Nevena Novaković, Janez P. Grom and Alenka Fikfak [eds.]

realms of urban design
mapping sustainability

labs

BOOK SERIES

reviews of sustainability and resilience of the built environment for education, research and design

Saja Kosanović, Alenka Fikfak, Nevena Novaković and Tillmann Klein [eds.]

This thematic book series is a result of the Erasmus+ project, *Creating the Network of Knowledge Labs for Sustainable and Resilient Environments (KLABS)*. The books are dedicated to establishing a comprehensive educational platform within the second cycle of higher education across the Western Balkan region. The series comprises five volumes in the English language:

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FOR SUSTAINABLE & RESILIENT ENVIRONMENTS

Creating the Network of Knowledge Labs for Sustainable and Resilient Environments – KLABS

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Realms of Urban Design
Mapping Sustainability

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Reviewers
Eglė Navickienė, Ugis Bratuskins

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Preface

Saja Kosanović, Alenka Fikfak, Nevena Novaković and Tillmann Klein

The continuous evolution of the notion of a sustainable and resilient built environment demands repeated examination. For this reason, the state-of-the-art thematic series *Reviews of Sustainability and Resilience of the Built Environment for Education, Research and Design* contributes to the comprehensive understanding of the two approaches and their interrelations in the built environment by retrospectively investigating their development, addressing current issues, and speculating on possible futures. The series represents one of the results of the Erasmus+ project, Creating the Network of Knowledge Labs for Sustainable and Resilient Environments – KLABS, dedicated to establishing a comprehensive educational platform within the second cycle of higher education across the Western Balkan Region.

The sustainable and resilient built environment is a multi-layered and multi-disciplinary construct. To successfully tackle the intricacy of the points in question, the series of books comprises five thematic volumes that initially approach sustainability and resilience from the socio-spatial perspective, subsequently address sustainable and resilient urban planning and urban design, and then focus on individual buildings and a range of approaches, methods, and tools for sustainable and resilient design, placing particular emphasis on energy issues. By addressing different levels of the built environment and different aspects of sustainability and resilience in a systemic way, 83 academics from 12 different countries gave 54 contributions in the form of narrative or best evidence articles with the main objectives of informing the development of specialised knowledge, building critical awareness of interdisciplinary and transdisciplinary knowledge issues, and connecting university education with the domain of scientific research. The broad aim is to develop the collection of reviews of sustainability and resilience of the built environment that are useful for students, educators, professionals, and researchers, all of whom are dealing with these two important subjects internationally.

We express our gratitude to all authors, editors, reviewers, and members of the publication board for investing significant efforts in the development of the book series in the framework of the Erasmus+ project, KLABS.

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Eglė Navickienė and Ugis Bratuskins

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Research of built environment within the disciplines of architecture, urban design, and urban planning, as well as the professional practice in these fields, have recently experienced shifts, both in priority and direction. We are facing dramatic transformation in the global environment, society, and climate, which are mostly put off balance by human activities. Therefore, the continuing focus on sustainability, and the more recent focus on resilience in the context of the development of urban environment, as a way to bring (back) equilibrium, quality, and equity to it, is more than relevant. It might seem that research on sustainability has already been sufficiently developed in the disciplines of urban design and urban planning, and that its principles, methodology, and tools have been adequately elaborated. However, when it comes to practice, and to the specific urban cases in certain environmental or typological circumstances, the application of sustainable design principles proves to be quite confusing.

The need for a critical interpretation of sustainability theory for specific urban situations, and the existing shortage of interconnection between research and practice, demonstrates the relevance of the book "Realms of Urban Design: Mapping Sustainability". The book bridges the contemporary findings in theory of sustainability and resilience in the disciplines of urban design and urban planning and the application of sustainability principles, methods, and tools of professional practice. The book includes eleven thematic chapters that address particular topics contributed by different researchers. The themes of chapters comprise an exploration of the topical spatial problems and processes occurring in the cities and in-between spaces; the social dimension brought to urban design by activating the communities and participatory contribution; and the customary marginal urban typologies that need transformation and regeneration, such as informal urban landscapes, brownfields, industrial territories, and business zones. The chapters cover topics of various scopes and scales: from critical review of theory of urban sustainability and resilience treated as the planetary-wide processes, through adaptation of the issues to urban environment, and especially to specific urban spatial situations and social interactions, to detailed illustrative case studies, mostly from the western Balkan region. The common thread that runs through the chapters is the focus on the aspects of sustainability and resilience, and each chapter interprets the core topic from different point of view, discussed in a particular urban typology, dimension, and scale, which is accomplished

with the up-to-date practical solutions and supplemented by the personal views of the authors. The significant value and relevance of the book lies precisely in these peculiarities, as the book shares the applicable multi-layered and all-encompassing knowledge on sustainability in the urban environment.

The book ought to be a contribution for those students, researchers, and professionals who seek a contemporary perspective on complex sustainability issues in the fields of urban design and urban planning, or who wish to take a deeper look at sustainability aspects in urban situations that are specific for their spatial or social conditions. The shared experience of implementation and activities in real-life situations should be in great demand for specialists involved in solving similar questions.

Assoc. Prof. Dr. Eglė Navickienė
Vilnius, Lithuania, February 2018

II

The collection of books "Reviews of Sustainability and Resilience of the Built Environment for Education, Research and Design" shows the promising ambition of the vast group of authors and editors to gather and systematise the up-to-date theories of development of the built environment in transition, to display the complexity of the field, and to provide space for further investigations. The entire collection is expected to cover the principles of creating and maintaining a, sustainable and resilient environment, starting from general guidelines to the specific technological, social, climatic, and economic aspects of transformation. The second volume focuses on the overview of the spatial and social aspects of the contemporary urban environment, whose theoretical framework is largely based on Kevin Lynch's theory on human perception of urban environment and Jan Gehl's theory of interaction between urban shape and public life.

This book contains eleven chapters that focus on the topical issues of contemporary urban development – the role of the local communities in social and urban processes and public involvement, revitalisation of industrial heritage and degraded environment, etc. Examples of several towns or separate cases in the Balkan context (Mostar, Banja Luka, and the former smelter complex "Trepča" near Zvečan) are discussed in great detail.

The book includes sections on the relationship between urbanisation, architectural spatial environment, and society in the formation of a modern living environment, which, alongside cultural, genetic, and social aspects, are important factors in the context of the identity of the place. The latest attitudes, modes, and techniques for urban development are discussed, leading to the elaboration of guidelines for a sustainable city in terms of a green, smart, and open city. A description

is given of the positive impact of participatory revitalisation, which, if well managed, plays an important role in the livelihoods of contemporary society, contributing to the emergence of high-quality environmental development solutions.

The book represents a collection of highly valuable information that may serve for educational purposes, giving insight into the diversity of the latest methods and approaches in the evaluation and estimation of the best tools to further urban development. The lists of references included at the end of each chapter serve as excellent sources of extended information on the issues discussed. The Index, a list of terms used in the book that contains references to exact location of each term within the text, will be of great informative value as well as will allowing for easy usage of the book.

The book addresses a wide range of users – students, teachers, scholars, and practitioners. The examples and case studies from the Balkan countries discussed in several chapters of the book will be a good source of information not only at the local scale, but also in the wider international context.

Prof. Dr. Ugis Bratuskins
Riga, Latvia, March 2018

Introduction

Nevena Novaković, Janez P. Grom and Alenka Fikfak

The traditional thematic realms of urban design, such as liveability, social interaction, and quality of urban life, considered to be closely related to urban form and specifically to public space, have long since been recognised as important, and have given the discipline a certain identity. The book *Realms of Urban Design: Mapping Sustainability* is certainly rooted in this fundamental urban design thinking, but its main contribution belongs to the second part of the book's title – discourse on sustainability. Its chapters, considered as a whole, put forward the importance of the discipline and the designerly way of thinking in the context of the discussion about unprecedented environmental transformation.

The eleven chapters of the book represent the major sustainability concerns that the authors have seen as being related to the urban design discipline in their specific professional and environmental contexts. Therefore, the chapters as an entity could be seen as an act of mapping the sustainability issues that are coming "from the front" of urban design research and practice at the universities involved in the project *Creating the Network of Knowledge Labs for Sustainable and Resilient Environments (KLABS)*. They show disciplinary, mostly methodological, concerns with the larger scales in comparison to those of the neighbourhoods and public space that are traditionally connected to urban design; with the collective or common nature of urban space; and with the distinctive, underused spaces coming not only as a legacy of the 20th century, but also as an important by-product of contemporary economic trends.

The first four chapters tackle the self-questioning of the disciple of urbanism in the wake of spatial, social, and environmental change at an unprecedented planetary scale. They are assembled around the question of what the sustainability concept means for the discipline and how the discipline should change to become socially relevant in the context of dynamic spatial transformation? The chapters are review contributions to recent theoretical and methodological rethinking of design approaches to the urban condition, with a focus on multi-scale and process-oriented urbanism. The chapters call for an integrated design approach in the sense of finding a theoretical and methodological common ground for separated disciplines of architecture, urban design, and urban planning.

The next two chapters examine what is, in the traditional manner, considered to be the main theoretical and analytical focus and the main creative and practical outcome of urban design – the urban form. How we should understand, analyse, and design the urban form in

the context of the contemporary complexities of urbanisation? Two chapters present opposing perspectives of urban form design. One is a morphological approach in which the urban form is seen as a disciplinary tool of conceptualisation and regulation of the city, using sophisticated concepts such as landscape and place, while the other maps the urban form as a resident's basic expression of the need for shelter, territory of everyday use, and cultural interpretation of home, beyond regulation and urban design. By putting the two approaches side by side, the urban form can be comprehended as the simultaneous materialisation and negotiation of the ground of power intentions and everyday practice.

Chapters 7 and 8 are dedicated to a specific dimension of urban design process – participation. Who can participate in the design of territories and places? Who has the privilege to define who will participate? How should an urbanist manage the many different and contradictory requirements? Ultimately, how can people be encouraged and stimulated to take part in the public urban debate? These are the highly important questions rising in the wake of the urbanism crisis, intensified with the disintegration of the holistic expression of the public interest, characteristic of the modernist period. These chapters present a review of important theoretical considerations and recent experience of multi-voice design methodologies.

The final three chapters deal with the specific typology of urban space - previously developed and then abandoned, forgotten and underused spaces of an economic and technological past. These reminders of past urbanisation are still numerous in the western Balkan countries. What could the role of these places be in the sustainable strategies of urbanisation? How can the approach to the urban regeneration (planning, regulation, and design) of these spaces be conceptualised in order to be in tune with the ecological and social demands of a distressed planet and local historical and cultural values? By explaining the specific theoretical concepts and western Balkan case studies, these chapters tackle the most important issue related to sustainability and the management of urbanisation - the question of spatial resources.

Sustainability vs. Resilience in Urban Design

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ABSTRACT **Cities are subjected to rapid changes, due to economic and cultural globalisation, demographic changes and migratory flows, urban planning strategies, social networks, and other factors. These spatial dynamics are happening under diverse visible and invisible relations between cultural changes, spatial boundaries between morphology patterns, voids, lost spaces, informal structures, self-organisation, planned regularities, etc., mainly following organic dialogues characterised by the complexity of the grid system. Research on sustainability and resilience in urban design indicates that the most functional urban structures are those with a multiple number of interconnections at all scales. The work articulates elements of identification, inventory, and evaluation of interconnections in urban open spaces, with added discussion on traditional city centres. By following the research methods of understanding the urban design, the study aims to investigate the open spaces in urban areas, prevailing on composition of urban morphology with perceptions in space. Here, the case study of the Municipality of Žiri, Slovenia, is included, where we explored the connections from the scale of the landscape to the detail in developing the concept of urban design for the central square of Žiri. This part of the study was done at the University of Ljubljana, Faculty of Architecture, as part of the Workshop *Developing the City Centre of Žiri,* with the students of architecture and urbanism involved together in experiential work.**

KEYWORDS sustainability, resilience, urban design, traditional city centres, case studies in the Municipality of Žiri, Slovenia

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1 Introduction

Cities are subjected to rapid changes, due to economic and cultural globalisation, demographic changes and migratory flows, urban planning strategies, social networks, and other factors. Increasing ecological problems resulting from the overuse of resources and pollution, as a result of uncontrolled market-oriented production and consumption patterns, have made cities and regions more prone to such disasters as floods and droughts (Eraydin & Taşan-Kok, 2013, p. 1). The increasingly changeable natural and environmental conditions affect the quality of life and quality of living areas, both outdoors and indoors. Mayors, governors, developers, and suburbanites desperately need alternatives to sprawl, and architects need to be re-engaged practically - and theoretically - with the unavoidable issues of ecological sustainability, social justice, mobile capital, consumer culture, ethnic and cultural identities, and politics (Dunham-Jones, 2009, p. 16).

Today, our public spaces are undergoing major changes. City centres are being emptied, while life moves to cities of consumption with attractive commercial and entertainment content, which continuously grow on city outskirts. Shopping centres contribute to the emptying of city centres, where commercial services turn into tourist services. The users and their way of controlling space have, in general, changed the balance between various activities and public open space users. Shopping centres offer precisely those elements of open public space that are missing in traditionally designed European city centres: good access, fluidity, parking areas, entertainment also (and above all) for kids, events, etc. The image of a city centre with content as described by Lokar (IPOP, 2010) – "I dream of a Ljubljana where you can go buy bread and flowers on foot or walk to the nearest restaurant, park, or cinema, close to the place where you live" – seems a distant and idyllic vision of the past. On the other hand, regardless of all migration flows, we ask ourselves where and what is the balance of these values in terms of sustainability and resilience. Sustainable development attempts to weave together multiple values to confront the challenges of reversing environmental degradation and reducing overconsumption and grinding poverty (Bahrainy & Bakhtiar, 2016, p. 26). We wonder whether, based on this definition, we can make the shift from a consumer society to the challenges of reducing excessive consumption and diversity, reflected in the poverty of the sociocultural structure and the degradation of the quality of living environment. Is the latter reflected in the values of a sustainable society? Values of sustainability "are sometimes referred to as the three 'Es' of sustainable development: environment, economy, and equity" (Bahrainy & Bakhtiar, 2016). In the sense of the righteous three 'Es', what does open space offer us, as it is clearly the "venue" and catalyst of sustainability in the sense of weaving together people of various cultures, race, gender, knowledge, and image? Is sustainability, therefore, an idealised image of something that we would want in the form of a "just society" and is resilience then the negative counterweight that warns us about the responsiveness of sustainability, when its spatial balance shifts into environmental imbalance? Is sustainability in urban space thus a balance of humans, spatial organisation, and

environmental elements? Bourne (1995) claims that "urban systems change and reorganize according to the diverse outcomes of economic globalization, based primarily on population data, but with secondary reference to trends in economic growth and restructuring, and to the various roles played by governments in shaping the urbanization process". Thus, economic growth and restructuring that results from globalisation creates certain population dynamics and mobility patterns that influence the reorganisation of urban spaces (Santos Cruz, Costa, Ávila de Sousa, & Pinho, 2013, p. 53). In the discussion on urban centres as open public spaces, we can claim that most settlements in the European space are centrally conceptualised, following the 'central place theory' (Christaller, 1933; Lȍsch, 1954), which means that their design is subordinated to a central organisation (size, function, gravity, specialisation, and development dynamics). The question, however, relates to the inhabitants' awareness about the values of an organised central space, even more so in cases where the users are not exclusively permanent residents, but come from near and far – for them, the city centre means to attend activities, go for a walk, soak up in the sun, etc. City centres are of key importance for the general community, while permanent residents do not see only their quality-of-life value, i.e. they indirectly influence them with their use or lack thereof, according to the level of necessity or likeability. Questions that arise from the discussions about contemporary values, changes in urbanity, especially in public open spaces, and searching for quality of life are: How to approach new urban projects in ways that embed cities in the long term, and that factor in the constraints we are facing in a finite world, including in design solutions with the risks of climate, cultural, and social changes?

2 Sustainable, Resilience and Design Thinking

"Good bye sustainability, hello resilience" (Zolli in: Zolli and Healy, 2012)

"Resilience – resisting disorder – may be the key to global sustainability" (Center for Resilience, n.d.).

There are several definitions of sustainable development, but the simplest and clearest one is that given by the World Commission on Environment and Development, which says that to make development sustainable means "to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987). In the decades of growing environmental awareness, cultural awareness, and many public discussions, several different orientations were formed, each of which had six basic ideas fundamental to sustainable development in common, which Jacobs (1999) lists as: environment-economy integration, futurity, environmental protection, equity, quality of life, and participation. Given the meaning of sustainability (Brundtland Commission, 1987), two key concepts are defined: 1) the concept of "needs", in particular the essential needs of the world's poorest people, to which we should give overriding priority; and 2) the idea of limitations which is imposed by the

state of technology and social organisation on the environment's ability to meet both present and future needs. Our relationship to sustainable development is not only about waste treatment and how we act in protected areas, and use drinking water and other natural resources; it is, in the first place, about how we understand the process of spatial planning. Sustainability in urban development predicts a self-sustained development of the city within itself by closing the loop by eliminating the impact on the environment. The debates about ideal or desirable urban forms are not new; some can even be traced back to the end of the nineteenth century at the outset of the garden city movement (Breheny, 1997). Following the resilience approach, sustainable urban development (Fig. 2.1) should also take into account patterns that provide capacity to the system to absorb disturbances and reorganise itself (Eraydin & Taşan-Kok, 2013, p. 8).

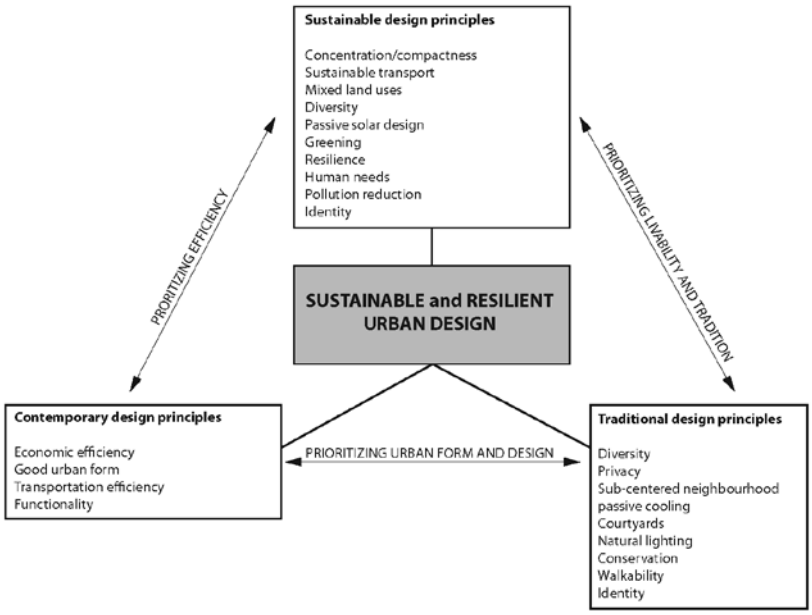

FIG. 2.1 Conceptualisation of sustainable and resilient design *(Bahrainy & Bakhtiar, 2016)*

Resilience, on the other hand, is the ability to resist change without undue deformation: that is, it resists physical and structural obsolescence (Carmona, Health, Oc, & Tiesdell, 2003: 202). Considering a city as a place of interactions between humans and the built environment, maps of social activity reveal how urban–social systems have self-adaptive properties like complex dissipative systems (Pulselli, Ratti, & Tiezzi, 2011). But other definitions of resilience are also found in scientific discussions and, as stated by Pendall, Foster, and Cowell (2010), the resilience concept indicates considerable fuzziness, and indeed, the numerous interpretations and definitions of urban resilience do make it rather fuzzy. However, as Lagendijk (2003) notes, this may simply be a symptom of the immaturity of the concept that will decrease over time. The three central features of resilience, according to Berkes, Colding, and Folke (2003, p. 6), are: 1) the ability of a system to absorb or buffer disturbances and still maintain its core attributes; 2) the ability of the system to self-organise; and 3) the capacity for learning and adaptation in the context of change.

Resilience thinking helps to interlink the spatial dynamics that lead to different urban forms with respect to the vulnerabilities of urban systems. The concept of resilience (and sustainable development some years earlier) has given rise to questions related to the contribution and role of certain land uses and urban forms in creating cities that are more resilient (Eraydin & Taşan-Kok, 2013, p. 8).

While there are as many definitions of sustainability and resilience as there are authors, there is one general idea that is confirmed by most, as we can see from the examples above. Generically, resilience is the capacity of a system, enterprise, or a person to maintain its core purpose and integrity in the face of dramatically changed circumstances; this can point to attributes of a built space, or urbanised space, to withstand dramatic changes in the environment. Resilience is a system and strategy to face unpredicted changes. Sustainability is oriented to solutions on the level of technological attributes, political will, and social incentives connected to urban design features when speaking of urban development, which guarantee the balance of a system. If sustainability strives towards a situation of equilibrium and balance preservation of all elements, it is resilience that deals with situations when imbalance is created. To put it bluntly, it is resilience that reminds us of the errors in planning and follows the doctrine of sustainability. This logic works in all manners of application, whether it is the financial world, environmental politics, or urban design, no matter the scale and location. Urban development, in a line to secure a quality living environment, is a cycle between sustainability and resilience. Yet to strive for resilience is not simply a contingency plan for when it is already too late to apply the term sustainable; the two are complementary, as resilience is what has to be thought of for situations when "things go wrong", as the world's artificial and natural systems are much too complex to predict.

2.1 Thinking in Terms of "Sustainable Urban Design"

When talking about sustainable design features, they cannot be avoided in any urban solution. In the discussion on sustainable principles, Carmona (2009) explored the works of other authors and identified a set of 10 generic principles: stewardship, resource efficiency, diversity and choice, human needs, resilience, pollution reduction, concentration, distinctiveness, biotic support, self-sufficiency (Table 2.1). The review of many authors and their papers on the topic of "sustainable urban design" showed that "good urban design is sustainable, but, as the paper has shown, this implies much more than simply reducing energy use and carbon emissions" (Carmona, 2009). Regardless of the theoretical definitions, for any urban solution that is claimed to be sustainable by the designers it is necessary to address the following: develop neighbourhoods that promote walking, prioritise bicycle networks, create dense networks of streets and paths, support high-quality transit, zone for mixed-use neighbourhoods, match density to transit capacity, create compact regions with short commutes, and increase mobility by regulating parking and road use. These design attributes are important elements of sustainability when we expect to

improve mobility, reduce carbon emissions, attract economic activity, improve air quality, preserve arable land, and support a harmonious and prosperous society, but the question is how to implement ideas of sustainability in projects where the limited scale of the intervention does not allow you to apply all of these attributes. As Carmona (2009) concludes in his discussion, "relevant issues are applicable at different scales", as are: buildings, spaces, quartiers, settlements. In terms of general design orientation guidelines, when producing large scale interventions or urban development strategies, they must be in line with physical design features that apply to the concept of sustainability for smaller interventions. It is the respect of the natural and built context, the selection of materials, and the building method that ensure sustainability of a specific urban design development project. Orientation, insolation, wind, water, greenery, as well as buildings and other artificial structures on location, have to be interpreted and included in the design of the intervention. It is more sustainable to select a local stone for the paving of surfaces instead of selecting materials that require oil tankers to deliver them overseas.

FEATURES	DETAIL (TECHNICAL AND DESIGN SOLUTION) SCALE	SPACE SCALE
Sustainable and resilient design attributes by scale		
ENSURING SUSTAINABILITY	• Use local materials • Use recyclable materials • Unique design approach for site specifics • Smart and innovative technical solutions	• Design for low maintenance • Take advantage of natural features (insulation, wind protection, natural water drainage,...)
ENSURING RESILIENCE	• Durable and robust materials • Smart and innovative technical solutions	• Design robust and durable spaces usable for many functions • Design spaces able to accommodate above and below ground infrastructure requirements • Design of serviceable space
Related features supporting both sustainability and resilience		
STEWARDSHIP	• Ensure easy maintenance	• Respond to and enhance context • Calm traffic • Allowing personalisation of public space • Manage the public realm
RESOURCE EFFICIENCY	• Use of recycled or renewable materials • Take advantage of natural features • Using local and natural materials	• Layouts to allow sun penetration • Spaces that reduce vehicle speeds and restrict vehicle circulation • Design spaces that reduce wind speeds and enhance microclimate
DIVERSITY OF CHOICE	• Provide opportunities for mixed uses • Ensure accessibility and safe use	• Design for mixed uses along streets and in blocks • Design for walking and cycling • Combat privatisation of public realm • Remove barriers to local accessibility
		• Ensure economical soundness for project financing and operation (can buy PPP contracts – to insure Public interest)
HUMAN NEEDS	• Design ergonomically • Use user friendly materials (adoption of tactile materials) • Safe technical solutions	• Provide high quality, imageable, public spaces • Combat crime through space design and management • Enhance safely by reducing pedestrian/vehicle conflict • Design for social contact and for safe children's play
	• Use of artificial, composite and other durable materials • Adoption of details and surface finishes difficult to get damage and wear	
POLLUTION REDUCTION	• Use vegetation for noise absorption and climate control • Use recyclable materials	• Reduce hard surfaces and run-off • Design in recycling facilities • Design well-ventilated space to prevent pollution build-up • Give public transport priority
	• Use durable and robust materials	

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CONCENTRATION	• Repurpose degraded areas • Maximize space usability	• Reduce space given over to roads • Reduce space given over to parking • Increase vitality through activity concentration
	• Preserve self-regulatory natural elements and features	• Preserve areas that are needed for self-regulation
DISTINCTIVENESS	• Adopt traditional local design solutions and visual elements	• Reflect urban form - townscape and site character in design • Retain distinctive site features
	• Adopt designs that ensure survivability of elements	• Design for sense of place - local distinctiveness • Retain important building groups and spaces
BIOTIC SUPPORT	• Think of planting typical local types of greenery	• Plant and renew street trees • Encourage greening and display of private gardens
	• Think of planting low maintenance and durable greenery	• Design in robust soft landscaping
SELF-SUFFICIENT	• Low maintenance details, elements, and furniture	• Encourage self-policing through design • Providing space for small-scale trading • Provide bicycle parking facilities

TABLE 2.1 Sustainable and resilient design attributes by scale *(Adapted and supplemented from Carmona, Health, Oc & Tiesdell 2003, p. 46-47)*. The column 'SPACE SCALE' has been revised. Divisions between Sustainable and Resilient attributes have been marked in colours; orange for Sustainable and blue for Resilient; all other attributes are common to both principles.

2.2 'Resilience', a New Paradigm in Designing Open Urban Spaces

Resilient does not mean an upgrade of the term sustainable. Resilience, in terms of urban design, follows the principles for resilient urban planning and design in a post-carbon, climate-responsive building environment (Resilientcity.org, n.d.), identified as: density, diversity and mix; pedestrian first; transit supportive; place-making; complete communities; integrated natural systems; integrated technical and industrial systems; local sources; engaged communities; redundant and durable life safety and critical infrastructure systems; and resilient operations. It is therefore necessary to establish systematic solutions that deal with basic policies and attitudes of the city, functioning both from the infrastructural point of view as from the view of the correct composition of all other elements that comprise the city. However, it is the small intervention that finally completes the puzzle of a complex solution (by principles of sustainability or resilience), which can have an influence on the environment in a more complex and comprehensive way. On the level of small scale interventions, the resilient urban design development must address the questions of technical details and how they behave during stress situations (harsh winters, events of artificial pollution, floods, a brief different use, etc.; to care about maintenance protocol, to make it energy efficient, environmentally friendly, etc.) to establish the identity of the place and a sense of community as a result. In the sense of resilience, all principles of operation are stressed in the sense of "acting responsible to space" through the awareness of each individual in the community, and the inclusion of the bottom-up approach. The emerging dilemma relates to the question of the role of micro scale and detail, i.e. definition of the smallest detail, as, systemically, under the influence of sustainability principles, these principles should have been put in place already. This is theoretically the ideal system of coordination and complementarity of urban planning principles. However, this is a system that depends on dealing with a previously established order (as only resilience could complement or maintain the so-called "resisting disorder"). Each system should first follow sustainability principles, which are complementary and maintained by resilience principles.

3 Open Public Spaces and Urban Design

Open public spaces play a key role in creating a sense of city distinction and identity, acting as an important bearer of content and values in the widest sense. They act as the main platform to which programs, content, and values are attached. A public space is mostly a social space, created and defined by different practices of users (Lehrer, 2007). Public space is, by definition, a space or area that is accessible to everyone, regardless of race, gender, social status, age, etc. (Dešman, 2008). It is a susceptible, sensitive, democratic, and important space, whose role is to protect the right of the users (...) (Carr, Francis, Rivlin, & Stone, 1992). In the sense of the transformation of cities, we can use a wide definition of the urban stage, which can potentially be any open space, any closed public space, or any private space with a mainly public access, and which has any form of spatial setup or scenery in any area of the city that has, in different contexts, a minimal or more permanent characteristic of place-ness (Hočevar, 2000, p. 138). The notion of public space and its functions are best defined by the contemporary definition from the book The Metapolis Dictionary of Advanced Architecture (Gausa et al., 2003), which follows up on Aristotle's thought that a city must be composed of different types of people. Public space is precisely the area that enables people to learn, despite all seemingly impossible differences, and to learn to live together. Gehl (2011, p. 15) defines activities in the public open space as a series of social activities: "Opportunities for meetings and daily activities in the public spaces of a city or residential area enable one to be among, to see, and to hear others, to experience other people functioning in various situations". Zucker, in *Town and Square*, (1959) outlined five basic types of 'artistically relevant' urban squares while stating that a square rarely represents one pure type but more frequently bears the characteristics of two or more (Carmona & Tiesdell, 2007, p. 155). Zucker (1959) argued that many squares were 'undoubtedly art', because the 'unique relationship between the open area of the square, the surrounding buildings, and the sky above creates a genuine emotional experience comparable to the impact of any other work of art'.

How can one, with all these definitions, and many others – similar and different, understand the difference between the open space of a street in the centre of Amsterdam and the public space in Antarctic research stations? How can these two completely different places define the term open space, which includes the diversity of each location with its 'genius loci'. All these uncertainties and the incapability of capturing the many diversities of the definition can be complemented by the interesting thoughts by architect C. Moore about Disneyland's Main Street – "You Have to Pay for the Public Life" (Keim, 2001, p. XXIII) – where, even though the term contains the word "public", which can be interpreted as accessible, this is not necessarily the case.

3.1 Urban Design Scale and Measurability of Space

As defined by Carmona (2009), "in linking theory to practice consideration is given to how these principles impact across the range of different spatial scales: buildings, spaces, quartiers, settlements." However, the question of quantification in open spaces in relation to the quality thereof has always been part of ongoing research. Christopher Alexander, in his chapter on 'Small Public Squares', observes that 'for some reason there is a temptation to make these public squares too large' and goes on to recommend a maximum dimension of 25 metres for a successful public space (Makower, 2014, p. 96). Jan Gehl, in his Cities for People..., recommends that squares should generally not be larger than 80 x 100 metres, which is based on human sight – to achieve the 'best of two worlds: overview and detail' – rather than on spatial qualities (Makower, 2014, p. 95). We wonder how quantification of space impacts our perception of quality elements in the context of the questions that relate to sustainability and resilience in urban design. Both spatial paradigms set humans and their wellbeing to the forefront. The scale that is adapted to humans even when we talk about public spaces is important, regardless whether these places relate to old city centres or open spaces in new neighbourhoods. The form of quantifying the "scale adapted to man" has already been explored by Vitruvius, Leonardo da Vinci, and Gehl (contact of man with activities and space), as well as in the frequently cited Le Corbusier's Modulor, and Rapoport's defining categories of the private–public relationship, etc. The approach to applying the concepts of sustainability and resilience to solutions in planning or designing undoubtedly differs based on scale. The question of impact areas of open public spaces reaches beyond the settlement scale; however, individual interventions on the local or community scale are those that create a direct impact in the perception of users. What is direct and temporary (in use) has an impact on social, economic, and environmental sustainability and resilience; and affects us most in our quality of living, enjoying, exploring visible and invisible relations in open public spaces with cultural changes, spatial boundaries, voids, lost spaces, informal structures, self-organisation, planned regularities, etc. Let us take a closer look at Trg republike (Republic Square) (together with its surrounding buildings, built between 1961–1975, and renovated in 2014) in Ljubljana (Fig. 3.1). Its length is 90 m (125 m together with the street and the area in front of the buildings) and its width 80 m (135 m altogether). Along with the dimensions, the programme of the neighbouring structures is also important – RS Parliament and a bank, i.e. programmes that do not stimulate experiential activities but play the role of a spatial dominant, i.e. control of space and man. The square is minimally organised, without additional activities. Nevertheless, it is becoming more empty, and less friendly to humans. In terms of sustainability and resilience, we see a change: before the renovation the square was used as a parking area, while afterwards parking was provided in underground facilities at the location and in the neighbouring car park under the Kongresni trg. This change seems to promote sustainable mobility without cars. However, when looking at it from the perspective of urban heat islands, we realise that below-ground parking is even more burdensome in terms of overheating of ground surfaces. This development definitely fails to promote environmentally resilient urban design.

FIG. 3.1 Trg Republike; it was meant to be the political and cultural centre of the Slovenes.

3.2 (In)Finity in Open Public Spaces

In discussing the measurability of a square, like Trg Republike in Ljubljana, we wonder whether this dimension, which goes beyond the so-called recommended dimensions by Gehl (2011) and Alexander et. al (1977), does not hide any other spatial potentials. We wonder whether this rounded-off, clearly defined square, limited from all sides, has the best possible impact on human wellbeing in an open public space that would allow people to have positive interaction with other participants in space. What about the sense of infinity, view across the horizon, lack of limits? Can an arrangement in an urban space replace the view across the horizon of a sea? As already pointed out by Cullen (1961) 'townscape' and a sequence of spaces, as a continuation of features of a space, which attract and lead to the next point, experientially awaken the creativity of each individual, while curiosity leads us further in space. Infinity connects us with elements of open space and ambience ventilation (wind flow and flow capacity during flooding). Infinity is not quantifiable, while it is spatially connected with natural elements that are part of the horizon. According to Bachelard (1964, p. 180) "being myself a philosopher of adjectives, I am caught up in the perplexing dialectics of deep and large; of the infinitely diminished that deepens, or the large that extends beyond all limits". The discussion on infinity is continued by the dilemma pointed out by Cold (2000, p. 207), who states that the users wants "an environment with a richness of detail that is larger than our immediate ability to process it". In a similar manner, Nasar (1998, p. 75) philosophically determines the relationship between capturing the curiosity and interest of spatial users "while interest increases with the complexity of an environment, our preference increases only up to a point, beyond which it decreases", where we can claim that at a certain point infinity turns into boredom and disinterest.

