

Contents

Introduction	1
Part I The Cultures of Cities	
1 The Two Cultures of Cities	9
1.1 The Two Cultures	9
1.2 The Two Cultures of Cities	10
1.3 Parallel Currents	12
1.4 CTC – One Medium with Two Messages	13
2 The First Culture of Cities	17
2.1 Thünen’s Isolated State	17
2.1.1 The “Isolated City”	19
2.2 The Best Location	20
2.3 Cities as Central Places	23
2.4 Rank-Size Cities	25
2.5 Ecological Cities	28
2.6 The Eco-City	31
2.7 Gravity Cities	32
2.8 Spatial Diffusion and the City	34
2.9 Cities as Simple Systems	38
3 The Second Culture of Cities	39
3.1 Introduction	39
3.2 SMH (Structuralist-Marxist and Humanistic) Cities	40
3.2.1 The City of Social Justice	41
3.2.2 The Marxist City	42
3.2.3 The Humanistic City: From Space to Place and Back Again	43
3.3 PPD Cities (Postmodern, Poststructuralist, and Deconstruction)	46
3.3.1 The PPD City	47

3.4	The Third Way	48
3.4.1	Hägerstrand's City of Daily Routines	50
3.5	CTC as a Link Between the Two Cultures of Cities	52
4	Complexity Theories of Cities (CTC)	53
4.1	Introduction	53
4.1.1	Bénard Cells	53
4.1.2	A Concise Introduction to Self-Organization and Complexity	54
4.2	Long-Term Complexity Theories of Cities	57
4.2.1	Dissipative Cities	57
4.2.2	Synergetic Cities	60
4.2.3	Sandpile Cities	69
4.3	Short-Term Complexity Theories of Cities	72
4.3.1	Chaotic Cities	72
4.3.2	Fractal Cities	79
4.4	Complexity Models of Cities	85
4.4.1	Cellular Automata and Agent-Based Cities	85
4.4.2	FACS (Free Agents on a Cellular Space) Cities	88
4.4.3	Small World Cities	90
4.5	Concluding Notes: CTC – First, Second, or Third Culture of Cities?	94
5	Complexity Theories of Cities Have Come of Age: Achievements, Criticism, and Potentials	95
5.1	Achievements	95
5.2	Criticism	98
5.2.1	What Went Wrong?	99
5.2.2	The Medium is the Message	100
5.2.3	Implicit Criticism	100
5.2.4	The Qualitative Message of Complexity Theory to Cities ...	102
5.2.5	Partial Application	102
5.2.6	Adaptive vs. Nonadaptive Application	103
5.2.7	The Limits of Nonadaptive CTC	105
5.2.8	Simple vs Complex Agents	107
5.3	Potentials	107
5.4	Concluding Notes	109
 Part II Complexity, Cognition and the City		
6	Cognition, Complexity and the City	113
6.1	Cognition	113
6.1.1	Cognitive Science – A Concise Introduction	114
6.1.2	The Black Box	114

6.1.3	Classical Cognitivism	114
6.1.4	Embodied Cognition	115
6.2	Cognition and the City	117
6.2.1	Cognitive Maps	118
6.2.2	The Image of the City	119
6.3	Cognitive Cities	121
6.3.1	Systematic Distortions in Cognitive Maps	122
6.3.2	Kinds of Cognitive Maps of Cities	123
6.4	Cognition and Complexity	127
6.4.1	Synergetics and Cognition	129
6.4.2	Self-Organizing (Cognitive) Maps	130
6.5	Complexity, Cognition and the Dynamics of Cities	131
6.5.1	The Boundary of the City as an Arena	132
6.5.2	The Boundary of the City as a Derivation and Representation	133
6.5.3	The Boundary of Reductionism	134
6.6	A Concluding Note: SIRN (Synergetic Inter-Representation Networks)	138
7	SIRN – Synergetic Inter-Representation Networks	139
7.1	Introduction	139
7.2	IRN and SIRN: A Preliminary Introduction	139
7.2.1	From IRN to SIRN	140
7.2.2	SIRN's List of Basic Propositions	141
7.3	SIRN's Basic Propositions	142
7.3.1	Innate Capability for Representation	142
7.3.2	The Interaction Between Internal and External Representations	143
7.3.3	Shannonian and Semantic Information	147
7.3.4	Implicate and Explicate Relations	150
7.3.5	Similarity to Genotype–Phenotype Relations	151
7.3.6	The Boundaries of the Cognitive	152
7.3.7	Synergetics	156
7.4	SIRN – The Basic Model and its Three Submodels	158
7.4.1	The Basic SIRN Model	158
7.4.2	Intrapersonal Subjective Submodel	160
7.4.3	Interpersonal Collective Process	162
7.4.4	Interpersonal with a Common Reservoir	163
7.5	Concluding Notes	165
8	Shannonian Information and the City	167
8.1	Introduction	167

