INTRODUCTION

> We can succeed only by concert. It is not 'can *any* of us *imagine* better?' but, 'can we *all* do better?' The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise – with the occasion. As our case is new, so we must think anew, and act anew.
>
> *Abraham Lincoln, State of the Union Address, 1 December 1862*

This book discusses how professionals, policy makers, researchers, and people from all walks of life should collaborate to co-create built environments that facilitate and sustain health and well-being. The book presents innovative ways of constructing buildings, infrastructure, and services. These innovative contributions influence what is designed and planned, how it is constructed, and those conditions in which new built environments are used and maintained. We explain how and why the capacity of built environments to respond to persistent problems by creative, radical change warrants more attention than it has received to date.

One axiom of this book is that collective thinking and innovative projects by consortia of individuals and institutions are more capable than discipline-based projects to address the complexity of people-environment relations in a rapidly changing world. We recall the words of Abraham Lincoln because we consider that collaborative contributions, rather than conventional ones, are more likely to recognize and respond effectively to the multiple challenges faced by societies. We emphasize that these challenges transgress conventional disciplinary boundaries and sector-based structures. Urban challenges are not mono-disciplinary, or even multi-disciplinary, but explicitly inter- and trans-disciplinary (see Box 0.1). They require the convergence, collaboration, and commitment of many individuals and institutions throughout planning and construction processes. These collaborative and democratic ventures should replace elitist and esoteric ones, especially hierarchical decision-making processes. We consider how planning, designing and constructing built environments can be more socially accountable, economically affordable, and ethically responsible than conventional contributions.

BOX 0.1 TERMINOLOGY: WHAT ARE WE DISCUSSING?

Key terms used in this book for diverse disciplinary approaches are defined because there is no consensus about their definitions:

Disciplinarity refers to the definition and specialization of academic disciplines such that each discipline has its own concepts, definitions, and methodological protocols for the study of its precisely defined domain of competence. For example, in the domain of environmental sciences, different definitions, concepts, and methods coexist in biology, chemistry, geology, and physics. This means that collaboration across disciplinary boundaries requires a shared working definition before collaboration is possible.

Multidisciplinary refers to an additive approach including multiple contributions that remain within disciplinary conceptual and methodological boundaries. Each contributor applies disciplinary concepts and methods without intending to collaborate with others. This approach is frequently applied in environmental impact assessments (EIA) of large-scale housing developments and urban infrastructure projects.

Interdisciplinary contributions involve intentional collaborative actions that are applied by researchers in at least two different disciplines to achieve a shared research goal about a common subject. This kind of collaboration has created new disciplines, including architectural psychology and environmental sociology. Sharing of combination of concepts and methods is intended between different disciplines, but the whole process does not extend beyond scientific knowledge, protocols, and know-how.

Transdisciplinary contributions extend beyond scientific knowledge by including non-academic researchers and institutions, such as representatives of the private sector, public administrations, community associations, and citizens. Transdisciplinary contributions enable the cross-fertilization of knowledge and the experiences of people educated in disciplines, trained in professions, and experienced in policy making. Collaborative planning and participatory design are tangible ways of co-producing new built environments with the involvement of representatives from industry, researchers, practitioners, policy makers, and citizens.

The rationale and timing of this book stems from a longstanding personal concern that many design professionals and social scientists have retreated from interdisciplinary research and collaborative planning that occurred between the 1960s and 1980s. Too many architects, interior designers, landscape and urban planners have chosen to work with their expert aesthetic/artistic criteria (a heritage of post-modern design) proposing designs only for design's sake (Williams, 2019). The complicity of architects, urban designers and planners with the agendas of investors and institutions in the real estate sector can be problematic. However, the ethical and humanist dimensions implicated in planning, constructing and using built environments have rarely been addressed by consortia of social scientists, planners, policy makers and designers in recent years, as they were by several authors 30 and 40 years ago. Sometimes we forget those seminal contributions from the 1960s to the 1980s. They are recalled in this book to show how their different kinds of contributions can be reapplied in the immediate future to deal with contemporary planning and design challenges about the provision and sustenance of habitats for human health and well-being.

This book is about the way we build and plan to live in our habitat, an artefact created by human intentions, and a democratic arena constructed for dialogue about our future. Each chapter