4 Changing of Open Public Spaces through the Perceptual Dimension

At the local scales, in terms of the level of open spaces in settlements, we can observe that the perception of a space is determined by physical elements such as road profiling, roughness of paved surfaces, and

selection of greenery, and these details should enable safety for the users, easy maintenance, and resistance to ageing. The aesthetic on this level is dependent on the correct selection of materials, their final processing, and their attributes, such as colour, texture, acoustic properties, luminosity, reflectivity, etc., and all of these elements have an impact on our imagination. They affect our feelings, experiences in space, and integration; they create experientially changing images. They offer the dimension of feeling and trigger a response (comfort or discomfort), such as freshness of water or the sound of a waterfall on a hot summer's day, the scent of strawberries on a noisy Saturday morning market, or sitting cosily by a fire with a view of a snow-covered landscape. Social relationships are included in this process as well. Notably, open space in all its forms includes physically intangible elements that are defined as values, beliefs, symbols, and meanings – the values of each individual, which are both acquired from the environment and returned back there. These elements are of importance when evaluating the built environment, along with its forms and patterns, as they developed in tandem with society; they connect us with our past, and help us create our tradition and our experiential space.

4.1 Identity of Place and Space

The social idea that came with the change in society, the industrialisation and dramatic migration from the rural area to the cities, saw a change in urban design principles. The identity of place or place identity (Lynch, 1960) are those elements that define a place's individuality, i.e. something that distinguishes the place from other places. It is used as the basis for its recognition in the sense of a separate entity (Lynch, 1960). Assuming that identity is a mixture of characteristics ("inventory of inventories" of these characteristics), which are interdependent and have various impacts in a recognisable hierarchy, it can be concluded that this is, in fact, the essence in the overall identification of architecture (Fister, 1993).

The exponential growth and expansion of the cities brought a wide array of complex and unprecedented problems and, with it, the search for the preservation of identities of urban spaces that connected to the identities of the users, opened a new age in civic design. It is no longer an exclusive process of architectural design but rather an intricate interdisciplinary exercise. The 1980s movement New Urbanism sought to foster place identity, a sense of community, and environmental sustainability, and since then its influence has grown significantly (Day, 2003, p. 83). In contrast, the Modernist idea was one based on arguments of economy, technology, justice, and equity, but at its core disregarded individuality and all the unique identities of the spaces. As such, it is hard to see the concepts behind the Modernist idea as being able to adapt to the notions of sustainability and resilience, since the human scale, besides the application of human ergonomics in relation to building and furniture details, is generally neglected as a determinant for the identity of places, and is being replaced by a universal application of the theory.

The process of urban sprawl nevertheless negated the human scale and therefore slowly eradicated the notion of identity. As it coped with the city as a functional machine, it neglected the idea of place-ness, community, and, subsequently, sustainability and resilience.

4.2 The Image of the City

Lynch's (1960) systematic 'The Image of a City' is a rather subjective comprehension of the city, as each individual user creates his own ideas and mental maps of it. The image itself is a result of a combination of actual in-situ sensation and of the memory of past experience.

A legible mental map gives people an important sense of emotional security; it is the framework for communication and conceptual organisation, and heightens the depth and intensity of everyday human experience. The city itself is thus a powerful symbol of a complex society (Lynch, 1960). An environmental image has three components: identity (the recognition of urban elements as separate entities), structure (the relation of urban elements to other objects and to the observer), and meaning (its practical and emotional value to the observer). It is important that these urban elements are not hermetically designed to a precise and final detail, but present an open-ended order. Urban inhabitants should be able to actively form their own stories and create new activities. In relation to buildings and open spaces, Gehl (2011) defines three categories of outdoor activities: 'necessary', 'optional', and 'social or resultant' activities (Fig. 4.1). They all affect the intensity of use, for how long the activity lasts and, in this respect, which activity to develop. Importantly, giving full freedom to act, create, and move is not enough if not incentivised to do so. There must be a process that enforces regulations and takes care of equality in professional decision-making and equality of individual needs and opinions. An intervention in an open space has, by consequence, more chances of giving an image and impression of a democratic place, a place that also functions from the technological aspect when facing unforeseen changes and a place of commonly recognised identity if this understanding is applied in the design. It is when a general image of a specific space becomes the image of it that this space becomes the place.

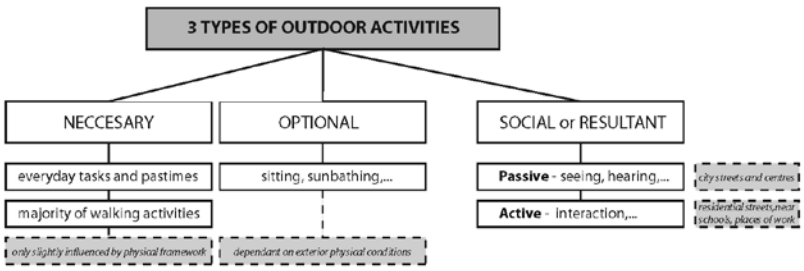

FIG. 4.1 Outdoor space and outdoor activities *(Gehl, 1980)*

4.3 Lost Spaces, Invented Places, and Voids

When speaking of physical presence in the spatial dimension, the lost spaces are the "undesirable urban areas that are in need of redesign-anti-spaces, making no positive contribution to the surroundings or users / they offer opportunities to the designer for urban redevelopment and creative infill and for rediscovering the many hidden resources in our cities" (Tracik, 1986). There are five major factors that have contributed to lost spaces in our cities: 1) an increased dependence on the automobile; 2) the attitude of architects of the Modern movement toward open space; 3) zoning and land-use policies of the urban-renewal period that divided the city; 4) an unwillingness on the part of contemporary institutions - public and private - to assume responsibility for the public urban environment; and 5) an abandonment of industrial, military, or transportation sites in the inner core of the city (Tracik, 1986).

However, on the other hand, the void is not just another lot to fill. Sometimes it is the sacred space between two different human groups, a border without the physic line, an imaginary obstacle that will never be surpassed even if there is no barrier, a wall, a limit. Just a void, even if, at a distance, it is touchably close to two buildings, it is an unlimited space between two souls.

In urban tissue, street connectivity is the basic structure, a symbolic void, a backbone to which different patterns of urban morphology are connected. Voids are often filled with informal construction that is in transition - structures without content or structures with a distinctly ethical programme (retail, small businesses, etc.). Why do we also talk about lost spaces? Because when we fill the void that has a symbolic value in it, this is a lost opportunity to have an open public space.

5 Multiscale-Levels in Designing Open Public Spaces – Case Study Žiri

The application of resilient urban design development to the case study was carried out mainly on two levels. The physical level dealt with the stream and its unpredictable nature. The design features are carried out in such a way that the intervention withstands the force of torrential waters during floods; they are able to self-regulate and fix themselves in the part where the intervention is made with green and natural elements; and the artificial part is made in such a way that it is very easy to clean after floods. As the intervention went through a lengthy process of public and professional discussions, the final result was accepted by the community and recognised as an integral part of the settlement identity. In the process of defining the project, its area, and content, there were several dilemmas, as the design of a project must answer environmental, social, and economic situations. How does an isolated local level intervention in a public open space integrate aesthetic and technical characters with environmental and

social complexity? How is this intervention designed to ensure the reinvention of identity, and its proliferation through it, is nurtured by protecting it, while still being able to react and even accept an overall accelerating transformation? How does a single project adapt to non-linear dynamics of overall changes?

Several divisions should be taken into account at this point, i.e. planning levels, the application method of design principles regarding sustainability and resilience discussed in Chapter 3.1, and the idea of measurability (size and scale), growth, and expansion. Scale is treated as a qualitative term, as it speaks of relativities as well as values and is just as relevant when viewing a city as a whole, or when touching the detail of a wall or a window frame. The word 'size' is quantitative and can refer either to the size of the population or to its physical extent (Makower, 2014, p. 32). To apply the thought developed by Makower to the case of Žiri means bringing in the notion of growth and scale. "If a city grows (as opposed to just expanding), where does it grow from? If it shrinks, what does it shrink back to?" (Makower, 2014).

5.1 Specifics of the Location – Municipality of Žiri, Slovenia

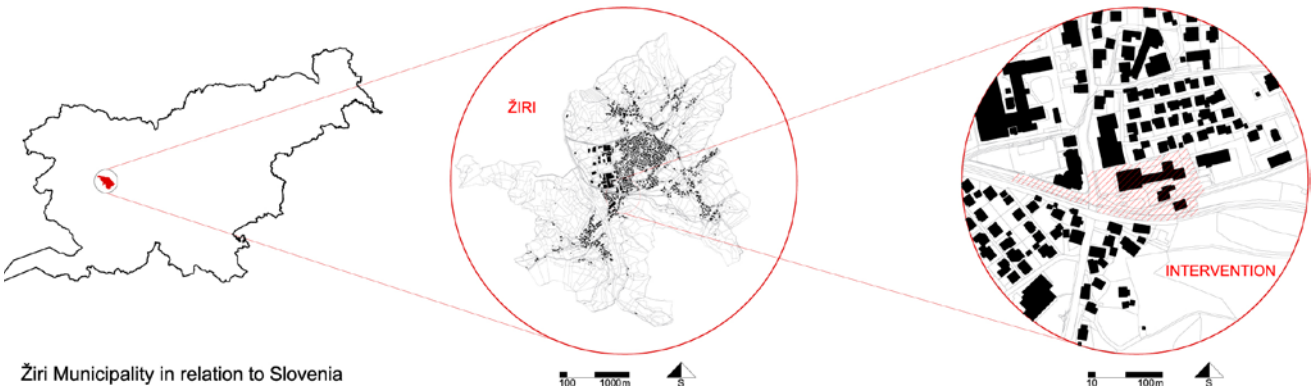

FIG. 5.1 Municipality of Žiri, Slovenia - Location

The settlement of Žiri lies in the centre of the Žiri Basin in the Gorenjska statistical region, in the extended upper part of Poljanska Sora at an altitude of 478m above sea level (Fig. 5.1). It is located at the junction of three Slovenian regions: Gorenjska (Upper Carniola region), Primorska (Littoral region), and Notranjska (Inner Carniola). The settlement of Žiri is the administrative centre of the Municipality of Žiri, founded in 1994. The river Račeva joins the larger Sora river on the west side of the settlement and both rivers are often flooded despite regulation efforts. Žiri, which already had a very urbanised structure, expanded from the old Žiri by connecting and partially absorbing nearby settlements of Stara vas and Nova vas and Dobračevo. Today, Žiri has almost 3,500 inhabitants.

The settlement was placed to East of the heavily fortified border between the Kingdom of Italy and the Yugoslavian kingdom before the Second World War. The industry began to develop rapidly after the Second World War. From individual shoemakers' cooperatives, the Alpina shoe factory was created and became the principle generator of the economic growth of the municipality. Private wood and metal industries also play important roles, while agriculture is a largely complementary activity. As rapid urbanisation resulted in many lost opportunities to generate quality open public spaces, the problems of urban functional and visual impression became exponentially evident and pronounced. Lost development opportunities were reflected in slower economic growth, in rising civic maintenance costs, and the slow loss of identity.

5.2 Developing the Town Centre of Žiri

The process of reading the space for intervention and designing a solution for it was rather linear. Spatial studies began with the organisation of a student workshop held by the Faculty of Architecture, UL, in collaboration with the Municipality of Žiri. The teams of students each developed a different solution under the mentorship of the teaching staff at the faculty and with consultations with the relevant staff of the municipality. Suggestions, comments, and criticism were collected and served as a basis for the design of a final solution that finally received general approval from the public and was within the boundaries of the municipality, which was the investor in this case.

5.2.1 New City Centre – From the Idea of Sustainability to Resilience Design

The location perceived by the local population as the town centre has been affected by a growing number of floods in the recent years (Fig. 5.2, Fig. 5.3). The lack of maintenance and proper regulation of the nearby torrential water stream has caused a deteriorating situation in terms of flood control. Inappropriate technical regulation of the watercourse banks was found to be the main cause of this situation. While being one of the main focuses in the urbanisation of Žiri, as a result of technical issues the Račeva stream became forgotten by the town's residents. The river was clearly identified as a part of the identity of Žiri in the past. As the vegetation gradually overran the stream banks, direct access to the Račeva is now completely denied.

FIG. 5.2 Račeva river about to flood, 22nd October, 2014 *(Image by Dejan Kacin, DK PICTURES, 2014)*

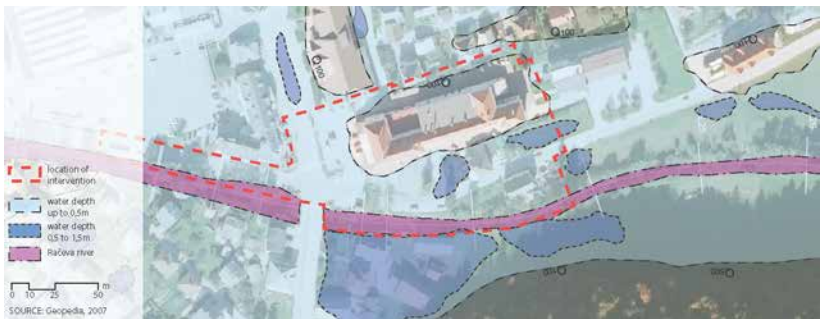

FIG. 5.3 Flood warning map *(Data sourced from Geopedia and Slovenian environmental agency, May 2007)*

In terms of developing the Žiri square, we talk about wider arrangements, including the Račeva stream; here, we stand in front of a dilemma that is, in this case, a quantifiable element in terms of scale and size. The square, i.e. the central part of the public space, has an area of 40–60 m × 55–70 m, while its diversified shape creates in itself an inherent hierarchy between ambiences. This dimension includes the area of roads and parking areas and the empty space between the buildings. The area intended for the market is clearly delineated, next to the cultural centre and a store. Because of the road and the level of the Račeva river area, the dimension changes into an irregular quadrilateral of 25–60m × 80–90m in size. The areas of the market place and the parking area intersect with the main square, The open public space transforms into the landscape and thus "escapes" any spatial quantifiability in the river area. In developing the system of the recreational axis, i.e. 'horizontal connections', which complements the central role of the square, the developments and connections with natural elements, i.e. vegetation, trees, water, forests, play a major role. In the context of (in)finity, water is the central element. However, in the case of Žiri and the Račeva stream area, this is not the case. The square and settlement itself are set against surrounding hills. The developments are subordinate to the system of sequencing in space and connecting the levels between the square, the river, and the landscape.

Creating more than a mere engineering design to fight off floods was the goal of the proposed project solution. Pouring vast quantities of reinforced concrete and economical resources as part of a strictly technical engineering solution would solve the problem, but would

lack any additional value and would further impact the location. Consequently, the design solution conceived the stream banks as new open public spaces with a selection of programmes. The supporting wall was formed in such a way that it can host a small climbing wall (Fig. 5.6). A platform close to the water became a sidewalk that follows the water stream, and ramps were introduced so that the higher level of the town's public spaces is connected to the newly created spaces with a technical feature, allowing for the disabled to access the water freely and thus ensuring good accessibility for everyone (Fig. 5.4, 5.5, 5.6). The municipal council decided that, if successful, this intervention would represent the first phase of a wider intervention. The results would then be used as an incentive and an encouragement for the further reconstruction works of open public spaces that are perceived as the wider context of the town centre.

FIG. 5.4 Visualisation of the Račeva river bank design proposal *(Fikfak, Grom, & Kalčič, 2016)*

FIG. 5.5 Visualisation of the river bank connection to the upper-level platform showing reduced motorised traffic surfaces and uniformity of material and detail features *(Fikfak, Grom & Kalčič, 2016)*

FIG. 5.6 Visualisation of the placement of programmes in the square/ upper-level showing possibility of flexible uses, material selection, and traffic segmentation *(Fikfak, Grom & Kalčič, 2016)*

This second phase was executed at the level of variant idea projects, in which all the separate solutions followed the specific goal of establishing a multipurpose open space of "identity creation" and self-reflection. At the risk of sounding high-spoken and idealistic, this non-material element is the exact effect that is necessary to establish a long-term sustainable and resilient solution. The watercourse banks are flood-proofed, the degraded surfaces of the banks have been reinvented and returned to use by the implementation of creative solutions, the higher-level town centre areas have been re-connected to the water, the wider town centre with its spaces has been restructured, and the neglected character of the town has been re-established (Fig. 5.4).

Ensuring a resilient result in an urban intervention through adequate design features, the correct material selection and an adequate project solution is only the start (Fig. 5.7). These material and measurable elements need to be in balance if they are to become the basis for a new perception of the role of the place where the intervention took place. The perception of the user makes sure that the place will become resilient, not as much to future material changes, but to the change of the role it has for the people, only when a measurable solution transcends the materiality.

FIG. 5.7 Visualisation of the Žiri centre renovation proposal *(Fikfak, Grom & Kalčič, 2016)*

6 Discussion – Thinking of Four Dimensions in Time and Space

This paper places emphasis on spatial quantifiability, (in)finity, and in terms of spatial perception, the identity, the image of the city, lost spaces, voids, and invented places. At the heart of physical elements and quantifiability, lies the dilemma about the location as a "place", while in terms of identity and voids lies the dilemma about "space". This dilemma is complemented by the mystique of the specificities of a site, or "genius loci", which includes the quality of the "sense of place". In genius loci, this mostly refers to the identity of a concrete place, to nature's own identity, and to the human relationship toward it. Identity and interactions are the key terms of ecological awareness. It is important to recognise two basic elements: symbols and structures of *locus*. Symbols present its content, its mental part, while the structure of shape represents its formal part (Norberg-Schulz, 1984).

On the other hand, the word "dimension" has a double meaning: 1) a simple quantitative measure of a line or a pixel; and 2) more complex aspects of time and space, built up in layers of perception and memory, purpose, and understanding. However, by defining the quantifiable dimension, the geometric explanation, we find that this "dimension" does not include everything that means "being". Humans have developed a special dialogue in other dimensions with space, both natural and man-made – the language of the mind – thoughts included in the fourth dimension of space, a space of behaviour, a cosmological space. This form relates to social interactions between individuals and the individual and the society, and vice versa. At the same time, it is clear that, rather than just physical or economic space, humans need space that is intangible and includes *values, beliefs, symbols, and meanings* – values of each individual.

With a mixture of quantification, dimensions, and questions about the infinity of space, we face the challenge of experience and personal integration with space- our experience. Experiential space is also the space that we enter and exit – a hodological space. The basic invention of Lewin was to introduce a new geometrical framework, a "hodological space" (from "hodos", a Greek word meaning "way") (Rainio, 2009), to describe psychological occurrences. There is always the question of what are the ways to it, what are the connections between two points in space (where we never know the start nor end points, and which are also never the same). The road is sometimes easy and at other times hard or, on the contrary, the most pleasant one, depending on one's wellbeing and purpose. The experiential space is never uniform (nor equal): it contains places and in-between places; in a place the goal is activities, while there are no goals in in-between spaces, only distances.

The understanding of the fourth dimension "Spacetime", which cannot be measured in metres, is the basis of spatial paradigms that follow progress that is both sustainable and resilient in nature.

7 Conclusions

It is unavoidable to define what makes an urban intervention, or temporary use of space, sustainable or/and resilient is a combination of several elements. The basic step is the function and impact of the technological detail that follows and respects the idea of sustainability and makes the result of an intervention in space a resilient solution. We can call a solution a "good design" when the sum of the singular elements is more than the singular element alone. If the sustainability of intervention is what supports the definition of identity, measurability, and (in)fininty in space, and has a positive impact on its user, then the "duty" of resilience is to replace, react, and recycle it when the role or use no longer follows the positive effects (for the user, owner, natural and built environment, and all stakeholders). By considering the basic design dilemmas between the modernistic concept "less is more" and the ecological concept "more is more" or "more from less" (Buckminster Fuller's adage), through sustainability strategy with "more value – less impact", in the resilience strategies we come to "less is more because more is more" (Zolli & Healey, 2012).

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The Scale of Urban _
World Urbanisation and Architectural Reactions

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ABSTRACT **The chapter represents a theoretical overview of the historical and contemporary debate on urbanisation issues. It is presented in the form of a concise interpretation of the basic concepts related to urbanisation, for the purposes of the understanding and reinterpretation of (urban) sustainability. The chapter points out the critical urban theory thesis that urbanisation is a social process generated and materialised through dynamic spatial transformation that is becoming planetary. The contemporary urbanisation fundamentally changed the cities from centric formations to the new polymorphic urban tissue deeply extended in the once rural and natural environment. Therefore, the chapter is based on the presumption that the issue of urban sustainability cannot be comprehended without an understanding of emergent interconnections and dependencies between different spatial scales, urban agglomerations, and close and distant operational territories. The management of urbanisation as a large-scale process and configuration is understood as the basic drive for the creation of sustainable urban places and territories. Furthermore, the chapter follows the contemporary methodological platforms and conceptual tools for the research of the local urban conditions in the context of planetary urbanisation. It focuses on the selected emerging urbanism approaches to researching and designing the new urban tissue, as a disciplinary path to overcoming the utopian comprehensive model of planning and designing the cities.**

KEYWORDS urbanisation, urban age, planetary urbanisation, spatial scale, city boundaries, territory, design strategies

TOC

1 Spatial Scales of Urban Sustainability

"Sustainability is commonly misunderstood as being equal to self-sufficiency, but in a globalized world virtually nothing at a local scale is self-sufficient. To become meaningful, urban sustainability therefore has to address appropriate scales, which always would be larger than an individual city." (Elmqvist, 2013, para. 4).

The basic and most commonly used definition of the *sustainability* concept, coming from the famous Bruntland Report (UN-WCED, 1987), is essentially concerned with resources. Of course, after that point in the historical line of sustainability, the concept evolved through the numerous interpretations coming from different academic and professional fields, some of which will be explained in the other chapters of this edition. Above all, the Bruntland Report definition stayed at the core of sustainability thinking and states that we, as a civilisation, should envision and manage our development (growth) in a way that will preserve the resources for our future generations. Therefore, if we want to understand the meaning of the sustainability concept in the context of urbanism, we should first understand how the cities are functioning in terms of their resources.

The cities of today are highly dependent on resources and services from the wide territorial and planetary scale. Considering that, cities are no longer distinct territories of different sizes, surrounded by rural and natural environments, as they were until the twentieth century. On the contrary, they are connected by transportation and communication networks into almost one urban formation, dispersed and fragmented. One place is reliant on many distant places and regions around the world for food, water, electricity, and many other necessities. The city is no longer directly related only to its nearest or surrounding territories, and this large-scale character affects its own structure, functioning, and urban way of life.

Following this contemporary condition of cities, this chapter relies on the Thomas Elmqvist's thesis on the urban sustainability (Elmqvist, 2013). Cities, in order to be considered sustainable, need to manage their transformation and everyday way of life on different scales. At the city scale, there is a need to continuously work on the optimisation of the use of resources, to increase energy efficiency and to minimise waste. On a wider scale, there is a need to consider any kind of a city's dependence and impact on resources in other parts of the world. Therefore, if urbanism wants to address the sustainability, it must address the issue of contemporary urbanisation that no longer produces a city as a settlement in a traditional sense, but as a large-scale, dispersed, fragmented, and networked landscape. The question of sustainability is related to the question of *interconnectedness of various spatial scales*.

Contrary to the Elmqvist's thesis, the urban sustainability debate is predominantly concerned with the city scales, "as bounded, technologically controlled islands of eco-rationality that are largely delinked from the broader territorial formations (Brenner & Schmid, 2015, p. 157)". Interpretations of the sustainability concept in fields that deal with urban space have begun at the international level, through summits and conferences, in the nineties. Until today, they have resulted in strategies, agendas, and other types of regulatory documents that are voluntarily accepted at the national/state levels. On the other hand, their operational level is very local, where regional and city authorities play the key role in the development and implementation of the sustainability principles. The famous Agenda 21, the UN sustainability strategy defined at the UN Earth Summit in Rio de Janeiro in 1992, is an example of this hierarchical principle through which sustainability is monitored and measured on administrative spatial scales, from the state level to the local, mostly city level (UN, 1993). Although Agenda 21 called for the exchange of the collected data, the establishment of a cooperation network, as well as the formation of a common set of urban indicators of sustainable development, it stayed focused on a city scale. It rarely takes into account the wide-scale socio-economic process that does not stop at the city or national borders. Even implementation on the regional level means that sustainability is going to be measured as a sum of local and national actions in wide territories such as Europe, North America, Africa, etc. In general, sustainable development is expected to come through the implementation of common principles into hierarchically divided territories, mainly cities, taking no account of the horizontal, multi-scale functioning of the urbanisation process. The most recent UN document, adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, in 2016 (UN, 2017), dwells on the same premise.

Alongside the sustainability discourse, the prevailing body of contemporary urban ideologies is concerned with the urban condition as the city phenomenon (Brenner & Schmid, 2015). Moreover, the practices of urban planning and urban design usually deal with administratively bounded territories and predefined scales. In this sense, urban theory and practice enhance the further fragmentation of urban space, while the urban reality is deeply immersed in networks. As Elmqvist pointed out, there is a need to understand it from the perspectives of diverse scales.

This chapter will explore this 'scale misunderstanding' and point out the gap between the contemporary forms of urbanisation, multi-scaled and networked in nature, and the comprehensive ideal of the city theory and planning, still very much alive in the urbanism discipline. Furthermore, it will follow the recent theoretical body and research strategies on urbanisation that seek to understand the social and spatial relations between the concentrated habitats we call cities, and the distant territories they are now dependent on. An understanding of these relations will bring us, we believe, closer to sustainability. Consequently, managing urbanisation is what sustainability is about.

2 The New Urban Tissue

"...while the locus of urbanism as a mode of life is, of course, to be found characteristically in places which fulfil the requirements we shall set up as a definition of the city, urbanism is not confined to such localities but is manifest in varying degrees wherever the influences of the city reach" (Wirth, 1938, p. 7).

From the spatial point of view, urbanisation radically transformed landscapes all over the world. Traditional configuration and the experience of the city as a dense, walkable, and core-dominated unit had already begun to dissolve in the fifties. The spatial results of the post-war decentralising urban politics became soon visible, such as large-scale infrastructural systems, demolition of old city centre neighbourhoods, spreading of low-density urban peripheral structure, and repetitiveness of urban morphology. Today, all these spatial transformations are even more radicalised and extended to villages, farming fields, forests, deserts, wetlands etc. producing new social and spatial relations. Sometimes, in contrast to common knowledge, where "[s]uch a transition exposes strange urban landscapes where the marginal can be central; centrality can be on the urban margin; and the 'urban' expands far into spaces previously considered as 'countryside' (Graham & Marvin, 2002, p. 115)."

Philosopher and sociologist Henry Lefebvre conceptualised the new spatial configurations that expand into and reshape rural areas, and at the same time transform historic city cores as the new *urban fabric* (*tissu urbain*) (Lefebvre, 2003/1970, p. 3). In his book *The Urban Revolution* (*La Révolution urbaine*) from 1970, he explains that this new urban landscape is forming in such a way that boundaries between the cities and their surroundings are made relative. In this relationship, a city can hardly be seen as a spatial and functional whole, while at the same time its perimeter represents an area characterised by highly dynamic forms and sizes. Lefebvre describes this simultaneous process of urbanisation as an "implosion-explosion" and its outcome tissue as "the tremendous concentration (of people, activities, wealth, goods, objects, instruments, means, and thought) of urban reality and the immense explosion, the projection of numerous, disjunct fragments (peripheries, suburbs, vacation homes, satellite towns)" (Lefebvre, 2003/1970, p. 14). These 'exploded' fragments, out of the sight of an urban dweller, but at the same time coherently connected to our urban reality, form what urban theorists and researchers Neil Brenner and Cristian Schmid call *an operational landscape* (Brenner & Schmid, 2015).

An important component in the production of the new urban tissue has been the introduction of new infrastructures. There is a complex *hardware* landscape consisting of the railways, highways, pipes, wires, and building networks that are running through, over, and under cities and hinterlands. They deliver the flow and exchange of energy, water, food, and commodities, but also of people and information. In addition,

there is a technologically advanced *software* layer of this new landscape composed of electronic signals and signs. Together, they support, and are a part of, the creation and extension of a new urban tissue in the spatial sense. However, they also support the contemporary urban life as a dynamic interplay between the body scale and global world. As a means of communication, mobility, information distribution, etc., they also support the production of a new urban experience, multi-scaled in nature.

Brenner and Schmid, in the last four decades, recognised and put forward three macro-trends that characterise the urbanisation (Brenner & Schmid, 2015). The first one is the formation of the *new geographies of uneven development* (p. 152). The previous period of industrialisation also produced uneven spatial development, but it was geographically readable as a distinctive typology of territories, such as village and city, East and West, First World and Third World, etc. In the contemporary state of urbanisation, different conditions of wealth and poverty, growth and decline, centrality and marginality, stand side by side and mutually produce each other.

The second trend of urbanisation is *the change of the basic nature of urban reality*, which means that 'exploded' contemporary condition is problematic in categorising according to the traditional bounded space typology of town, city, metropolis, and region (p.152). We are confronted with the urban reality that brings forth diverse socio-economic conditions and territorial formations. Some of its key features are the densification of inter-metropolitan networks, building the large infrastructural systems, restructuring the traditional hinterlands, extension of large-scale land-use systems devoted to recourse extraction, transformation of rural areas, operationalisation of wilderness, etc.

Finally, the third trend following urbanisation is *transformation of inherited geographies of urban governance* (p.153). Hierarchical institutional frameworks that operated according to the hierarchical territorial organisation, such as the state territory, became the worldwide network of the decision-making places. This new landscape of territorial governing is dominantly oriented to market 'liberalisation' and state deregulation.

In conclusion, although urbanisation is materialised and visible through *tissu urbain*, critical urban theory conceptualises urbanisation as a process, not exclusively as a physical appearance. The thesis explicitly put forward by Henry Lefebvre (2003/1970) has been developed through the work of other critical urban thinkers such as David Harvey (1985, 1996) and, more recently, Neil Brenner and Cristian Schmid (2013, 2015). Spatial transformations of the concentrated built environment and distant landscapes are closely intertwined with economic and governance restructuring, as well as with dramatic social and environmental consequences.

"Simply put, the urban is not a (fixed) form but a process; as such, it is dynamic, historically evolving and variegated. It is materialised within the built environments and socio-spatial arrangements at all scales;

and yet it also continually creatively destroys the letter to produce new patterns of socio-spatial organisation" (Brenner & Schmid, 2015, p. 165).

The contemporary urban condition is, of course, closely related to a neoliberal model of capitalist economy. However, it is often portrayed as an almost natural and inevitable demographic, morphological and economic phenomenon (Harvey, 1996; Keil, 2016). Still, as all of these thinkers have noticed during the past five decades, the urban condition is dominantly read as a typological spatial duality of the city and the rural hinterland, and urbanisation as a demographic movement of people from a rural to an urban environment. The metropolis, rising peripheries, and immense urban networks are not mere consequences of distant political and economic forces, but should be understood as one and the same socio-spatial production, as we learned from Henry Lefebvre (Lefebvre, 1991/1974). Society is producing the spatial arrangements and space is the important medium of the (re)production of the social organisation.

3 The Recent Questioning of Urban Age Thesis

"Globally, more people live in urban areas than in rural areas, with 54 per cent of the world's population residing in urban areas in 2014. In 1950, 30 per cent of the world's population was urban, and by 2050, 66 percent of the world's population is projected to be urban. There is significant diversity in the urbanization levels reached by different regions. The most urbanized regions include Northern America (82 per cent living in urban areas in 2014), Latin America and the Caribbean (80 per cent), and Europe (73 per cent). In contrast, Africa and Asia remain mostly rural, with 40 and 48 per cent of their respective populations living in urban areas. All regions are expected to urbanize further over the coming decades. Africa and Asia are urbanizing faster than the other regions and are projected to become 56 and 64 per cent urban, respectively, by 2050" (UN-DESA-PD, 2015, p. xxi).

The UN information about the dominance of urban population over rural is widely used in all kinds of discourses and debates about the urban condition. Since 1988, the Population Division of the Department of Economic and Social Affairs of the United Nations (UN-DESA-PD) has been issuing the revised and updated estimates and projections of the urban and rural populations of all countries in the world approximately every two years.

The criteria for identifying any specific area as urban are not specifically defined by the UN-DESA-PD, but are defined by each country for its own administrative and statistical purposes. Basically, the UN-DESA-PD is just collecting the previously generated data. The explanation of the methodology identifies the several most common national criteria for the classification of a territory as urban: administrative criteria, a

minimum population threshold, population density, the presence of infrastructure such as paved roads, electricity, piped water or sewers, etc. Among the 233 countries included in the assessment in 2014, 125 used administrative criteria to distinguish between urban and rural areas and for 65 of these countries, this was the only criterion. Furthermore, 121 countries used the population size or population density criteria, and, in 49 cases, demographic characteristics were the only criterion. However, the lower limit of population size above which a settlement is considered urban varies greatly from country to country, with values between 200 and 50 000 inhabitants (UN-DESA-PD, 2015, p. 4-5).

Considering the above criteria, the UN statistical data on urban population are based on very unstable methodological grounds. There is a huge gap between the diversity of socio-spatial conditions around the world and the homogenous way of contemporary thinking and measuring these conditions as urban. One could say that unifying urban categorisation based on statistics is blurring different, and sometimes degrading, living conditions of a great extent of the 'urban population'. The legitimate question is to ask: what is the purpose of the collected data? Nevertheless, the publications, especially influential on academic research and policy development, such as the UN Habitat World Cities Report, titled *Urbanisation and Development: Emerging Futures* (UNH, 2016) and *New Urban Agenda* (UN, 2017) all reference the UN demographics and consider the UN data on urban population as the starting point of the agenda.

The historical roots of this numerical approach to the urban condition, where a city is considered as an administratively defined territory with clear boundaries and a measurable population that has a tendency to grow, can be found in the period of industrial cities. According to the German Reich statistics from 1871 and the First International Statistical Conference held in Berlin in 1887, all areas with a population between 5 000 and 20 000 are defined as small towns (Schmidt-Lauber, Wolfmayr, Eckert, Gozzer, & Mitarbeiterinnen, 2011). Areas with fewer than 5 000 inhabitants are considered rural, while larger levels of urban classification are the medium cities (*Mittelstadt)* with 20 000 to 100 000 inhabitants and the large cities (*Großstädte*) with 100 000 inhabitants and more. Later, the famous American sociologist and demographer, Kinsley Davis, in the same way defined the threshold of 20 000 to 100 000 inhabitants for territory to be defined as urban (Brenner & Schmid, 2013). This demographic methodology was widely accepted and applied in the western countries after the Second World War. Although criticised even in the nineteenth century (Schmidt-Lauber et al., 2011), the statistical and administrative methodology is still in use in 121 countries, as we learned from the UN statistics.