8.2	Faces	168
8.2.1	The Face	168
8.2.2	The Face of the City	168
8.2.3	Two Questions and Two Answers	171
8.3	Legitimizing Artifacts in the Process of Cognition	173
8.3.1	Artifacts	173
8.4	Shannon's Information and Cognition	174
8.4.1	Shannon's Information	174
8.4.2	The Magical Number 7	175
8.4.3	Figurative Goodness	176
8.5	How Many Bits to the Face of the City?	179
8.5.1	Houses	179
8.5.2	Streets	184
8.5.3	Local vs. Global Information	185
8.6	Concluding Notes	186
9	Semantic Information and the City	187
9.1	Introduction	187
9.2	Semantic information enters in disguise	187
9.3	Aspects of Semantic Information	189
9.3.1	Pattern Recognition – The Process that Gives Rise to Semantic Information	189
9.3.2	Grouping and Sequential Processing	191
9.3.3	Semantic Categorization and Shannonian Information – The Gaudi Effect	193
9.3.4	Central Place Grouping and Categorization	199
9.3.5	Semantic Information and Self-Organization	199
9.4	Implications	201
9.4.1	Information Theory	201
9.4.2	Cognition	201
9.4.3	Pragmatic Information	202
9.4.4	Urban Elements	204
9.4.5	SIRN: A New View on Categorization and Pattern Recognition	206
9.4.6	Information Adaptation	209
9.5	Concluding Remarks	209
10	Notes on the Category 'City'	211
10.1	Introduction	211
10.2	Cities from the Point of View of Cognition	212
10.2.1	The City as a Classical Category	212
10.2.2	The City of Wittgenstein	213
10.2.3	The Embodied Cities of Experiential Realism	213
10.3	The City – A Peculiar Category	215

10.3.1	Cities Are Very Large Objects	215
10.3.2	Each Single City Is Itself a Category	216
10.3.3	Cities Are Artifacts	217
10.3.4	Cities Are Self-Organizing Systems	218
10.3.5	The Category 'City' has a 5,000 Year-Long Life Span ...	218
10.4	The Boundary of the Cognitive	219
10.5	Concluding Notes	220
11	Complex Artificial Environments	223
11.1	Introduction	223
11.2	Cities and Languages	224
11.2.1	Chomsky's E- vs. I-Languages	224
11.2.2	Space Syntax	225
11.2.3	Alexander's Pattern Language	225
11.2.4	Complex vs. Simple Artificial Systems	225
11.3	Cities and the Sciences of the Artificial	227
11.3.1	Methodology	227
11.3.2	The Ant Hypothesis	228
11.3.3	Information Compression	231
11.4	CTC as a Link Between Space and Place	233
11.4.1	CTC – The Deeper Messages	233
11.4.2	The Production of Space and Place	234
11.4.3	The Differences	236
11.4.4	Place and Space as Two Forms of Information Compression	237
11.5	The Two Cultures Once Again	240
 Part III Complexity, Cognition and Planning		
12	The Two Cultures of Planning	243
12.1	Introduction	243
12.2	The Planning Pendulum	244
12.2.1	Utopian Planning – The First Hermeneutic Culture of Planning	244
12.2.2	The 'Rational Comprehensive' as the First Scientific Culture of Planning	244
12.2.3	SMH Planning as the Second Hermeneutic Culture of Planning	245
12.2.4	The Catch of the Kitsch	246
12.3	Planning and the New Urban Reality	247
12.3.1	The Collabative Planning Approach	247
12.3.2	Strategic Urban Planning (SUP)	248
12.3.3	On the Conjunction Between Collaborative Planning and SUP	249

12.3.4	Governance	250
12.3.5	New Urbanism	250
12.4	Complexity Theories of Cities: First, second, or third culture of planning?	251
12.4.1	CTC: The Quantitative Message	252
12.4.2	CTC – The Qualitative Message	253
13	Complexity, Cognition, and Planning	255
13.1	Introduction	255
13.2	Cognitive Planning	256
13.3	Memory and Planning	257
13.4	Complexity, Cognition, and Planning	259
13.4.1	Pattern Recognition	259
13.4.2	Decision Making	259
13.5	Collective Urban Planning and Design	261
13.5.1	A SIRM View on Planning, Design, and Construction	261
13.5.2	Collective Planning	262
13.5.3	Collective Design	265
13.6	Concluding Implications	266
13.6.1	From Solitary to Collective and Professional Planning ...	266
13.6.2	Collective Design?	267
13.6.3	Planning Behavior	268
14	Learning from Paradoxes about Prediction and Planning in Self-Organizing Cities	269
14.1	Introduction	269
14.1.1	Achilles and the Tortoise	269
14.1.2	Paradoxes	270
14.2	From Schrödinger's Cat to Planning Paradoxes	271
14.2.1	Schrödinger's Cat	272
14.2.2	The rbc City Paradox	273
14.2.3	An Imaginary Prediction Paradox	274
14.2.4	A Real Case of Planning Paradox	275
14.3	Learning from Paradoxes	276
14.3.1	Self-Fulfilling and Self-Falsifying Predictions (SFFP) ..	277
14.3.2	Classical vs. Self-Organizing Planning Theories	277
14.3.3	Prediction in Complex Self-Organizing Systems	278
14.3.4	Planning in Dual Self-Organizing Systems	280
14.3.5	Memory, Complexity, Prediction, and Planning	280
14.3.6	Prediction as Information	281
14.4	Concluding Notes	282
15	CTC, Social Theory Oriented Urban Theory, and Planning	285
15.1	Linking CTC Oriented and Social Theory Oriented Planning ..	285

