Complexity Theories Of Cities Have Come Of Age An Overview With Implications To Urban Planning And Design

In the contemporary city, the physical infrastructure and sensorial experiences of two millennia are now inter-woven within an invisible digital matrix. This matrix alters human perceptions of the city, informs our behaviour and increasingly influences the urban designs we ultimately inhabit. Digital Futures and the City of Today cuts through these issues to analyse the work of architects, designers, media specialists and a growing number of community activists, laying out a multi-faceted view of the complex integrated phenomenon of the contemporary city. Split into three sections, the book interrogates the concept of the 'smart' city, examines innovative digital projects from around the world, documents experimental visions for the future, and describes projects that engage local communities in the design process.

Complexity, complex systems and complexity theories are becoming increasingly important within a variety disciplines. While these issues are less well known within the discipline of spatial planning, there has been a recent growing awareness and interest. As planners grapple with how to consider the vagaries of the real world when putting together proposals for future development, they question how complexity, complex systems and complexity theories might prove useful with regard to spatial planning and the physical environment. This book provides a readable overview, presenting and relating a range of understandings and characteristics of complexity and complex systems as they are relevant to planning. It recognizes multiple, relational approaches of dynamic complexity which enhance understandings of, and facilitate working with, contingencies of place, time and the various participants' behaviours. In doing so, it should contribute to a better understanding of processes with regard to our physical and social worlds.

This book provides a thorough discussion about fundamental questions regarding urban theories and modeling. It is a curated collection of contributions to a workshop held in Paris on October 12th and 13th 2017 at the Institute of Complex Systems by the team of ERC GeoDiverCity. There are several chapters conveying the answers given by single authors to problems of conceptualization and modeling and others in which scholars reply to their conception and question them. Even, the chapters transcribing keynote presentations were rewritten according to contributions from the respective discussions. The result is a complete “state of the art” of what is our knowledge about urban processes and their possible formalization.

Generally, textbooks on urban geography and urban planning are based on ideas laid out in the west and are unable to explicitly connect those ideas to the way Indians experience their cities. This gap is addressed in this book by reconceptualising Indian urban studies. The reconceptualisation is done by dissecting western theories, concepts, paradigms, and principles and practices, and placing them alongside how Indians experience their urban landscapes. Such a comparative analysis allows readers to break from their past understandings of the structure and dynamics of Indian cities as well as enable researchers to make exploratory hypotheses. The book will empower students to craft and implement new approaches, unconstrained by orthodox theories and biases. Primarily intended for the students of Geography and Urban Planning, the book covers the evolution of urban structures and dynamics of settlements in India, largely after India's Independence. There are seven chapters in the book. First three chapters describe and explain the evolution of Indian settlements up to the present. The next four chapters focus on regions, urban planning, urban governance and the social landscape of Indian cities. Each chapter ends with a set of short and long answer questions. KEY FEATURES Large coverage of the syllabi prescribed in Indian academic institutions Strategically organised text of each chapter for the ease of learning Abundant case studies in each chapter Chapter-end short-answer, long-answer and fill-in the blank type exercise problems Target Audience B.Arch BA/B.Sc (Geography) MA/M.Sc (Geography)

Permaculture is more than just the latest buzzword; it offers positive solutions for many of the environmental and social challenges confronting us. And nowhere are those remedies more needed and desired than in our cities.The Permaculture City provides practical guidance and plenty of examples for creating abundant food, energy security, close-knit communities, local and meaningful livelihoods, and sustainable policies in our cities and towns. Permaculturists have learned that the same nature-based approach that works so beautifully for growing food—connecting the pieces of the landscape together in harmonious ways—applies perfectly to many of our other needs. This book shows, in the stories of the innovators who are doing it as well as in how-to instructions, how permaculture design can help towndwellers solve the challenges of meeting our needs for food, water, shelter, energy, community, and livelihood in sustainable, resilient ways.