The contemporary demographic description of the urban condition, meaning that the majority of world population is living in cities, researchers Brenner and Schmid call "urban age thesis" (Brenner & Schmid, 2013). They find that the urban age thesis of a predominantly urban population in the world and its concentration in the bounded

entities of cities is omnipresent in international professional, governmental, scholarly, and journalistic papers.

"Much like the notion of modernisation in the 1960s and that of globalization in the 1980s and 1990s, the thesis of an urban age appears to have become such an all-pervasive metanarrative that early 21st century readers and audiences can only nod in recognition as they are confronted with yet another incantation of its basic elements" (Brenner & Schmid, 2013, p. 4).

The demographic understanding of urbanisation as a transition of population from dispersed small rural settlements to larger, more concentrated, and denser settlements (UN-DESA-PD, 2014, p. 1) has a specific territorial assumption. The empirical and theoretical question of appropriate spatial boundaries of urban territory whose population was to be measured is converted to the numerical question on how many inhabitants are required, within a *predefined* jurisdictional unit, to justify its classification as urban (Brenner & Schmid, 2013, p. 5). Therefore, are Brenner and Schmid questioning why those specific population number thresholds are used? Why not some numbers other than 20 000 or 100 000? What are the theoretical explanations of this analytical model? Most importantly, why we are still using the same measuring method if it had not even been completely justified in the times in which it was developed.

4 Understanding the Concept of Planetary Urbanisation

"As long as we identify urbanism with the physical entity of the city, viewing it merely as rigidly delimited in space, and proceed as if the urban attributes abruptly ceased to be manifested beyond an arbitrary boundary line, we are not likely to arrive at any adequate conception of urbanism as a way of life" (Wirth, 1938, p. 4).

The traditional definition of urbanisation as the demographic change in the urban-rural territorial relationship had already been criticised in the formative years of the paradigm. Sociologist and the prominent figure of the Chicago school of sociology Louis Wirth was concerned with the problem of the numerical and spatial definition of urban and urbanisation in his influential 1938 paper "Urbanism as a way of life" (Wirth, 1938). Wirth puts forward the sociological and cultural perspective of urbanisation, where the way of everyday life is very important for the recognition of the urban condition. The sociologist was writing about the cities of his time, but he anticipated wide scale urbanisation and put forward the importance of spatial scale in understanding the urban.

"The influence which cities exert upon the social life of man are greater than the ratio of the urban population would indicate, for the city is not only in ever larger degrees the dwelling-place and the workshop of modern man, but it is the initiating and controlling center of economic, political, and cultural life that has drawn the most remote parts of the world into its orbit and woven diverse areas, peoples, and activities into a cosmos" (Wirth, 1938, p. 2).

Even in the thirties, Wirth was aware of the transformative power of urbanisation and its different socio-spatial manifestations, so he was critical about the urbanism and sociology focus on the city as a bounded space and universally comprehensive category. Consequently, Wirth emphasised the need for a new analytical theory of urban condition, one that would put in context the physical urban structure with specific social organisation and individual and collective behaviour. The general theory that explains the urban condition through the socio-spatial processes would allow the analysis and further understanding of the fast transformation of a modern man's environment. It would be based on the clear conceptualisation of the essential and common characteristics of all the socio-spatial conditions that we call urban, but at the same time it would provide the tool for empirical research on the differences at local scale and through history. Therefore, as Wirth puts it, the need for these characteristics to be exact or of the same condition is not important, and it should not be used as a recipe for the creation of urban tissue in different parts of the world (Wirth, 1938, p. 6). The contemporary theories of urbanism and the city very often define a normative prescription of aspects such as structural density, population number, area size, functional organisation etc, for the design of sustainable urban environment, usually highly supported by technological invention. What is important though, according to Wirth, is the potential that a measured entity offers for the desired state of the urban configuration, suitable for the local social and environmental condition.

The large-scale urbanisation that Wirth had anticipated in a modest way, Lefebvre describes in its extreme version thirty years later: "I'll begin with the following hypothesis: Society has been completely urbanised. This hypothesis implies a definition: An urban society is a society that results from a process of complete urbanization. This urbanization is virtual today, but will become real in the future" (Lefebvre, 2003/1970, p. 1). Radical in the seventies, this hypothesis of *planétarisation de l'urbain*, as Lefebvre called it, could not be considered as a hypothesis today. Society truly becomes completely urbanised. Nevertheless, what Lefebvre is also emphasising is that urbanisation should be understood as a process, not as a physical object. The result of the planetary urbanisation as a process is *the urban society* or *the urban tissue*, the changed phenomenon that could not be explained by the category of the city, that belongs to nineteenth and twentieth century knowledge foundations. In that context, "(t)he concept of the city no longer corresponds to a social object" and "(s)ociologically it is a pseudoconcept" (Lefebvre, 2003/1970, p. 57).

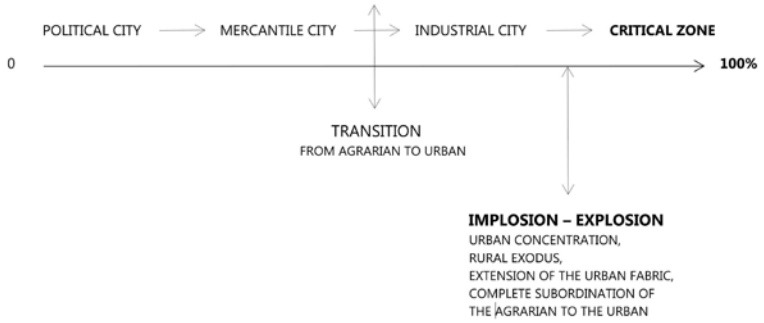

FIG. 4.1 Lefebvre's historical diagram of the process of complete urbanisation of the society *(according to Lefebvre, 2003/1970, p. 15)*

In the same manner as Wirth in the thirties and Lefebvre in the seventies, other thinkers in the field of urban studies put forward the urgent need for the new theory of urban, confronted with the discrepancy between the urban theory and design state of the art, and the real social and environmental change at the planetary scale. The most numerous papers, rooted in the critical social theory and Lefebvre's theoretical legacy, come from Brenner and Schmid, and their associates at Harvard School of Design and ETH Zurich. As they emphasise, their work does not pretentiously aim at the new substantive theory of urbanisation or urban condition. It is aiming to present *the epistemological framework* for further theoretical development and research of the past and contemporary states of urbanisation (Brenner & Schmid, 2015, p. 163).

The authors are offering the seven theses on urbanisation as a contribution to the new epistemology of urban as a collective intellectual project, built on the previous in-depth analysis of traditional and contemporary urban ideologies. Brenner and Schmid are aiming at the "open-ended" and "reflexive'' epistemological framework that may help bring into focus and render intelligible the ongoing phenomenon in relation to the simultaneous evolution of the very concepts and methods being used to study it (2015, p. 161-163). Certainly, all seven theses are equally important in the context of the theoretical venture. However, four theses on urbanisation will be shortly described in this chapter, as closely connected to the issue of urban scale.

So, what do we need to presuppose about the planetary urbanisation, before we start with the empirical inquiry of the specific environmental conditions? Following Lefebvre's theory, and against the dominant sociological and design position of the 'the city-ness', the authors define the *urban as a multi-scale process* of social and spatial transformation (Brenner & Schmid, 2015, p. 165). Urbanisation can no longer be comprehended as a universal form, settlement type, or bounded spatial unit. Urbanisation is a dynamic and historically evolving process that materialises itself across the different socio-spatial arrangements and various scales.

Furthermore, urbanisation has always comprised *three mutually constitutive "moments"*, which are: concentrated urbanisation, extended urbanisation, and differentiated urbanisation (p. 166). This means that urbanisation is not only a concentration of population, or means of production and investment, as it is predominantly referenced, but

also involves the operationalisation of distant places, territories, and landscapes. These distant urbanised spaces support the economic and social way of life of urban agglomerations. At the same time, urbanisation is not only concentrated and extended, but also differentiated. Socio-spatial configurations of different, previously emerged and inherited scales are constantly changed and "creatively destroyed" to make room for the new (Brenner & Schmid, 2015, p. 166).

Besides the three ''moments'', urbanisation should be comprehended through the *three "dimensions"* as well, in reference to Lefebvre's theory of production of space: spatial practices, territorial regulation, and everyday life (p. 169). Urbanisation is a process that involves intensive production of the built environments, various kinds of rules concerning land, labour, and resources, formal procedures of planning, and management of territorial development. At the same time, urbanisation is developing through everyday routines and practices of people who use and appropriate the urban fabric.

Finally, *urbanisation is a planetary* wide process. In its various forms of concentration and extension, through dimensions of spatial (everyday) practice and regulation, urbanisation is spreading and changes even the distant places once called hinterlands and wilderness, producing the new urban tissue.

Besides this robust and neatly elaborated theoretical body, we must also follow the critical observations here. As well as the question of what makes the urban condition, they also ask: what are the elements of the *experience* of planetary urbanisation at the very human level? Should not we also observe and understand *how* urban condition is produced, shaped, or appropriated through the habitual, banal, and repeated everyday practice of individuals and communities (Giroud, 2015, para. 15)? Moreover, this is the point where, according to some authors, it is still analytically and politically relevant to redefine the notion of the city, in the context of contemporary urban condition. City life is still the context through which millions of people are experiencing, understanding, and transforming the planetary urbanisation (Davidson & Iveson, 2015, p. 662).

5 The New Urban Tissue and Problem of (Rational) Urbanism

"Since it is out of control, the urban is about to become a major vector of the imagination. Redefined, urbanism will not only, or mostly, be a profession, but a way of thinking, an ideology: to accept what exists. We were making sand castles. Now we swim in the sea that swept them away" (Koolhaas, 1995, p. 969-971).

Beyond the urban age ideology and the celebration of the city-ness, how does urbanism as a discipline and body of knowledge deal with these unprecedented spatial and social changes, with a wide scale urbanisation? Urbanism devotion to spatial and physical order over social and cultural processes was recognised in the years after the Second World War. There were rare critical voices in the first half of the century, such as those of Patrick Geddes, Louis Wirth and Lewis Mumford. However, they became more articulated in the second half of the century, together with the undertakings of post-war renewal. The social and environmental consequences of the post-war landscape transformation, including large-scale infrastructure construction, peripheral urban area enlargement, and uncritical application of technocratic planning principles, were starting to be recognised, and criticised, in the fifties. Among the most influential voices was that by Jane Jacobs, journalist and urban activist, whose negative criticism directly pointed to the profession of urban planning (Jacobs, 1992/1961). Jacobs raises the problem of the urbanism approach as a rigid organisation of the city space and its complexity, primarily connected to the concept of the functional city and its historical roots. The theme of the urban life 'reality' is set opposite the professional ideology that exclusively deals with the physical appearance, which strives towards the visual order and finds meanings within itself.

An intellectual domain in which the problem of this *spatial determinism* lies, Henry Lefebvre called operative rationalism (Lefebvre 2003/1970, pp. 82-83). The problematic approach in urbanism in which the analytical reason is brought to its extreme is based on a detailed analysis of individual elements separately - social and economic organisation on one side and spatial structure and functions on the other. Planners, as rationalists, see the city as a contradiction and as disorderly, not recognising such states as conditions of modern self-existence. The key words that determine their further actions to bring order and normality into chaotic urban reality are coherence and completeness.

Following the same line of the critique of spatial determinism, sociologist Richard Sennett wrote in much recent times:

"Urbanists, globally, anticipated the 'control freakery' of New Labour by a good half-century; in the grip of rigid images, precise delineations, the urban imagination lost vitality. In particular, what's missing in

modern urbanism is a sense of time – not time looking backwards nostalgically but forward-looking time, the city understood as process, its imagery changing through use, an urban imagination image formed by anticipation, friendly to surprise" (Sennett, 2006, p. 11).

The basic thesis of criticism formulated by Jacobs, Lefebvre, and later Sennett, is a thesis on design principles that advances the static spatial form above the social and cultural processes. The relationship between the spatial form and social relations is perceived as very simplified, one-way oriented, and insensitive to time and change (Novakovic & Djukic, 2015, p. 416). Therefore, urbanism that ignores social and cultural processes of different scales, specifically of everyday life, is not in a position to interpret and design spaces of urbanisation. Following the evolution of rational planning critique (above) and the recent elaboration of the urbanism crisis during the twentieth century (Koolhaas, 1995; Graham & Marvin, 2002; Bajić-Brković, 2002; Palermo 2010, 2014; Inam 2014; Quito papers, 2017), the general and most important characteristics of the problem of urbanism in the wake of planetary urbanisation are extracted.

The profession of urbanism is primarily focused on the formal and morphological qualities of a city. The future vision of a city development is translated into comprehensive spatial plans that are supposed to lead to the desired spatial and social condition, in the defined period. However, in reality, *comprehensive plans* showed their *inflexible nature,* having had a very low capacity to adapt to multiple and often conflicting economic and social demands across space and time. The classical and rational urban planning tradition based on the hierarchical spatial order and linear scenario development is very difficult to relate to the contemporary complex spatial, social, and economic urbanisation processes. The plan, as the main outcome of a planning practice and the crucial regulatory mechanism of urbanisation, failed in coping with real life processes.

Theoretical discourse in urban planning, urban design, and architecture is lacking the coherent paradigmatic framework *(no common ground)* related to the questions of urbanisation, necessary for interpreting, mapping, and designing spatial transformation. The theoretical debate on urbanism is very often developed around separate disciplinary ideologies that are not rooted in the socio-spatial context, nor in real technical and practical demands. Besides the search for new concepts, the new tools and methodologies for the interpretation and design of urban territories are also yet to be defined.

It is also important to notice *the fragmentation of urbanism*, to narrowly focused and separated disciplines in terms of spatial scale they consider, and the tools and methodologies with which they operate. Urban planning, mostly devoted to city-scale spatial regulation, is immersed in theoretical debates about the decision-making processes and interest struggles, and has lost the physical urban space as the subject of its consideration. At the same time, urban design is understood as a small spatial scale practice, backed down to a morphological and

aesthetic scope of intervention, predominantly of public space. Further fragmentation and specialisation come from a professional's tendency to focus on the different issues of the urban condition separately, resulting in concepts such as landscape urbanism, everyday urbanism, tactical urbanism, ecological urbanism, emergent urbanism, etc. (for detailed elaboration, see Barnett, 2011).

The *lack of reformatory tendencies*, true ambition for innovation, and radical creative visions of urban future in urbanism praxis and theory, are based on the essential understanding of contemporary urban condition. The urbanism discipline is more oriented towards the re-reading of past theoretical accomplishments or towards an adaptive postmodern spirit of (neoliberal) deregulation, to accept what comes first.

The urbanism issues described above cast doubt upon the social role of the discipline and its influential capacity in the wake of wide-scale urbanisation. Spatial determinism and disciplinary separation led to the fragmented views on urban condition and impossibility to understand the proper scale of urbanisation. As Rem Koolhaas concluded in general, "(i)n spite of its early promise, its frequent bravery, urbanism has been unable to invent and implement at the scale demanded by its apocalyptic demographics" (Koolhaas, 1995, p. 961). The gap between real human needs, urbanism intervention, and the planetary spatial transformation is becoming wider and more visible. At the same time, its lack of capacity to comprehend and follow the contemporary spatial change and socio-economic activities is rarely the subject of discipline self-questioning (Palermo, 2010).

6 Architectural Utopias of Urbanisation

"What can urbanism be? ...How we think about cities absolutely impacts how we design them. The most fundamental shifts in transforming cities do not happen by tinkering around the edges, but by fundamentally rethinking processes, methods, and outcomes of urbanism" (Inam, 2014, vii).

The large-scale urbanisation and the ephemerality of city boundaries were part of the *design ideas* about the future of cities very often during the nineteenth and twentieth century. Architectural theorist and historian Francoise Choay filtered those ideas about urban condition into the urban model typology (Choay, 1978/1965). According to Choay, the two basic models of the city, *progressive* and *cultural*, can be easily read according to the attitude towards the city boundaries, the relationship of city to the wider environment, and the scale of urbanisation. While the culturally rooted ideas about the city and urban community envisioned distinct boundaries between the man-made urban structure and the natural environment, progressive models imagined the urban as a

technologically driven development of endless carpet-like fabric of greenery and buildings.

The famous Ebenezer Howard's the Garden City model, although presented as a 'marriage' between rural and urban, had very clear city boundaries. They meant not only the borderline between the city and the natural environment, but also the limits of city growth in physical and population sense (max. of 30 000 people). The Garden City could not widen and spread, it could only multiply and reproduce on the other locations.

On the opposite side of urban model spectrum are the progressive models of urban condition, such as the plans and projects by Tony Garnier, Walter Gropius, and Le Corbusier, which are of more importance for this chapter. However, even more radical in the city boundary disintegration was the *naturalistic* model of Frank Lloyd Wright. The image of the future city envisioned by the famous architect in his 1932 book called *The Disappearing City* looks at least prophetic today. Among the other people who were ahead of their time, Wright could see the fast development of transportation and communication networks and the advance it could bring to developers and business people. His *Broadacre City* was a vision of a decentralised and dispersed city in which the city boundaries did not exist. Anticipating contemporary urbanisation, Wright wrote:

"To put a new outside upon any existing city is simply impossible now. The carcass of the city is far too old, too far gone. It is too fundamentally wrong for the future we now foresee. Hopelessly, helplessly, inorganic it lies there where the great new forces molding modern life are most concerned. Those forces are making its concentrations not only useless but deadly or poisonous by force of circumstances being driven inward, meantime relentlessly preparing to within, to explode. Reactions that should by reasonable natural organic change drive the city somewhere into somewhat other and else are everywhere at work. The new city will be nowhere, yet everywhere. Broadacre city." (italic from original) (Wright, 2005/1945, p. 320).

With distinguishable boundaries or not, the most of Choay's urban models are about the completely new urban environments, where the existing historic and industrial city is considered as a place of disorder, inappropriate and unhealthy for the development of modern men, as Wright clearly explained. However, the urban theory of the nineteenth and twentieth century defined urbanisation as the *growth of historical city*, relating the newly designed city expansion to the existing one. Urbanists of the time also posed the question of how to design a logical expansion of urban tissue beyond the existing boundaries.

Probably the most paradigmatic model in this context is Ildefonso Cerdá's *General Theory of 'Urbanización'* and his 1859 plan for the expansion of Barcelona. While his plan for Barcelona is widely known, his impressive and wide-in-scope theoretical work is yet to be fully appreciated. Cerdá was highly ambitious to establish the foundations

of a new discipline that would have the city as the subject of general scientific theory (Soria y Puig, 1995). During a period of more than twenty years, Cerdá developed the theoretical body that supposed to serve an eminently practical purpose, which he applied to his plans or projects, as he called them, for Barcelona and Madrid. His city building theory envisioned the city as a network of many systems through many scales, from transportation, infrastructure, and housing, to morphological elements as urban blocks, street intersections, and pedestrian paths. At the same time, his theory covered the urban aspects of economy, legislation, administration, and politics. Cerdá offered a comprehensive view on the city as a construction and evolution of many aspects and elements in mutual relationship. He was first to use the term *urbanizatión* in 1860 and in the next decade he expanded this theory of urbanisation to the comprehension of the land beyond the city limits (for detailed elaboration, see Soria y Puig, 1999).

Urbanism ideology of the industrial and modern city, including Cerdá's theory, has the fundamental assumption that makes urban historians, such as Francois Choay and Robert Fishman, call them utopian (Choay, 1978/1965; Fishman, 1999). The assumption is that we can expand and rebuild our cities according to a new and better model - the unitary solution for social and spatial problems. Instead of a process, the city was seen as the image, as the object and the model that can be reproduced. This utopian vision had already started to disintegrate in the second half of the twentieth century and the postmodern urbanism thinking rejected the modernistic visions as false and contrary to human needs. Urban theory, after the sixties, was returning to a redesign of existing cities according to the rule of historical continuity, often celebrating the *cultural* models of the past. However, while the urban thinkers and designers are searching for the answers inside the cities, the urbanisation process of a networked and neoliberal society is developing the urban in the opposite direction, outside the city limits to become planetary. As Robert Fishman asks: as "(w)e have not replaced Le Corbusier's answer to what Manuel Castells calls "the urban question" by a better one" and "we no longer believe that a unitary answer exists", what could urbanism be in the context of planetary urbanisation, after the end of cities and beyond utopia? (Fishman, 1999, para. 2)

7 Planetary Urbanisation and the Large-Scale Design Strategies

"Territory charts out a space, a territory, for architecture beyond conceptualisations of context or environment, understood as that stable setting which pre-exists the production of new things. Ultimately, it suggests a role for architecture as a strategy of environmental tinkering versus one of accommodation or balance with an external natural world" (Gissen, 2011).

Today, the research and design of the cities and territories need a set of general theoretical fundamentals about the urban condition. This is important not only because the urban reality has changed and our theoretical apparatus is old, but because this apparatus needs to be operational in analytical and methodological terms, in the context of planetary urbanisation. A common theoretical frame will enable the definition of specific elements and their relations for evaluation of the existing urban places and creation of the specific design strategies. This will not demand that all urban places reach these criteria in the same way.

The most elaborated reactions to the contemporary process of urbanisation are coming from the advanced urbanism research hubs, such as *Urban Theory Lab* (Harvard Graduate School of Design), *Future Cities Laboratory* (ETH Zurich), *ETH Studio Basel - Contemporary City Institute*, and *TRULAB: Laboratory for designing urban transformation*. These 'laboratories' are running research programmes about the transformation of urban areas around the world. They offer emerging urbanism approaches for research of the new urban tissue and socio-spatial configurations of different scales, with the aim of understanding and interpreting various interconnections and dependencies between a city and the close and distant urban spaces that are important for a city life.

Based on Lefebvre's general theory of the production of space, Christian Schmid (affiliated to the three laboratories mentioned) developed the simple conceptual system that can be used in the concrete empirical analysis of urban space. The methodological proposal is that the new urban configurations can be investigated through the three concepts: networks, borders, and differences (Schmid, 2006). Application of these criteria in the research of different locations enables the comprehension of the specific forms of urban condition.

According to a conceptual triad, urban space consists of many different kinds of interaction *networks*, such as networks of communication, trade, and daily routines. These interactions are related to the spatial practices and have their own material infrastructures, so they can be understood through their physical appearance. By understanding the 'position' of a specific place inside the urban networks, we are closer

to understanding that specific urban condition. In that context, the important characteristics of a place are the number of networks running through it, the range of networks, their material infrastructures, and its development over time. Central and peripheral positions of a specific urban area are no longer defined by their geographical position in territory, but by their relational position in urban networks (Schmid, 2006, pp. 170-171).

Although urbanisation, as a planetary process, deals with dissolving the geographical city boundaries and blurring the division between the rural and urban, *borders* are still important urban elements. Studying the development and quality of borders means a search for the potential of connections and relations. "Hence, it is not the lifting of borders that is an indication of urbanism but their transformation into the productive aspects of urban culture" (p. 173). There is a constant need to redefine what and where the border is in spatial terms.

Differences are the third criterion that defines the urban condition, according to Schmid (p. 173). Following Lefebvre, the author is describing the city as a place where social differences collide and become productive. However, the mere presence of cultural differences is not enough for the urban context to be productive in this sense. The basic question is how these differences relate to each other, and whether they interact and exchange, thus releasing the potential for city to reinvent itself. Segregation, marginalisation and ghettoisation are very common appearances of spatially isolated, and therefore unproductive, social and cultural differences, as Schmid reminds us. To research the differences is to detect the degree of their presence, and then, their active behaviour and the possibilities of their coexistence and exchange.

The criterion set was first explained and applied in the ETH Studio Basel project *Switzerland: An Urban Portrait 1999 – 2003* (Diener, Herzog, Meili, de Meuron, & Schmid, 2006), and it was further developed in the ETH Future Cities Laboratory project, *Territories of Extended Urbanisation* in 2015 (Schmid & Topalovic, n.d.). This research of Singapore's hinterlands, as the focal location of the project, is rooted in the assumption that the relationship of the cities with the wider urbanising territories, such as operational landscapes, natural environments and hinterlands, are central to understanding the cities and sustainability (Topalovic, 2015, p. 14). The case study of Singapore is the exemplar and central case study of extended and planetary urbanisation. The project brings alive the old architectural idea about the unity of a city and its surroundings, understood as two inseparable parts of the same phenomenon, as leading researcher Milica Topalovic explains (Topalovic, 2015, p. 12). The research puts forward the *territorial approach* to the interpretation of urbanisation, applied to Singapore's spatial transformation and its resource dependency from various close and distant lands. Urbanisation, as a process, is not explained by the city itself, Singapore agglomeration and centrality, but through the urbanising region and hinterlands that this city is a part of. In the context of networks and borders, the research showed that Singapore is a part of numerous and various networks of trade and exchange

across the planetary range. Its urban condition has spread and moved far beyond the administrative or geographical borders of the city.

Following Topalovic, the right questions to be asked in the context of urban sustainability are: What is the appropriate scale of urban hinterlands? Should we *plan and design* these lands woven into a city orbit? How are we supposed to govern this large-scale spatial transformation and the socio-economic processes that are crossing all kind of administrative borders? (2015, p. 25-27)

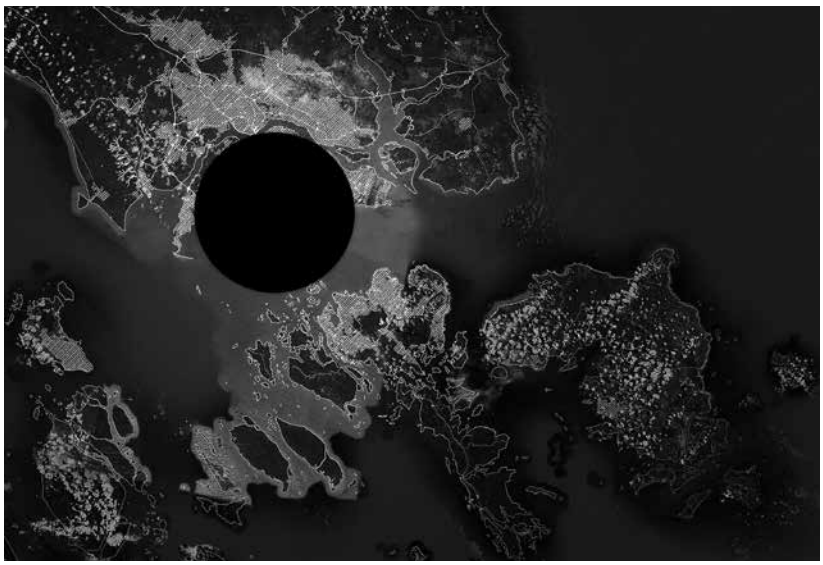

FIG. 7.1 The Eclipse Method applied to Singapore territorial research. Hiding away the city enables the adequate perspective and analysis of the urban hinterlands. *(Topalovic, ETH Zurich D-ARCH Architecture and Territorial Planning, 2015)*

8 Conclusion: Towards Sustainable Spatial Design

Urbanisation fundamentally changed the world over the last three decades. It transformed the existing cities and produced the new urban tissue that extended deeply into the once rural and natural environment. The new urban tissue is not only concentrated like the city before, in the traditional sense, but is also dispersed and polymorphous. The once distinctive boundaries between the urban and rural are transformed and fragmented, putting the wide and distant territories in the functional and spatial orbit of the city.

The fundamental question for urbanism is how to adapt to these changes, and manage and design the relations between the cities and the close and distant landscapes on which they are dependent and which they change through this dependency. This issue is more complicated if we acknowledge that the growth of the cities today is directed (if at all) inside the administrative borders of a city, metropolitan, national, or sometimes regional area. However, urbanisation is not evolving exclusively inside any administrative or even spatial borders. Urban condition today is rooted in the globally networked economic and social processes that change the configurations of existing cities and transform the land far beyond local and national borders.

In the context of this change, called the planetary urbanisation, urban theorists and researchers are putting forward the need for a refreshed epistemological framework, new theory and concepts about the urban condition, beyond the traditional city notion. This would provide architecture and urbanism with the basis for the creation of the new strategies of spatial design and overcoming the (utopian) comprehensive model of physical order.

The general theory is not a substitute for the specific research on the local urban condition. On the contrary, the planetary urbanisation theory emphasises that urbanisation is always rendered by historical and geographical circumstances, with endless possibilities of mor phological results and temporal dynamics of socio-spatial trans-formation. However, the local urban condition is also generated through its relations to larger scale. The local urban condition is a part of the planetary urban tissue, which is "at once the framework and the basis for the many forms of socio-spatial differentiation" (Brenner, 2015, p. 175). Therefore, next to general theories of urbanisation as a planetary process, urbanism needs the methodological platforms and conceptual tools for the research of the local urban condition.

We will repeat the questions put forward by the researcher Milica Topalovic: "Should then the scope of the discipline of architecture be broadened once again, beyond the limits of the city, to include urban territories? Do the scales of urbanisation today demand a larger view? (Topalovic, 2015, p. 11)" They definitely do. Contemporary urbanism (and architecture) needs this scale approach adjustment, to embrace the new urban tissue, and to understand its place specificities inside the global patterns and development during the time. This "larger view" would allow the discipline to potentially take part in managing the process of urbanisation and designing urban territories. Of course, this means the cooperation with other disciplines and the creation of interdisciplinary context of research and action. The strongest tool that architecture will bring to this interdisciplinary large view are design synthetic ways of thinking, rooted in urban history knowledge and sensitive to cultural differences (Topalovic, 2015, p. 32).

The scale question does not only imply the disciplinary larger view, but also the overcoming disciplinary fragmentation to separated spatial scales of interest and practice for architecture, urban design and urban planning. This does not mean that these historical disciplines should merge to one. They need to work on the new common theoretical platform and shared understanding of what the urban and urbanisation are today. Moreover, they need to participate in each other's ventures, always bringing different scale perspectives to the project.

To become meaningful, urban sustainability must address appropriate scales that would always be larger than an individual system concerned (Elmqvist, 2013). This means that managing the relationships between the spatial scales, agglomerations, and the 'non-city' landscapes, which have become very important in supporting urban life, is a necessary part of the path to sustainability.

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Abilities and Attitudes for Sustainable City Creation _

Contemporary Arguments for a Non-Linear Learning Methodology

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ABSTRACT **The definition of urban areas, the space in which urban functions are developed, has extended in recent decades to practically include the entire territorial space. In it, we can find cities of all sizes and ranges, as well as natural/agrarian landscapes or hybrids of the two. We could therefore define our "work space", in the sense of the framework of our discipline (architecture and urban planning), as a unit within a network composed of a sum of 'territorialities'.**

From this point of view, the different parts of territory need to be unlinked and understood because they are full of connections between spaces, times, and different themes. These are the kind of 'urban' territories that demand an architectural project. Even further, they often scream for one. Nevertheless, what would be the most suitable project for this kind of hybrid space? What kind of methodology should we employ to cope with the complex issues involved?

The objective could be to encourage a change in mentality that transcends, or at least seeks to implement, a method for constructing 'criteria of intervention' rather than concrete measures. These methods should be both sensitive to and capable of selecting the most appropriate ways of approach, incorporating certain "keys" into the design process and planning. This is why, in the frame of our workshop, guidelines are proposed for a project production based on sustainability criteria that take advantage of a multi-scalar, multi-temporal methodology, leading to the exploration of possibilities of incorporating, in the most conscious and creative way, these tools of discovery and evaluation of alternatives.

KEYWORDS architecture, urban design, sustainable development, multiscale, creativity

1 What is Urban: The Contemporary Architecture´s Work Space

The contemporary perception of what "urban" actually is, means we must include the intermediate spaces and the relationship between their parts: highways, service areas, ex-urban growth, residential spaces associated with natural parks, industries, technologies, and thematic spaces - an increasing variety of possible functions that flood the inter-urban communication channels. The Italian geographer Giuseppe Dematteis has described the approaches to territorial space (1990) in this way. It would be, in accordance with "the patchwork metropolis" defined by Neutelings (1994), a city of cities of underlying fragmented condition that, however, are often composed of both coherent and encouraging links with those parts of different origin.

On the other hand, from an architectural point of view, there is a school of thought and a practice that tries to keep up with this pace of spatial change. Architecture schools frequently use the concept of 'scale' to attract necessary, specialised, and different approaches and compositions. The overlap of different disciplinary fields, represented by subject blocks of study (Architectural Projects, Urban Planning, Construction, Installations, Structures, etc.), becomes a non-defined system of sum or combination for the students. Times, rhythms, and proportions between these different fields are not fixed, and their degrees of involvement are responsible for the success or failure of urban planning learning in architecture schools.

In order to meet the challenge of the interrelationship between architectural and urban projects, we must identify a number of key aspects of the discipline, which can reveal necessary features for further research. The complex territorial reality needs a set of appropriate mechanisms that explore the possibilities in the most conscious and creative way to facilitate discovery and evaluation of alternatives.

Such connections are presented in this text as "key project variables" or "methodological guidelines". They provide spatial disciplines with a means of recognising forms and functions in contemporary cities while providing a method of dealing with them, keeping the focus on the learning process in architecture and urbanism. This, as we shall see, will involve investigating their different dimensions -scales and times- and understanding and measuring, not only the physical space but the imaginary space or "mind map" that ultimately defines it. This concept is part of the language of architecture that emerged after post-structuralism (Verga, 2006) and was based mainly on the 'environmental image' of Lynch (1970). It can be defined as a generalised mental picture of the outside world held by an individual: "as a result of an immediate sensation and memory of past experiences at the same time [...] for interpreting information and guiding action".

2 A Scalar Issue: The Design of a Spoon

Scalar considerations are common in architecture schools and among other faculties such as engineering and geography studies. Looking at courses on architecture design or urban design, certain questions are common in the learning process and arise persistently. These questions are mainly related to how relationships between various subjects, scales, or matters should be tackled. Of all those recurring questions that people involved in the classroom usually hear, whether in the process of learning or teaching, it would be interesting to choose one of the funniest ones according to this author: Is designing a spoon the same as designing of a piece of a city?