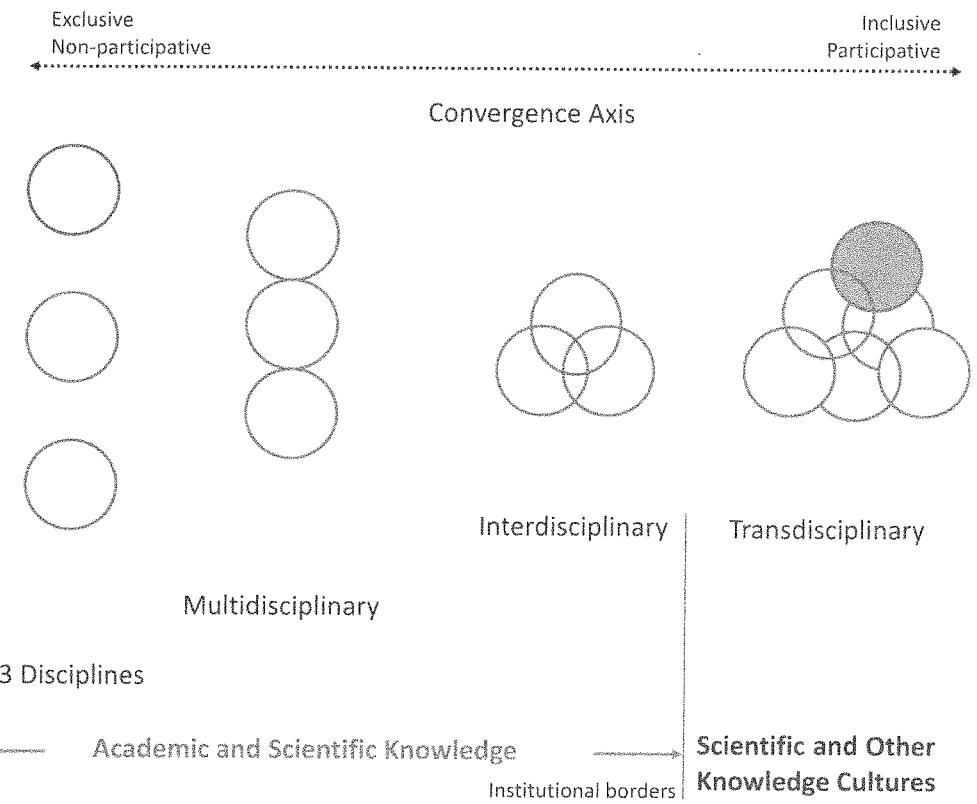

FIGURE 0.1 This figure is a modification and extension of a diagram proposed by Thierry Ramadier (2004). It represents the differences between multi-, inter-, and trans-disciplinary contributions. The original did not explicitly indicate a convergence axis, or refer explicitly to different knowledge cultures, which we argue are the foundations of all types of knowledge and diverse ways of knowing.
Source: Ramadier, T. (2004). 'Transdisciplinarity and its challenges: the case of urban studies', *Futures* 36(4): 423–439. © Roderick Lawrence.

is meant to stimulate debate among a large audience of professionals, researchers, and people who want to understand what is changing and what needs to change, to meet the challenges of planning and constructing built environments for current and future generations. We also consider how to correct the lack of accumulation of knowledge, the poor dissemination of know-how, and the non-application of knowledge and know-how during recent decades.

The five thematic chapters in Part I of this book synthesize many documented examples about the collaborative ways that professionals, policy makers, researchers, and laypeople think about, modify and use built environments. In the second part, a variety of conceptual frameworks, tools, methods, and processes are presented because these can be applied according to their appropriateness for specific subjects in precise localities. Collectively, all the chapters discuss fundamental principles shared by design practice and transdisciplinary inquiry implemented by disciplines and professions within and beyond the domain of built environments. They confirm that symbiosis between knowledge and know-how from within and beyond different disciplines and professions can provide co-benefits. They also show that creative and innovative contributions apply relational thinking to interpret built environments as settings for projects about alternative futures and the radical change required to implement them.

Global Challenges of the Urban Condition

We recall that Hannah Arendt (1906–1975) published *The Human Condition* to present her account of the condition of human life in the aftermath of two World Wars and the Hungarian Revolution of 1956. Her book became a beacon in political theory and social analysis about human agency, life in public and private domains, consumerism, work, and wealth in relation to power relations in contemporary society. Arendt (1958) criticized many academic interpretations of human actions. Indeed, she challenged the way modern scientific contributions became 'alienated from the world'. She proposed that human actions should be reconsidered in terms of human capabilities, because she felt these had been neglected, not just in terms of individual activity, but also collective actions and their consequences.

Arendt (1958) noted that human agency declined during the last century despite opportunities for increased human power using technological innovation and social organization. She argued that humans are increasingly unable to control the consequences of their actions. We consider her analysis is appropriate at a time when there is too much inertia, and too little collective action, to address major threats to life on Earth, including climate change and the impacts of more frequent extreme weather events in specific localities; increasing loss of biodiversity and depletion of natural resources; growing incidences of non-communicable diseases, especially among urban populations; and increasing socio-economic inequalities between and within populations living in large cities.

We recall Arendt's seminal contribution here and endorse Bernard Debarbieux's (2017) analysis of the spatial concepts and theoretical framework used in her analysis of society. The human condition she proposed 60 years ago has become a global urban condition for more than half of the world population at the beginning of this century. It is manifest in diverse ways, including the disconnection between people and natural ecosystems; the replacement of local food harvesting by imported goods produced by industrialized food systems; the commodification of housing by property investors in collaboration with real estate investors and built environment professionals; and the medicalization of health and well-being. In these and other ways, the urban condition embodies a cultural crisis that should concern policy makers, property investors, researchers, and professionals in the field of land-use planning and built environments, as well as other disciplines and professions.