This book presents emerging work in the co-evolving fields of design-led systemics, referred to as systemic design to distinguish it from the engineering and hard science epistemologies of system design or systems engineering. There are significant societal forces and organizational demands impelling the requirement for “better means of change” through integrated design practices of systems and services. Here we call on advanced design to lead programs of strategic scale and higher complexity (e.g., social policy, healthcare, education, urbanization) while adapting systems thinking methods, creatively pushing the boundaries beyond the popular modes of systems dynamics and soft systems. Systemic design is distinguished by its scale, social complexity and integration – it is concerned with higher-order systems that that entail multiple subsystems. By integrating systems thinking and its methods, systemic design brings human-centred design to complex, multi-stakeholder service systems. As designers engage with ever more complex problem areas, it is necessary to draw on a basis other than individual creativity and contemporary “design thinking” methods. Systems theories can co-evolve with a new school of design theory to resolve informed action on today’s highly resilient complex problems and can deal effectively with demanding, contested and high-stakes challenges.

A proposal for a new way to understand cities and their design not as artifacts but as systems composed of flows and networks. In The New Science of Cities, Michael Batty suggests that to understand cities we must view them not simply as places in space but as systems of networks and flows. To understand space, he argues, we must understand flows, and to understand flows, we must understand networks—the relations between objects that compose the system of the city. Drawing on the complexity sciences, social physics, urban economics, transportation theory, regional science, and urban geography, and building on his own previous work, Batty introduces theories and methods that reveal the deep structure of how cities function. Batty presents the foundations of a new science of cities, defining flows and their networks and introducing tools that can be applied to understanding different aspects of city structure. He examines the size of cities, their internal order, the transport routes that define them, and the locations that fix these networks. He introduces methods of simulation that range from simple stochastic models to bottom-up evolutionary models to aggregate land-use transportation models. Then, using largely the same tools, he presents design and decision-making models that predict interactions and flows in future cities. These networks emphasize a notion with relevance for future research and planning: that design of cities is collective action.

Written by some of the founders of complexity theory and complexity theories of cities (CTC), this Handbook expertly guides the reader through over twenty years of intertwined developments: the emergence of general theories of complex self-organized systems and the consequent emergence of CTC. Examining studies from the end of 1970 through to the current leading approach to urbanism, planning and design, the book provides an up-to-date snapshot of CTC. Insightful chapters are split into five parts covering the early foundations of the topic, the evolution of towns and cities and urban complexity, modeling traffic and parking in cities, and urban planning and design. The Handbook on Cities and Complexity concludes with the contributors' personal statements on their observations of Covid-19's impact upon global cities. This book will be an invaluable resource for those researching cities and complexity and also for scholars of urban studies, planning, physics, mathematics, AI, and architecture.

Nam P. Suh focussed his axiomatic design theories on methods to understand and deal with complexity. Suh is a well-respected designer and researcher in the fields of manufacturing and composite materials. He is best known for his systems that aim to speed up and simplify the process of design for manufacturing. The 'axioms' in axiomatic design refer to a process to help engineers reduce design specifications down to their simplest components, so that the engineers can produce the simplest possible solution to a problem. Complexity, besides being a key area of burgeoning research in disciplines interested in complex systems and chaos theory (like computer science and physics), is a complicating factor in engineering design that many engineers find difficult to overcome. Suh's multidisciplinary exploration of complex systems is meant to eliminate much of the confusion and allow engineers to accommodate complexity within simple, elegant design solutions.

This book gathers a collection of the latest research, applications, and proposals, introducing readers to innovations and concepts from diverse environments and systems. As such, it will provide students and professionals alike with not only cutting-edge information, but also new inspirations and potential research directions. Each chapter focuses on a specific aspect of applied decision making, e.g. in complex systems, computational intelligence, security, and ubiquitous computing.

Provides guidelines for assessing the sustainability of urban systems including theory, methods and case studies.

Complexity, Cognition and the City aims at a deeper understanding of urbanism, while invoking, on an equal footing, the contributions both the hard and soft sciences have made, and are still making, when grappling with the many issues and facets of regional planning and dynamics. In this work, the author goes beyond merely seeing the city as a self-organized, emerging pattern of some collective interaction between many stylized urban "agents" – he makes the crucial step of attributing cognition to his agents and thus raises, for the first time, the question on how to deal with a complex system composed of many interacting complex agents in clearly defined settings. Accordingly, the author eventually addresses issues of practical relevance for urban planners and decision makers. The book unfolds its message in a largely nontechnical manner, so as to provide a broad interdisciplinary readership with insights, ideas, and other stimuli to encourage further research – with the twofold aim of further pushing back the boundaries of complexity science and emphasizing the all-important interrelation of hard and soft sciences in recognizing the cognitive sciences as another necessary ingredient for meaningful urban studies.