To some extent, it can be considered appropriate not to answer this question, because the vagueness of the answer would not be useful for the learning process on design. There are obviously reasons to think that the design of a simple spoon is not the same as considering a whole urban area, or even to think that it is not the same as building a small house in the country. The supporters of the 'Spoon Designers Union' would probably fervently defend their ability against any such inference and according to some conclusions from fractal geometry, it is quite right to assume that there is not such a big difference. If we delve deeper into what seems trivial in the design of cutlery we find that it should not be too heavy, nor too light, it must be strong, fireproof, and waterproof; it should be pleasing to the eye, to the touch, and to the taste (better if they taste of nothing). If we talk about the aesthetic, traditional, identity, and ornamental considerations, the little world of the spoon widens infinitely.

Firstly, it is true that tools, methodologies, and the importance of arguments are different, depending on the type of design or plan. In this sense, what really becomes interesting is the journey between these differences: recognising the small nuances as well as the categorical and marked contrasts between scales.

On the other hand, similarities usually arrive by themselves, as Oscar Wilde said, "let us observe the trivial, for the essential will come to us alone" (1889). The similarity between things will normally be revealed without us having to strive for it. However, at the start of a project, it is a fact that the precise scale of your work and its mechanisms need to be taken into consideration in order to make good initial decisions and in order to decide the different phases in the process of designing it. In other words: "*There is, essentially, a breath of optimism, of naïve confidence in the richness of urban events (urban in the general sense, without obviously accepting models). A confidence that is probably born from the same fervent look with which the wise astronomer scrutinizes the firmament*" (Solá-Morales i Rubió, 2008).

According to the above, it would be right to say that a good lesson about spoons should teach city architects and planners a lot, for the content on similarity is guaranteed and the journey of difference is clearly enriching. Therefore, it is frequently convenient to place students

on moving ground, relocated from the central subject of the course. It is similar to how a good basketball player marks an opponent by moving away from him, rather than by rushing at him, in order to observe his movements or make him believe that he can move in one direction where, in fact, he would finally be easily intercepted. What is interesting in this apparent freedom of action is that it is paradoxically provoked by a centrifugal journey that will get closer and closer to the heart of 'the problem'.

From spoons to facts. Taking into account this positive journey, between big and small spoons or between the design of a complete set of cutlery and the last dessert spoon, all of the elements of their design should be considered, though not equally. Moreover, that same displacement works on urban territory 'design'.

The final objective could be to generate a change in mentality on the matter of urban things that transcends or at least seeks to implement a method for constructing 'criteria of intervention' rather than concrete measures. In order to set the basis for a kind of guide for that purpose, the references and examples included in this chapter are an accurate reflection of the increasing possibility of an 'urban architecture', as a way to name that architecture committed both to the city and to itself, with a multi-scalar attitude.

2.1 Multi-Scale Projects, Prospective Mapping and Creativity

Sustainability is one of the clearest challenges that urbanisation must pursue in the next few decades. The current paradigm should provide us with base guidelines containing specific criteria, information, and a rich variety of representations. These guidelines will provide information to students, designers and experts on the current territory orientation. They will guide them towards a very open understanding of the habitats and their possible projects.

However, for all of this to be possible, it is important to permit the 'desired' territory to emerge and lead to more sustainable cities in a creative form. In this sense, three different methodological assumptions are proposed in the search for key patterns on urban design for creating a contemporary approximation: a) the importance of an inherently multi-scale design exercise; b) the generation of prospective and interesting cartographies, as a means to produce knowledge, and c) the recognition of 'the project' as a creative act.

In relation to the first point, in order to address the territorial complexity described, it is necessary to reflect more than ever on the ability of the design process to move between scales. Many failures as a practice are due to a lack of an internalised 'MULTI-SCALE VISION' (Rivas, 2006). The fact that, over any point of the territorial space, many scales of reality act at the same time or intermittently, requiring an additional explicit and intentional effort to achieve the objective

framework of the intervention. In this way, many exercises in urbanism and urban architecture, both plans and designs, have inordinately dealt with regional or supra-municipal economic scales while neglecting local relations. Many others, entwined with immediate concerns or initial demands of the program, have not taken advantage of the geographical logistics or larger scales that arise during the process of generating plans or projects.

FIG. 2.1 Local framework for the city-street in Málaga *(Rivas, J., 2015)*

"The first step in understanding the adjustment grade for different urban elements of the study area is to confront them directly, obtaining a spontaneous superimposition that offers us a great variety of relationships. This is the grouping of space around a facility, the coinciding of a metro station and the routes of various bus lines, etc. which, the same time, offers us an opportunity to observe an absence of accord, or gaps: lack of public open space next to the bus stops, dense areas where facilities become very inferior, super-accessible areas that are under endowed, etc. All of these graphic conclusions are important when trying to differentiate distinct places that compose the area of study and then to assign qualities and defects by which to judge them. [...] In the study area there are necessarily different possible groupings of urban elements like empty spaces, recurring spaces, redundant spaces, inaccessible spaces, dense zones, and areas of opportunity." (Rivas, 2015).

Secondly, to operate in a contemporary space that is full of contradictions and differences, we must reshape the meaning of CARTOGRAPHY, finding the necessary skills to mix instruments available to us. According to the most remarkable research from thinkers on urbanism in the last century, from the universal Scottish biologist Patrick Geddes (2009), to the American urban planner and author, Kevin Lynch (1970), the American architect and theorist born in Buenos Aires, Mario Gandelsonas (1999), or one of the most renowned urbanists and professors in IUAV (Istituto Universitario di Architettura di Venezia.), the Italian architect Paola Viganò (2001), urban design has been trying to approach territories from a 'compiling' perspective for decades, disentangling them and putting them back together over and over again (See Figure 2.1). This involves constructive methods that distinguish the parts or assembly components, value their importance in the creation of hierarchies, and lay the foundation for the creation of special areas of intervention. Thus, it is possible to speak about the need for a 'prospective cartography' that does not underestimate the capacity of the progress of the project in the diagnosis and analysis phases. These cartographies are collective visions of reality or scenarios, which are built "with critical capacity to select the past and with long range vision of its use and usefulness criteria" (Solá-Morales i Rubió, 1981).

Thirdly, and as a result of CREATIVE ATTITUDE, the critical position, and freedom of thought are imperative in urban architectural projects and urban planning. This means that, in as much as there is a need to obtain and manage information accurately, well contrasted analysis of urban territories must be compatible with allowing urban facts to approach the project, influence it, or even determine its outcome. This concerns a line of 'research by design', which is present in some schools of architecture, highlighted in Europe (TU Delft, IUAV di Venezia, or ETSAB-UPC in Barcelona, among others) (Meyer, 2005). This would lead to a way of creative designing that contains qualities or capacities that are relational or synthetic, like abilities of innovation and development of new categories oriented to a contemporary urban design, which would be useful in the learning context.

3 Attitudes, Modes and Techniques for City Creation

The progress of the work in the fields of knowledge described above always counts on a number of fundamental components: enough information and a well-contrasted analysis of the urban territory where we are developing the work; an account of how things happened over time to become what they are today; the management of this information and the ability of those instruments that allow learners and designers to assimilate it and create knowledge (Trullén, Ladós and Boix, 2002). In addition, attitude, stance, and freedom of thought are fundamental when dealing with urban space. It is necessary to let the urban facts come closer to us. That means possessing some of the same values and ideals as the representatives of the society, not forgetting that the work is for them.

Creating cities as an urban whole has been one of the most challenging jobs throughout human history. If you approach this using Ervin Galantays historical pathway (1975), it is possible to observe the key moments and temporal leaps, as well as a number of consistencies in their foundation. Cities such as Mileto (479 B.C.), with its linked and sloping grid of built squares in the bay; Bagdad (761 D.C.), locked in a 'divine' circle; the strength of Vällingby (near Stockholm, 1954) and its centre/square over the railway station; the beautiful foundations of Timgad (100 D.C.), Savannah (1733) and Adelaida (1823)... the belief in the shape of Brasilia (1956), with its bow and arrow; the creative rationalism of Le Corbusier in Chandigarh (1951); the strict equity of New Delhi (1911); the pieces/characters of Cumbernauld (1955); the sustainability of Hook (1883) with its pedestrian network, which give a very rich palette of creations, along with the involvement of technicians and politicians, reflecting societies ready to begin something new.

All of these are skills or attitudes that served and must serve, now more than ever, to create or develop cities, bearing in mind the current necessity to include more complex variables, such as sustainability and climate change, heritage values, new social and economic issues, among others. In the learning context, assuming its specific condition, each attitude or ability needs to be considered and upgraded to be consistent with the type of design, scale, etc. But it is not possible to ignore any of them.

Each of them is based on the perception of different urban/architectural projects. It is true that they are always global actions, but if you pay attention to the partialities, the intermediate areas, places, neighbourhoods or crossroads, from an appropriate distance, they are also able to manage this totality and achieve a grade of self-sufficiency that permits them to be integrated into bigger entities.

They are finally presented in three different groups: attitudes, modes, and techniques (See Table 3.1).

BLOCK → ABILITY/ATTITUDE → DESCRIPTION → 20TH CENTURY		
ATTITUDE	RELATIONAL	Search for Relationships between spaces, long and short, continuous or separated distances / Relationships between times: vindicating and protecting the fragile past, attending to the present moment, anticipating scenarios and promoting futures / Definition of relevant relationships and priorities
		The Industrial City by Tony Garnier (1917)
	EDUCATIONAL / BROAD-MINDED	Creation of positive, useful, and diverse space that contains and spawns future opportunities / Spaces from a difference that respond to specific conditions of the context and the proposal / Tones of space.
		Tapiola (1950s and 60´s)
	INNOVATIVE	Focus on architecture as responsible for forms and functions integrated into urban space. Territorial and urban corners. Generate integrating conscience, in the social and the spatial, between classes, between artifice and nature, between the central and the local.
		Quinta da Malagueira, Évora. Alvaro Siza (1977-1979).
MODAL	DYNAMIC	Situate mobility as a creator of places / Compression of the movements, the inertias, the velocities, the intensities, the urban forces, the slow places and the confluences / Creation of balancing networks and systems that benefit the project.
		Centro de Rotterdam, Joan Busquets (1989)
	SYMBIOTIC	Nature update, creation of intermediate spaces, situations of interexchange between systems or media, to incorporate the city into the geography, and infiltrate open space into the urban interior.
		Piano di Coordinamento Territoriale di Salento (PTCP de Lecce, 1999-2001) Bernardo Secchi y Paola Viganò.
	SYNTHETIC	Operate in function of balance and synthesis of the decisions / Attitude based on the economy of media, reserve of future opportunities, anticipations and previsions.
		Cordoba Congress Centre. OMA, 2002.
TECHNICAL	SPACIAL	Attention to detail and the specific form of the solutions / Care for the spaces, for the secondary arguments, the combination of the small with the large, the sensorial with the structural / Ability to make urban facts and the proposed solutions comprehensible / Preparation for both current and future conflicts and their resolutions
		Centro cívico de la ciudad de Tapiola. Aarne Erv (1956)
	ARCHITECTURAL/ OF INTEGRATION	Dedication to the imagination. Acting without model or typical solutions / Increasing the frame of liberty of the project / Transformative and active capacity or attitude of new models and solutions that combine assumptions that are traditionally independent.
		Siedlung Björnholm, Alvar Aalto (1959)
	DIMENSIONAL	Reinforce the technique of measurement, size and quantities / Search for better values, adequate intervals, right position, interesting distances for the efficiency and quality of the proposal / Pondered measurement of the mix, the density, the concentration, the proportion between the public and the private.
		Neue Nationalgalerie, Mies va der Rohe (1968) Filarmónica de Scharoun (1963), Kulturforum, Berlin.

TABLE 3.1 Abilities and attitudes for the creation of the city

3.1 Relational Attitude

In relation to urban design and planning, it has always been necessary to connect "things", like pieces of a puzzle, in order to observe an overall perspective and to find appropriate matches. It is the search for relationships between urban and territorial spaces, between long and short distances while paying attention to the adjacent and the separate. However, it is also the pursuit of the relationship between times, both urban and non-urban times. In order not to lose what we have learned from the past, to know what we need to do to confront the passing of time, and to prepare for the future while paying attention to the importance of the present moment.

City creation also demands preparation to connect disciplines, concepts from several sources; as in ancient times when cities were built near water, at times for defensive reasons; and for a long period they were built depending on strategic, military, conquest, trade, or tourist positions.

This is the case of The Industrial City by Tony Garnier, a hypothetical design for a city close to a river, published in 1917. This French architect set the basis for modern urban planning in relation to the precepts of the Athens Charter drafted in 1933 at the 4th International Congress of Modern Architecture (CIAM) (Pundlik, 2010; Pawlowski, 1993).

It also reflects the important skill of taking into account internal urban relationships and giving priority to some over others. Sometimes this involves denying relationships, separating elements that damage each other and highlighting certain places using remarkable architecture and oriented public space.

FIG. 3.1 Picture of an aerial view of The Industrial City project by Tony Garnier (1917). *(Retrieved from http://www.delyonenlarge.com/2015/03/11/musee-urbain-tony-garnier-decouvrez-larchitecte-qui-a-revolutionne-lyon/#jp-carousel-2356. From a design mural monumental made by https://citecreation.fr/realisation/quartier-des-etats-unis-lyon-france/)*

3.2 Educational /Broad-Minded Attitude

Urbanism needs both detail and shape. It needs big lines that pass carefully through the places that respond to small reasons and do not renounce the strength of their size; new and old lines that serve to reread the territory and to reconnect things. Urban roles, urban conversations, urban dialogues, and urban assistance are a set of tools to make the events that have already happened comprehensible, to create integrating consciences between classes, between artifice and nature, and between the central and the local.

FIG. 3.2 Tapiola roundabout at the end of the 60s *(Image by Atte Matilaine, Housing Foundation, Espoo City Museum. Retrieved from https://www.epressi.com/tiedotteet/kauppa/liikenneyhteydet-tapiolan-palveluiden-aareen-parantuvat-viikonloppuna-avautuva-uusi-pysakointihalli-tarjoaa-yli-2000-paikkaa.html)*

All of this is what the exemplary city of Tapiola reveals. Tapiola is one of the first post-war "new town" projects in Europe, and was constructed in the 1950s and 1960s by the Finnish housing foundation. It is located at 8kms from the city of Helsinki and was designed as a garden city, and mainly defined as a satellite town (Galantay, 1975). The urban planning and development of Tapiola shows protected but accessible intimate spaces and related areas of density and mixture. It is not like a number of machines with sharp edges, independent from their environment or acting as parasites rather than joining the city. In this case, houses or schools are in the middle of the forest without the latter losing their nature. The architecture is faithful to these urban dispositions. It is an exercise in adapting to the façades, the courtyards, the unfolded alignments, displaced but in the attitude of dialogue, generating streets that are half free, letting visual diagonals cross between its buildings. Educational attitude is the basis of a model of urban design where urban patterns have respected the traits and limits of the rural landscape, a kind of game of approximation that aims at consensus and mutual acceptance.

3.3 Innovative Attitude

The creation of a city, or of intermediate or small areas, demands a commitment to imagination, to acting without instructions. The necessary attitude of innocence and refusing to believe that we are unable to transform the world is possible, if urban design and planning work is completed with the humbleness of knowing that it is just a small part of the human story. New ways of finding the urban solution mean using renewable energies, saving enough 'air' between things and laying down rhythms and guidelines. Quinta da Malagueira urban

FIG. 3.3 Quinta da Malagueira by Álvaro Siza, Évora, Portugal *(Images by author, December 2011)*

project by Siza is one of the most highlighted examples of urban design according to this fundamental attitude. It is a settlement at the edge of the city centre of Évora (Portugal), designed in the late 1970s by the renowned Portuguese architect Álvaro Siza, who won the Pritzker Architecture Prize in 1992. Through finding a new protagonist role for urban facilities – the building of warehouses, water courses, and a central water pond as a new public space – this neighbourhood creates different key places where architecture is responsible for forms and functions integrated into urban space (Castanheira and Porcu, 2002). Siza recycles urban and natural elements, with the enterprising ability to create new routes, and new paths for a cohesive and hybrid whole at the same time.

3.4 Dynamic Mode

Contemporary urban territory does not stop. It is not bad photography. By contrast, good photography is where you are able to notice that the shutter was opened and then closed to capture only a constantly flowing reality, capturing in this manner that place and those actions. In this sense, understanding the territory as a dynamic element means working with a place-creating mobility, situated in places, in order to learn that urban projects are included in existing areas with their own inertias and to learn how to integrate them, incorporating new movements into the existing flows.

Based on the above, an urban design by the Catalonian professor, architect Joan Busquets, sought to restore the functionality of the city centre of Rotterdam, around Binnenrotte Square, in 1989 (Busquets, Correa, & Carse, 2007). This referential project presents a model of an urban system taking into account different times and lines, with the aim of creating balancing networks that benefit the whole area. This model of operation leads us to understand different velocities as levels of intensity, such that slowness produces spaces while the confluence of speeds causes different urban opportunities. The project succeeds in finding the role of key urban architecture in adapting to

places and producing suitable pieces of the city. Busquets et al. teach us how it is possible to slow down fast speeds and allow other kinds of mobility, diverting the necessary urban tensions through better channels, to finally turn the intervention area into a more sustainable place in accordance with spatial features.

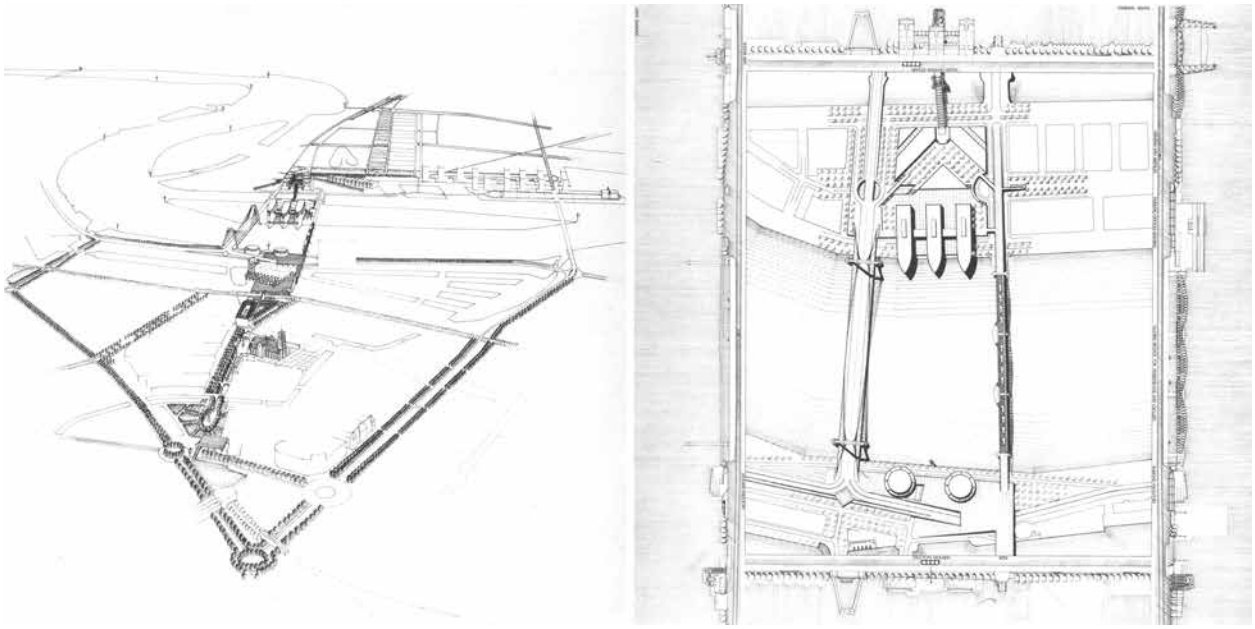

FIG. 3.4 'Rotterdam, bridging North and South' by Joan Busquets. The Netherlands / Rotterdam. *(Busquets, 1989)*

3.5 Symbiotic Mode

At the same time as the above, a sort of symbiotic mode of functioning is necessary: updating nature, creating intermediate places, creating the ability to change from one means to another, to incorporate the city into the geography, to infiltrate open space with urban interiors. In this sense, rivers, valleys, peaks, hillsides, beaches, forests...everything plays a part in city creation. Even the symbiosis of urban realities that were created individually take part in a valley or specific geographic location; as was the case in the Salento project by the professor in IUAV, architect Paola Vigan. An ambitious regional planning of that part of Italy in which small villages, agricultural landscape, and urban centralities focused on manufacturing related to the countryside, small scale units of urban growth are all integrated within a regional perspective and new links have created a more cohesive and sustainable development (Secchi and Viganò, 2001; Viganò, 2001). The creation of a new contemporary territory that, detached from big metropolitan forces, takes on a new identity based on, or built according to, a geographical logic, is an enormous opportunity for transformation that strengthens the landscape through the sum of small changes, working with infiltrations of nature into the urban sphere.

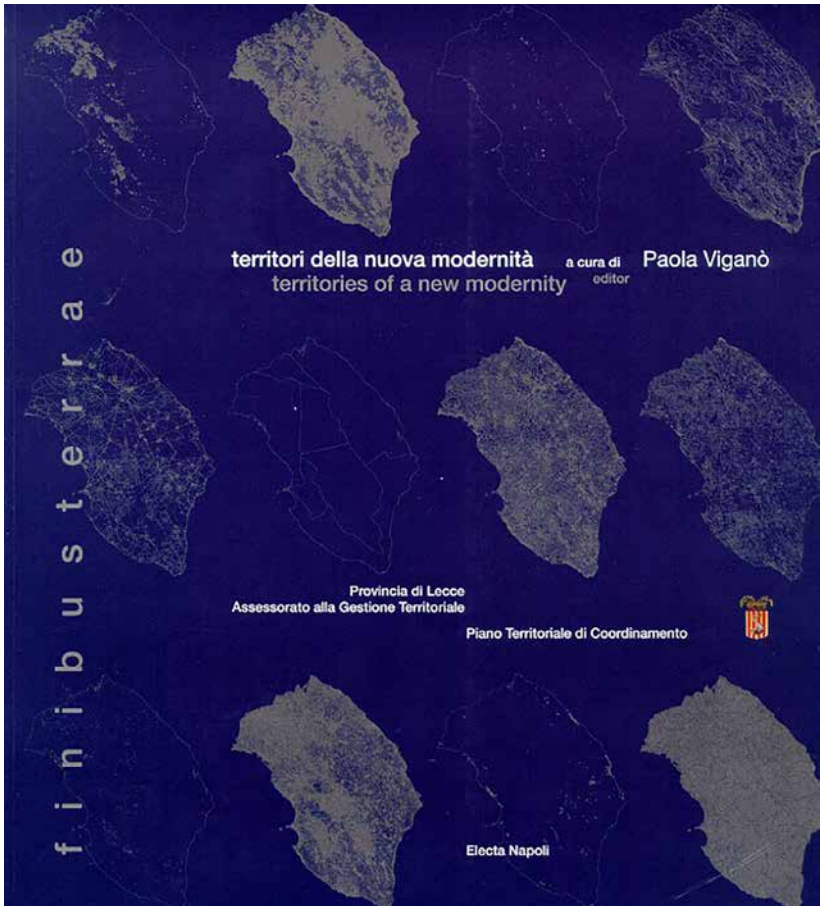

FIG. 3.5 Cover of the book "Territories of a new modernity. Provincia di Lecce. *Assesorato alla Gestione Territoriale. Piano Territoriale di Coordinamento" (Image by Paola Viganò (2001). Retrieved from https://www.libroco.it/dl/aa.vv/Electa-Napoli/9788843585786/Territori-della-nuova-modernita-Il-Piano-territoriale-di-Lecce/cw6716851269841.html)*

3.6 Synthetic Mode

Throughout the process of urban design, mainly in the learning context, it is necessary to undertake certain key steps to discover how the project can be simplified. A kind of synthetic ability that permits balances and decisions forecasting the consequences of excess or lack. A method of reflecting on the project based on the economic means, on future soil reserves, and on predictions, as well as foresight. This skill may be found in Rem Koolhaas's essentiality for the Cordoba Congress Centre (CCC), or by observing the Busquets's project referred to above, through the intelligent decision to re-use the Rotterdam tracks and port for the pedestrianisation of its central street, recycling the old railway bridge as a walkway, as well as in so many anonymous projects of renewal based on the strength of simple ideas. In the case of CCC, "In 2002 OMA won the competition to design a new conference center located on the Miraflores Peninsula, facing the historic city center of Cordoba, Spain. Wishing to improve on the possibilities of the original building site, OMA proposed a new and unexpected location on the peninsula." (OMA Office Work Search, 2002). This was stated on the OMA website, explaining how the architectural type was considered in relation to the new urban position and their close surroundings (See Figure 3.6).

FIG. 3.6 (Left) Cordoba Congress Centre proposal by OMA. "The site is thickened into a long block that marks the threshold of the Miraflores neighborhood and defines a southern edge for the planned fluvial park. A horizontal slice through the slab allows the necessary activities - congress center, auditorium, retail, hotel - to be contained along a continuous trajectory running the full length of the building." *(OMA Office Work Search, 2002)*

(Right) The Neue Nationalgalerie and the St. Mattew Church *(Image by Fabio Candido, 2017)*

3.7 Spatial Technique

Learning needs techniques. Students and designers require experience of having their skills tested considering that lack of time, resources, and/ or updated information about the case study is habitual. In addition, they need to deal with frequent difficulties in terms of the disciplinary overlaps that are present in each project. For this reason, speaking in terms of space could help to overcome this complicated starting point and put the creation of good urban space, useful and varied places, containers and sources of future opportunities at the forefront of the project. The space should be a strong but open element, unenclosed and unconfined, which does not accept definite compromises and does not collapse under the weight of its own success in the first years of life.

As previously stated, the elegance of the Tapiola centre may just be observed, a simple roundabout with a nearby park, which represents a whole life philosophy (Tapiola, 2006) (See Figure 3.2). At the same time, let us observe its representative space, the one that brings together the elements of the civic centre, slightly elevated, with an impressive entrance stairway, supported by the architecture of a tower to the right of the entrance. It is an ongoing attitude to generate difference in the spaces of the proposal using geographical and spatial techniques which avoid generalisations, from creation of pedestrian lines to riverside squares, taking into account the surrounding urban fabrics that make up multifunctional areas.

3.8 Architectural/Integration Technique

Urban projects cannot forget architecture, despite their scale, and they must read the territory in which they are involved, arising from a cover-up solution where different scalar implications are integrated. This is the way that sustainability works, through the combination of the widest range of objectives possible, measuring the interrelation of goals of sustainable development (Næss, 2001). Thus, for example, the house has territorial dimensions; urban buildings position themselves to make the most of their place, to create the place, to connect places (contributing an added value). The 'jump of scale', a direct movement

between separated scales, is similar to the direct movement between separate times. In the same way that distant times combine, urbanism must separate the scales without necessarily conceiving of all of the intermediate steps. In this manner, the forms and urban uses of the project are more responsible for the integration of scales.

This is how the little known urban planning for a new Siedlung (settlement) by the Finnish architect Alvar Aalto, called Björnholm (1969), was established, in which other integrations between the highway, the houses, and the lake were developed (Fleig, 1999). The project generates, in a reasonable way, three architectural typologies for three places and forms a single related foundation in connection to the geography and the road infrastructure. All of these aimed at creating proximity, avoiding big soil relocations, and the integration of overlapping values of landscape.

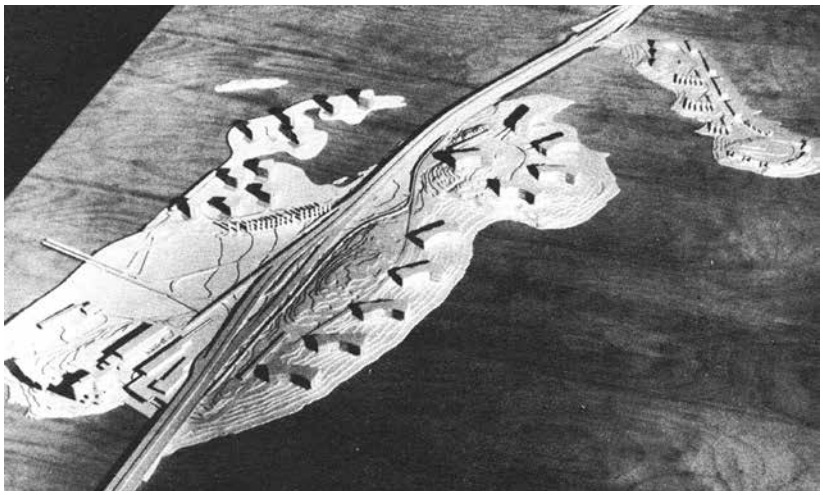

FIG. 3.7 Siedlung Björnholm by Alvar Aalto *(Fleig, 1999, p. 12)*

3.9 Dimensional Technique

Architecture has traditionally been related to the ability of measuring, a technique of sizes and quantities. That means a concern about being precise, for instance, on the number of floors, on the distribution of pavement and road, on positioning the free space within the appropriate limits. What is not so clear is whether this value can be applicable to urbanism in the same way. From the perspective of some of the authors mentioned, at least in the context of learning in urban design and planning in architecture studies, you do need to apply it with the same forcefulness (Solà-Morales i Rubió, 2008; Frampton and Ibelings, 2008; Gandelsonas, 1999; Panerai, Mangin & Sánchez de Madariaga, 2002). It is necessary to consider that a correct technique on sizing of urban facts, systems, and problems must become a fundamental aspect of designing. Moreover, this is a way to reach not only a spatial or functional efficiency of the area involved in the project, but also a more sustainable development from an economical and sociological point of view.

The dimensional technique refuses to allow us to be satisfied with any value a priori, and it makes us search for the appropriate interval and the correct figure with the right position, the one that makes the design something really good.

Good examples of that include the perfect dimensions reached by the best engineering bridges; or how the size of Tapiola fits its foundation, establishing the dimensions of its central space; or how the final distances in between the Kulturforum buildings in Berlin are wonderfully perfect, just like the courtyard of the main building, the Neue Nationalgalerie, designed by the German architect Mies van der Rohe in 1968 (Zimmerman & Gossel, 2009) (See Figure 3.6).

In urbanism, dimensions will lead to the assessment of the value of public buildings, the effects of social, cultural and leisure infrastructure, the potential for meetings to become opportunities of expression. The mixture, density, concentration, the wisdom of finding the private measure in the public, or vice versa, you need to learn to manage distances to put public buildings at the heart of urban design.

4 Conclusions: Guidelines for Multi-Scale Projects of a Sustainable City

It was in the early 1970s when the postmodern American architects Robert Venturi and Denise Scott Brown began to study everything considered mutable, and to replace the traditional analysis that centred on the stable elements of physical space (Venturi, Scott Brown, & Izenour, 1977). In that emerging suburban city, their architecture confronted the formal disorder of the city "high art" versus "low art" taking into account the urban buildings, the local initiatives, and the culture of the masses.

This novel architectural attitude, born at that moment but promoted later by many of the other cited references who developed the described guidelines (such as Tadao Ando, Steven Holl, Rem Koolhaas, or Daniel Libeskind, whose work emerged in the nineties, as well as the more contemporary, Japanese architect Kazuyo Sejima or the French office of Lacaton & Vassal, by Anne Lacaton and Jean-Philippe Vassal), consolidated a change of attention in the transition into the 21st century that has now become obligatory for the group of possible interactions on relationships between objects and for multi-scale projects, more than for the objects themselves.

In the context of architectural studies, it is necessary to combine the two different traditions mentioned in this text, both from the architecture discipline and the urbanism one, to generate a framework of learning that takes advantage of the two. The results obtained in the teaching exercises throughout the last decade have allowed us to activate the abilities, methods, or techniques described and have proved, at least partially, the potential of reinforcing the learning on urban design and

the architectural design methodology, with the aim of broadening the creative liberty of the process

Their behaviour as "new strong ideas" of the project/plan methodology invites thinking about subsequent guidelines and their future implementation. The continuous practice of urban design activity in the schools of architecture make them the most adequate testing grounds for experimenting with these disciplinary and scale fusions, introducing sustainability criteria and innovation, and encouraging a constant positive critical dialogue. Contemporary urban design needs to generate interesting new cartographies that underline the revelatory and liberating forces of a proposal and give us the necessary images for further research; multi-scale and multi-temporal projects as concepts that lead to a project methodology and plan that is a balance between knowledge and operative action.

The creation of a city and the ordering of the territory need to integrate all the dimensions than have been mentioned, by superimposing their differences, in order to plan future scenarios based on our current experience. However, at the same time, city creation also demands imagination: a partial, summative, as well as unitary, vision of different things. The urban project needs these wakefulness states charged with precisions, unbelieving of its rigidity: observation, respect, sustainability, knowledge, innovation, communication, identity, socialisation, responsibility, freedom... times for the paradox, where the present memory is mixed with the distance of what deserves to be created.

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Sustainable, Green, Smart and Open City _
Rethinking Mostar

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ABSTRACT **One of the main challenges of the 21st century is that of how to run the city. Development that is based purely on the exploitation of the natural resources is hopefully behind us, but the wounds to be healed are numerous and our consciousness is changing more slowly than expected. Obvious climate changes, causing many problems in cities (floods, landslides, earthquakes...), overpopulation and inadequate spatial planning, bad building practice and lack of greenery, infrastructure that cannot sustain growing settlements, lack of legislation, and inability to adjust to contemporary trends, are the main issues for many of today's cities. Transforming the city into a resilient organism, changing usual practices, is not an easy task for many societies.**

All contemporary knowledge, based on decades of studies and research on this topic, showed that the only ways to approach strategies for city development and spatial planning should be taken holistically, taking into consideration all indicators and constant changes in the circumstances given by many stakeholders and conditions.

This section gives an overview of the challenges faced by the 21st century city, focusing on possible development with the aim of creating, of keeping the city alive. The authors explain and compare sustainable/resilient, green/edible, smart and open cities. Mostar is presented as a case study, along with its historical background, urban development, and current situation. Finally, the authors propose some solutions for Mostar, based on history, acknowledgments, and current trends.

Some of the answers on the ways in which the city can become more resilient to the physical, social, and economic challenges of 21st century lie in their development as sustainable, resilient, green, smart, and open cities.

KEYWORDS urban development, sustainable urbanism, resilient city, open and agile city, smart city

1 Introduction

What makes our cities liveable? For decades, the focus of urban planning was to keep the cars happy, but the city is not just about traffic efficiency and parking spaces. The shape of the city, above all, has enormous impact on the human lives. It is all about how people, not just cars and buildings, use spaces, and how people feel living and walking around them. The fact is that the 21st century is bringing more and more changes at all scales, including urban planning, and more demands and challenges are defining the running of everyday life in the city.