We recognize that the urban condition is complex because it is dynamic and systemic. It has emergent properties, and it is dependent on societal variables (especially cultural, ethical, financial and political dimensions) that are defined contextually and temporally. This book also confirms that no single discipline or profession can tackle the challenges of rapid urban development, or effectively intervene to reduce unintended consequences of built environments. The global urban condition is not just a subject of study for researchers in specific disciplines, or an object for interventions by design professionals. It is, and should be, interpreted as a societal condition that requires shared understanding and concerted action by all those who can contribute to the formulation and implementation of societal visions and innovative projects about living conditions in this century. These innovative contributions can be implemented by policies, programs, and projects about built environments that admit the need for change using creative thinking.

Rethinking Built Environments

We interpret 'built environment' as a term that refers to human-made landscapes, buildings, and infrastructures that are intentionally provided by the modification of extant undeveloped sites and natural ecosystems, as well as changes to, or renovations of, existing spaces, buildings, gardens, parks, and infrastructure (including the supply of energy, transport, water, and waste disposal). We acknowledge that built environments are multidimensional, dynamic, and systemic. They exist from the scale of specific buildings and sites, to streets and public parks, neighbourhoods and cities, as well as urban agglomerations and mega-urban regions. In this book, we interpret 'built environment' as a complex knowledge domain rather than a specific academic discipline or profession. This complex domain combines knowledge and know-how from many disciplines and professions including architecture and interior design; civil, electrical and mechanical engineering; economics and property management; ecology, landscape and land-use planning; law, politics and public administration; and urban and regional planning.

Numerous observations of built environments in cities show that urban development, and the provision of buildings and communal infrastructure, usually follows the logic of segmented and uncoordinated human actions that often produce fractured districts and neighbourhoods. During the last century, these outcomes were increasingly driven by the liberalization of land-use planning, the influence of foreign property investors and developers, and the transfer of the provision and maintenance of infrastructure and services for energy, transport, water supply, and waste disposal from the public to the private sector (Rydin, 2013). In addition, national or state-owned infrastructure and services have been increasingly replaced since the 1980s by privately-owned enterprises. The vast number of enterprises and institutions involved in the planning, design, construction and maintenance of buildings, public spaces and infrastructure has created important challenges regarding the coordination of what were once commonly accepted as public provisions.

The current urban condition, and its chronic problems, requires a different kind of response than that applied in the last century, because land-use planning and the building construction sector have failed to provide affordable and accessible housing for all households (UN-Habitat, 2016). We recall that, after the Second World War, elected officials and planners claimed that standardized and rationalized projects for the construction of large-scale housing projects, whole new towns, and the reconstruction of inner-city neighbourhoods, would meet the needs of rapidly growing populations (Parker and Doak, 2012). However, although urbanization is a global process, the diversity and heterogeneity of households, housing stock, and livelihoods in cities around the world, remains strong. The assumption that design solutions and planning proposals can be constructed in one locality and reproduced elsewhere has been challenged since the 1960s, following the criticisms of Jane Jacobs in *The Death and Life of Great American Cities* (Jacobs, 1965). The unforeseen cultural, economic, environmental, and human consequences of this kind of approach are still being billed!

We argue that there is an urgent need for more inclusive frameworks and contributions like those presented in the chapters of this book. The first barrier to overcome is the gap between knowledge (what we know and what is unknown) and action (what we do). Already 30 years ago, John Friedmann (1987, p. 311) noted that, in the field of urban planning, the logical relationship between knowledge and action rarely existed. In the same year, we noted in *Housing Dwellings and Homes* that the applicability gap between knowledge and professional practice about residential environments existed, and it still exists today (Lawrence, 1987, 2015).

Why Bridge Across Knowledge – Practice Divides?

Human groups and societies have built many kinds of bridges for centuries. Bridge building is used as a metaphor in this book to replace disciplinary confinement and piecemeal approaches during the planning and construction of built environments. Many conventional design and planning approaches do not stimulate interdisciplinary or cross-sector collaboration. Urban challenges are too often analysed and managed within traditional national and local government structures, and

institutional frameworks that were proposed two centuries ago (Rydin, 2013). The expert-driven model is inadequate if it is not based on a broad understanding, and accumulating of empirical knowledge from data collection and systematic research, as well as feedback from professional practice. Bridges can provide explicit linkages between professional practitioners, corporate clients, elected officials, public administrators, scientists, and representatives of local communities for the common good.

Our bridges represent conceptual and physical interrelationships that comprise dynamic, mutual interaction between people, between people and built environments, and between people, their habitat and constituents of the biosphere. These interrelations can nurture or inhibit convergence and collaboration between different types of knowledge, other ways of knowing and values. Convergence is redefined in this book because it is a prerequisite for the co-design, co-creation and co-production of built environments. When convergence and collaboration occur, interpersonal relations between participants are strengthened, stronger adherence to projects is plausible, trust between participants is more likely, and longer term social commitment can be envisaged.

