# Contents

*List of figures* xii
*List of tables* xiii
*Acknowledgements* xiv

PART I
**Foundations** 1

**1 Introduction** 3
*1.1 Introduction 3*
*1.2 Developments in systems thinking 4*
*1.3 Structure of the book 9*

**2 Philosophical foundations: critical realism** 10
*2.1 Introduction and context 10*
*2.2 Problems in the philosophy of natural science 11*
*2.3 An introduction to critical realism 16*
*2.4 Criticisms of critical realism 22*
*2.5 Conclusions 27*

**3 Systems thinking and critical realism** 28
*3.1 Introduction and context 28*
*3.2 The development of basic systems concepts 28*
*3.3 Systemic concepts in Bhaskar's early work 36*
*3.4 Systemic concepts in dialectical critical realism 42*
*3.5 Conclusions 47*

PART II
**Ontological issues** 49

**4 Explanatory mechanisms** 51
*4.1 Introduction 51*

*4.2 Deduction, induction and abduction: the logic of mechanistic explanation in critical realism 52*
*4.3 Parts, wholes and boundaries: the basis of systemic thinking 55*
*4.4 Issues in mechanistic explanation 55*
*4.5 Conclusions 63*

**5 Emergence, generative powers and causality** 65
*5.1 Introduction 65*
*5.2 Emergence and causality 65*
*5.3 Powers, properties and tendencies 71*
*5.4 Events: the Actual and the Real 73*
*5.5 Abstracting causal relations – demi-regs 78*
*5.6 Conclusions 83*

**6 Can social systems be autopoietic?** 85
*6.1 Introduction 85*
*6.2 The attractions and problems of social autopoiesis 85*
*6.3 Society as a system of autopoietic communication 90*
*6.4 Structuration theory and critical realism 97*
*6.5 Conclusions 110*

**PART III**
**Epistemological issues** 115

**7 Observing systems: the question of boundaries** 117
*7.1 Introduction 117*
*7.2 Physical boundaries 118*
*7.3 Mathematical boundaries 123*
*7.4 Conceptual boundaries and language 126*
*7.5 The boundaries of social systems 134*
*7.6 Self-bounding through organization closure 134*
*7.7 The problem of the observer 137*
*7.8 Boundary setting in practical interventions 143*
*7.9 Conclusions 144*

**8 Knowledge and forms of truth** 147
*8.1 Introduction 147*
*8.2 The realism debate 148*
*8.3 Knowledge management 149*
*8.4 Truth 152*

*8.5 Forms of knowledge and truth 159*
*8.6 Conclusions 166*

PART IV
**Practical issues** 169

**9 Methodology: what *might* we do?** 171
*9.1 Introduction 171*
*9.2 Quantitative methods in systems research 172*
*9.3 Qualitative methods in systems research 181*
*9.4 Multimethodology 184*
*9.5 Critical realism and research 187*
*9.6 Conclusions 194*

**10 Ethics: what *should* we do?** 195
*10.1 Introduction 195*
*10.2 Philosophical ethics 195*
*10.3 Business ethics 197*
*10.4 Habermasian discourse ethics 199*
*10.5. Ethics in critical realism 205*
*10.6 Comparing Habermas and Bhaskar 209*
*10.7 Applying discourse ethics and critical realism in management 214*
*10.8 Conclusions 216*

**11 Conclusion** 218

*Bibliography* 220
*Index* 245