FIG. 1.1 Old Bridge in Mostar: green Neretva shores

Urban ecology is a sub science of ecology – it studies relations between coexisting living organisms and their environment, in this case urban, and mostly high-density, built spaces.

In addition, urban ecology falls into human ecology, dealing with the built environment and unbuilt space. This includes the maintenance, protection, and preservation of the built environment and yet unbuilt space (Morsan, Vahčić, Lušić, & Mladina, 2007, pp. 455-476).

Contemporary studies on urban ecology are very focused on various individual problems, such as hazards, on human lives, and on the

pollution and destruction of bio-diversity, but only a small number of such studies is devoted to the city as an ecosystem. Today's concept of sustainability, in general, is the result of mistakes made throughout the last century. Lack of greenery, pollution, increased heat, vacant buildings, heavy traffic, etc. are all problems that most of cities are trying to solve.

"Sustainable community development is the ability to make development choices which respect the relationship between the three "E's"- economy, ecology, and equity:

- Economy - Economic activity should serve the common good, be self-renewing, and build local assets and self-reliance.
- Ecology - Humans are part of nature; nature has limits, and communities are responsible for protecting and building natural assets.
- Equity - The opportunity for full participation in all activities, benefits, and decision-making of a society" (MACED, n.d.).

Frederic Steiner, in his paper, 'Opportunities, for urban ecology in community and regional planning' published in Journal of Urban Ecology in 2016, says: "Our species plans. That's who we are: plan makers. We rely on knowledge, instincts, and gut reactions to guide our decisions. Good plans rely on a careful reading of a place or a situation. Plans require context. Ecology, especially urban ecology, can contribute much to an understanding of place and context in city and regional planning" (Steiner., 2016, pp. 1).

The organisation of sustainable urban development is a very complex task. It is not just about the repair of the urban tissue that has been damaged in the past - it is about preventing it from further damage, protection of identity, making conditions for development and use of the land, introduction of new technologies, giving response for various demands, and environmentally correct behaviours in everyday situations. Therefore, the question is: how should we make our city liveable, resilient, and sustainable?

Throughout the world, there are no two cities that share the same history, problems, or solutions. Although diverse cultures, political environments, climate conditions, and other factors have made cities all over the world look completely different – today, they all have the same goals – sustainability and resilience. It is not just the responsibility of planners and architects to foresee future developments - planning now requires the input of many more vocations and experts from different fields, as well as political will and an educated and demanding society.

The city of Mostar, once an oasis of greenery and water in the karst area of Herzegovina, was proclaimed by UNESCO to be architectural masterpiece built up on distinctive styles. During the recent war (1992-1995), the city underwent vicious devastation, but more concerning was the post-war lack of legislation and management, and bad politics, which brought Mostar to its worst phase in terms of urbanism, greenness, resilience, and sustainability. Nevertheless, many citizens, non-

governmental organisations, companies, and educational institutions realised this problem, and decided, from the standpoint of their own expertise, to try to find a new model to make Mostar green again, as well as smart, sustainable, and open. Rethinking Mostar and examining technological tools, business models, and participatory smart development can transform the city, and return it to the list of the most desirable places to live. The approach that is argued for the development of the future city also considers technology as a tool for creating smart, market-based solutions for all citizens. Integrating tools and technologies for big data management allows more objective decisions in urban sustainability planning and development.

Through this chapter, the causal relationship between urban ecology and urbanisation, i.e. the link between urban planning and ecology, according to the principles of sustainable development, is to be shown.

2 Sustainable Development Principles

Mankind started to change this planet with the first furrow planted with domesticated crops. Human settlements continued on this path, which was more or less successful and stable. People learned how to adjust their cities to work with nature, respecting the winds, water, microclimate, fertile soil, geomorphology, resources, and other factors that influenced their future in a certain location. They always used local resources with profound respect and developed practices, crafts, and customs according to them. Growing populations and developments in politics and economy brought cities to divergent phases of its function. The ability to adapt to changes in society, and the development of human skills and technologies became the measure for any successful long-lasting city, capable of transforming to meet new demands.

From Egypt and Mesopotamia, through Persia, Aegean civilisations, China and India, South America, Greek and Rome – different civilisations invented different practices for building sustainable societies. Ancient cities and their stories, told through legends or new scientific discoveries, are valuable sources for understanding how a particular society lived and how sustainable it was. Vanished civilisations are the best examples to show us what happens when the development rushes forward regardless of resources and potentials.

Through recent decades, as we faced global problems of climate change and various social and economic issues, it became clear that we should change attitudes in many areas of human behaviour and, in doing so, many definitions for sustainable development came to life.

The most widely known definition of sustainable development comes from the Brundtland Commission (UN, 1987, pp.3-5), which defined sustainable development as a development that will not compromise the ability of future generations to meet their own needs.

In preparation for the URBAN21 conference in Berlin in 2000, sustainable urban development was defined as: "Improving the quality of life in a city, including ecological, cultural, political, institutional, social and economic components without leaving a burden on the future generations" (What is a sustainable City? n. d.).In 2015, United Nations adopted a set of goal for a sustainable future in its agenda: 17 Sustainable Development Goals and 169 targets, which demonstrated the scale and ambition of this new universal agenda (UN, 2015, pp.3-5). This agenda was made for the following 15 years, taking into consideration all important issues concerning future development (Fig. 2.1).

FIG. 2.1 UN sustainable development goals 2015-2030. *(Image by UN, 2015) Retrieved from http://www.un.org/sustainabledevelopment/sustainable-development-goals/*

The highlights of the declarations comprise 5 Ps:

- **People** - We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

- **Planet** - We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

- **Prosperity** - We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

- **Peace** - We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

- **Partnership** - We are determined to mobilize the means required to implement this Agenda through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global

solidarity, focused in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people." (UN, 2015, pp. 3-5).

The only solution for making the cities liveable, sustainable, and resilient is to take a holistic approach. We must understand the past in order to plan the future; we must know the climate, and have wide knowledge about climate changes, and its possible predictions and scenarios. Additionally, the thinking process must be continuous – after determining indicators, pointing out the problems, determining the goals, finding out the best solution and tools – we must be aware that even if it is possible to implement the whole design – it is essential to provide monitoring and allow new data to be incorporated. Projects of this kind are successful only if they are resilient and sustainable – that means that they must meet real-time problems and changes, and be able to react immediately for different tasks. Natural disasters (floods, earthquakes, landslides...) and changes in trends and policies are the main issues that such strategies need to predict. The time between the emergence of the problem and the appropriate reaction shows us how resilient the system is. The ideal situation would be that such plans and strategies have already predicted and identified these scenarios and are thus able to provide an immediate and effective response.

2.1 Sustainable City / Resilient City

The Oxford dictionary defines the sustainable city as: "A city constructed or landscaped in such a way as to minimize environmental degradation, with facilities (such as transport, waste management, etc.) which are designed so as to limit their impact on the natural environment, while providing the infrastructure needed for its inhabitants." (Oxford dictionary online, n.d.).

Another term that is also used to define the future of city development and its ability to face and accept changes is 'resilient city'. According to Resilientcity.org: "A resilient city is one that has developed capacities to help absorb future shocks and stresses to its social, economic, and technical systems and infrastructures so as to still be able to maintain essentially the same functions, structures, systems, and identity" (Resilience, n.d.). The same source (Resilience, n.d.) determined the main obstacles that cities must be prepared to overcome:

- CHRONIC STRESSES
  Stresses weaken the fabric of a city on a daily or cyclical basis.
  Examples include:
  - high unemployment
  - overtaxed or inefficient public transportation system
  - endemic violence
  - chronic food and water shortages

– ACUTE SHOCKS
Acute shocks are sudden, sharp events that threaten a city.

Examples include:
- earthquakes
- floods
- disease outbreaks
- terrorist attacks

With examples of many unsustainable communities all around the globe that give us an understanding of the risks of reaching the point of no return, many experts started to rethink and change the paths for urban development. Today, thanks to science, media, politics, and responsible individuals with vision, many cities have reached the goals of becoming almost fully sustainable or even self-sustainable. Throughout the world, the improvement of quality of life has become one of the main goals for further development. Cities that are attracting educated and young people who have an awareness of environmental issues have certainly benefited in many fields. Changes to old spatial planning patterns, and new holistic approaches towards life of the city and its inhabitants, have made significant impacts on the quality of life for many cities and countries.

"Sustainable communities are those that believe today's growth must not be achieved at tomorrow's expense" (Initial Report, Governor's commission for Sustainable South Florida, 1995).

Sustainable communities are communities with a vision and a sense of space and time. These towns, cities, and villages are deciding to become and remain healthy and long-lasting. It is not just about preserving ecosystems, it is about how to live and build sustainability through all human values, culture, and businesses. Public health, quality of life, and economy all depend on how the society deals with use of resources, waste management, environmental policy, traffic, land use and other issues.

Many studies were introduced in recent years to show how cities have managed to answer new challenges of becoming sustainable and resilient. Many cities are competing to become leaders and trends-setters in these fields. In relation to Mostar, it is clear that we can learn from past, change current trends of ad-hoc decision-making, and try to make strategies and plans that will allow the city to react in sustainable and resilient ways.

2.2 Green Cities, and Urban Farming

Nowadays, green cities represent a new, post-industrial way of thinking. Nowadays, half of the world's population lives in the cities, while in Europe, two out of three people are living in urban environments. Polluted air, dirty streets and facades, and grey skylines were the background for most of the big city panoramas. Awakened awareness, fear of increasing

global natural disasters brought by El Nino, melting icebergs, and new scientific data obtained by many measuring instruments, have changed the way we see our future. Many responsible individuals with divergent backgrounds and different interests made the first pioneering attempts to persuade society, politicians, and governments to start looking at the world through a practical, smart, and logical prism of possibilities and abilities.

In last decades, many countries decided to change the path of future – instead of erecting more and more concrete, glass, and steel buildings on every available green spot in the city, they are starting to do the opposite. This is not just to preserve the greenery, but also to add more to existing streets, roofs, and facades.

				INDICATORS			
	PERIODICITY	AUTHOR	CITIES	TOT	CATEGORY	N°QUANT.	N° QUALIT.
Urban Ecosystem Europe	(2006) 2007	Ambiente Italia	Europe/32	25	**Air quality**, Acoustic Environment, Water, Energy, **Waste**, **Transport**, Green areas and land use, Building, CO_2, Health, Equity, Education, Participation	21	4
European Green City Index	2009	Economist Intelligence Unit	Europe/30	30	CO_2, Energy, Building, **Transport**, Water, **Waste** and land use, **Air quality**	17	13
European Green Capital Award	Since 2010	European Commission (DG Environment)	Europe/ cities with more than 200,000 inhabitants	56	Climate Change, **Local Transport**, Green Urban Areas, Nature and Biodiversity, **Air quality**, Quality of Acoustic Environment, **Waste**, Water, Waste Water, Eco-innovation, Energy, Environmental management	52	3
SDG 11	2015-2030	United Nations	World	13	Building, **Transport**, **Air quality**, **Waste**, Green areas and land use, Education, Equity, Safety, Health, Participation	10	3

TABLE 2.1 Methodological characteristics of tools. The categories highlighted with bold font are present in all the indices. *(Pace, Churkina, & Rivera, 2016., pp 15, 16)*

Many studies have been done in last few years that have tried to determine which is the greenest city in the world, but the results vary depending on the criteria set and cities included (Table 2.1). What is

interesting in this race is that every city that starts competing - wins! Even minor changes to the unsustainable systems of the '70s and '80s are bringing multiple changes for the environment and people, resulting in attracting successful and leading industries and young people with visions. Some of the most unappealing cities in the world have now become the most desirable.

But, green cities are not about the percentage and square meter area of greenery – it is about the quality of life. Green cities offer sustainable environment (infrastructure, public transportation, reduced emissions...), good politics, working opportunities, etc.

Not long ago it was almost unthinkable to use the city as a garden. Gardening was reserved almost exclusively for rural areas and for city border areas and suburbs.

Ignoring ancient civilisations like the Egyptian and the Inca, we can find early examples of so-called Victory gardens from WWI and WWII eras, all over USA, Canada, United Kingdom, Australia, and Germany.

FIG. 2.2 Victory Gardens poster *(Retrieved from http://www.crazywebsite.com/Free-Galleries-01/USA_Patriotic/Pictures_WW1_Posters_LG/WWI_Poster_Victory_Garden-3LG.jpg)*

On January 11, 1942, the Office of Civilian Defense (OCD) announced that Local Defense Councils would start community Victory Garden Programmes. The Secretary of Agriculture and DHWS appointed a National Garden Advisory Committee to lead the Victory Garden programme. The Committee included members from industry, extension, home-making, garden clubs, and garden publications (Endres & Endres, 2009, pp. 32-35).

The purpose of the programme was fivefold:

– better the health and nutrition of Americans by increasing the consumption of fresh fruits and vegetables;

- encourage the proper storage and preservation of food; 3) provide money savings to be applied to foods that had to be purchased;
- assist urban gardeners in obtaining communal property in which to grow fruits and vegetables; and
- "maintain the morale and spiritual wellbeing of the individual, family, and Nation". (Endres & Endres, 2009, pp. 32-35).

These gardens were the main supplier of quality food for most people living in big cities in such times of hunger and war, while they also boosted local economy and bonded people in time of crises.

Another example, that continues even today, is Cuba. Its isolation during the Cold War and increased dependence on Soviet merchandise and food, inspired Fidel Castro and his government to introduce various sets of measures from 1960 onward. Nevertheless, the fall of the Berlin Wall and the Cold War drew drastic changes in Soviet politics, and made Cubans hungry again.

On September 26, 1990, the government declared that the country was in a "Special Period of Peacetime" and that austerity measures equal to being at war would be instituted. On the supply side, Cuba announced a multi-faceted new food programme aimed at increasing domestic production to achieve food self-sufficiency (including state-run farms, farm labour initiatives, farmers' markets, land re-utilisation & small-scale gardens, agricultural extension) (Endres & Endres, 2009, pp. 32-35).

The City of Havana created an Urban Department of Agriculture with satellite offices throughout the city (Murphy, 1999, pp.12-13). Their example was a role-model for many of today's societies.

FIG. 2.3 Urban farming in Ljubljana, Slovenia

Many cities in the USA recently found different motivation for urban farming and edible cities – from economic and environmental, to social motives.

Chicago has more than 40 established community gardens spread throughout its park system, the oldest of which was established during World War II. A partnership between Green Living Technologies and the New York City–based firm Elmslie Osler Architect installed four wall panels in downtown Los Angeles to help feed lower-income and homeless people. Los Angeles also has an initiative called the Urban Farming Food Chain Project, which constructs food-producing wall systems and mounts them on buildings (Lehrer & Dunn, 2011).

Sustainable European and Asian cities also follow these trends, inventing new models and technologies. Urban farming is a link between tradition and technology, all in favour of sustainability and a better life.

Benefits from urban farming are many:

- Reduction of pollution and global warming, improvement of the quality of urban environment, and an increased percentage of greenery in the city;
- Transportation and storage cost reduction, and reduction in energy use and pollution from exhaust gasses and packing waste;
- Involving community, increasing social awareness, poverty reduction, and social interaction;
- Infrastructural improvements (usage of wastewater, absorption of rainwater, forming of sound and dust zones and barriers...).

Urban farms can be situated in various locations – from parks, unused plots, rooftops, public spaces, facades, inner courtyards, etc. Many of these use the principles of "permaculture" for more sustainable development.

In many cities, urban farming became a lifestyle.

2.3 Smart City and Open City – Transformation Strategies

There are several important global trends that shape our future. One of these trends is the rapid growth of the Earth's population. Another important trend is the changed role of the city; 21st century cities are becoming smart and open. To better understand what smart and open cities are, we will explore the core definition of 'smart' and its business models. This will allow us to understand how technology can transform our urban landscapes and improve quality of living.

The smart city is defined in many ways, but to simplify the understanding of smart we will observe the smart city as being instrumented, interconnected, and intelligent. Instrumented means aggregating and interpreting real-time data about all urban activities; interconnected means allowing devices to communicate and data to be exchanged between different cities; and intelligent means applying data analysis models that allow us to better understand city dynamics and therefore make better operational and management decisions (Albino, Berardi, & Dangelico, 2015, pp. 3-21). The smart city allows us to learn and

innovate through using its digital infrastructure, and in order to be able to innovate we must question the known methods and learn how to ask the right questions. This will lead our cities to become open cities that transparently share insights with its citizens, allowing them to directly participate in development and innovation processes.

A citizen-centric approach to developing new services in smart cities is perceived as a sustainable model. However, business models around this approach are not firmly set and will certainly evolve over time. The evolution of the business model for Mostar and other similar cities depends on how citizens and businesses reflect upon the digitalisation of their city and their expectations of city government.

CONTENT PROVIDER	Providing static and dynamic content, including contact information, organisation information, product and service information, and news.
Direct-to-customer	Directly providing services to customers and/or businesses. Various stages can be determined, including the information, communication, and transaction stage.
Value-net-integrators	Collecting, processing, and distributing information from several organisations. This is a networked type of business model that often focuses on a particular customer segment; for instance, entrepreneurs.
Full-service provider	Enabling interaction through directly providing information and services. This involves the collaboration of several departments and/ or organisations to create a one-stop shop.
Infrastructure service provider	Providing infrastructural services to support the creation of an online presence.
Market	Matching the supply and demand with regard to information, human resources, services, or goods; for instance, matching volunteers with requests for volunteers.
Collaboration	Providing the instruments and tools needed to participate in activities like policy-making projects and decision-making, including visualisation and simulation tools that can be used to predict the implications of policies.
Virtual communities	Providing a community of recurring customers, including user-generated and shared content, and the sharing of content.

TABLE 2.2 Business model for e-government, several studies *(Janssen et al., 2008; Weill and Vitale, 2002., Kuk, G., & Janssen, M., 2011.)*

Building digitalised city architecture will enable citizens and businesses to better access such services, and will enable a city government to reach its citizens more quickly, by offering them online access to both information and services. However, to initiate this transformation the city needs to implement an e-government system comprising four stages: online documentation archive, online transaction system, and vertical and horizontal integration (Kuk and Janssen, 2011, p. 40). There are several examples of business models that e-government brings to cities, which are: providing direct customer-to-customer communication and enabling direct transaction; aggregating information and distributing it to a different target audience (e.g. visitors, entrepreneurs, and investors); establishing one-stop-shops that allow full service and prevent time waste; developing collaboration tools and prediction models for increased productivity and improved decisions; and enabling virtual communities that share content freely (Kuk and Janssen, 2011, p. 42).

An important component of developing a smart and open city is participatory planning, which understands the engagement of citizens in policy decisions. Citizens can directly communicate their opinions and suggestions. This in turn contributes to building more cohesive

communities within the cities that are willing to share information and learn about the different challenges their cities face. However, to promote participatory planning, cities first need to implement appropriate technological tools. These tools comprise three layers: the first layer is used for big data such as spatial visualisation; the second layer enables stakeholder direct engagement; and the third layer represents applications used for various purposes (Stratigea, Papadopoulou, & Panagiotopoulou, 2015, pp. 43-62). To be more precise, two brief examples of citizen engagement enabled through technological tools are outlined: The first example is the city of Trento that established a R&D lab so that its citizens can volunteer and test various innovative products, such as mobile and desktop applications. The second example is the city of Barcelona, which motivated its citizens to use public spaces and test different city government products and services relating to urban planning, mobility, tourism, and education (Stratigea et al., 2015, pp.43-62).

Transforming any city into a smart citizen-centric city requires the right set of values and tools, but to begin such a transformation the city government must change its approach to tackling current and future challenges. The suitable approach is to build an ecosystem in which citizens will be able to participate in different discussions and activities. This again entails building a platform for digital services. To do so, the city must offer a simple process for public-private partnership projects and involve IT business leaders as partners in the transformation process.The city of Ghent can serve as an interesting example for a transformation strategy that developed it into a smart city. The city is home to a quarter of a million inhabitants, it has a high level of entrepreneurial activity, and it is a student city that houses a significant student population (Van der Bergh & Viaene, 2016, pp. 5-19). Ghent focuses on investing in human capital and exploiting its natural resources in a sustainable manner. Citizens can co-create plans and community actions and there is a healthy relationship between them, city government, and technology. It is interesting to note that the city decided to establish an IT venture that has a mission to develop digital infrastructure for the city and be a partner in building a sustainable digital ecosystem.

3 Mostar – Green, Smart, and Open City Challenges

Mostar is a city with rich and stirring history. Throughout last 500 years, Mostar witnessed several episodes of near breaking points of its civilisation, and drastic change in all aspects of its existence. All of these changes are clearly visible in its urban tissue, even today.

The first notion of Mostar as a city (more a settlement), is found in a Dubrovnik archive from 1441. At that point, it was a small town with a dozen houses and a suspension bridge. The surroundings had been settled long before – traces of Neolithic settlements, and Illyrian, Greek and Roman cultures are still visible today.

FIG. 3.1 Mostar – aerial view *(Image by Ledić Domagoj, 2015. Retrieved from https://www.jabuka.tv/jabuka-tv-na-prvom-letu-mostar-osijek/)*

Since the time when Ottoman empire entered Bosnia and Herzegovina, a strong and important medieval kingdom, cities that were at cross-roads, river crossings, or strategic points took primacy. Within such a big empire, the importance of Mostar as a centre for trade and transportation was immense. From that moment on, Mostar developed into a vivid and prosperous city.

The Ottomans made the settlement on the narrow and longitudinal left (eastern) side of the city (XVI century), allowing the citizens to have their gardens on the right side, which was wider in all directions and had the benefit of running water from river Radobolja. The houses were made of local materials, stone, lime mortar, clay and wood, covered with stone tiles.

During the following centuries, Mostar also spread towards the west, across and along the Neretva river on both sides. The Ottoman principle of "mahala", city quarters with different crafts, housing, and a mosque was the main principle of urban development.

The Austro-Hungarian arrival created drastic changes in the small-scale urban tissue of Mostar. Big building blocks in the old city core, generous spreading of the modern city towards the west, wide streets and alleys, public buildings and infrastructure, all gave Mostar a new European look. Suddenly, from having a picturesque and cosy eastern appearance, over just a few years Mostar became a modern European city.

Over the following periods, the Kingdom of Yugoslavia and the Socialist Federal Republic of Yugoslavia continued the development of the city, all carrying the latest trends in architecture and technical improvements. The city continued to spread toward once rural surroundings, forming natural suburbs and satellites, based on geomorphology and existing infrastructure.

Every new government was ignorant and contemptuous towards the built heritage and urban matrix created by those who had now been conquered. The Austro-Hungarian builders had disrespected the Old Town with new large-scale buildings, and the post WW2 period brought even more devastation of cultural heritage to the city core. The ideology of mass confusion about the difference between religion and tradition almost destroyed the most valuable monuments in Mostar – Kujundžiluk Street and Old Bridge, accusing them of being "sacral". Fortunately, common sense prevailed, and these unique pearls of architecture escaped the destiny of most of the city mosques.

FIG. 3.2 Mostar – pedestrian and vehicular streets

Unfortunately, at the end of 20th century, this city went through one of the most destructive phases of Balkan conflicts. From 1992-1994, most of the Ottoman city core and its surroundings were destroyed, together with the symbol of the city, the Old Bridge, built in 1566. Over the past 500 years, Mostar has suffered from fires, earthquakes, violence from new conquerors, ignorance, and neglect, but these events brought so much destructive power that the city became unrecognisable.

It was not just physical devastation that occurred in Mostar; the worst damage has been done through political decisions that aim to artificially keep the city divided. No city is resilient to this kind of vandalism. Cities like Mostar, Berlin, Beirut, and Belfast share a need for another dimension of resiliency – against post-conflict political decision that divide a once integral and whole city into two unnatural parts.

Besides all obstacles that the transitional, post-war country is bearing, the city of Mostar became a perfect example of bad politics, a city without spatial planning and with maximum opportunism by suspicious investors.

Despite all of its problems, Mostar can still be an excellent example for a learning-by-doing system. Its great geographical position, mild climate, and long tradition of good and prosperous governance can put this beautiful city back on the list of most desirable places to

live. Before the conflict of 1992, Mostar was a living example of the 3P principle – it cared for people, the planet, and was economically prosperous. Resources, production, and education were all in good relations, which was also a trigger for sustainable growth – together with industry grew sport, culture, and social awareness. The main resource of Mostar was the people; firstly, people with the vision and understanding of possibilities and needs, and then young people with proper education. The schools and faculties followed the needs of the industry, educating young professionals in close cooperation with industry, and thus providing immediate employment.

FIG. 3.3 Radobolja and Neretva river in Old Town neighbourhood

Today, after more than five years of war, the city is full of unused plots (especially on the "division" line), and devastated or abandoned buildings, which look depressing but which hold great potential to be easily transformed into a temporary or permanent green oasis. Those could be the spots for urban farming and social interaction, but also a means to reduce $C0_2$, improve the environment, and provide healthy food, as well as creating a greater offering for tourism and healing the lost connections of inhabitants.

Another potential that Mostar offers is the creation of green paths (as was planned in 1980) throughout the city and on Neretva shores. This would boost pedestrian and bicycle transport routes and would lead to improvement of traffic in general. This intervention only requires minor changes in the way that the streets are used, allowing safe and uninterrupted connections between disparate parts of the city. City transportation could be solved with one electric tramline on Bulevar Street, going from North/North-West to South/South-East.

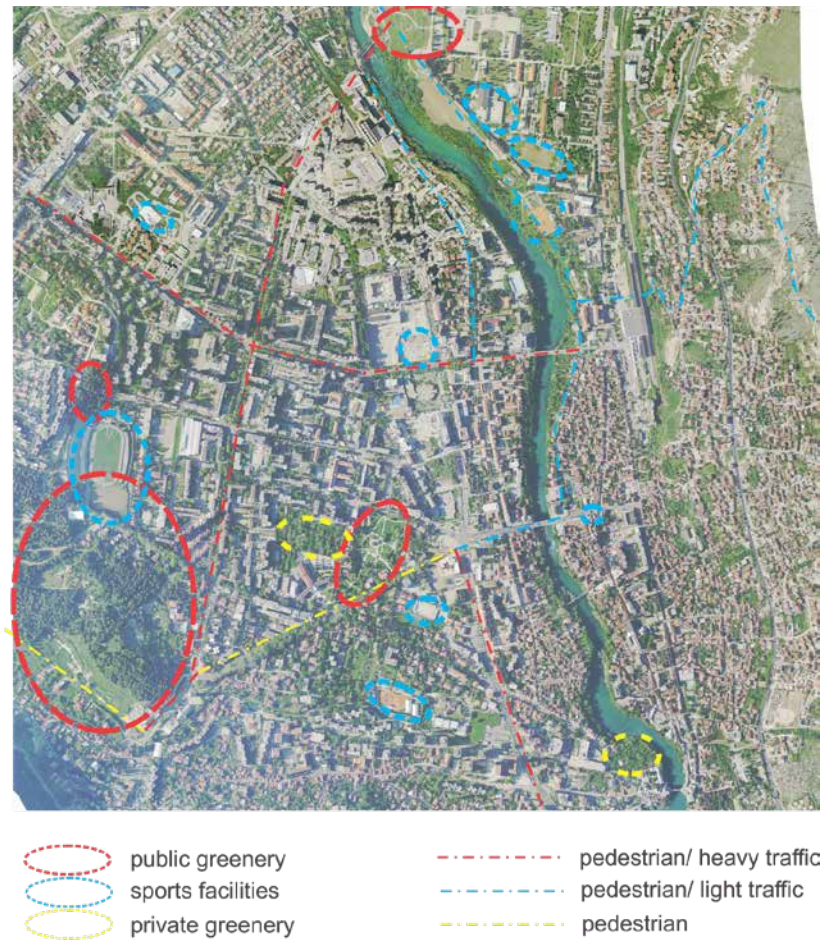

FIG. 3.4 Mostar map – greenery and pedestrian/cycling paths

To change the negative trends, the change must go both ways: bottom-up (citizens' initiative) and top-down (government set of new laws and legislation).

FIG. 3.5 Mostar- traditional urban farming

The city of Mostar can position itself as an open and smart city through cooperation with existing IT companies, business leaders, increased sustainable agricultural practices, and knowledge institutions. Partnership could bring needed change and focus on building a sustainable smart architecture and environment. It could also stimulate more

intensive cooperation and more effective communication between different segments of city administration. A transparent e-system would ease the flow of information and reduce its distortion. Citizens would be incentivised to participate in different activities within the city planning and execution, since they would be able to directly communicate via a digital system and see the results. This in turn would offer a better overview of city processes, data aggregation and analysis, and improved decision-making.

Mostar is a city with great potential; change of policies, new technology, and know-hows could make it green, smart, and sustainable in just a few years.

4 Conclusion

Today, sustainable, resilient, and smart cities have become a goal for most countries. According to forecasts, 96% of urban growth will take place in developing countries. A holistic approach to the planning of cities, towns, and buildings, their treatment as a living organism in accordance with the terms of micro-location and tradition, considering all aspects of sustainability, has proved to be the only possible way to avoid the further destruction of this planet.

Cities around the world are competing to fulfil all goals of sustainable and resilient design, to decrease emissions, improve energy efficiency, and become flexible in all issues related to new requests and technological improvement.

Trends are showing that only green, resilient, and determined cities attract young and capable people and smart enterprises.

Mostar is a city of great history. Rebranding it from a case-study of a problematic city to a city of the future is possible through smart solutions, a lot of good will from the government, and the decisive attitude of society.

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Urban Form in the Context of Sustainability and Resilience

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ABSTRACT **Urban form is recognised as a point of convergence, meeting place, and source of theoretical and practical effort; it is a reflection of, and a framework for, scientific and professional activity when drawing up a concept of the regulation and establishment of urban order. Theoretical research into urban environment sees urban form as a heterogeneous and composite urban phenomenon, and its contemporary investigations insist on inter-disciplinarity and contextualisation. Hence, the focus of this article is on the relation of urban form towards social, economic, and cultural aspects and issues of the environment. Contextualisation of urban form is understood as the concurrent consideration of a range of spatial and temporal aspects for the purpose of understanding its complexity. Urban form is observed from the perspective of urban morphology, as inseparable from urban landscape, to understand its composite nature and multiple layers. It is essential to see various aspects and layers of space as urban landscape, and to understand urban form as a temporal design process.**

Because urban landscape is understood as composite, as uniting the urban morphology and visual character of a city, and since it is analysed and interpreted as human habitat, urban form, and physical structure, permeated with and fused by the landscape structure, thriving with human activity, and laden with symbolic value, meanings and messages – it is recognised as an expression of the conceptualisation of the city and as an instrument of research, planning, design, and preparation of the environment to be sustainable/resilient.

KEYWORDS urban form, urban landscape of Banja Luka, spatial order, sustainability, resilience

1 Introduction

In this text, urban form is treated as a constituent of urban landscape, which ensures *optimal spatiality*, i.e. the visual encapsulation of various spatial elements of urban landscape into an *organic, pre-organised compositional whole* (Dobrović, 1954, p. 2). Therefore, urban form is seen as an expression of spiritual, social, historical, spatial, and physical continuity. The continuity and endless succession of urban frames, expressed as various urban forms that originate in different periods and social contexts and co-exist at multiple levels, confirm the existence of a lasting link between human power and the changing social tissue. This will be illustrated through the case of Banja Luka's urban morphogenesis. The concept of urban form is used in an integral sense, combining the objective and symbolic aspects of this complex phenomenon. What does it mean? The physical appearance of an urban environment and its mental and symbolic projections or images, which carry symbolic meanings and bear communicative significations.

1.1 Glossary of Linking Terms

An exposition of the concept of urban form asks for an interpretation of the key terms associated with it – landscape, urban landscape, urban growth, spatial order, urban rules – along with the reasons for their consideration.

Landscape
Landscape (scenery, panorama, vista) – Etymology of this term comes from the Latin *pagus*, which denotes a specific rural area. Aside from its original meaning – a landscape, a certain area as seen by the human eye, whose character is the result of interaction of environmental and human factors, the term is also used to designate a natural setting, the environment or natural surroundings. It also denotes an image, scene, depiction, or representation of an area seen or observed. Furthermore, it is used in the compound "landscape architecture", which concerns elements of landscape, landforms, and the planning and design of facilities and structures of landscape architecture, integrated in the system of city greenery. Finally, it is also found in the name of a more recent discipline, landscape urbanism, representing a strategically devised method of landscape and urban planning and design.

The understanding of the concept of landscape changed through the 20th century, as evidenced by the relevant scientific theories of urbanism and urban and cultural geography (see also John Wylie's *Landscape. Key Ideas in Geography*, 2007).

Historically, the focus of research into landscape, and of landscape design, shifted from the earliest, original understanding of landscape as a clearly demarcated area of land characterised by specific social, anthropogenic, natural, cultural, axiological, normative, and consuetudinary content, to the material, physical properties of space as understood statically, to the more recent interpretations of the meaning

of the term "landscape" as having distinctive visually expressive, perceptual, experiential, artistic and aesthetic content, or that which is subjective and imaginary. Both contemporary urban research into landscape and landscape design practices have treated their subject as a cultural and social product; they are based on the process of evaluation of the effects that landscape produces on a socio-cultural setting, relative to the functioning and patterns of use of landscape in the context of time (Novakovic, 2011, p. 212).

According to Lewis Mumford, the landscape of preindustrial settlements was seen as integrating the natural and man-made surroundings (Mumford, 1988, p. 241). In opposition to that, the industrial city was seen as distinct from landscape, through the lens of the relationship it established with its natural and rural surroundings. In the late 19th and the early 20th centuries, there was a trend in landscape design, which emerged due to the negative consequences of industrialisation, to draw nature i.e. the environment into the "diseased" urban tissue and along its perimeter in the form of buffer zones (green belts and parks). In the first decades of the 20th century, avenues lined with multiple lines of trees connected city parks with gardens and the environment. In that period, the landscape of European cities changed in accordance with generally accepted artistic principles of urban planning, as laid down by Camillo Sitte in his eponymous 1889 book, *The Art of Building Cities: City Building According to Its Artistic Fundamentals* (*Der Städtebau nach seinen künstlerischen Grundsätzen*). There was a tendency to see and plan the landscape of modern cities so as to turn them into parks, solve all the problems of the industrial city and make its relationship with the environment and rural surroundings perfectly harmonious (their full integration into a single unit, a park-city). The concept of landscape was mainly understood as possessing a physical-functional component and a visual component, which led to its geometrisation and formalisation at the level of city organisation. The social component was reduced to the search for the ideal spatial order, expected to result in the ideal social order.