We recognize that the physical characteristics of built environments are multidimensional and systemic, and they change over time. These characteristics need to be understood by relational thinking and careful analysis using multiple types of knowledge and know-how (see Chapter 7). Given that methods and tools exist for this kind of research and reflexive practice, we hope this book illustrates how they can be applied in many different kinds of situation to address a variety of concerns. Practitioners in the field of the built environment should be educated and trained to reduce the gap between knowledge and practice in order to understand and change real-world situations, especially persistent ecological, financial, and social problems.

We consider that there is an urgent need to redefine the contributions of scientific knowledge and professional skills and competences involved in the construction, renovation, and reuse of built environments. We propose a rethinking of the strong focus on scientific research that is commonly assumed to produce knowledge that is transferred for use in professional practice. We recognize that much empirical knowledge is produced by professionals and laypeople as 'knowing-in-practice', a concept used by Michael Polanyi (1969) when he described the fundamental contribution of different types of individual and shared knowledge grounded in everyday life. We posit that these types of non-scientific knowledge are necessary in order to deal effectively with the environmental/ecological, economic/financial, political/ethical and cultural/social challenges of providing a habitat for current and future generations in a rapidly changing world. These challenges should be interpreted as global and societal ones rather than the mandate of a small group of scientific or professional experts.

Five Strategic Domains

The chapters of the book are organized in two main parts. Part I includes chapters about five thematic and strategic domains: Creating with nature in mind; Planning for health and well-being; Food for thought; Housing matters for all; and Creating adaptations and co-implementing change. These five domains are presented in independent chapters even though the interrelations between them are underlined. In the future, these domains could be supplemented by other strategic themes including the production and consumption of energy; the collection, treatment and recycling of liquid and solid wastes; and communication, mobility, and transportation.

Part II presents the conceptual foundations and methodological approaches analysed and synthesized in order to write this book. The reader is invited to consult these chapters if she/he is interested in learning more about the historical antecedents of conceptual frameworks and

methodologies for interdisciplinary and transdisciplinary contributions in and beyond the field of built environments during the last century. The book has been written by the cumulation and synthesis of many publications in academic journals, reports of international, and national organizations, and non-government organizations. Analysis of specific cases is derived from published sources, site visits and/or discussions with other researchers, or personal research. Research completed since the 1980s by the author has also been funded by the Swiss National Science Foundation and the European Commission.

Chapter 6 describes key concepts that collectively form an epistemic web of meanings about people-environment relations, particularly built environments in the context of urbanization and its impacts on extant ecosystems, planetary health and human well-being. In principle, humans appropriate conceptually and physically their habitat using their agency which includes individual and collective ways of knowing, or what Michael Polyani called 'knowing-in-practice'. Several core concepts including agency, co-action, co-evolution, and symbiosis, are interpreted according to the conceptual framework of human ecology. This people-centred framework is dynamic, holistic, and systemic and it is pertinent for the interpretation of urbanization in specific locations.

Chapter 7 presents a range of methods used in research and professional practice during the last five decades to co-create, co-produce, and co-manage built environments. This part is grounded in the author's contributions to interdisciplinary and transdisciplinary research and teaching. It develops ideas generated in two European Commission 5th and 7th Research Framework projects, and in projects coordinated by the Organization for Economic Cooperation and Development (OECD) and the World Health Organization. These ideas concern more effective ways of bridging knowledge and practice by anticipative and imaginative thinking using scenarios and backcasting; relational and holistic thinking including systemic analysis; experiments and testing with simulations and representations of built environments; participatory decision-making processes using a range of methods and tools; and creative collaboration by individuals who share different knowledge cultures and ways of knowing. Too often the genesis of ideas and methods about the analysis of urban planning problems are being re-used today without an understanding of their origins. This book presents many examples of how key concepts, ideas, and methods have been applied creatively in participatory action research and professional practice in disciplines related to buildings and infrastructure, as well as projects in the humanities, and the natural and social sciences. These chapters confirm that convergence, collaboration, and co-action between several disciplines and professions, and with other individuals and institutions in society, have co-benefits.

Domain 1: Constructing With Nature in Mind

When Ian McHarg published *Design with Nature* for landscape architects and land-use planners in 1969, he described the multiple interrelations between natural landscapes and their planned uses for human purposes. Since the 1970s, this kind of approach has been enlarged by natural scientists in their studies of ecosystem services, which include co-benefits of multiple functions linking ecosystems and human health. In parallel, some designers have championed biological analogies and applied bio-mimicry in their projects. In recent years, 'nature-based' projects, including 'eco-design' and 'green buildings', have been proposed by practitioners trained in several disciplines and professions, including architecture, interior design, landscape and urban planning. Increasingly, their contributions are explicitly concerned with the interface between built and natural components of human-made ecosystems, and how these influence biodiversity, human health and well-being.