This book examines the introduction of smart technologies into public administrations and the organizational issues caused by these implementations, and the potential of information and communication technologies (ICTs) to rationalize and improve government, transform governance and organizational issues, and address economic, social, and environmental challenges. Cities are increasingly using new technologies in the delivery of public sector services and in the improvement of government transparency, business-led urban development, and urban sustainability. The book will examine specific smart projects that cities are embracing to improve transparency, efficiency, sustainability, mobility, and whether all cities are prepared to implement smart technologies and the incentives for promoting implementation. This focus on the smart technologies applied to public sector entities will be of interest to academics, researchers, policy-makers, public managers, international organizations and technical experts involved in and responsible for the governance, development and design of Smart Cities.

This book both analyzes and synthesizes new cutting-edge theories and methods for future design implementations in smart cities through interdisciplinary synergizing of architecture, technology, and the Internet of Things (IoT). Implementation of IoT enables the collection and data exchange of objects embedded with electronics, software, sensors, and network connectivity. Recently IoT practices have moved into uniquely identifiable objects that are able to transfer data directly into networks. This book features new technologically advanced ideas, highlighting properties of smart future city networks. Chapter contributors include theorists, computer scientists, mathematicians, and interdisciplinary planners, who currently work on identifying theories, essential elements, and practices where the IoT can impact the formation of smart cities and sustainability via optimization, network analyses, data mining, mathematical modeling and engineering. Moreover, this book includes research-based theories and real world practices aimed toward graduate researchers, experts, practitioners and the general public interested in architecture, engineering, mathematical modeling, industrial design, computer science technologies, and related fields.

'Over recent years Complexity Science has revealed to us new limits to our possible knowledge and control in social, cultural and economic systems. Instead of supposing that past statistics and patterns will give us predictable outcomes for possible actions, we now know the world is, and will always be, creative and surprising. Continuous structural evolution within such systems may change the mechanisms, descriptors, problems and opportunities, often negating policy aims. We therefore need to redevelop our thinking about interventions, policies and policy making, moving perhaps to a humbler, more 'learning' approach. In this Handbook, leading thinkers in multiple domains set out these new ideas and allow us to understand how these new ideas are changing policymaking and policies in this new era.' - Peter M