At the level of materialisation, efforts were made for cities to become park-cities – bright and insolated, with clean air and verdancy; commercially efficient, with multi-storey buildings and crisscrossing roads (for example, New Belgrade). The degree to which these and other principles, as incorporated in the Athens Declaration and adopted worldwide, have fragmented the landscape of cities in the second half of the 20th century forced Christian Norberg-Schultz (2006) to state that "its continuity has been interrupted, and it broken into pieces".

Urban Landscape

The term "urban landscape" (city landscape, cityscape, townscape, Stadtslandschaft) is used to mark a unit of landscape – the urban form of a city seen as a single unit, with the natural givens of its physical location and primary identity traits as constituent elements. The term and concept of urban landscape first emerged in Germany and Austria in the late 19th century. Its use became more frequent and spread between the world wars in both Europe and the U.S., as the subject of

urban morphological studies into the process of development of the form and structure of human settlements, first under the umbrella of geography, and then as an independent field of study, called urban morphology, which found its application in architecture and urbanism. In the last decade of the 19th century, German geographers Otto Schlüter and Joseph Stübben observed the city integrally as one with landscape, studied urban structure and its elements, and also studied the differences between German cities that grew spontaneously and those that were built following plans. Simultaneously, the Austrian art historian and architect Camillo Sitte developed the first typomorphological classification of elements of urban landscape in his book *City Planning According to Artistic Principles* (*Der Städtebau nach seinen künstlerischen Grundsätzen*). Schlüter introduced the term *Stadtlandschaft – the landscape city,* that is, *Stadtslandschaft – city-landscape,* which became the focus of research during the interbellum, when cities were typically studied as integral to landscape and which recognised the influence of cultural identity on the morphological characteristics of cities (in addition to the level of their socio-economic and technological development (Đokić, 2004, p. 7).

The term "urban landscape" became a part of the present-day understanding of the city, which we owe to Gordon Cullen (Cullen, 2007), meaning the complexity of spatial relationships between elements and subunits of urban space. It started to be used more frequently in the second half of the 20th century, in the context of postmodern architecture and urbanism, when landscape began to be seen not as something distinct from the city, but integral to it – when the city became landscape. Between the 1960s and 1980s, the city or urban landscape, as inseparable from landscape, was researched and designed under the umbrella of urban morphology. It dealt with it by taking into consideration not only its physical and visual-aesthetic properties, but also the element of cognitive and emotional experience of space, while excluding the socio-political aspects of space as a concept (Lynch, Cullen, Alexander, etc.).

Urban Development (Urban Growth / Urban Stagnation / Urban Decline / Depopulation

Urban development is understood as a process of change that occurs in urban space through time, i.e., during the existence of a city (its past, present, and future). The process of development represents the course, way, manner, and procedure of how changes are effected in physical space, across urban territory, through time: the emergence of phenomena, their existence, alteration (growth / stagnation / decline) and disappearance. The past reveals to us what has led to the current situation, the underlying mechanisms and the paths followed on the way to it. The present is the reality that surrounds us – it is in this reality that we determine and define the spatial relations present in an urban territory, the mechanisms whereby those relations are established and fostered, and the impact they exert. The future is a function of the past and present – it is uncertain and inescapable, and it needs to be researched – to predict future trends in the process of urban development – relevant for the planning and design of urban form.

Spatial Order and Regulation

The postmodern paradigm recognises, in relation to the planning and design of urban space (here: urban form), the importance of dealing with both social space and physical or geographical space in an integral manner. Interaction between social processes and the process of production of space has also been acknowledged and recognised (Lazarević Bajec & Maruna, 2009, p. 71). Spatial order is created through processes of reproduction of various social and cultural values within social order, while regulation serves the role of planning and design of urban form, i.e. urban landscape. It is important, in these processes, to bring into focus *connections between people, types of conduct, objects, places and the city*, as well as research, to understand *what makes urban places special and significant for those who use them* (Lazarević Bajec & Maruna, 2009, p. 57).

Webber also pointed out this peculiar interconnection between social and spatial changes (Webber, 1964), recognising the changeability and dynamics of spatial forms to represent three things simultaneously: the result, content, and framework of urban processes. Lefebvre claimed that social production is a weapon in the hands of the ruling class, which uses it to reproduce its domination. As well as that, he equated the reproduction of the social relations of production with the production of space. This means that space is a social product or a complex social construct, which is based on values and the social production of meaning (Lefebvre, 1991).

Urban Rules

The goals, values and norms of urban communities, as well as the needs and interests of their members, are translated into standards and parameters of urban form, which is the most important regulation instrument. The thread that runs through all these levels and holds the whole process of city development together is the implementation of written rules – norms, standards as well as laws. Rules have existed for as long as human communities, because living in harmony in a community requires compliance with rules that do not jeopardise the agreed and generally acceptable degree of personal freedom of the individual. Building rules were made to specify the rights and obligations of all those participating in the building of a city or living in it. For a long time, rules were established irrespective of planning documents and enforced by means of laws. They were always established by city administrations (individuals, groups, institutions). As socio-economic relations changed, this led to changes in urban planning doctrines or approaches to the building and planning of settlements, meaning that the degree to which rules existed and to which they exercised influence also changed (Minić-Šinžar, 2003, p. 31). Building codes and standards connect the inherited values and meanings of the building heritage with contemporary practices of planning, design, and production of urban space. They may be labelled keys to the interpretation of historical layers of meaning.

2 The Phenomenon of Urban Form

Urban form is seen as a point of convergence, a meeting place, and a source of theoretical and practical effort; as a reflection of, and a framework for, scientific and professional activity when drawing up the concept of spatial order. Such a phenomenon requires discipline, sensitised to various aspects and levels of space, and capable of understanding urban form as a temporal design process.

Urban form can be generally and concisely defined as an integral part of urban landscape and as a complete structure, composed of physical basement and sociological construct. Physical component is an objective physical manifestation, "three-dimensional space with emphasised functional character stemming from technical aspects of physical reality" (Milić, 1996, p. 44). Sociological construct or upgrade, with the meanings, symbolic values, and communicative character of messages, represents an "image" of the city – mental and symbolic images, respectively, and urban form projection; it is a result of socio-cultural factors and is considered a physical activity driver. Due to this complexity, urban form phenomenon must be seen from many aspects and studied through the interpretation of changes and effects produced by different factors of urban development in a concrete urban form, which is to be presented in the following text through the case study of Banja Luka. The selection of relevant aspects for the urban form study stems from the widest context of sustainability and resilience and is adapted to them: socio-cultural, environmental (ecological), and economic aspects.

Contemporary research on urban form requires an interdisciplinary approach where various temporal and spatial levels are observed simultaneously on different scales. With regard to that, urban form is observed from the perspective of urban morphology, a discipline suitable for exploring various aspects and levels of space, and able to understand urban form as a temporal design process (Figure 2.1).

2.1 Urban Form – What Does It Include and How Do We See It?

This section further defines the notion of urban form, what it includes and what it means. The notion and meaning of urban form will be presented here through a sort of overview of theoretical research on urban form as built environment (approaches, concepts, methods, and cases).

FIG. 2.1 Urban form as a landscape – San Gimignano, Italy

Primarily, urban form, defined as a structure composed of physical fundamentals and a sociological construct, is associated with the *space syntax theory*. According to the main principles of this theory, published by Julienne Hanson and Bill Hillier in their 1984 book *The Social Logic of Space* (Hillier & Hanson, 1984), the built urban structure in its spatial form contains social form determinateness, that is, built objects are at the same time social objects. Built objects are both producers of spatial configurations of forms and of the social organisation of everyday life, and representatives of this social organisation expressed as spatial configurations of forms and elements that we observe or that have the role of being significant visual features (Hillier & Hanson, 1984, p. 9). Changing the scale of spatial levels – buildings in relation to the complete spatial form of the city – is not of importance, i.e., it does not change its complex and, at the same time, spatial and social, content.

Furthermore, starting with the principle of urban form as an inherent part of urban landscape and a representative of urban identity (Simonović, 2014, p. 80), we will refer to the theoretical and practical research of urban form, based on the complete experience of urban form and landscape. Ranko Radović reminds us, in the preface of his book *Form of the City,* (Radović, 2003) that "for us, form of the city is an elementary subject of urban thought and science..." and that *forma urbis* is founded on the basis of life processes of urban development, and is always a part of the overall culture of a particular environment, stemming from a long period, in diachronic transformation; and that we constantly must discover laws of urban form and landscape, "looking for causes of every urban phenomenon, its sense and meaning, the atmosphere of the city ambiences, the nature of their contents, messages of urban structures, functions of parts of the city and city as a whole, connections and inter-influences of heterogeneous urban forces" (Radović, 2003, pp. 4-5).

What is significant is considering the inseparability of natural environment and built fulfilment of urban landscape within the physical city image, understanding formation, development, and their clearly defined urban functions, and that this complex integrated system, inside which exist connected built elements, spaces, and ambiences – urban form, represents a complete ambience and environment of urban life processes.

Continuity and continuous change of urban frames, expressed by simultaneous existence and parallel multi-layered life of different urban forms from different time epochs and social sources, confirm the constant connection between human power and changeable social tissue. Urban form represents a specific basis on which records of human survival in cities have been kept continuously (Radović, 2003, pp. 65-66).

How do we see urban form? Radović thinks that the basic way of connecting man with the world is through experiencing space. The relationship between man and the environment is interactive – people, by their activities and in accordance with their power, shape and form their environment, so that the formed spaces may have influence on the spiritual and material world of man. Experiencing urban form is not exclusively a visual-plastic and aesthetic phenomenon, but its research requires analyses of socio-psychological and physical-biological factors, as well as physical structure of the city itself. Socio-psychological basis is primary, since the process of experiencing city space includes united performance of perceptive power, experience, and creative power of an individual as well as a community. The physical-biological basis shows to what extent basic natural-ecological conditions of a concrete urban environment or city ambience are changed. While discovering and experiencing the physical structure of the city, movement and time are of crucial importance. City space is experienced in the movement, in time sequences and intervals, continually. Therefore, Lynch considers that the "cumulative effect of the whole range of looks and views" is more important for urban form. Experiencing the physical structure of the city or urban form depends on its morphological characteristics; for that reason, Gordon Cullen's approach is recommended as adequate

when analysing city spaces and their influence on observers (Radović, 2003, pp. 46, 47, 82). The physical structure of the city is seen as a substantive, functional, and socio-dimensional multifaceted frame that sends numerous messages, and as a spatial multi-dimensional system. The spatial and functional organisation of the city is the basis of urban morphology – it significantly determines urban form and represents the embodiment of complex relations in urban environment. Lynch insists that it is very important for land to be used for city activities and that the way in which the land is used defines its general physical city form – urban form. Apart from land use, considerably important are functional and substantive connections and relations of particular parts of the city, as well as distribution of activities in each built, urban environment – which altogether make the basic dimension of the city morphology. Furthermore, housing density, basic spatial relations between built and non-built, particular city facilities, and their character, are central features of urban conception of the city and its form (Radović, 2003, pp. 75-77).

Urban form has abilities to last and change – vitality, stability, and constancy. The duration of physical structures is determined by their content, place in the community, and the quality of objects, whereas dynamic socio-economic processes define the changes. The symbolic and spiritual importance that is given to physical forms of the city affects their longevity. Sometimes, it is a function that lasts within them, or physical forms subsist with altered purpose. Duration of undeveloped, vacant space in urban environments is special – regardless of the frequent changes of objects. In addition, the variability and adaptability of physical structures of the city to social changes is constant. Continuity of changes is a fact; therefore, urban form should be understood as "dynamic (flexible, adaptable, variable, and sometimes ephemeral) spatial form", which requires a method of clear and complex differentiation of physical structures of the city according to their longevity (Radović, 2003, pp. 94-97).

Kevin Lynch introduced his theory of urban form in the first edition of his book entitled *A Theory of Good City Form* in 1981, and in 1984, in the second edition, under a slightly altered title, *Good City Form* (Lynch, 1984). The theory of physical environment or urban form is presented through a new, alternative approach, based on the systematic consideration of the interrelationship between urban forms and people's aims – contrary to the current state of theory and approaches that are static and fragmentary (Linč & Rodvin, 2009, p. 304). Considering valid analytical approaches, from descriptive to genetic and historical ones, from solving problems to analysing processes and functions, without challenging them, they offer more a general and systematic form of the theory and technique of studying interrelations between objectives and urban forms.

Analytical system criteria of urban form categorisation must meet the following requirements: have importance at the city level – so they can be controlled and described at this level; include the physical form or schedule of activities, without mixing them; be applicable to all urban

areas; be suitable to be recorded, communicated and tested, and have significant effects on the achievement of people's goals and include all essential physical characteristics.

The proposed analytical system has a developed set of abstract descriptions of quality, quantity, or spatial distribution of various characteristics of models present in some form in all areas. City forms, put into different categories for the purpose of analysis, actually present a unique pattern; it is not always possible to consider the influence of structure without specifying density and size (Linč & Rodvin, 2009, pp. 318-319). Instead of fragmentary records (such as differentiation of a traffic network, separating or combining land use, and organising a residential area), there is a need for general theory of a city urban form as a whole (Linč & Rodvin, 2009, p. 323).

In *Good City Form,* Lynch proposes a theory of urban design based on fundamental human values and explores how such values can lead to the status "good city form", pointing out the significance of connections between human values and physical forms of cities as crucial. Selected characteristics, such as accessibility, equipment, vitality, control, efficiency, sense, etc., have broad meanings and cannot be interpreted in various ways nor reinterpreted in specific contexts and locations. Transforming theory into forms or guides with different types of urban forms that can be successfully used in the practice of urban design, he manages to make a logical and natural connection between theoretical research and application in concrete projects, taking into account three things: human activities, processes and control, and of course, the physical form.

Between other theoretical researches on urban form as built environment, the discipline of urban morphology, with an adequate practical methodology setting of typomorphology, is very important. Apart from architects, typomorphology is used by geographers, sociologists, art historians, and others, mainly concentrated in groups or schools in France, Italy, and England (Kurtović-Folić, 1995, p. 38). They study urban form and landscape through three basic dimensions: time, form, and size. The most famous typomorphological schools are: *Italian* – Saverio Muratori's and Ganfranco Caniggia's, also known as Cannigia's school, and younger generation (neorationalists) led by Aldo Rossi and Gullio Carlo Argan; and *Versailles* (also known as LADRHAUS – *Laboratoire de recherche: Historie architecturale et urbaine-Societe)*, which was, besides the architects, represented by philosophers, sociologists, historians, and geographers – Jean Castex, Philippe Panerai, and Jean-Charles Depaule, who were mainly influenced by Henri Lefebvre. In addition, there was the *English school*, whose founder was M.R.G. Conzen, a geographer and urban planner who came from Germany and after whom the Conzen's school is also named, within which the *Urban Morphology Research Group* was founded at the University of Birmingham in 1974, now branched worldwide.

The Italian school has set the theoretical bases for the planning and design of the urban landscape by harmonising with traditional urban

design settings. The French school set a new trend of research on urban (built) landscape based on criticism of contemporary theories of design. The English school set a morphogenetic scientific approach to the research on built landscape and contributed to its implementation in the management of the city in accordance with its historical development (Kurtović-Folić, 1995, pp. 38-39).

Typomorphology, as a complex discipline, deals with defining the physical and spatial structure of the city, in a way that different spatial levels are seen as the landscape, and the city is understood as a process of forming through time. According to Kurtović-Folić, there are three main characteristics of typomorphology. The first is a type applied in typomorphology, which combines volumetric characteristics of built structures with corresponding open spaces, and which defines a built landscape type. Land, i.e. a plot, as a basic unit of urban tissue, appears as a connecting element of built and open space. The second includes the land as a constituent element in typomorphology, thus enabling the connection between the individual structure and the whole city. The third characteristic defines the urban or built landscape as a morphogenetic rather than a morphological unit, since it is defined by the time when the city was formed, developed, used, and changed.

The oldest Italian typomorphological school was based on Muratori's theory of designing cities (and his follower Caniggia), which was based on the understanding of the development process of traditional Italian cities. Their typomorphological research and analyses were prerequisites for the urban and architectural design of existing cities. Two things were particularly important for Muratori: the principle of historical continuity in the interpretation of urban structure, and application of typological classification of built forms in their analysis.

The constitutiveness of elements of the urban area (physical structure and open spaces), embodied in the urban form of city, is a result of the permeation of numerous approaches, concepts, operations, and tastes; integrally monitored and typologically classified, they enable the expression of the essence of their diverse character. Caniggia argued that spatial objects could be classified in four different spatial levels or sizes: buildings, groups of buildings (built tissue), cities, and regions. These spatial objects of different sizes should fit into each another in such a way that, in the case of planning and designing, all levels and proportions of spatial objects must be considered, from individual buildings to the region (Kurtović-Folić, 1995, p. 38). Traditional and modern cities can be distinguished not only on the basis of the relationship between an individual building and the city as a whole, but also by the way the building itself is designed.

In the mid-1960s, recognising this change in relationships within a modern city as a fact that cannot be changed, a group of architects who called themselves neo-rationalists, including Aldo Rossi, Gullio Carlo Argan, and Carlo Aymonino, among others, approved both approaches to the design process. The first, which belonged to their teachers, Muratori and Caniggia, was based on the principle that

recognised types from the past applied in urban practice, and the second, was based on understanding and developing shapes and forms of space through typomorphological analysis, in which the type is a representative of a particular category with specific features. Neo-rationalism first emerged in Italy, then in Spain, Belgium, France, and Germany, and it indirectly influenced the application of typomorphology in the United States, critically treating functionality as the basic definition of form, insisting on the development of urban form types by respecting archetypes, but also through understanding the complexity of the city as an expression of collective memory and environment identity. Paolo Portoghesi sees archetypes as basic institutions of the language and practice of architecture, which can bring meaning back to architecture and urban planning.

The most famous advocates of typomorphology among neo-rationalists in Britain are brothers Robert and Leon Krier, who, in their theoretical and practical studies, insisted on the importance of typology in understanding contemporary urban phenomena. Within their active participation in the Movement for the Rehabilitation of the European City, they advocated for 1) the idea of urban space as a basic element of urban morphology; 2) typomorphological studies as the base for the new architectural discipline; and 3) the history of the city as a foundation on which guidelines for city space reconstruction are developed. All three of the ideas represent the essence of the urban-morphological research. The importance of typological analyses of city space elements lies in emphasising key features of their recognisability (Đokić, 2004, p. 10). At the same time, with the above-mentioned Movement for the Rehabilitation of the European City (from the 1960s to 1980s), a similar movement, the Townscape movement, was started in the USA by Gordon Cullen, whom we will address later in the context of understanding urban landscape as an experience of environment.

The French or Versailles School put the issue of the city into the interdisciplinary frameworks of human and social sciences, and therefore, the city could be considered as a sociological phenomenon, thanks to the knowledge gained by detailed urban morphological analyses. They considered relations between urban form and social space to be dialectical, and that social forces were embodied in the changes recorded in the urban landscape. This is most clearly seen through historical, morphogenetic layer of typomorphology, i.e. the unification of material and social space. Within typomorphological research of this school, two categories of built landscape types have emerged: 1) the archetypal, traditional urban type, which endures through time and development periods and is always considered in relation to the existing urban tissue; and 2) type plan or prototype (of multiplied repetition of the same spatial form), contemporary and future type, resulting from the integration of basic functional programs and the specific spatial forms, without establishing a relationship with the immediate urban tissue. The above-mentioned categories of type are based on the theoretical research of the Versailles School, directed to urban forms and elements of urban analysis, as well as typology and architectural types (Kurtović-Folić, 1995, p. 39).

In the English school of urban morphology, Conzen's analyses of the urban plan (with differentiated elements of a street, plot, or building) were used to set a methodological basis of typomorphological research. By applying a morphogenetic approach, the principle of time was introduced into urban morphological research. The urban plan, in the form of a two-dimensional mapping performance, consisting of systems of streets, plots, and buildings; urban tissue (building fabric), composed of physical structures and open spaces, in three-dimensional spatial form; and a detailed plan of land use and buildings – were the key elements of the Conzen's methodology (Kurtović-Folić, 1995, p. 39). These elements, plans, and dimensions are intertwined with each other and are subject to the temporal dimension and evolution, which is the essence of Conzen's interpretation of the urban development process. His followers, in 1974, at the University of Birmingham, founded the Urban Morphology Research Group, which is still active and receptive to researchers from around the world, dealing with the transformation of urban forms within the existing types or through the process of forming new types.

On the group's website, there is a glossary of terms, necessary in the research on urban form, which has been formulated by Conzen, along with Jeremy W.R. Whitehand. Today, the group's highlighted topics include morphological regionalisation, plan analyses, management of urban landscape, peripheral zones, and the history of urban morphology. The management of urban landscape has been actualised and presents the dominant approach to the management of the city (especially in Great Britain).

Studying urban landscape through the identification of the physical and spatial structure of the city, and understanding the transformation of spatial patterns through the history of the city by methods of urban morphology, includes research on the significance of the morphological characteristics of the environment, through the experience of urban space. This is because the urban landscape, in its ambiguity, presents the visualisation of environment, whereas human experience has a role in shaping a performance or image of built environment, simultaneously real and imagined. Theoretical works, in which the described ways were used to approach the study of urban landscapes, originated in the United States, and were published between the 1960s and 1980s by theorists who were supporters of the Movement for the Renovation of the City, starting with founder Gordon Cullen, to spatial planners Kevin Lynch, Christopher Alexander, and Christian Norberg-Schulz, and finally to architectural historian Spiro Kostof.

Thanks to these theorists, who worked in the 1960s, space was perceived increasingly as existential, a proposition whose roots are found in the thinking of philosopher Martin Heidegger, who claimed, back in the 1920s, that existence is spatial (Hajdeger, 2009). Space stopped being understood in the Euclidean sense, as an abstract concept or a geometrical category; it was now seen as a relational concept, an existential category, made of multiple, interrelating layers, which are also interconnected through man's treatment of space. The structure

of existential space, as formulated by Norberg-Schulz, consists of layers or levels of different scales: *geographic layer, landscape layer, urban layer, private space layer – houses, and a hand layer- things and everyday items.* According to Norberg-Schulz, layers of existential space constitute the structure of the totality of space corresponding to the structure of human existence (2006, p. 60). Despite identifying the level of landscape with the land on which configuration of existential space is being developed, this Norwegian architect and architectural theorist emphasises the correlation between human activity and topography, vegetation, and climate, as reasons why people have different experiences of the same landscape. The content of landscape is not only physical, yet is created, and filled with patterns of its use by humans, and cultural, symbolic, and other meanings. Settlements get their identity by being shaped according to the landscape from which they grow, but the landscape level is transformed under the influence of ideologies and beliefs, as basic aspects of human orientation: physical safety and psychological identity (Norberg-Schulz, 2006, p. 113). In the review of transformation of urban landscape during significant periods of city development, Norberg-Schulz seeks the key points in which fortresses and temples dominated the traditional European landscape, while the Renaissance and Baroque landscape was geometrical, with the intention to connect with the environment in a well-conceived way and humanise the landscape itself. During the time of the paradigm of modern architecture, he noted the loss of continuity of landscape, that is, he claimed that (natural) landscape had stopped forming the basis of and background on which object figures could be clearly seen, but that they had rather been shattered into pieces, with a general visual chaos as the result (Norberg-Schulz, 2006, p. 114).

Thomas Gordon Cullen united his theoretical assumptions about urban landscape as a way to artistically design a city (which he previously published as an art director in the journal *The Architectural Review*) in his book *The Concise Townscape* (1961). He offered a whole set of recommendations and guidelines for shaping the urban landscape with the primary objective of achieving "the art of relationship" – visual coherence and the organisational integrity of the urban area (Cullen, 2007, p. 6). He presented them in a sort of atlas of perspective drawings – analyses of selected spatial patterns of urban structure, in terms of the experiential-emotional reactions of people to the urban environment in three ways, namely: through the experience in motion, motionless experience, and through the content and meaning of space. By intertwining and overlapping the structuralism perspective with space, perceptual approach, and phenomenological theses of emotional knowledge of space, he studied the various aspects of the experience of urban environment and discovered numerous ways to meet human needs through the daily experience of space, by means of artistic design of urban landscapes based on the art of relationship (Novakovic, 2011, p. 216). Besides the emphasis on the visual and aesthetic component of his approach, components that are based on the analysis of content, meaning, and character, or on the identity of place within the urban area and the relationship with the spatial structure of the city, are also important.

In his book *Pattern Language: Towns, Buildings, Construction* (1977), Christopher Alexander notes that architecture connects people with their environment in an infinite number of ways, and that we can respond to the needs of ordinary people through the application of spatial patterns. He defines 253 spatial patterns used to achieve unification of purpose and enable the creation of architecture that is not static, but that lives and serves man. The first 94 spatial patterns need to be changed in the city design. In his second book, *The Timeless Way of Building* (1979), Alexander complements 'The Language of Forms' and points to a far deeper connection between nature and the human mind, and offers universal truths about how man interacts with the world. According to Alexander, there is a central value, which is a key criterion of life and the spirit of man, city, or building. In order to define this value in buildings and cities, we have to understand that each place is given its character in the form of certain patterns that are constantly evolving. These patterns or occurrences are always connected with certain geometric patterns in space. Every building and every city is composed of these patterns. They represent the atoms and molecules of which the city is made. According to Alexander, these specific patterns that form the city may be living or non-living. The bigger number of living patterns in space – a room, building, or city, the more evident it is, and the higher its value (Alexander, 1979, pp. 18, 157, 351). He believes that people can form objects for themselves, and they have been doing it for centuries, using the language of patterns. The language of patterns gives each person using it a power to create an infinite variety of new and unique objects, in the same way as his ordinary language gives him the ability to create an unlimited variety of sentences. The language structure consists of a network of connections between individual patterns, which is now the language made of a group of patterns. Then, at the end, individual languages, made for different parts of building, can be used to create a bigger structure, a structure of structures, which is constantly evolving, and that is, at the same time, the common language of the city. Such a rich and complex rank of the city can grow out of a thousand creative parts. Because, once we have a common language of patterns in the city, we will all have the ability to make our streets and buildings live, through our daily activities, without force. Language, as a seed, is a generic system that gives the millions of small parts the ability to create a whole. Finally, in the context of a common language, millions of individual objects together will create a city that is alive, comprehensive and unpredictable, and without control.

Through usage, people and space are constantly changing. Form and content of urban space affect the type and intensity of human activity and communication, but at the same time, space gets altered and adapted to human needs and interests, in a real and imaginary way. A structuralist, Nikolaas John Habraken, sees this type of relationship as a so-called "live configuration", which also includes the built environment and the people who formed it and imbued it with vitality and the spirit of place (Habraken, 1998, p. 17). In connection with the study of these mutual relations between people and space, through exploring patterns of spatial use by people and dealing with morphogenetic characteristics, is the theory of territoriality, which Habraken dealt with (space as a

territory), but, in a special way, the poststructuralist analytical space syntax theory (space-like configuration) also dealt with it. However, unlike Habraken's theory of territoriality, which treats space as a social reality and according to which social and cultural meanings are formed through the use or production of space, Julienne Henson and Bill Hillier (1984, pp. 7, 9) believe that these meanings are already contained in spatial forms, as postulated by their space syntax theory.

The prior review of theoretical research on urban form as built environment enabled the creation of a broader framework for explaining the concept and meaning of urban form.In the following text, the definition of this complex notion is adapted to the topic of a broad cogitation of the sustainability and resilience of the built environment, for the purpose of linking education, research, and design (for more about resilience and sustainability, see Vujičić's "Shifting Forward Resilience Thinking", KLABS Book 1, Chapter 7, *Resilience and Sustainability*). We accept the beliefs that resilience and sustainability can be seen as complementary concepts and that "(r)esilience, understood as a desirable system property/state, is a crucial prerequisite for achieving sustainability and sustainable development" (Folke et al., 2002, p. 40).

According to Vujičić in "Shifting Forward Resilience Thinking", "...in literature, resilience and sustainability are defined in different ways – more metaphorical (normative) or more specific, empirical (descriptive)" (Vujičić, in progress). She emphasises that some scientists explore it separately, while others consider it in combination, while to some, resilience theory is a subset of the broader concept of sustainability (see more in Folke, 2016). Others suggest an equivalence of sustainability and resilience, arguing that "resilient socio-ecological system is synonymous with region that is ecologically, economically, and socially sustainable." (Holling & Walker, 2003, p. 2) Beyond that again, some believe that resilience is a new and more advanced paradigm (Cascio, 2009, p. 92). However, while resilience and sustainability have a lot in common and they have similar goals, there are certain distinctions between them. They have different approaches and types of outcomes that result from these (See Table 7.1). Nevertheless, the specified (descriptive) definition of resilience does not necessarily conflict with sustainability; moreover, they could be seen as complementary concepts. Vujičić defines resilience, understood as a desirable system property/state, as a crucial prerequisite for achieving sustainability and sustainable development (Vujičić, in progress). As Vujičić concludes, the resilience concept can be seen as both metaphorical/general and specific/operational, as well as a way of thinking and system property.

2.2 The Four "Pillars" of Sustainability and Resilience

This entire section is focused on the four "pillars" of sustainability and resilience: the social, cultural, environmental, and economic aspect. Our choice is determined by resilient and sustainable approaches and goals. The resilience approach has the following goals: ecological, economic, and social sustainability. The sustainability approach has

some different goals: economic efficiency, human well-being and social justice, and environmental protection. A more detailed elaboration is given on the aspects from which the subject of urban form is observed – through the case study of the urban morphogenesis of the city of Banja Luka. Examination of the influence of relevant factors on the formation and transformation of the urban form of Banja Luka is based on urban and morphological analysis that was published by Simonovich, in the book *Landscape Cities: A Comparison Between the Development of Urban Identities of Banja Luka and Graz* (2010).

The urban form of Banja Luka is a prototype of a linear polycentric city in the natural landscape, which has been developing by moving the core of its development, often changing abruptly and with severe cuts, occasionally losing the human relationship, between the expansion of its territory and the value of the natural environment. Its funnel shape that extends to the north is completely adapted to the topographical features of the region, although different phenomena of modern age can be clearly noticed.

The Socio-Cultural Aspect

The socio-cultural aspect can be interpreted through the changes that have been manifested in the urban form of Banja Luka, under the influence of social factors. Simultaneous existence and intertwining of several cultural codes as well as multi-ethnicity; changes in the socio-economic system and the administrative position of Banja Luka within the countries it belonged to; application of several different models of urban design and architectural expressions – are just some of the complex influences that have been manifested in the urban form of Banja Luka. Banja Luka has always belonged to Krajinas, the border areas. Such position caused ethnic and religious diversity, and frequent changes in the structure of the population, which depended on nationality, as was often the case within the city of Banja Luka. Situated on an area that received influences from different cultural contexts, the structure of the population of this territory was variable, depending on the power of particular influences. This had a crucial impact on the process of urban development and the transformation of the urban form of the city. Sudden changes that took place at the level of the socio-cultural context of the city development directly caused changes of urban form (wars, epidemics, etc.). Gradually, there were changes in the mentality characteristics of the population, their way of life, customs and habits, interpersonal communication, expression, and indeed, changes of character in ways of using space, and culture in general. All of this, over time, has left clear traces on the urban form of the city of Banja Luka.

In the middle development period – the period of Turkish occupation, the urban form of Banja Luka expanded longitudinally, following an imposed oriental model (sequencing neighbourhoods – quarters, along the River Vrbas). For the analysis of the urban form of Banja Luka, specificity has a significant role – the existence of two fortresses (one in Upper Sheher and the other in Lower Sheher), and two urban cores (old and new). The River Crkvena was a significant element of the

urban form of Banja Luka, acting as a border, the line of separation of parts of the city with different concepts of urban design. The town (predominantly the Christian part of the city) stood on the left bank of the River Crkvena, with its approximately orthogonal street network, and the settlement on the right bank, with a geometrically irregular network that spontaneously branched transversely in relation to the dominant linear direction of the Imperial road and around which was formed a cell structure of neighbourhoods. In the final, third stage of development, the influence of socio-cultural factors on the urban form transformation were of crucial importance. The successive application of the Central European concept of urban design can be noticed during the Austro-Hungarian rule over Bosnia and Herzegovina.

The Environmental (Ecological) Aspect

Natural and morphological factors had a decisive role in the formation of the elongated urban form of Banja Luka. In the mature development stage, the urban form of Banja Luka was defined by common effects of natural and morphological, as well as socio-cultural, factors. In the final period of development, the strongest influence on the change in the urban form of Banja Luka were the effects of catastrophic earthquake (1969), then the effects of war, whereas significantly less impact was made later by natural disasters such as floods (the most recent was in 2015). The urban form of Banja Luka had been abruptly changed during the last war, particularly by the demolition of some religious buildings of cultural significance, which resulted in a change of identity. Many dilapidated buildings of environmental or architectural values collapsed completely – in this way, individual buildings or environmental features of architectural heritage disappeared, which had a negative impact on the memory of the city and on its continuity.

In the urban form of Banja Luka, one can see all the cultural layers that have intertwined over the centuries and formed its overall cultural and urban design expression. Morphological structure and interrelations of morphological elements are moderately typologically diverse. Its urban morphology is characterised by contrasts between morphological elements. It is evident that there is an absence of some traditional types of spatial patterns (the closed city block) and the prevalence of a detached house on the plot. Typologically different spatial patterns are combined with each other in mixed types. This is the urban-morphological specificity of Banja Luka (city blocks are formed by interpolation of multi-family dwellings within the peripheral series of plots with single-family dwellings).

The transformation of the urban form of Banja Luka in the longitudinal direction defined its identity of the city with an elongated shape, oriented to the river, and with a strong linear connection; in the most recent period of development was the spread of urban form and deviations from the river. Moving the core of the settlement along the main route of communication, which lasts through the entire process of the morphogenesis of Banja Luka, is the characteristic of urban form in present time, with the centre of development at a distance from the river, showing a tendency towards eccentric positions to the northwest

and northeast. Vital functions of the city have moved away from the River Vrbas, as well as the central city core; the parts of the city on the left and right banks are of different character and identity, and the river is not a place of their merging, but of their separation.

An extremely important segment of the urban form of Banja Luka – open spaces and green structures – were substantially neglected and inappropriately used in the said period (although, in the last few years the situation has been improving). However, there has been a reduction in the capacity of available green areas intended to be used for gathering, leisure time, and recreation in the city area, especially in the central zone. Standards and urban indicators of plot coverage were increased, whereas norms for the capacity of needed open green spaces were drastically reduced. What has been considered a comparative advantage in former practice – enough free, open space in the urban matrix (markets, squares, parks ...) and distinguishing elements of the urban identity of Banja Luka, became a drawback – there is not enough free, green areas within the built plots and city area in general.