Positive outcomes are discussed according to concepts including ecosystem services and co-benefit, endorsed by the World Health Organization. These concepts are pertinent for implementing projects that endorse sustainable development goals.

Chapter 1 highlights important developments in the way researchers and practitioners think about the web of relations between natural and built environments at the scale of residential neighbourhoods and cities. Empirical research shows that contact with nature, and especially time spent in parks and gardens, have positive influences on the health of individuals and urban populations. The Cheonggyecheon Stream Restoration Project, in Seoul, is presented to show how corrective measures, introduced from 2003, have demolished urban infrastructure erected in the 1960s and 1970s for road traffic, and replaced it by convivial public spaces in a dense urban neighbourhood. This major urban project has created multiple co-benefits. The chapter also briefly describes the Taichung Gateway Park, inaugurated in the city of Taichung, Taiwan, in August 2018. This project creatively addresses the challenges of climate change in cities in order to promote urban change more extensively. The chapter also presents innovative examples of land-use planning and building construction in Singapore. The public authorities in Singapore have attributed particular attention to sustaining biodiversity and biological corridors, public green spaces, vegetation around buildings, and local food production in the context of a strict national land-use planning system that promotes densification of building sites for a growing population.

Domain 2: Planning for Health and Well-Being

Cities are components of national, regional and global networks in which each city is competing for tourists, enterprises, cultural events, and taxpayers. Research has identified key variables that define the attractiveness of cities, especially the attractiveness of the housing stock, public spaces, and community services and infrastructure. These variables of built environments are important for health promotion, well-being and quality of life. Therefore, urban designers and planners should consider them when they refurbish existing buildings or neighbourhoods, as shown by the redevelopment of brownfield sites in many cities, including Zurich and Stockholm (see Chapter 4); or when they plan, design, and construct new residential neighbourhoods, as shown by the case of the strategic vision for Singapore.

Chapter 2 recalls that public health and urban planning have a long history of symbiotic interrelations that gathered momentum in the nineteenth century in order to eradicate vectors of infectious illness and disease (Porter, 1999). This kind of collaboration is urgently needed again in order to formulate and implement innovative approaches to counteract the growing incidence of non-communicable diseases (including cancers, cardio-vascular disease, and mental illnesses). The chapter refers to empirical research and innovative projects in New York City that promote healthy lifestyles by access to public green spaces in cities. The chapter presents evidence showing that built and natural environments contribute to planetary health, urban health and well-being of citizens at a time when increasing numbers of mayors and public administrations want to ensure and sustain health and quality of life in cities. Some mayors have made commitments as active partners of the World Health Organization Healthy Cities project. This project has accumulated 30 years of knowledge and know-how about promoting health and well-being in local authorities. The project shows that investments in active living, housing quality, energy saving measures, and community services are also investments in health and quality of life. Specific actions are targeted to population groups including children and older citizens. Examples of housing and community services for elderly people are presented to show the merits of participatory action research and innovative practice in Quebec, Canada, and Lund, Sweden.

Domain 3: Food for Thought

Chapter 3 recalls that cities have always depended on their hinterlands for the supply of food, water, and waste disposal. Globalization, coupled with urbanization, has transformed national and regional food production and consumption to the extent that local food markets have been threatened in many countries and cities. Food production and consumption have direct impacts on public health, land use, and the consumption of water, while contributing significantly to greenhouse gas emissions and energy consumption. The globalization of food markets has increased financial speculation on primary food produce, increased food wastage, but not solved malnutrition. According to the World Health Organization, processed foods are major contributors to increasing incidences of obesity among children and adults, and chronic diseases in all regions of the world (World Health Organization, 2016).

Relationships between agriculture and urban development have a long contentious history, preceding contributions of authors including Ebenezer Howard and followers of the Garden City Movement early in the twentieth century. The long-term custom of industrial food production and consumption during the last century have been challenged by growing numbers of community-led initiatives that have reintroduced allotments in urban neighbourhoods in many cities, including Berlin, Bristol, Detroit, New York, San Francisco, and Singapore. These local initiatives provide food markets that sell local and regional produce in season, and recuperate unsold food from supermarkets for distribution to low-income households. Although these contributions cannot replace mass-produced and processed food, community initiatives such as 'Incredible Edible' in Todmorden, England, since 2008, serve as exemplars for others. These community-led initiatives are presented in this chapter to show that implementing cooperative projects can create social cohesion and communal bonds in a world that has enabled individualism to override citizenship and community life.

Domain 4: Housing Matters for All

The Universal Declaration of Human Rights (1948) stipulates that housing is a human right. Chapter 4 emphasizes that this fundamental principle is still not reflected in the policies and programs of many elected governments and political parties, or the agendas of professional associations. Housing should be attractive, affordable, accessible, and adaptable. A fundamental rethinking of the 'supply' and 'demand' of housing markets is required because the provision of affordable housing for all, including the requirements of ageing populations, handicapped persons and migrants, is not being achieved in many countries. Given the shortcoming of the performance of both the public and private sectors, Chapter 4 discusses the contribution of a third non-profit sector – collective and cooperative housing – over a century in several European countries. It also presents and compares two well-known residential projects constructed in Zurich and Stockholm, in the last two decades. These projects show that, even in cities with expensive housing markets, there are ways of providing affordable housing that also meets ethical, environmental, energy, financial, and cultural criteria for sustainable urban development, and that built environment practitioners have an important contribution to make.

