative modeling of hierarchical patterns in gender dynamics at the cultural level 254  
*Hannah L. Brown, Chase R. Booth, Elizabeth G. Eason and Damian G. Kelty-Stephen*
- 14 Modeling social complexity in infrastructures: a case-based approach to improving reliability and resiliency 267  
*Carl J. Dister, Brian Castellani and Rajeev Rajaram*
- 15 Phase transitions and social contagion as enabling mechanisms for coordinated action in populations: a mathematical framework 285  
*James K. Hazy and Peter R. Wolenski*
- 16 Applying complex adaptive systems to agent-based models for social programme evaluation 312  
*Michael E. Wolf-Branigin, William G. Kennedy, Emily S. Ihara and Catherine J. Tompkins*
- 17 Complexity, the bridging science of emerging respiratory outbreak response 327  
*Babak Pourbohloul, Krista M. English and Nathaniel Hupert*

#### PART V MULTI-LEVEL NETWORKS

*Introduction to Part V by Patrick Beaument*

- 18 Multilevel systems and policy 363  
*Jeffrey Johnson, Joyce Fortune and Jane Bromley*
- 19 Complex scenarios in socio-economic data: a comprehensive analytical study 388  
*Sanjay Kumar Palit, Santo Banerjee and Sayan Mukherjee*

20	Employment of tools and models appropriate to complex, real-world situations <i>Patrick Beautement</i>	426
21	Leadership network structure and influence dynamics <i>Michael Gabbay</i>	459
<b>PART VI MIXED METHODS AND COMPLEX ANALOGIES</b>		
<i>Introduction to Part VI by Benyamin Lichtenstein</i>		
22	Complex analogy and modular exaptation: some definitional clarifications <i>Pierpaolo Andriani and Giuseppe Carignani</i>	483
23	Emergence and radical novelty: from theory to methods <i>Jeffrey A. Goldstein</i>	507
24	Applying the 15 complexity sciences: methods for studying emergence in organizations <i>Benyamin Lichtenstein</i>	525
25	Mixed methods research: a method for complex systems <i>Liz Varga</i>	545
26	Dynamical systems therapy (DST): complex adaptive systems in psychiatry and psychotherapy <i>Yakov Shapiro and J. Rowan Scott</i>	567
	<i>Index</i>	591