Allen, Cranfield University, UK
This edited volume provides an essential resource for urban morphology, the study of urban forms and structures, offering a much-needed mathematical perspective. Experts on a variety of mathematical modeling techniques provide new insights into specific aspects of the field, such as street networks, sustainability, and urban growth. The chapters collected here make a clear case for the importance of tools and methods to understand, model, and simulate the formation and evolution of cities. The chapters cover a wide variety of topics in urban morphology, and are conveniently organized by their mathematical principles. The first part covers fractals and focuses on how self-similar structures sort themselves out through competition. This is followed by a section on cellular automata, and includes chapters exploring how they generate fractal forms. Networks are the focus of the third part, which includes street networks and other forms as well. Chapters that examine complexity and its relation to urban structures are in part four.The fifth part introduces a variety of other quantitative models that can be used to study urban morphology. In the book's final section, a series of multidisciplinary commentaries offers readers new ways of looking at the relationship between mathematics and urban forms. Being the first book on this topic, Mathematics of Urban Morphology will be an invaluable resource for applied mathematicians and anyone studying urban morphology. Additionally, anyone who is interested in cities from the angle of economics, sociology, architecture, or geography will also find it useful. "This book provides a useful perspective on the state of the art with respect to urban morphology in general and mathematics as tools and frames to disentangle the ideas that pervade arguments about form and function in particular. There is much to absorb in the pages that follow and there are many pointers to ways in which these ideas can be linked to related theories of cities, urban design and urban policy analysis as well as new movements such as the role of computation in cities and the idea of the smart city. Much food for thought. Read on, digest, enjoy." From the foreword by Michael Batty
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Within the most recent discussion on smart cities and the way this vision is affecting urban changes and dynamics, this book explores the interplay between planning and design both at the level of the design and planning domains' theories and practices. Urban transformation is widely recognized as a complex phenomenon, rich in uncertainty. It is the unpredictable consequence of complex interplay between urban forces (both top-down or bottom-up), urban resources (spatial, social, economic and infrastructural as well as political or cognitive) and transformation opportunities (endogenous or exogenous). The recent attention to Urban Living Lab and Smart City initiatives is disclosinga promising bridge between the micro-scale environments, with the dynamics of such forces and resources, and the urban governance mechanisms. This bridge is represented by those urban collaborative environments, where processes of smart service co-design take place through dialogic interaction with and among citizens within a situated and cultural-specific frame.
This comprehensive Handbook summarizes existing work and presents new concepts and empirical results from leading scholars in the multidisciplinary field of behavioral and cognitive geography, the study of the human mind, and activity in and concerning space, place, and environment. It provides the broadest and most inclusive coverage of the field so far, including work relevant to human geography, cartography, and geographic information science.
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This book contains the contributions presented at the international workshop "The Dynamics of Complex Urban Systems: an interdisciplinary approach" held in Ascona, Switzerland in November 2004. Experts from several disciplines outline a conceptual framework for modeling and forecasting the dynamics of both growth-limited cities and megacities. Coverage reflects the various interdependencies between structural and social development.
Cover -- Title -- Copyright -- Contents -- Foreword -- Acknowledgements -- 1 Global competitiveness of cities -- 2 Regional development of cities -- 3 Innovation systems and multiple helix ecosystems -- 4 Social innovation, knowledge and networks in smart cities -- 5 Sustainable entrepreneurship in cities -- 6 Institutional entrepreneurship and urban planning -- 7 Entrepreneurial universities -- 8 The future of smart cities -- Index
This book, which resulted from an intensive discourse between experts from several disciplines – complexity theorists, cognitive scientists, philosophers, urban planners and urban designers, as well as a zoologist and a physiologist – addresses various issues regarding cities. It is a first step in responding to the challenge of generating just such a discourse, based on a dilemma identified in the CTC (Complexity Theories of Cities) domain. The latter has demonstrated that cities exhibit the properties of natural, organic complex systems: they are open, complex and bottom-up, have fractal structures and are often chaotic. CTC have further shown that many of the mathematical formalisms and models developed to study material and organic complex systems also apply to cities. The dilemma in the current state of CTC is that cities differ from natural complex systems in that they are hybrid complex systems composed, on the one hand, of artifacts such as buildings, roads and bridges, and of natural human agents on the other. This raises a plethora of new questions on the difference between the natural and the artificial, the cognitive origin of human action and behavior, and the role of planning and designing cities. The answers to these questions cannot come from a single discipline; they must instead emerge from a discourse between experts from several disciplines engaged in CTC.
Re-framing Urban Space: Urban Design for Emerging Hybrid and High-Density Conditions rethinks the role and meaning of urban spaces through current trends and challenges in urban development. In emerging dense, hybrid, complex and dynamic urban conditions, public urban space is not only a precious and contested commodity, but also one of the key vehicles for achieving socially, environmentally and economically sustainable urban living. Past research has been predominantly focused on familiar models of urban space, such as squares, plazas, streets, parks and arcades, without consistent and clear rules on what constitutes good urban space, let alone what constitutes good urban space in 'high-density context'. Through an innovative and integrative research framework, Re-Framing Urban Space guides the assessment, planning, design and re-design of urban spaces at various stages of the decision-making process, facilitating an understanding of how enduring qualities are expressed and negotiated through design measures in high-density urban environments. This book explores over 50 best practice case studies of recent urban design projects in high-density contexts, including Singapore, Beijing, Tokyo, New York, and Rotterdam. Visually compelling and insightful, Re-Framing Urban Space provides a comprehensive and accessible means to understand the critical properties that shape new urban spaces, illustrating key design components and principles. An invaluable guide to the stages of urban design, planning, policy and decision making, this book is essential reading for urban design and planning professionals, academics and students interested in public spaces within high-density urban development.
A comprehensive core text from the expert in the field introducing students to the main issues of spatial systems modelling and analysis.
This book is a selection of the best and peer-reviewed articles presented at the CUPUM (Computers in Urban Planning and Urban Management) conference, held in the second week of July 2015 at MIT in Boston, USA. The contributions provide state-of the art overview of the availability and application of Planning Support Systems (PSS) in the framework of Smart Cities.
Understanding Complex Urban Systems takes as its point of departure the insight that the challenges of global urbanization and the complexity of urban systems cannot be understood – let alone 'managed'