In the context of long-term reductions in public investments in the housing sector, the shrinkage of social and welfare programs, and the increasing unaccountability of politicians, property investors and those professionals who serve their interests, this chapter presents alternative approaches that have been generated in low-cost housing in Pune, India, and in Enkanini, an informal settlement in Stellenbosch, South Africa. These innovative, low-cost contributions are

facilitated by responsible practitioners who help residents create community solidarity, shared visions, and implement change to their living conditions. They extend the seminal contributions to housing and public space by Giancarlo De Carlo, Jan Gehl, John Habraken, Herman Hertzberger, Nabeel Hamdi, and John Turner.

Domain 5: Creating Adaptations and Co-producing Transformations

In a world of global change, that is perceived as accelerating, unpredictable and a source of uncertainties, the consequences of change on the livelihoods of urban populations and local communities warrants attention by policy makers and practitioners in the field of the built environment. Professionals working in different sectors need to collectively rethink their role and responsibility. The chapter presents tools and methods applied in Living labs or on-site that create a shared understanding of how certain global changes (e.g. the impacts of climate change and extreme weather events in specific localities) can be reinterpreted as opportunities for adaptive incremental change and more radical change in precise situations. The formulation of opportunities and potentials is not only dependent on knowledge and know-how, but also on the definition of social and political agendas that incorporate ecological and ethical principles presented in Chapter 1. The example of Ringland, a community-led project that challenged official transport projects and road traffic infrastructure in Antwerp, Belgium, shows how constructive interventions by citizens are being supported by practitioners in order to understand persistent problems and generate alternative projects that are plausible futures. Collective thinking benefits from dialogue between participants that uses alternative scenarios and backcasting creatively. Chapter 5 concludes by showing how innovative approaches applied in recent years reconsider the contribution of built environments to respond to these kinds of challenges in the context of the United Nations 2030 Agenda for Sustainable Development (United Nations, 2015).

Synthesis

The five preceding chapters of this book discuss and illustrate contributions to planning, designing, and constructing built environments that depend on a fundamental rethinking of the interrelationships between professionals and laypeople, between people and their habitat, and between human and natural ecosystems and the biosphere. These examples confirm that innovative projects benefit from convergence (shown in Figure 0.1), that enables collaboration and co-action between many participants representing public authorities, disciplinary knowledge, the skills and competences of professions, and the know-how of other community-based associations in cities and neighbourhoods. The five strategic domains presented in these chapters are frequently taught in higher education and administered by practitioners and policy makers as if they are independent of each other. In contrast, one key aim of this book is to illustrate the symbiotic interrelations between them. The conceptual and methodological principles used to construct these interrelations are explained in Part II of this book.

The kinds of creative, relational thinking and practice proposed and illustrated in all the chapters, is beneficial and necessary if researchers, policy makers, practitioners, and laypeople are to improve their understanding of how planning and implementing projects of built environments can directly or indirectly influence other domains. An enlarged understanding of symbiotic interrelations is proposed and applied in order to highlight the added value of convergence, collaboration, and concerted action between researchers, practitioners, local authorities, and laypeople.