15.1.1	The Self-Organization of Communicative Planning	285
15.1.2	The Ethical Dimension of CTC	286
15.1.3	The Butterfly Effect of Tel Aviv Balconies and its Implications	287
15.1.4	Forms of Planning	288
15.1.5	Public Participation in Planning	289
15.2	Toward a CTC-Derived Planning Theory	290
15.2.1	The Current Problematic of Planning Theory	290
15.2.2	The Structure of the Planning System – The Missing Components of Planning Theory	291
15.2.3	The Perception of the City as a Derivation/ Representation and its Planning Implications	293
15.2.4	The City as a Market Failure and Externality	294
15.2.5	Planning as an Instrumental Arm of the National Government	294
15.2.6	The Planners and the Planned	295
15.2.7	Toward an Urban Derived Urban Planning	296
16	A Self-Planned City	299
16.1	Introduction	299
16.2	The Three Planning Authorities	300
16.2.1	The Legislative Planning Authority	301
16.2.2	The Planning Executive Systems	302
16.2.3	The Judiciary Planning Authority	302
16.3	The Planning Law	304
16.3.1	Sources of Inspiration	304
16.3.2	The Matrix of Urban Elements	305
16.4	Planning Hermeneutics	308
16.5	Concluding Notes	310
 Part IV Complexity, Cognition and Urban Simulation Models		
17	Revisiting Cognitive Dissonance and Memes-Derived Urban Simulation Models	315
17.1	Introduction	315
17.2	Principles of SIRN USM	315
17.2.1	A Comprehensive CTC	315
17.2.2	A Cognitive CTC	316
17.2.3	Simple vs. Complex Agents	316
17.2.4	Intentions vs. Behavior	317
17.2.5	Classical Social Theory	317
17.2.6	Complexity Theories	318
17.2.7	SIRN	318
17.3	Cognitive Dissonance-Derived USM	319

17.3.1	Cognitive Dissonance	319
17.3.2	Spatial Cognitive Dissonance	319
17.3.3	Cognitive Dissonance, Chaos, and Emerging Urban Boundaries	320
17.3.4	The Model	322
17.3.5	Results: Spatial Cognitive Dissonance and Socio-Spatial Emergence	323
17.4	Memes-Derived USM	325
17.4.1	The Genetic Code Metaphor	326
17.4.2	Memes and the Extended Phenotype	326
17.4.3	The Model	328
17.4.4	The Definition of the m-Code	329
17.4.5	Cultural Groups	329
17.4.6	Local and Global Information	330
17.4.7	Some Results	330
17.4.8	Model Dynamics for Low-Dimensional Cultural Identity: $K = 1$ and $K = 2$	332
17.5	Concluding Notes	334
18	CogCity (Cognitive City): A Top-down→Bottom-up USM	335
18.1	Introduction	335
18.2	Cognitive Processes and Their Implications	335
18.2.1	A SIRN Urban Simulation Model	335
18.2.2	Information Compression Implies a Top-down Decision Process	338
18.2.3	Agents' c- and s-Cognitive Maps	339
18.2.4	Embodied Spatial Models	341
18.2.5	The Infrastructural Urban Categories	342
18.2.6	The Overall Model Dynamics	343
18.3	Cognitive City (CogCity) – The Model	344
18.3.1	The Agents	344
18.3.2	The Infrastructural Categories	345
18.4	Results	346
18.5	Concluding Notes	349
19	Pattern Recognition, SIRN and Decision Making	351
19.1	Introduction	351
19.2	Pattern Recognition as Decision Making	351
19.3	An Extension Concerning Cognitive Mapping	355
19.4	Decision-Making Heuristics	356
19.5	A SIRN Approach to Decision Making	359
19.5.1	Intrapersonal Decision Making	360
19.5.2	Interpersonal and Collective Decision Making	361
19.6	An Outline for a SIRN Decision-Making Model	364

20 Decision Making, Conflicts and Time in a Synergetic City 367

20.1 Introduction 367

20.2 Synergetics – A Reminder 368

20.2.1 The Assignment Problem 369

20.3 The Model 370

20.4 Simulation Results 372

20.5 Time-Dependent Costs, Neighborhoods, and Dynamic
Clusters 378

20.6 Conclusions 380

**Concluding Notes: Complexity Theories of Cities at
the Gate of the 2010s** 383

Bibliography 387

Index 409



<http://www.springer.com/978-3-642-19450-4>

Complexity, Cognition and the City

Portugali, J.

2011, XXIII, 412 p. 156 illus., Hardcover

ISBN: 978-3-642-19450-4