– by sectoral and disciplinary approaches alone. But while there has recently been significant progress in broadening and refining the methodologies for the quantitative modeling of complex urban systems, in deepening the theoretical understanding of cities as complex systems, or in illuminating the implications for urban planning, there is still a lack of well-founded conceptual thinking on the methodological foundations and the strategies of modeling urban complexity across the disciplines. Bringing together experts from the fields of urban and spatial planning, ecology, urban geography, real estate analysis, organizational cybernetics, stochastic optimization, and literary studies, as well as specialists in various systems approaches and in transdisciplinary methodologies of urban analysis, the volume seeks to advance the discussion on multidisciplinary approaches to urban modeling. While engaging with the ‘state of the art’ in their respective fields, the contributions are specifically written for both experts from a broad range of disciplines as well as for urban practitioners who feel the need for new approaches given the uncertainty of current developments.

Spatial planning is about dealing with our 'everyday' environment. In A Planner's Encounter with Complexity we present various understandings of complexity and how the environment is considered accordingly. One of these considerations is the environment as subject to processes of continuous change, being either progressive or destructive, evolving non-linearly and alternating between stable and dynamic periods. If the environment that is subject to change is adaptive, self-organizing, robust and flexible in relation to this change, a process of evolution and co-evolution can be expected. This understanding of an evolving environment is not mainstream to every planner. However, in A Planner's Encounter with Complexity, we argue that environments confronted with discontinuous, non-linear evolving processes might be more real than the idea that an environment is simply a planner's creation. Above all, we argue that recognizing the 'complexity' of our environment offers an entirely new perspective on our world and our environment, on planning theory and practice, and on the raison d'être of the planners that we are. A Planner's Encounter with Complexity is organized into 17 chapters. It begins with the interplay of planning and complexity from the perspective of contemporary planning theory. It continues by critically assessing planning theory and practice in the light of the interdisciplinary debate regarding complexity thinking. As the book progresses, it positions itself ever closer to the perspective of complexity thinking, looking at the planning discipline 'from the outside in', clarifying the facets of complexity and its importance in planning. Finally, conceptual and theoretical developments towards more applied examples are identified in order to see the interplay of planning and complexity in practice. This book emphasizes the importance of complexity in planning, clarifies many of the concepts and theories, presents examples on planning and complexity, and proposes new ideas and methods for planning.

This book presents a theory as well as methods to understand and to purposively influence complex systems. It suggests a theory of complex systems as nested systems, i. e. systems that enclose other systems and that are simultaneously enclosed by even other systems. According to the theory presented, each enclosing system emerges through time from the generative activities of the systems they enclose. Systems are nested and often emerge unplanned, and every system of high dynamics is enclosed by a system of slower dynamics. An understanding of systems with faster dynamics, which are always guided by systems of slower dynamics, opens up not only new ways to understanding systems, but also to effectively influence them. The aim and subject of this book is to lay out these thoughts and explain their relevance to the purposive development of complex systems, which are exemplified in case studies from an urban system. The interested reader, who is not required to be familiar with system-theoretical concepts or with theories of emergence, will be guided through the development of a theory of emergent nested systems. The reader will also learn about new ways to influence the course of events - even though the course of events is, in principle, unpredictable, due to the ever-new emergence of real novelty.

Written by some of the founders of complexity theory and complexity theories of cities (CTC), this Handbook expertly guides the reader through over forty years of intertwined developments: the emergence of general theories of complex self-organized systems and the consequent emergence of CTC.

This book addresses up-to-date urban health issues from a systems perspective and provides an appealing integrated urban development strategy based on a 10-year global interdisciplinary research programme created by the International Council for Science (ICSU), and sponsored by the InterAcademy Partnership (IAP) and the United Nations University (UNU). The unique feature of this book is its “systems approach” to urban health and wellbeing: solution-oriented for science and society and not purely theoretical, it can be applied in the context of decision-making, and has the potential to unlock cities’ unused potential by promoting health and wellbeing. Furthermore, the inter- and transdisciplinary urban issues addressed in this book are examined from a cross-sectoral perspective – e.g. the transport sector is addressed in connection with air pollution, respiratory and cardiovascular diseases and the loss of productivity. The interconnected thinking to urban health and wellbeing makes the book a particularly valuable resource. Decision makers in city administrations and civil society organizations from different geographical regions will find the book an informative and inspiring guide for delivering towards the goals of the New Urban Agenda, for which health can be the vital indicator of progress. Graduate students and researchers will be attracted by the case studies, systems methods and models provided in the book.