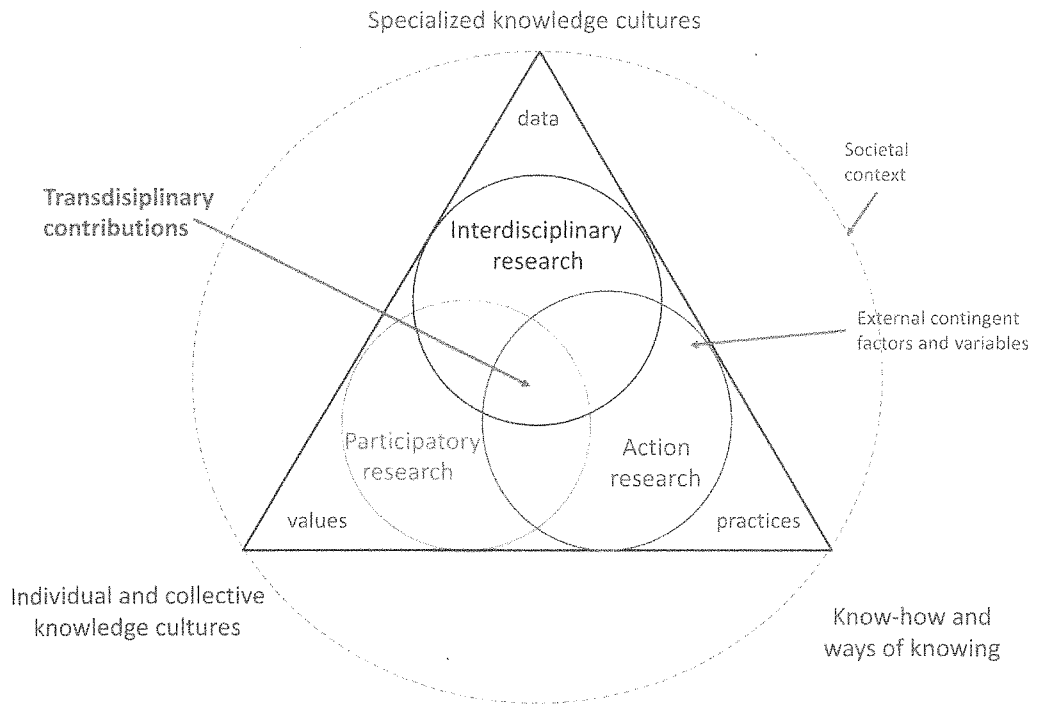

FIGURE 0.2 Convergence of interdisciplinary research (involving at least two academic disciplines), action research (meant to change an extant situation or create an new one), and participatory research (involving people from civil society with different knowledge cultures and ways of knowing) are prerequisite conditions for transdisciplinary contributions as explained and illustrated in this book. This interpretation of convergence is much broader in content and purpose than the interpretation of the US National Academy of Sciences (2014). It means that alone, interdisciplinary collaboration, action research or participatory research, as well as participatory action research, do not ensure transdisciplinary contributions.

Source: Roderick Lawrence. © Roderick Lawrence.

Key Messages

This book has five key messages for its readers which are summarized here.

First, built environments and infrastructure in cities, and all the activities they contain, are sources of persistent ecological, economic and social problems. However, we also underline that many cities are also localities with a high potential for innovative change and alternative responses to global challenges and persistent problems.

We acknowledge that urban development processes have changed and continue to change natural ecosystems by modifying the biological, ecological and geological components and processes of ecosystems, both within and beyond specific development sites in all regions of the world. Observations about these irreversible human processes have a long history. We know that cities today occupy only about 2% of the total land surface, but contribute about 70% of global GDP; over 60% of global energy consumption; 70% of global greenhouse gas emissions; and 70% of global waste (UN-Habitat, 2016). Cities are localities of relatively high concentrations of air pollution

and greenhouse gas emissions, noise nuisance, accumulated liquid and solid wastes, and they have a relatively high carbon footprint per capita.

Nonetheless, research also confirms that cities are localities of creativity, innovation and change. This book confirms that cities and local authorities are pertinent settings for effective responses to many global challenges because their local populations experience and interpret them as part of their livelihoods, and they seek creative and pertinent ways of responding to them. We argue for, and illustrate how, community associations, private enterprises, public administrations, and local authorities can form multi-agent networks that address the problematic situations that affect them. Creative community and local government initiatives have bypassed the institutional frameworks of national governments. Think of programs and projects in Curitiba, Brazil; Medellin, Columbia; Bristol and Manchester, England; Detroit and Portland USA; Prune, India; Stockholm, Sweden, and Zurich, Switzerland. These initiatives have been complemented by international networks of local authorities – including C40, Design with the other 90%, 100 Resilient Cities, Transformative Cities, WHO Healthy Cities project, and ICLEI. These networks debate local concerns and persistent problems, including inefficient mobility and transportation systems, differentiated impacts of climate change and extreme weather events, loss of biodiversity and reduced ecosystem services, inflationary prices of food, unaffordable housing, access to affordable health care, and the growing incidence of non-communicable diseases. Many innovative programs and projects that have benefited from the competences and skills of built environment researchers and practitioners, can serve as beacons for change in other cities around the world.

Second, built environments are key components of urban and economic development. They assume a key role in conventional production and consumption processes as well as implementing innovative change. The built environment sector should address global challenges systemically and contribute to implementing the United Nations 2030 Agenda for Sustainable Development including the sustainable development goals (SDGs).

We know that many elite architectural and urban professionals have accepted mandates to design and build new enclaves of landmarks including exclusive housing, monumental public buildings and spaces, and high-tech infrastructure, in new cities in the Arabian Gulf States, and China, and other cities around the world. These contributions have usually perpetuated mainstream approaches applied during the last century at a geographical scale and a speed previously unknown (Williams, 2019). They have not provided built environments, or collective processes, that contribute to implementing the United Nations Agenda 21 endorsed at the Earth Summit in 1992 (United Nations, 1992).

Although the design and construction of 'green' and 'low-carbon' buildings have some merit, the strong focus of their authors on technological innovation for energy-efficient built environments often ignores core principles of equity and social justice that directly influence who has access to these edifices. What some practitioners claim to be viable responses to sustainable construction are only defined by technological innovation that ignores, cultural, ethical, financial, political, and other social factors embedded in sustainable development.