The Economic Aspect

In the last two decades, there has been an intensive influence of urban form change through processes of degradation – fragmentation of urban tissue and the processes of upgrading and extending of existing physical structures, which disturbs the vertical regulation and distorts the established city image. Thereby, the mode of spatial distribution of city functions has been partially changed – once segregated functions have begun to blend. A new mixed typological pattern of housing and business is formed, in addition to the existing moderate typological classification into multi-family and single-family housing. The way of using city land has also changed. Traditional, clear classification into public and private space was valid in Banja Luka until the adoption of Le Corbusier's urban planning, and was an important feature of urban identity. Today, there is a drive to establish equality between private and public ownerships of urban building land, but due to the difficulty of denationalisation and privatisation, the process has not yet been completed.

Changes in the urban form of Banja Luka in the last fifteen years have developed some specificities. The tendency to connect Banja Luka and Gradiška through the linear form of specialised production-trade-service moves, effected the further deformation of Banja Lukas urban form and the change of its identity. Then, the urban form was transformed by the abrupt unplanned development of city suburbs, as urban sprawl, which establishes the specific spatial relationships of conurbational, urban-rural, or pseudo-urban form. Spatial relations, which significantly contributed to the recognisable identity of the city, have been changed in terms of ratio, regulation, opening and closing views, focus or continuity of street front, vertical regulation, among others.

During the construction of new typological structures of mixed residential and commercial uses, Banja Luka has a noticeable trend of full

utilisation of the plot, typical of market relations in a transitional period. The most common plots with residential and commercial buildings have provided traffic access and parking areas, but do not have any open green spaces or objects. Besides, there are many ways and forms of adapting the urban form of Banja Luka to economic changes. Upgrade, extension, adaptation, recovery, and replacement with the new are some of the ways to meet diverse interests and needs. What is more, when it comes to Banja Luka, there is often insufficient insistence on the preservation of those values of urban form that testify to its continuity and distinctive urban identity. The consequences of these trends are certainly a distorted compactness of the urban structure and the loss of the authenticity and distinctiveness of the city.

Customising the new urban form to the current global architectural trends and conditions of market principles and private capital, which act without taking the context into account, constitute a global approach that denies the local and regional. This leads to the formation of a disharmonious and blurred image of the city, a heterogeneous physical structure without clear patterns, and compact spatial entities with their own character and human frame.

Values and Qualities of the Built Environment

In order to cover and connect all previously interpreted aspects, in the following paragraphs the concept of value, i.e. quality of the built environment is introduced.

Social or cultural values are what fundamentally constitute identity. They are defined as either implicit or explicit opinions and beliefs, passed on as tradition and commonly accepted within a culture, on what is relevant, right, desirable, true, valuable, and what goals should be striven toward. In that sense, social or cultural values are the core views or sentiments shared by a community, which define priorities, and thereby also the content and structure of the organisation of its life.

Incorporating social or cultural values and significations in the daily use of urban spaces makes physical space social and cultural (Lazarević Bajec & Maruna, 2009, p. 91). Therefore, urban space is a social product and it is based on values and the social production of meaning, while also changeable, owing to the changeability of social structures (Lefebvre, 1991, p. 129). If there exists a social contract regarding the general set of commonly accepted values, then it is within that set that humans act in, and upon, urban space, in the sense of spatial intervention. Still, the social dynamics that Lefebvre wrote about impacts the set value framework and demands that it should be open to change, in the sense of readiness to adapt to actual circumstances. Lazarević Bajec & Maruna (2009) also point out that the processes of translation of the set value framework, as agreed upon at the level of society to the given conditions existing in an actual urban setting, depend on the power relations in those particular circumstances (Lazarević Bajec & Maruna,). When it comes to the profession of planning and designing urban space, it does not suffice to simply rely on general rules and regulations; since urban space is socially and culturally dynamic, it

is necessary to balance social and economic values and negotiate attitudes in relation to various value demands (Upton 2002, as quoted in: (Lazarević Bajec & Maruna, 2009, p. 92)).

3 The Complexity of Urban Form – How Is It Explored and Evaluated?

This subsection presents the multi-layered nature of the problem, the space and time of urban form. The concept of urban form is used in an integral sense, combining the objective and symbolic aspects of this complex phenomenon, i.e. the physicality of the urban environment and its mental and allegorical projections or images, which carry symbolic meanings and emanate communicative significations.

Moreover, a brief overview is given of the theoretical research on urban form as the built environment and the relevant approaches, concepts and methods from the previous subsection (2.1), with an emphasis on the need to simultaneously observe various temporal and spatial levels, with changes of urban form thus observed over time and on different scales. In connection with that, the notion or concept of landscape/urban landscape is introduced in this subsection, in support of the position that urban form is considered an integral part – whether observing, evaluating, or shaping urban form.

Urban Landscape
Urban landscape is understood as a composite, something that merges urban morphology with the visual character of a city, and so it is analysed and interpreted as man's habitat, urban form and physical structure, permeated with and fused by the landscape structure, thriving with human activity and laden with symbolic value, meanings and messages. It is recognised as an expression of the conceptualisation of the city and as an instrument of research, planning, design, and preservation of the environment (Simonović, Novaković, & Vujičić, 2011).

Ideas of urban landscape as the subject and method of urban planning derived from Schlüter's concept of *Stadtlandschaft* – the landscape city, and were reaffirmed by Sitte's aesthetic principles of city planning, breathing new life into urban planning as was previously done in European cities, which until then had been typically rational and progressivist. This romantic and rejuvenating movement, foretelling the concept of the modern city, was completely different from the concept of the city and urban landscape that would be framed by the modernist movement a couple of decades later. Reviving the space patterns found in classical cities (squares, piazzette, etc.) and insisting on the quality and artistic content of public spaces in his 1889 book *City Planning According to Artistic Principles*, Camillo Sitte developed an entirely new method of city planning and design grounded in aesthetic principles and a three-dimensional perception of space. He combined Aristotle's principles of how to plan towns – machines intended to make people feel healthy and happy – with Vitruvius' guidelines for

the design of settlements and Alberti's Renaissance ideas of ideally designed streets and squares, and integrated them into fundamental city planning principles firmly insisting on aestheticism in the planning process (the art of city building).

His ideas were epitomised in the summary of the Manifesto of the Austrian Society of Engineers and Architects (1877): "Building a city both as a whole and as individual parts is an act of creation. City plans and urban growth are not only about sovereigns' actions and stylistic preferences; like with works of art, what it takes first is an idea, followed by a deep understanding of the needs of the metropolis and the pressures of modern life, and – even more – a sensual sense of space and an understanding of forms." (Dimitrovska-Andrews, 1994, p. 8)

Because of Sitte's major influence on urban planning in Austria and Germany, a great number of municipalities changed their urban plans in accordance with his theoretical principles (e.g., Brno, followed by Linz). Although it was also his students and the supporters of his ideas who contributed to other cities (e.g., Dessau and Munich in Germany), introducing changes to how they were previously commonly regulated. The late 19th century was a period during which aesthetic and architectural principles guided urban planning in Germany and Austria, known as the "romantic period". However, it also happened in other European countries, even the U.S. Thanks to the U.S. movement "City Beautiful", which was started at the time of the Chicago World's Fair of 1893, artistic principles, such as those of composition, symmetry and accentuating form, began to be applied in the planning of U.S. cities (Dimitrovska-Andrews, 1994, p. 9).

Camillo Sitte was the person responsible for enforcing the use of three-dimensional urban plans (Bebaungsplan), introduced in Austria and Germany after 1890. The *Bebaungsplan* later formed the basis for detailed urban regulation, i.e. zoning according to density and height. Zoning (zonierung) was, in fact, a German invention, defined as a "mechanism necessary for maintaining a certain order and an instrument to protect the public interest in circumstances characterized by urban sprawl and to prevent land speculation, which was a necessity when urbanism was in its early stage" (Dimitrovska-Andrews, 1994, p. 9). However, at the beginning of the 20th century, as contemporary research and urban planning focused on regional aspects, the theory of beauty and function could not be adapted to serve the needs of urban planning of that period. It reduced aesthetic principles of design to recommendations regarding the silhouette and integration of towns in the natural landscape, and to guidelines on how to design the perimeter that separates the urban environment from the natural environment (Dimitrovska-Andrews, 1994, 9).

It was at that time that Ebenezer Howard formulated his concept of the garden city, which was adopted and put into practice in various ways, often in simplified form, throughout Europe. This concept led to the birth of the Garden City Movement in 1898, which played an important role in the building of several new towns in England (Letchworth Garden

City, Welwyn Garden City). In her critical retrospective, Dimitrovska-Andrews notes that the garden city concept, which had a significant socio-political dimension to it, was reduced to the standardised design of suburbs in Austria (Anlagen in Vienna) and to the construction of working class neighbourhoods in Germany ("new towns" for German factory workers), without implementing the new lifestyle concept. Similarly, as noted by the same author, in France, Howard's idea of the garden city was limited to the design and planning of the urban development of suburban areas, despite the fact it was wholeheartedly accepted by the French Association of Garden Cities. This was partly because it was strongly counterbalanced by the comprehensive urban reconstructions carried out in major French cities (Dimitrovska-Andrews, 1994, p. 9).

3.1 Creating a Methodological Platform for Researching the Resilience of Urban Form

With regard to the aforementioned overview and summary of theoretical research on urban form, contemporary research of urban form demands interdisciplinary approaches to this complex matter. To this point, it is recommended that urban form be dealt with from the perspective of urban morphology, integrated with other contemporary approaches and methods – e.g. from perceptual, structuralism, and evaluative perspectives. This provides for balanced relations between the key aspects working to make the built environment sustainable and resilient. These aspects should be selected to address particular issues and designed specifically for each individual case, project, or research. Designing a methodological platform in such a manner, or adapting it to specific situations, also enables the understanding of urban form as the very process of shaping the built environment over time.

Evaluating the Properties of the Urban Environment
This explanation is directly linked to those outlined in the section above, pointing out that the evaluation of the characteristics of urban form should start with a previously created methodological platform: approaches selected and aspects of research formulated beforehand; the specificity of the given urban environment; as well as the final purpose or goals of the evaluation itself. The quality criteria for urban form or the built environment stem, in the broadest sense, from the socio-cultural context, most often representing the experiential starting points of planning, but also applied during the evaluation stage. Evaluating the quality of urban form and urban landscape involves the formulation of criteria and indicators of the quality of their physical characteristics, as well as the quality of complex, non-spatial, axiological characteristics.

The quality criteria for urban form mainly stem from the socio-cultural context and usually represent experiential starting points of planning, but they are also used to study the characteristics and determine the value of the urban identity of a particular city. These criteria are divided into qualitative (non-measurable) and quantitative (measurable), with quantitative criteria mostly used as indicators of the quality of urban

form. Qualitative criteria are more complex (social, ecological, economic, aesthetic, and formative); therefore, their normative elaboration includes quantitative criteria as measurable quantities. Quantitative criteria are converted into urban norms, i.e., social values and social development trends are synchronised with theoretical and practical urban knowledge and the general experience of the needs and interests of citizens, the conditions on which settlements function and the quality of urban life, which settlements are expected to fulfil (Simonović, 2014, pp. 72-77). "A criterion is a means or measure intended for judgement or comparison, containing a number of characteristics and requirements, respectively, qualitative or quantitative determinants. A criterion is considered a characteristic of a thing, which is a measure unit of its evaluation, of the assessment of its quality. Criteria are the requirements which a certain thing needs to fulfil or the qualities that it should have, to be what it tends to be or should be." (Minić-Šinžar 2003, p. 31).

4 The Variability of Urban Form – How Is It Shaped and Regulated?

At this point, it is necessary to interpret a major characteristic of urban form – its variability – and observe it in full awareness of its layered complexity. It is important to explain how urban form, its content and relations change during the process of urban development.

Urban Development and Urban Growth

The term "urban development" is connected with urbanisation as the prominent, comprehensive, and constant process of transformation of contemporary human settlements. The term "urban development" is directly related to kindred terms denoting the characteristic states that contemporary cities may be in at different levels of development: urban growth; urban stagnation; and urban decline or depopulation (so-called "shrinking cities"). It is in this context that we speak of the current crisis of the contemporary city, which does not only affect metropolises, but also small and medium-sized cities. The key problem is that cities grow exponentially, with the possibility of their optimal use simultaneously lessening. With urban growth, cities spread to an extent and at a pace that precludes urban activities from taking place uniformly across their expanded territory, due to which internal connections between individual components are severed. Also, when a city territory expands at an accelerated pace, its connections with the immediate and wider surroundings are also either severed or are not adequately maintained (Ralević, 1997).

At other levels, urban stagnation and developmental decline are also problems that many of today's cities encounter in the process of urban development. According to some recent studies into the phenomenon and problem of stagnation, many municipalities, cities, and settlements in both urban and rural areas of the Republic of Srpska are either stagnating or shrinking, i.e., they do not have the same opportunities

and strength as developed cities or developing cities. The causes of urban stagnation and shrinkage are demographic, social, economic, and sometimes environmental. They include: population decline due to negative population growth rates; aging populations; internal displacement and emigration (internal and external migrations); economic decline due to the closure of pre-war industries; slow and long-lasting processes of privatisation and restructuring of the economy; global economic crises; structural and political overturns; wars; natural catastrophes; etc. (Vujičić, in progress).

Complexity of Urban Development

In a wider context, a range of approaches founded on new methods, models, and techniques are applied when searching for answers to the stated problems. Administration mechanisms are sought to ensure that cities are of optimal size, and a very important condition is insisted upon – understanding the complexity of urban development. What is meant by this, and how can this condition be met? The term "complexity" includes all factors that influence urban development, which arise from social, cultural, environmental, and economic contexts.

Changeability

Moreover, the essential characteristic of development is changeability; on the one hand, this concerns the content, structure, organisation, and meaning of urban form, and on the other, changeability of the social, cultural, environmental, and economic context in which development occurs. Given the permanent feature of changeability of conditions and contexts, the key terms, characteristics or criteria of quality are adaptability, elasticity, and resilience.

As previously stated, the goal of development is to improve quality through quantitative change, which takes place with the help of development potentials. A development potential is defined as a resource category at our disposal that can be developed to a maximum in a number of alternative ways, in order to respond to unexpected circumstances in a timely manner and achieve optimal possible effects. When it comes to small and medium-sized cities (like Banja Luka), they should develop according to a scenario that ensures they are treated comprehensively, in all their complexity and as integral systems; managing urban development in the preferred direction should include the use of new, contemporary, ICT-based methods, models, and techniques. The quality of urban development of a city should be evaluated relative to the effects produced in terms of the stability of the balance created within the bounds of the system, i.e. the city as a system with its surroundings; of the degree to which maximum growth has been achieved by individual city parts and the city as an integral system; and of the extent to which urban growth is opportunely managed with regard to adaptation to changing circumstances. This means that a city's urban development should be influenced through both activation and creation, more specifically, the activation of identified development potentials, bearing in mind the goal to invariably ensure the city is of optimal size (Ralević, 1997).

However, changes to natural-ecological, spatio-physical and socio-cultural conditions, which take place continuously and in parallel with urban development, require not only their prediction, but also the construction of alternative response scenarios for the urban system, to allow the timely selection of the best possible response in the face of changing circumstances. What does a timely and adequate response to change mean in view of resilience? It is the ability to adapt to conditions of imbalance, understood as a kind of "immunity", which the urban system should either have or acquire in order to be resilient. Additionally, this concerns monitoring and predicting change, as well as managing the behaviour of the urban system in relation to change, with the aim of its becoming resilient to disturbances and ensuring its uninterrupted urban development.

Spatial Order and Regulation

Spatial arrangement or order, with visual order as one of its components, lies at the intersection of physical and social space, including relationships to identity and collective consciousness. Spatial order requires that spatial patterns of use for all types of space be clearly specified. It is defined in line with the previously created social and legal order, as well as through economic, legislative, and other forms of regulation. These regulatory processes depend on the political process that specifies orders for different forms of regulation and mediates between them. Social groups work hard to arrange space in a way that not only contributes to visibility or social control; regulating physical appearance also contributes to their representing and shaping identity, which brings identity into focus. Another thing to take into account is that administrative limitations play a part in creating identity and various visual representations. Lastly, it should be understood that regulating the visual representation or appearance of a place or area (street, block) – *its image* – also means, for the most part, exerting control over it (Shuffield, 2002, p. 10). In considering spatial order, aside from visual order as its component, collective consciousness is another element of importance – a constituent element of collective space, which has an important role in imposing both visual and spatial order.

Back in the 1960s, Jacobs attempted to redefine how visual order was commonly understood by society; according to her, space should look vivid and be defined by, and in accordance with, local community standards, with social control exerted to maintain this appearance (Jacobs, 1961). Public perception and visibility are at the core of understanding visual order, which is crucial in comprehending the relationship between people and places. This is not an irrelevant issue that may simply be brushed off as visual, or even aesthetic; it has to be regarded as being connected with identity, collective consciousness, and the actions of the social space in which they emerge. Visual order is a constituent part of social space and must be treated as such. All kinds of visual order express specific sets of values connecting individual identities to collective identity; therefore, analysis of visual order must be integrated in approaches to urban space. In addition, one needs to be aware of the fact that it is visual order as representation, as an element of identity, on which people place value (Shuffield, 2002, p. 75).

Codes and Laws

Codes and laws are recognised as regulators of the process of creation and keeping of spatial order, and they refer to its various components and domains. Components of spatial (urban) order fall into the following domains: spatial, economic and market-related, social, political, aesthetic, doctrinaire (ideological), technical-technological, etc. In addition, those components falling into the technical-technological, aesthetic, and doctrinaire domains can change more easily, unlike those that are relatively more constant and related to the essence of a socio-economic system. "Just as the state protects the given mode of material production (economic order), it protects in exactly the same way the given mode of spatial planning and settlement regulation (urban order), as based on the existing social structure (social orders)" (Pajović & Ralević, 2002, p. 96). If spatial creations and phenomena are viewed as the material elements of spatial order, and relations between them as spatial order, whereby spatial structure or organisation is made possible, it is understandable that their changes lead to changes in the existing structure or organisation. The existing spatial organisation reflects continuity or discontinuity as inherent to the applied approach to spatial planning and settlement regulation.

This kind of approach requires bringing spatial order at the state level, on such preconditions as a prior revision and harmonisation of general and special regulations – *codification*, those of importance for spatial planning and settlement development management, which are many in our legislation and which remain disharmonious. This would be accomplished with a codebook on spatial planning and settlement regulation that specifies general principles, which would permanently provide guidance for these activities.

However, when it comes to the Republic of Srpska and Bosnia and Herzegovina, it is impossible to talk about such a set of values, goals, and standards of communities and social groups, agreed upon by society, as is the case in developed countries. "Democratisation of society and the influence of the market economy started trends that changed contemporary urban intervention...", understood as the process of guiding spatial development and environmental design, "... (t)oward socio-economic policies on the one hand, and architecture i.e. construction on the other." Present-day cities have seen local-level administration rise in importance, with numerous stakeholders involved, whose constantly changing standards, needs, and interests necessitate the application of an asymmetric decision-making model (mixed administration at different levels of space and re-examination and estimation of policies, strategies, and goals defined according to them) (Lazarević Bajec & Maruna, 2009, p. 124).

Urban Planning Norms

Urban planning norms represent, in fact, an instrument of continuous harmonisation of social development and urban planning theory and practice and make a balanced system, which corresponds to the level of development of a community. These norms – technical, economic, design, etc. – determine the living conditions in a settlement and define

social needs on the whole, and they are complex in nature due to their technical, economic, and dimensional content. They undergo adaptation to the conditions that exist in a community, which makes them *orientative* and *optimal*, as well as *developmental*. They embody and epitomise the knowledge and experience of the needs of members of a community and the conditions under which a settlement functions. By establishing norms, a range of expected or preferred criteria, requirements, and functions of settlements are defined. Eran Ben-Joseph proposes taking into consideration local traditional experiences and the influence of the actual conditions and special characteristics of an area, instead of schematised and uniform procedures, used in accordance with the principle "one size fits all". On the contrary, these procedures should be followed using common sense and having a common purpose, with a consensus achieved based on the outcomes/effects/performance of standards defined or reached through experience, instead of enforcing generally applicable rules (Ben-Joseph, 2005, pp. 21-24).

One good example of this type of practice is the approach the modernist architect Juraj Neidhardt applied in planning working class settlements in Bosnia and Herzegovina (1938-1942). He adapted the applicable urban planning norms to serve the specific modern-day needs of the occupants of these new settlements, while also taking into account traditional principles of settlement siting and organisation (Grabrijan & Neidhardt, 1957, p. 457).

It is building codes and standards that connect cherished values and the significations of historical layers with modern practices of planning, production, and design of urban space, in light of the ever-changing social and cultural context and unforeseeable circumstances that might challenge cities in the future. They may be called legends for interpreting historical layers of meaning, or the *DNA of our cities*, the "...(o)ne intelligible and comprehensive explanation of the genetic basis behind the places that we inhabit", as claimed by Andreas Duany in his review of Eran Ben-Joseph's *The Code of the City. Standards and the Hidden Language of Place Making* (2005). Codes, standards, and building rules exist or are applicable for different periods: some are applied continuously across contexts and in time acquire universality; some last for as long as the given social system/order or cultural context; finally, those that last the longest reflect the essential local or regional particularity and significations. Today's technologically advanced countries apply standards and codes to ensure their societies are fully operational at all levels of their complex structures. These numerous rules, even though they are not truly universal, are widely applied across local settings and environments, which is the result of the uncritical application of uniform, doctrinaire approaches to urban development. Such approaches did not come from how the given natural and social contexts were initially treated, or from the connection with the local conditions; in time, codes, standards and rules broke away from the conditions they had stemmed from. In order to ensure our environment is planned and designed as sustainable, desirable, and resilient, it is necessary to apply flexible rules and standards that reflect

the conditions and peculiarities that genuinely characterise local and regional social and cultural contexts.

Only those norms based on a logical, socially accountable and value-oriented treatment of context have the capacity to create the kind of spatial order that will ensure sustainable spatial and social development of communities. "For what is appropriate to be built and design should be found not in the vision of an ideal average and social homogenization, but in the facts of cultural distinctiveness and in what is normal given the circumstances of place," claims Ben-Joseph (2005, p. 24).

In the Middle Ages, between the 12th and 14th centuries, European cities set up city committees to manage urban development (such as the independent and free city-states of Siena, Bern, Venice and Dubrovnik). These committees and city architects were guided in their decision-making by regulations, decrees, guidelines, or recommendations for planning, design, and construction. In Bern, building rules (codes) were clearly specified and adhered to, resulting in the building of row houses with ground floors connected with series of arcades. This gave Bern a unique appearance, making it one of Europe's most beautiful cities to this day. The same building rules were enforced between the 13th and 19th centuries, permitting the reconstruction of the city's street fronts in the modern era in new ways that were consistent with the spirit of the time, while also respecting the existing proportions (Dimitrovska-Andrews, 1994, p. 8). In the Renaissance as well as later, with the use of perspective, a great number of towns and cities planned and designed their physical appearance down to the last detail, putting into practice Alberti's ideas of ideally designed streets and squares.

In the second half of the 19th century, the romantic revival of the ideas of ancient Greek and Roman and Renaissance architects, that order should be brought into the city composition and appearance, led to the development of modern planning strategies. It was implemented in cities across Europe and was based on new principles, with city building seen as an art that should follow aesthetic rules. In that period, Camillo Sitte combined Aristotle's principles of urban design with Vitruvius' recommendations for the building of cities and Renaissance aesthetic principles in his *City Planning According to Artistic Principles*, formulating the fundamental principles of urban design. Sitte succeeded in enforcing the use of three-dimensional urban plans (*Bebaungsplan*) after 1890, as a basis for detailed city regulation and height zoning. This was a period in which aesthetic principles as applied in architecture had an influence on urban planning not only in Austria and Germany, but also in other European countries and the U.S. In the U.S., the *City Beautiful* movement (1893) helped incorporate into urban planning the artistic principles of composition, symmetry, and accentuated design, as well as zoning (Dimitrovska-Andrews, 1994, p. 9).

Quite importantly, zoning as a traditional instrument of urban regulation is still used for managing spatial development in many European countries, and especially in the U.S. As previously stated, it first appeared in the German rules and regulations as far back as

the late 19th century, with the division of cities into zones as specified by codebooks and subject to different rules of land use, design, and construction. Zoning was used to plan industrial neighbourhoods in Great Britain at the beginning of the 20th century, and, since the 1920s, also in the U.S., where it is still a major tool of urban planning, used to divide land into zones according to use, building height, and building density. It can be understood as the territorialisation of rules for building cities and neighbourhoods, i.e., as the division of city territory into zones – into subunits having certain characteristics regarding land use and the form and manner of construction of the physical structure (height, form, density) – *volume zoning*. It allows the division of single land use zones into several subzones permitting the construction of different types of structures of different volumes – building types, height, and density (*bulk zoning* in the U.S.).

Standards

It is common for standards or norms and parameters, as regulation instruments, to define the relationship between the preferred and possible in planning documents, laws, and codebooks (Minić-Šinžar, 2003, p. 21). A standard can be described as any measure or benchmark stipulated by law; as something serving as a model, a pattern; something recognised as classic. As defined by Nikezić, "[s]tandards are applied to place a view about what is good or adequate within a framework of specific circumstances and define the relationship between the preferred and possible" (2007, p. 64). Urban planning standards are the most important regulation instruments for quantifying phenomena and are normative by nature; they are found in different kinds of planning documents and their special parts (they may be found in codebooks specifying the design and construction of physical structures), as well as outside them. The norms and standards regulating the construction on, and planning and design of, land in cities and settlements are adopted based on parameters as analytical measures for natural and man-made conditions; they are employed as technical measures, stipulated with the aim of achieving the expected quality levels. They are rules or regulations that need to be conformed to in the realisation stage, over the period during which the norm is applicable (Minić-Šinžar, 2003, p. 24).

A standard is a benchmark reached on the basis of a tradition or the expected level of (well-being of) individuals, groups, or communities/ society, and it is expressed by means of data and indicators. A criterion is a benchmark or measure used to determine the value, i.e. the quality of a standard or norm planned or achieved (Minić-Šinžar, 2003, p. 31). A standard or norm is a formal or informal measure, which more precisely defines, for the sake of determining the quality of a thing, the extent to which a specific criterion has been met or is applied. Standards or norms are indicators whereby criteria are made concrete (Nikezić, 2007, p. 64).

Urban Rules – Design Rules

Urban rules present a link between physical and social space, between quality and quantity, the immeasurable and the measurable, and the

hidden characteristics that are manifested in urban form. They become the means of shaping/designing urban form – design rules. Building codes or standards are those that connect the inherited values and meanings of the building heritage with contemporary practices of planning, design, and production of urban space. They may be labelled keys to the interpretation of historical layers of meaning, or the DNA of our cities, as Andreas Duany does in his review of the book *The Code of the City* (2005) by Eran Ben-Joseph (for more details, see the section above). For a more detailed consideration, see the conclusions of Alex Lehnerer's 2009 book *Grand Urban Rules* (Lehnerer, 2009).

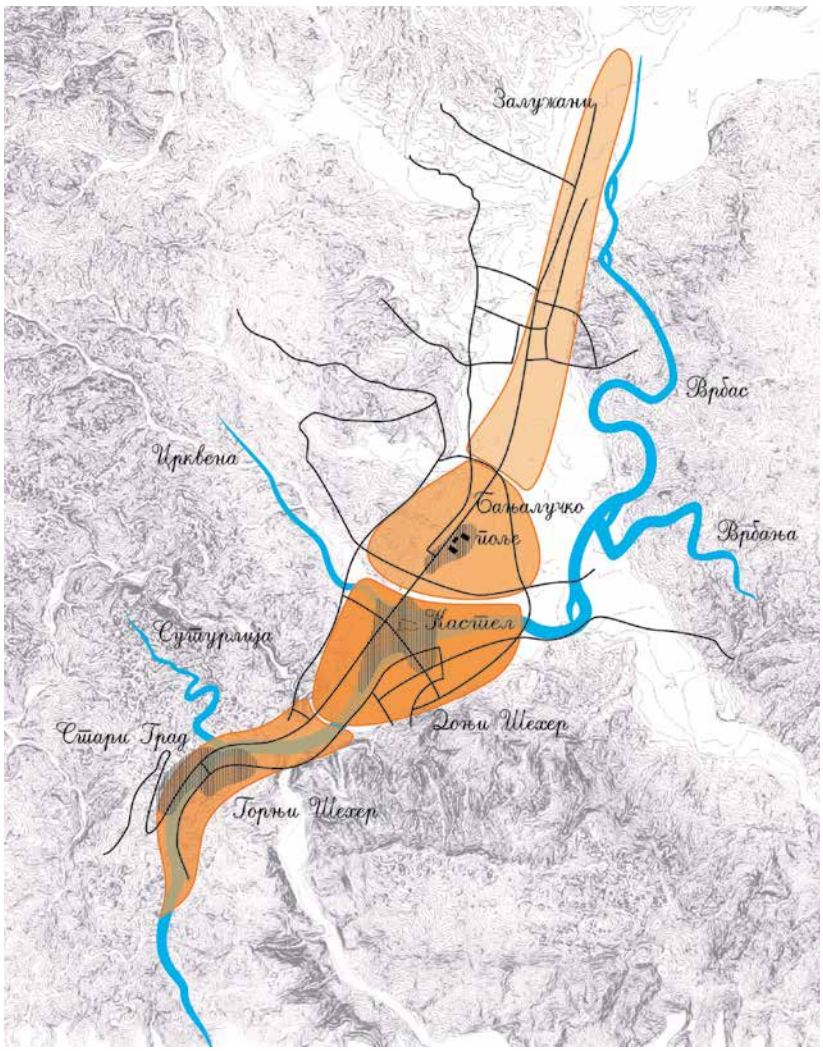

FIG. 4.1 Different spatial designs within Banja Luka's urban form with their own urban cores

At this point, this treatise will benefit from examining the urban development of the City of Banja Luka from the perspective of the history of urban regulation. It will provide insight into the evolution of the codes and standards used, as well as their impact on the design, creation, and transformation of its urban form and urban landscape (Simonović, 2014). According to this research and a subsequent analysis of the approaches used in the planning and regulation of the city of Banja Luka (content analysis of planning documents, legislation, and

regulations, as well as public state interventions), the conclusion is that the given spatial (urban) order reflects a discontinuity between the new and the former (Figure 4.1).

Moreover, there is a noticeable "absence" and "postponement" of regulatory interventions as instruments and mechanisms of imposition of spatial order across the city territory. In addition, different approaches in dealing with urban goods have been used simultaneously by the stakeholders involved in the city spatial planning and development management (including strife between them to be in control of those goods) (Simonović, 2014, p. 140).

5 A Case Study of Banja Luka's Urban Form

To what extent were Sitte's principles incorporated into the building laws and regulations that were put into effect in the special circumstances of the feudal society of Bosnia and Herzegovina in the late 19th century, and what effects did they have on land? This is revealed through analysis of the formulations found in the legislation and regulatory documents adopted, and the implementation mechanisms used by the Austro-Hungarian administration in Bosnia and Herzegovina with the aim of imposing order in city construction (*Bauordnung*, or the Construction Order Act, 1880). Analysis of the contents of these documents confirms they contained many of "Sitte's requirements". The height and density zoning rules were implemented by strictly controlling the height of buildings (the minimum and maximum number of floors permitted), depending on the category and width of the street or road. The code insisted on buildings being in "harmony with the adjacent ones" and contributing to the "architectural quality of the appearance of the whole street"; they also took into consideration the "major views of public buildings, squares, and streets, which need to create architectural units (wholes)", as well as to "local specifics" (Bauordnung, 1880, § 23, § 34).

The concept of Banja Luka as a garden city was framed and took root owing to the decisive influence of urban planning ideas and concepts that focused heavily on urban landscape. The greatest influence, in the sense of the development of Banja Luka's urban landscape taking a particular direction, with the result of its character and identity becoming prominently that of a landscape city, was exerted by ideas integrated in the *Stadtlandschaft*, the landscape city concept. This played a crucial role in the urban planning and design of European cities, more precisely, Central European cities, in the period preceding the emergence of the Modern Movement, as well as the period during which modernist ideas of urban planning started taking form. The concept of city landscape, which impacted the ideas underlying the urban planning and design of traditional European cities, enriched with principles of artistic urban design (the late 19th and early 20th century), was incorporated in Bosnia and Herzegovina's building regulations under Austro-Hungarian administration. Thereby, the contents and meaning of the concept were indirectly integrated into the planning

and regulation of Banja Luka's urban landscape. With changes that occurred in the historical and social context in which this concept took root, a development management model corresponding to the city landscape concept was only partly implemented, and later abandoned because urban landscape strategies changed under the new socio-political circumstances.