Urban change is often difficult because we are dealing with people’s elusive notions of place and perception, time and change. Urban design and planning in a changing urban context so that it remains relevant for people is elusive because the idea of place is embedded in memory and identity – but whose memory and whose identity? This book seeks to understand the urban change dynamic so that the planning of urban places aligns with the dynamic of people’s perception of place. Planning Urban Places examines the premise that building cities is a concrete business surrounded by a shifting context. It discusses the notion of urban design and placemaking from the perspective of place perception and cognitive psychology, place philosophy and human geography. It also considers network theory to help illustrate the self-organising paradigm of small word network theory for planning urban places.

Consider this ... How do we handle the convergence of landscape architecture, ecological planning, and civil engineering? What are convenient terms and metaphors to communicate the interplay between design and ecology? What are suitable scientific theories and technological means? What innovations arise from multidisciplinary and cross-scalar approaches? What are appropriate aesthetic statements and spatial concepts? What instruments and tools should be applied? Revising Green Infrastructure: Concepts Between Nature and Design examines these questions and presents innovative approaches in designing green, landscape or nature as infrastructure from different perspectives and attitudes instead of adding another definition or category of green infrastructure. The editors bring together the work of selected ecologists, engineers, and landscape architects who discuss a variety of theoretical aspects, research projects, teaching methods, and best practice examples in green infrastructure. The approaches range from retrofitting existing infrastructures through landscape-based integrations of new infrastructures and envisioning prospective landscapes as hybrids, machines, or cultural extensions. The book explores a scientific functional approach in landscape architecture. It begins with an overview of green functionalism and includes examples of how new

design logics are deducted from ecology in order to meet economic and environmental requirements and open new aesthetic relationships toward nature. The contributors share a decidedly cultural perspective on nature as landscape. Their ecological view emphasizes the individual nature of specific local situations. Building on this foundation, the subsequent chapters present political ideas and programs defining social relations toward nature and their integration in different planning systems as well as their impact on nature and society. They explore different ways of participation and cooperation within cities, regions, and nations. They then describe projects implemented in local contexts to solve concrete problems or remediate malfunctions. These projects illustrate the full scope presented and discussed throughout the book: the use of scientific knowledge, strategic thinking, communication with municipal authorities and local stakeholders, design implementation on site, and documentation and control of feedback and outcome with adequate indicators and metrics. Although diverse and sometimes controversial, the discussion of how nature is regarded in contrast to society, how human-natural systems could be organized, and how nature could be changed, optimized, or designed raises the question of whether there is a new paradigm for the design of social relations to nature. The multidisciplinary review in this book brings together discussions previously held only within the respective disciplines, and demonstrates how they can be used to develop new methods and remediation strategies.

Chaos and complexity are the new buzz words in both science and contemporary society. The ideas they represent have enormous implications for the way we understand and engage with the world. Complexity Theory and the Social Sciences introduces students to the central ideas which surround the chaos/complexity theories. It discusses key concepts before using them as a way of investigating the nature of social research. By applying them to such familiar topics as urban studies, education and health, David Byrne allows readers new to the subject to appreciate the contribution which complexity theory can make to social research and to illuminating the crucial social issues of our day.

Today, our cities are an embodiment of the complex, historical evolution of knowledge, desires and technology. Our planned and designed activities co-evolve with our aspirations, mediated by the existing technologies and social structures. The city represents the accretion and accumulation of successive layers of collective activity, structuring and being structured by other, increasingly distant cities, reaching now right around the globe. This historical and structural development cannot therefore be understood or captured by any set of fixed quantitative relations. Structural changes imply that the patterns of growth, and their underlying reasons change over time, and therefore that any attempt to control the morphology of cities and their patterns of flow by means of planning and design, must be dynamical, based on the mechanisms that drive the changes occurring at a given moment. This carefully edited post-proceedings volume gathers a snapshot view by leading researchers in field, of current complexity theories of cities. In it, the achievements, criticisms and potentials yet to be realized are reviewed and the implications to planning and urban design are assessed.