Therefore, this book includes numerous innovative programs and projects that embody a concern for negative ecological impacts, high financial costs and the social inequalities found in built environments. These recent contributions are tangible responses to the inability of public authorities and private enterprises to question why, what and how they contribute to the urban condition. This critical thinking highlights the need to replace exclusive policies and projects by others founded on innovative contributions and collective visions about a common future. Cities should provide tangible settings and institutional arrangements for the creation of alternative futures.

The United Nations 2030 Agenda for Sustainable Development, endorsed in 2015, can provide the framework for these alternative ways of constructing built environments (United Nations, 2015). Although the New Urban Agenda, proposed in 2016, acknowledged the importance of built environments in achieving sustainable development, it did not provide an enlarged conceptual framework, or methodological approaches to achieve the 17 SDGs and their 169 targets. Numerous examples presented in this book show how innovative contributions in and beyond the built environment sector have been implemented in many cities, despite the default of many national governments and their subservience to multinational companies.

Third, researchers and practitioners in the field of the built environment should reconsider their core competences and their moral responsibility in defining effective responses to global challenges in specific situations and localities, thus implementing the sustainable development goals (SDGs).

The current urban condition embodies a cultural crisis that has permitted the construction of 'placelessness' and reproductions of dehumanized habitats. The urban condition should be understood as a complex societal challenge that requires a collective response if progress towards the goals of sustainable development are to be achieved. We have shown that this has begun and is being implemented with innovative projects in many cities. However, in order to upscale from individual projects to coordinated program implementation, we argue that the role and responsibility of researchers, practitioners, and other stakeholders in both the private and public sectors needs to be redefined substantially.

The majority of built environment professionals has been marginalized by financial institutions, property investors, national policy advisors, and local authorities, who make fundamental decisions about economic growth, urban development and land-use planning, that define the contextual conditions for design and construction processes. In order to improve the rank of this marginal position, we suggest that built environment practitioners should demonstrate their skills and competences by creatively synthesizing the knowledge and know-how of several disciplines and professions using systems thinking, simulations, and dialogue during the conduct of community-based projects in specific localities.

The people-centred approach proposed in this book can overcome fragmented and uncoordinated contributions. We show that systemic thinking and coordinated actions are necessary to account for all 17 SDGs and their 169 targets because they are interrelated. Practitioners should reconnect research and practice in order to better understand and respond to the conditions of everyday life in contemporary cities.

Fourth, the growing number of achievements by community associations, citizens and other enterprises in a third associative sector are complementary to contributions by both the public and private sectors; they should benefit from creatively using the specialized knowledge and instrumental know-how of practitioners and policy decision makers in the field of built environments and knowledge and know-how of the local population.

This book shows how researchers and practitioners can become responsible facilitators of societal change processes that respond to societal challenges related to human-made environments. This means that the disciplinary and professional skills and competences of practitioners should be used in concert with the knowledge and know-how of scientists, professional practitioners, public administrators, private sector managers, community associations, and citizens.

We explain why the transdisciplinary researcher and practitioner is not a conventional academic, nor an elite designer, but an active multi-specialist who collaborates and facilitates social and political processes that are meant to create new built environments, or transform existing ones. These collaborative projects are settings for the joint definition of chronic problems, a shared understanding of extant situations, and the definition and implementation of responses to them. We acknowledge that some practitioners have proposed, are proposing, and will continue to propose innovative projects by creative design practices that are ecologically responsible, socially just,

and economically ethical and responsible. For example, we interpret the contribution of Shigeru Ban in the aftermath of the tsunami in Japan, and the earthquake in Christchurch New Zealand, as exemplary ways of responding to catastrophes using professional skills and competences in creative and innovative ways.

Fifth, sharing conceptual/theoretical frameworks and methodological/practical approaches between researchers and practitioners in and beyond the built environment sector will be beneficial for a broader understanding of, and coordinated responses to, complex urban challenges.

Today, co-producing built environments is no longer equated only with the translation of specialized knowledge and instrumental know-how of teams of professionals. This common interpretation of the last century has been replaced by an enlarged one that is founded on convergence, commitment, and collaboration of individuals and institutions from several disciplines and professions during planning and construction processes. These processes are not prescribed by conventional design and planning guidelines because they are culturally, geographically, socially, and temporally context-dependent. We acknowledge that terms such as 'co-creation' and 'co-design' have been used by architects, landscape and urban planners for several decades, while other academic disciplines and professions (associated with the humanities and the natural and social sciences) have adopted terms such as 'co-action', 'co-production', 'co-evolution' and 'co-implementation' during the last decade. We emphasize that scientists and design professionals in several disciplines and sectors should recognize that they both have specific analytical and synthetic skills and knowledge that should be combined in order to respond to societal challenges that are too complex to be addressed effectively by working in silos. In sum, convergence, collaboration and co-action across disciplinary and professional divides have multiple co-benefits. They should become the hallmark of teaching and training in order to address complex situations and chronic problems that are inherent to the urban condition.

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