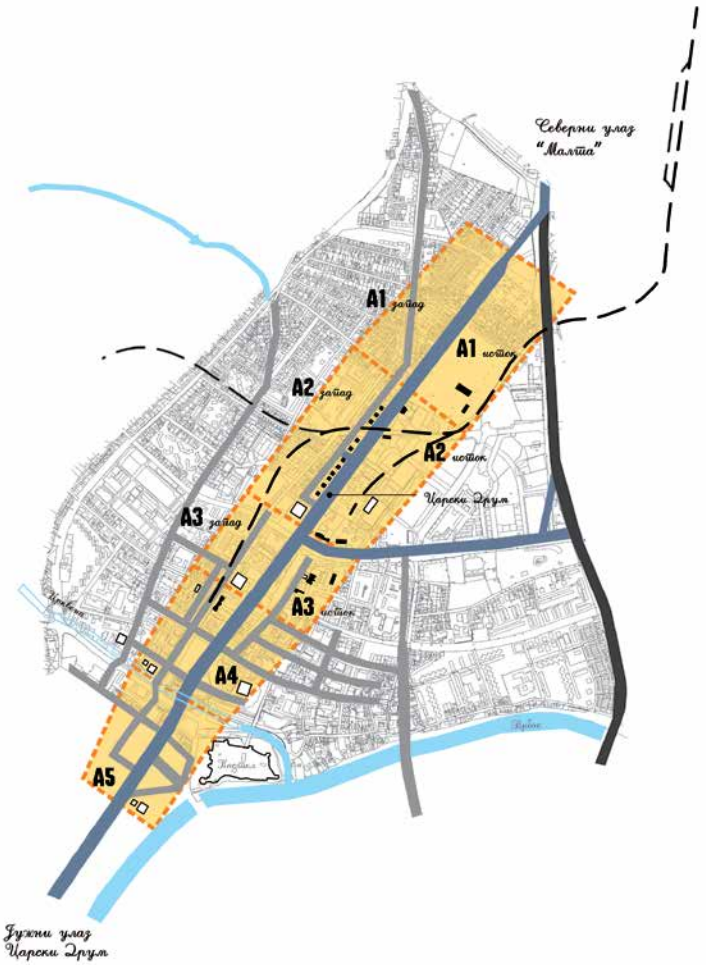

FIG. 5.1 The main city passage with a series of distinct urban and architectural settings from different periods

A comparative analysis of the Construction Order Act (1880) and the Construction Act (1931), and of their corresponding codes and regulations, reveal similarities and common features in the two documents. Despite a fifty-year gap, both pieces of legislation included all the latest urban standards and principles of the science of town planning and construction. The building code adopted in the late 19th century remained in effect and was observed in the Kingdom of Yugoslavia until 1931, with some adjustments to respond to the new circumstances. The two codebooks both had a degree of flexibility because of the need for them to be applicable across a vast and diverse territory; accordingly, this allowed their easy adjustment to local conditions and requirements, as needed. Both pieces of legislation were grounded in the principle of functionality and placed importance on structural aspects, visual and aesthetic aspects, and design and

perceptual aspects. These aspects were: image of the city and image of the street; criteria concerning the quality of the built environment, such as harmony, integrity, and singularity; and the principle of protection of public interests and common or public goods. They both strongly insisted on preserving as much vacant land as possible in high-density housing areas, as well as on having architectural design in compliance with aesthetic principles and particularities of the site and surroundings. Evidently, it was possible to interpret the stipulations as formulated in the two documents to meet the requirements in ways that were sensitive to specific contexts. This appreciation of the importance and value of local particularities, of recognisable features of concrete places, and respect for the local building code legacy, lead to the conclusion that the key elements of identity of places regulated by these acts were effectively preserved thanks to the flexible formulation of the codes contained therein (Figure 5.1).

With the arrival of new, alternative ideas of how to plan a city landscape under the new socio-economic circumstances, which required new ways of dealing with increasingly more complex problems of industrial cities, the time was ripe to abandon the traditional approach to city planning as an art project. In addition, it was time to embrace the ideas of the European Modern Movement in the late 1920s, which emerged on the international scene with Le Corbusier's work and the CIAM (Congrès Internationaux d'Architecture Moderne – Internationale Kongresse für Neues Bauen) movement.

This led to significant changes in the architectural and urban planning discourse in the Kingdom of Yugoslavia. It was a result of the adoption of the modernist paradigm of the functional city and Le Corbusier's discourse on urban landscape, *le paysage urbain*, which had a major influence on architecture and resulted in the construction of modern cities and city quarters around the world. When it comes to Banja Luka, between the world wars these influences were primarily reflected in the building of modern architectural buildings and facilities. Modernist strategies of urban planning and design had a decisive role in Banja Luka's development after the Second World War, when it was planned as a functional city and its urban landscape designed according to modernist discourse (Figure 5.2). Changes to the modernist strategies of urban planning in the socialist Yugoslavia that occurred with the changed socio-political circumstances in the 1950s and 1960s, and then again in the 1970s and 1980s (after the devastating earthquake that hit Banja Luka in 1969), led to changes in how Banja Luka's urban development was managed in this period.

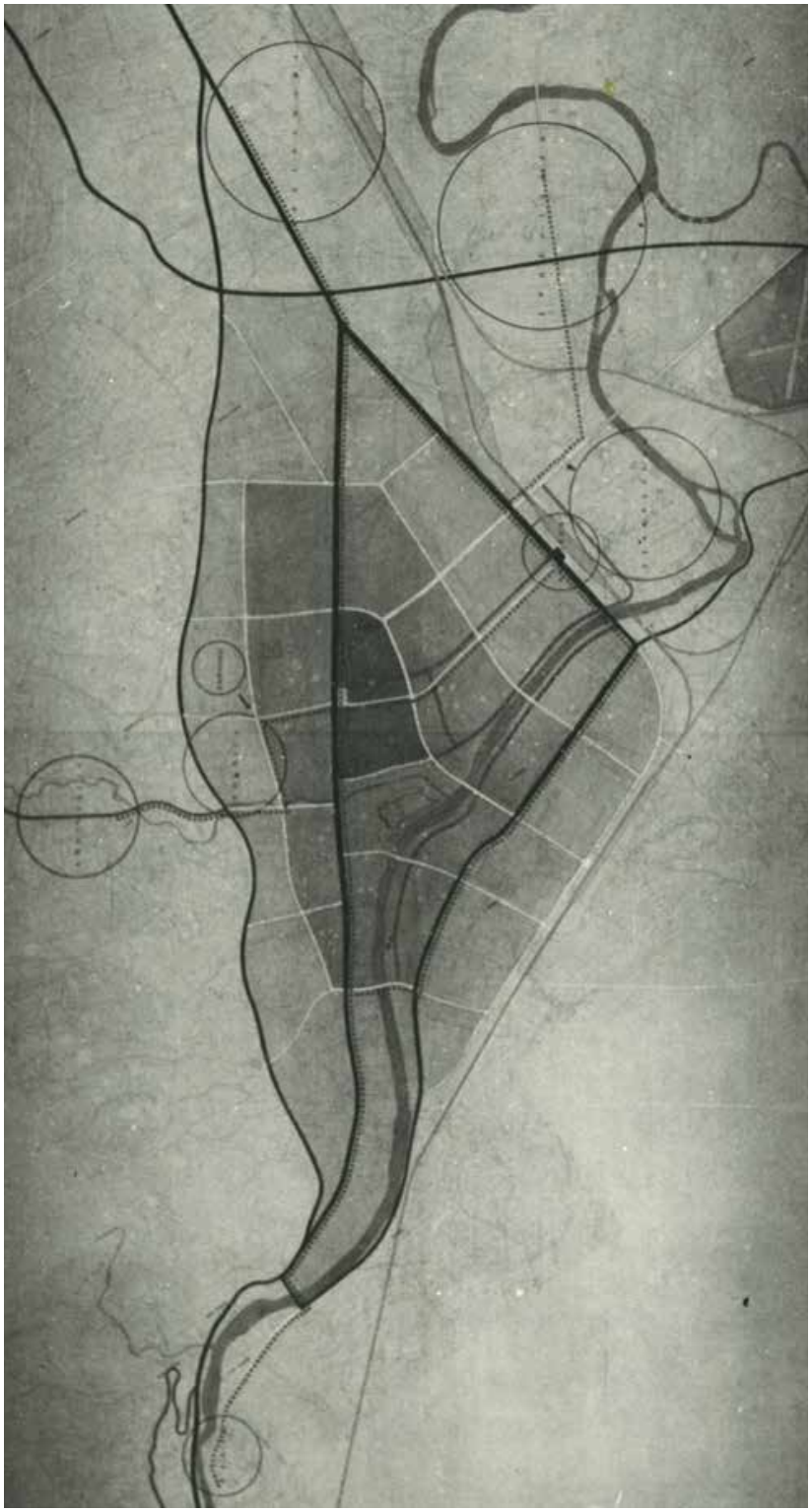

FIG. 5.2 Banja Luka's urban form according to Kirjakov's General Urban Plan (1952)

Le Corbusier's discourse of *le paysage urbain* was the theoretical cornerstone for all the major concepts of urban landscape implemented in post-WWII Yugoslavia, developed by Yugoslav urban planners in an attempt to follow theoretical trends and solve practical problems in the field (also present in Bosnia and Herzegovina). This concerned reconstruction projects of places destroyed in the war, and planning

new towns, according to principles reflecting the socialist social system in physical space, on the basis of the congruence of its ideas of, and aspirations for, a classless humane society, with those advocated by modernism, of a better life for all social orders. According to available data, construction projects in Banja Luka after the liberation from Austro-Hungarian rule (1918) in the Kingdom of the Serbs, Croats, and Slovenes, and also in Yugoslavia after 1929, do not mirror modernist ideas of urban landscape, precluding the possibility of a trend carrying on to the post-WWII period, when those ideas obviously shaped Banja Luka's urban landscape.

The most drastic change to Banja Luka's urban landscape induced by transformations of the social and cultural context was effected during the period of intensive urbanisation and regional economic development in the socialist Yugoslavia (Figure 5.3).

FIG. 5.3 Banja Luka's urban form in the post-WWII industrialisation and urbanisation period

The key change compared to the time before was that building in the city was now directed through town and spatial planning, as opposed to the implementation of building codes in line with plans. Another important factor was the nationalisation of private land, which was appropriated by the state; municipalities became the sole owners of construction land and made decisions single-handedly with regard to land boundaries, types of land use, and terms and conditions of land use. Spatial and urban plans of towns and cities in the Socialist Federal Republic of Yugoslavia (SFRY) treated land as a planning resource, and the state used planning to control and direct urban development.

6 Conclusions

This subsection considers the complex phenomenon of urban form from a number of aspects (socio-cultural, environmental, and economic), relying on the results of previously conducted research on Banja Luka's urban form. Among the conclusions of this research, one of considerable significance concerns the long-term functioning of a specific adaptable model of "open" regulation of Banja Luka's urban landscape, through which the phenomenon of interest is placed in the context of resilience and sustainability. In addition, this "adaptable model of open regulation" builds on and responds to the conclusion reached by Vujičić at the end of the chapter "Shifting Forward Resilience Thinking", in the first of the KLABS series of books: "To become an adaptive urban system, a city, i.e., society should build its adaptive capacities through the application of a resilience framework and planning and governance."

Based on the above, the conclusion is that the response of the present-day city to the requirement for adaptability to change, i.e., for creating a resilience interface – lies in the integration of different methodological approaches, aspects of urban development planning and regulation of settlements and ways of creating environments. Creating a resilience framework for the management, planning and urban design of cities is adapted to the most recent tendencies in developed areas, but it also needs to be compliant with the contextual requirements of a particular city. Building the adaptive capacity of a particular urban environment means consolidating universal (global) and specific (local) anticipated responses, or scenarios, in relation to a range of possible changes, threats and circumstances it may encounter. The management, regulation, and creation of urban form, in the context of resilience and sustainability, requires the definition of general (universal, common, related to a global framework) and specific (particular, concrete, related to the local context, and spatial identity) principles at various spatial levels and in different proportions. This is the basis for the proposed principles of management, regulation, and design of urban form and landscape in the context of resilience and sustainability:

- **The principle of codification** concerns the establishment of spatial order at the national level and compliance (at the regional and local level) with the general principles formulated in the Code on Spatial Planning and Regulation of Settlements, which is in line with the principles of international conventions (the global level).

- **The principle of asymmetric decision-making and management** is associated with strategic planning at the local level and implies a dynamic relationship aiming for the harmonisation between how local-level spatial order is defined and the previously defined national- and regional-level principles.

- **The principle of quality** concerns determining the general principles and qualitative recommendations for the regulation and creation of urban form and landscape, which needs to be additionally specified through urban regulation standards.

- **The principle of integrity.** The application of this principle is necessary at all spatial levels; adhering by the principle of integrity and completeness at the level of the constituent parts of the whole – ensembles, segments, strips, etc. – is essential for ensuring integrity and completeness across urban landscape, as the highest level of spatiality.

- **The principle of identity** commands that we respect the principle of specificity and adaptation of research and spatial intervention to each specific and individual situation.

- **The principle of continuity** concerns the selection of measures, instruments, and strategies of regulation in the function of resilience, which should be carried out in accordance with previous practice, in order to comply with lasting social, civilisational, and traditional values, which guarantee long-standing and continuous development.

- **The principle of harmony or contextuality** is associated with an integral approach to spatial interventions and research in the function of resilience, and insists on harmonisation with the characteristics of the local context.

- **The principle of flexibility and adaptability** is the most important principle in the creation of a resilience framework in planning and governance. It implies the simultaneous application of the normative and performance code in establishing regulatory mechanisms, switching from one mode to another, constant revision, predicting changes and adjusting to concrete circumstances, development conditions, the legacy, and identity.

- **The principle of value and meaning** insists on the appreciation of values and meanings of micro settings, segments and strips and of patterns of their use, with continuous reconsideration when intervening with the aim of making and keeping urban form resilient, by means of regulation used to convert common or accepted values into urban form and landscape standards.

- **The principle of diversity** is associated with the principles of adaptability, identity, quality, integrity, and the principle that applies to the values and meanings of urban spaces. In the context of the creation of a resilience interface, diversity concerns not only the urban-morphological and functional diversity of the urban environment, but also a variety of responses and scenarios of adaptation to changing conditions of development.

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Informal Rooting _

Informal Permanences in the Contemporary City

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ABSTRACT **This work is based on the observation that within contemporary metropolises, there is a worldwide rooting process of informal cities that are structured around themselves and persist; they settle in the collective imagery, producing a new social-cultural mutation. This paradigm shift is more frequently triggering processes of "non-replacement", which can also be observed on the physical pattern of these settlements that begin to mutate and adapt to the logic of stabilisation and reorganisation. The basic idea is to observe these territories, not yet explored, with the accuracy required by scientific literature, through the "eyes of the architect", overcoming the wall of the unknowable represented by the hyper-complexity, the marginalisation, and the difficulty to access these territories. The aim is to create a specific and new informal "catalogue" that gathers the heritage of actions, forms, and urban spaces created "within the rooting process", and that can be used to accurately know and interpret the informality.**

KEYWORDS informal rooting, informal space, informal spatial morphology, informal tissue, informal atlas

1 Introduction

This essay is a snapshot of the informal rooting that is the consolidation process of buildings and informal spaces that are initially precarious or temporary entities gradually transforming into enduring elements of the city: urban material is not removed or replaced anymore; it is rather reshaped and organised depending on its initial condition. Some elements belonging to these urban settings become fixed items in a landscape under construction.

This snapshot is not intended to show a thorough image of the urban informal, which is an extremely complex, manifold reality with different local varieties. It aims at framing the change of course perceived in some main metropolitan landscapes concerning the built environment, as well as the ideas and the actions undertaken by architects and city planners exploring it: even a rough overview on data, experiences, theories and plans, gives evidence on how the informal – the architecture and the city – is consolidating as an irreplaceable presence and becoming the keystone for any planning of the city's future.

Entities that sometimes continue to be deemed as evanescent and marginal, lacking any dignity in terms of architecture, are developing into complex, self-built urban systems. With regard to the most notable prime examples and historically stratified cases, there are some elements or parts of these systems affected by compositional and linguistic solutions as a result of conscious decisions. The input given by professional architectural planning is often lacking here: architecture and urban planning are distant from a reality that evolves independently. This condition leads to important questions about the current role and the architects' responsibilities, their ability in affecting the future of the city, as well as their way of production. However, there are experimental approaches concerning the willingness to combine planning-professional building and self-building.

Although the theoretical framework of reference is vast and inter-disciplinary, this case of informal rooting is observed through the eye of the architect. The aim is to understand which cities and which architectures emerge from the contemporary informal landscape. Buildings, open spaces, and tools are analysed as architectural devices with encodable logics, as elements of a city that is able to structure itself, to organize environments and relations, and to trigger transformations of a given context aimed at its consolidation.

The phenomenon is introduced through a brief roundup, on a global scale, of cases that show the rising and spreading of informal land-scapes, especially in Latin America, where its most significant expressions are avant-garde cases. The first section collects the opinions of some architects and researchers concerning the progressive consolidation of the informal environment and its fusion with so-called formal elements that proceed towards an ambiguous informal urban landscape. The second section characterises the actors and the places of informal rooting, the emerging urban paradigms and architectural

devices: a brief critical analysis interprets some self-built *ensembles*, architectures that are designed by professionals within informal contexts, and the products that result from a collaboration between the residents and institutional actors. A third section is an extension of the preceding one, expanding upon the planning: it is edited as an open and extendable dictionary and it explores the tactics of informal devices, that is to say, the ways in which buildings and built-up areas consolidate in space and time.

2 Informal Rooting

"*The history of architecture and material urban facts is always the history of architecture of the dominating classes; we should research to what extent and how successfully revolutionary epochs counterpose their concrete way to organize the city"* (Rossi, 2011, p. 15).

This quote of Aldo Rossi has been decontextualised in order to evaluate the condition of the contemporary city of the Global South.

Currently, the parts of the city that have grown outside the framework of the planning and supervision of urban development occupy, in many cases, vast and even dominating spaces with respect to the urban setting. This kind of growth entails a new dimension, to an extent that leads to the affirmation that "we are witnessing the birth of twenty-first century urbanism" (Brillembourg & Klumpner, 2010, p. 123). According to Brillembourg and Klumpner, "informal zones are not the exception – they are the rule" (Brillembourg & Klumpner, 2010, p. 123). It deals with "something that arises from within itself and its makers, whose form has not yet been recognised, but which is subject to rules and procedures potentially as specific and necessary as those that have governed official, formal citymaking" (Brillembourg & Klumpner, 2010, p. 123).

Referring back to the idea suggested by Rossi, and daring to combine it with the idea of the other two authors, we could suppose that the urban informal is the new rule that revolutionises the growth of the city. It is a concrete way to organise the city, which is subject to just as many rules and procedures as those that have governed the so-called formal development. This concrete way is disposed by a different subject, in opposition to the dominating classes, or, better said, to those who hegemonically own the power over urban development: hence, it is useful to enlarge upon the concept of subalternity. Ananya Roy suggests the concept of *subaltern urbanism* as its crucial interpretation, that is to say that the set of ideas that assumes "the theorization of the megacity and its subaltern spaces and subaltern classes" (Roy, 2011, p. 223). The *subaltern urbanism* suggests a positive interpretation of the informal phenomenon and works "against apocalyptic and dystopian narratives of the slum" and "provides accounts of the slum as a terrain of habitation, livelihood, self-organization and politics" (Roy, 2011, p. 223). At the same time, there are opinions that exalt the aestheticisation

of the city or the self-help economy and thus the misunderstanding of their dynamics. Roy affirms: "There are many arguments that can be marshalled against the frames of crisis and heroism. However, I hold that these critiques must be subsumed within a more substantial conceptual disagreement, one that rejects the notion of an informal sector and instead views informality as a *mode* of urbanization. Along with Nezar Al Sayyad, I have used the term *urban informality* to indicate an organizing logic, a system of norms that governs the process of urban transformation itself. Against the standard dichotomy of two sectors, formal and informal, we suggest that informality is not a separate sector but rather a series of transactions that connect different economies and spaces to one another question: how can we understand the inevitable heterogeneity of Southern urbanism, that which cannot be contained within the familiar metonymic categories of megacity or slum, and that which cannot be worlded through the 'colonial wound'?" (Roy, 2005, p. 148). The entire city as a heterogeneous and paroxysmal system is the product of the same dynamics. The new rule and way to organise the city are both situated within the space, differently legitimated by the state, by its contradictory regulatory setup and devices, and by its social components: "it has become obvious that informal housing and land markets are not just the domain of the poor but that they are also important for the middle class, even the élite, of Second World and Third World cities. Such trends point to a complex continuum of legality and illegality, where squatter settlements formed through land invasion and self-help housing can exist alongside upscale informal subdivisions formed through legal ownership and market transaction, but in violation of land use regulations. Both forms of housing are informal but embody very different concretizations of legitimacy. The divide here is not between formality and informality but rather a differentiation within informality" (Roy, 2005, p. 148). The rooting phenomenon is embedded right within this complex context: "illegal and extra-legal settlements extend, persist over time, gradually pass from precariousness to consolidation, absorbed into the large de-regulated urban *unicum* where all of the conventional distinctions between the "formal" and "informal" city [...] have begun to blur" (Perlman, 2010, pp. 29 – 30.). There is a landscape made of city pieces, suburbs, rural areas, production areas, discard, new *informal hybrids* dispersed in the "fractal geometries of metropolitan habitation" (Roy, 2011), where built-up areas are "either informally or formally initiated, but after a few years it is no longer possible to confirm the origin of a specific part or the whole of them" (Hernandez Garcia, 2010, p. 10). The revolution of this space – at the same time characterised by reactionary features – is hence fostered by a set of technically subordinated and unsubordinated figures that adopt the same rules for different scopes. These scopes merge in creating and transforming the same urban space. Different forms of making the city juxtapose and create heterogeneous *ensembles*: "in most cities around the world, several forms of urbanism coexist in the same space. These varied concepts of urbanism (whether everyday urbanism, new urbanism, post-urbanism or the several forms of indigenous urbanism) actually collapse into a simultaneous – often kaleidoscopic – manifestation which generates a variety of urban conditions" (Mehrotra, 2010, p. 11). This juxtaposition

conveys the consistency of the informal space that we are describing. There are different contents emerging from the interpretation of urban entities, as an evident result of a mix of compositions that are hardly ascribable to precise identities, to clear divisions. The settlements subject to updating programs concerning urban materials, exemplify this dynamic. The existing self-built *ensemble* is subject to reorganisations, implementations, infrastructural improvements imposed from the outside, or negotiations with local communities that stratify on the built-up areas, partially changing its shape and functioning. Another exemplifying case is government resettlements, where unplanned additions and modifications of pre-existing setups and architectures stratify by hotwiring them, changing their sense. At the edges, or in the sectors within both of the above-mentioned spaces, there are configurations and forms that go back to former times, as well as different, recent extensions. The dynamics governing the contemporary urban development also determine the destiny of these spaces.

Thus, it is necessary to go "toward a unified urban theory rather than one that operates through dichotomies like formal/informal and North/South" (Rao, 2010, p. 15). The theory in Rao's vision of a *slum* assumes "design itself as a research method, as a method for probing the provisional and for discerned as well as positing emergent states and forms of normativity from the contestation between the living and their milieu" (Rao, 2010, p. 17). The informal rooting process shapes a united hybrid space and reaches the planning dimension that changes the transitory environment into other forms.

3 Surviving Strategies

The analysis of this molten hybrid space dismisses the classification of genres and makes it useless. When the analysis deals with its specific manufactures, we need to compare different natures. The whole survey on the architecture of informal rooting aims at tracing the origin of assembled parts and layers, the way they interweave, the relations and new configurations. In this sense – apparently as a contradiction – we use and test the terms of informal and formal, we distinguish actors and identify specific places, we analyse the city and its different architectural devices. The aim is to analyse the transformations, which concern the built environment and lead to different identities.

As for the concept of informality in its various forms, being conscious of the problem concerning the terms and the current *way* of urbanisation, we conform to the consideration of Hernandez: "Although these issues of definition are important, they could cause confusion" (Hernandez Garcia, 2010).

3.1 Actors

Specific actors promote the premises for rooting and an evolution towards new configurations of the informal environment: they can be subdivided into endogenous and exogenous actors, depending on whether they work inside or outside the informal communities. Endogenous actors are mainly those who occupy lands and buildings and who built their housings or the surrounding spaces on their own. In structured communities, there might be organisations or associations of residents that defend the interests of the community in relation to property rights, equal access to property, resistance to eviction, decisions concerning settlements, promotion of an economic way of life and of mutual funds, as well as political representation. The *mutirão* (a practice aimed at a communitarian cooperation that is typical in Brazilian favelas for the building of residences or public infrastructures like external routes, stairwells, ramps or terracing) of Rio were one of the first examples of squatter associations. These organisations can currently represent extended communities composed of ten thousands of residents; they can be associated, and constitute global networks of slum dwellers sharing struggles and experiences. The SDI federation unites and establishes a communication between informal entities in thirty-four countries, managing financial resources coming from savings or crowdfunding promoted by the UFPI (Urban Poor Found International), and suggests plans for the improvement of the quality of life and spaces.

Secondarily, the endogenous actor is someone who works in the informal building market, hence there are contractors and small companies, owners of buildings and lands who trade and rent properties.

Endogenous actors can co-work with exogenous actors, that is, institutions, non-governmental organisations, companies, or other private partners. As for the plans for the upgrading and resettlement of informal built-up areas, these actors can trade or channel the funding, material resources and technical assistance for architectural, urban and infrastructural planning, for services, or in order to solve housing emergencies caused by natural disasters or for the prevention of that risk.

In some contexts, this cooperation turns out to be positive, as there is an improvement of the inhabitants' spaces and life. "There have been few land invasions over the past few years which, after careful negotiation with the authorities and the private sector, have resulted in participants securing the benefit of remaining close to sources of employment in areas where they have lived all their lives, as well as state support to stay. There have also been evaluations and studies that suggest improvement in some areas. Such as the promotion of participation, the reduction of the standardization of solutions, and responses which act more on a case by case basis" (Jirón, 2010, p. 87).

Links between endogenous and exogenous actors can involve professionals with different competences, like architects, technicians and engineers, artists, researchers, anthropologists etc., who produce

studies and tangible creations on site. These experiences can tangibly help to improve quality of life and spaces, in different ways and on different levels. The combination of both actors adds paradigmatic experiences to the considerations concerning the current situation, the urban forms that root through, or out of, conventional planning.

The actual interaction between endogenous and exogenous actors and the influence of updating programs is different from place to place and varies depending on the extent of the funding, the quality of the programs, the involvement of the communities and the appreciation of the accomplished work, hence depending on the success of the plans. Plans are often experimental interventions made in difficult contexts and in constantly mutating conditions, which can significantly affect their efficacy. Due to the experimental dimension and the different local form, neither their success, nor the quality of the taken measures, are assured: "it is not yet clear whether upgrading can achieve significant permanent improvements or will merely perpetuate social and spatial inequalities" (Beardsley & Werthmann, 2008). It is furthermore necessary to consult the residents and gather information on their actual involvement in the transformation of the environments that they have built, from a material and social point of view. From the planners' point of view, the crucial issues are the consensus and the funding: "In the absence of someone to build consensus, designers might be forgiven for finding this too time-consuming and demanding – not to mention professionally and financially unrewarding" (Beardsley & Werthmann, 2008). To solve this problem, some partners have structured themselves as a *for-profit* organisation that uses public funding for the planning and building of residences and equipment. These enterprises grant the access to the property at a minimum cost for the purchase, as they are sustained by specific financing plans. The experience of Elemental is paradigmatic. Alejandro Aravena expresses the concept of a private enterprise providing the solution to collective housing problems: "what started as an academic initiative, by 2005 became a company, a for-profit company with social interests. The for-profit condition is crucial in order to be sustainable. You can't depend on charity. Actually, the question of social housing is so difficult that if there's something that is needed, it's professional quality, not professional charity. Quality has to be paid" (Aravena, 2011).

As well as the crucial problem in financing and planning quality social housing, the transition from an illegal, self-built house to social housing also presents some dangers. The major risk is to exclude those who cannot afford to purchase, or pay back a loan for the purchase of a property, which means losing the self-built house and being relocated elsewhere. According to Roy, De Soto's approach, which is interested in legalising properties by granting their accessibility, does not lead to an actual redistribution of richness, but only to a transition from an informal economy to a financial system made of big assets.

The grey space, where the two actors relate to each other, often mixes them up and blurs the differences. An emerging middle-class, arising from informal contexts and economies, acts sometimes as a bridge

for real estate enterprises and speculators, while the state acts *ad hoc* to reproduce and keep these economies and spaces within different levels of legality, leaving room for infringements and illegal practices.

3.2 New Lands

The informal arises and consolidates on waste. These wastelands offer homeless people the chance to occupy space, to settle and build residential estates that grow and take roots. No man's land, forgotten or suburban land, both inside and outside the city, polluted land, swampy or unstable land, land that is of no interest to builders and their customers. Depressions and hollows filled with waste to build fragile constructions; landfills, residual spaces between railroads, under bridges and scarps of viaducts, frameworks of abandoned constructions, steep and hostile reliefs in urban areas. Waste, carelessness and planning mistakes become *new lands* (Marini, 2011). In Caju, Rio de Janeiro, many settlements are built on residual places between industrial areas, infrastructures, and the cemetery. Even the informal environment produces waste and is able to recycle it through restructuring plans: a sports area in Mangueira is situated on a steep slope, which was formally the landfill of the favela. Elsewhere, along the built-up coasts or between the shreds of soft isles, squatters go further, tearing land and water apart, occupying inhabitable areas, just as it happens in Maré. New stratigraphies of waste superimpose on natural territories, within the cities and in their suburbs, redesigning its topography. New waste stratigraphies compose the geology of ambiguous soils, just as it happened in ancient cities (among the cases in literature, there is *Monte dei cocci* in Rome, an artificial landfill shaped as a hill). Waste is used in this way as a construction material for buildings, embankments, fillings: "The new land, property of a foundation dedicated to F.E. Dinshaw, was unused. The government offered to the new occupants a ten year contract for a monthly nominal rent of five hundred rupees [...] When the occupants arrived to claim for their lands, they discovered that their new housing was a pile of stone chippings surrounding a crater twelve meters deep [...] The first issue to confront with was how to get rid of the hole. We filled it with waste. Any kind of waste. Two bulldozers have worked every day for four months. Every day something between two hundred and three hundred trucks threw their waste into the hole" (Neuwirth, 2007, p. 107). The informal rooting arises from the experience of recycling spaces, materials, and useless urban trays, which are abandoned or used for other purposes. The consolidation transforms waste into a resource, defining and organising it. This kind of procedure also entails discussions about the quality and the health risks borne by these spaces; nonetheless, the aspects concerning the planning also need to be considered. Considering that the situation varies from case to case, waste is currently the common thread for the different ways that cities grow. On the one hand, the quick economic and urban growth affecting a country during its development does not have the time, nor is not interested, in rethinking and replacing the urban swarf that it produces; this swarf is forgotten or set aside, while part of it becomes the land for an illegal occupation. On the other

hand, the consequent decrease or decline affecting the city and post-industrial territories generates *shrinking* phenomena that pull the city back, leaving waste and desertion. In some cases, these spaces become precarious housings for those who have been expelled from the economic and social system, or for those who illegally live in its shadow.

3.3 Urban Paradigms

New urban features crowd on waste lands, clearly measuring the space of the city, or blurring the distinction between the formal and the informal environment within the urban sea. As for Rio de Janeiro's favelas, Fessler Vaz and Berenstein Jacques (2004) observe that informal areas are characterised by an extreme heterogeneity of types and configurations, even within the same area. Considering the variety of these landscapes, some urban cases fix some elements; they strengthen them and influence the nearby environments, they are the focus of ongoing transformations. There are four informal urban types and paradigmatic cases: self-built settlements or self-built and redefined (or about to be redefined) settlements through architectural and urban interventions; governmental settlements whose original planning does not include certain developments; governmental settlements whose original planning includes and supports certain developments; and urban entities meant for other purposes, colonised and reorganised by the informal environment.

Proto-cities like emergency settlements or refugee camps need separate reasoning. This systematisation is a partial reorganisation of known experiences that were critically interpreted for the purpose of informal rooting.

The more enduring and stratified informal estates belong to the first paradigm. The role played by endogenous actors permeate the evolutionary process of the settlement. In general, these spaces are illegally occupied or built, and characterised by precise strategies intended to occupy the land, by a characteristic, morphological complexity, and by a tendency to use more refined architectural styles. Villa Canoas's residential area is a peculiar case of informal rooting in Rio de Janeiro.

The residential area is extremely small and has a population of about one thousand inhabitants. Situated between the wall that delimits the nearby green and the state street, it partially extends on a slope of a relief and partially on a riverbed. The built-up area is situated on the regular edge of the street to the east, creating a compact front over time, whose buildings imitate the features of the nearby middle-class districts. Behind the curtain wall, the settlement extends first below the carriageway, reclaiming the riverbed with residual material. Independent houses rise up to four storeys and crowd progressively, filling gaps and creating structures that collaborate statically. The result is an *ensemble* where single elements blend in a continuous and stratified self-built urban calcification. Although the settlement was the

concerned of the *Programma Bairrinho* and influenced by the context, its current shape is the result of an almost independent evolution without foreign elements that alter substantially its shape and functioning.

The second paradigm refers to settlements where the actions of several actors are combined. Endogenous data and exogenous data add up or hybridise, creating a heterogeneous environment. On a global scale, many settlements experience this condition, showing a varying intensity in the informal rooting. Two main attitudes characterise the planning of these urban landscapes: on the one hand, the exogenous plan imposes on the built-up area in order to replace it, while on the other hand it is kept and restructured in order to improve it. Governmental programmes that are more sensitive with respect to the social component and the urban habitat aim at replacing approaches meant to uproot the existent. The participatory planning and dialogue with exogenous actors allow the residents to denounce the problems and negotiate about the planning, to acquire new know-how and competences for the practice of self-building, and to solve structural defects that would be hard to solve only through *self-help.* This is due to the lack of liquidity, tools, and specific competences. The interventions coordinated by the programmes can concern basic equipment like: sewerage systems; connection to electricity grids and water supply networks; interventions aimed at improving pedestrian or drivable roads; consolidation of soils subject to landslides; improvement of driveability; and channelling of ducts and systems. They concern important works like: social residences; demolition of irrecoverable buildings situated in areas subject to hydrogeological risks; infrastructural works on the transport system; sports equipment; and public edifices like community centres and day hospitals. Santa Marta and the Complexo da Maré in Rio de Janeiro exemplify how the actions of two actors blend.

The case of Santa Marta represents a transitory stage towards a new urban identity. It concerns the occupation of unstable soil, composed of woodland on a steep slope. Due to the unstable and steep soil, buildings need anchoring systems, which are actually bases composed of waste material and wooden piles traced on site. The piles' size predetermines the height of the terraces and the opportunity to expand vertically. The built-up area follows the contour lines, as do the roads. Today, Santa Marta is pressed between insurmountable physical limits: a retaining wall and a cableway to its sides, the forest to the north and the planned city to the south. The built-up area keeps growing vertically on itself, progressively structuring both the precarious and the consolidated buildings. The cableway and the contact points with the planned city become arterial roads for the urban development, guiding the alterations of the unplanned built-up area. Near the landing site of the cableway, buildings are different from the self-built type of buildings; concrete blocks that extend up to several storeys. At the foot of the hill, surrounding a strongly symbolic open space, the existing buildings evolve like a curtain wall on several storeys, sometimes adopting remarkable style solutions. On an urban scale, the setup is amplified by the work of the artist JR, who designs differently coloured geometric stripes on the facades. The southern edge becomes

susceptible to formalisation processes, as it lies near the planned district, which, in contrast, is subject to a sort of informalisation, at least on a social and functional level. Architecture and life reflect the ongoing change. These presences modify the architecture of the favela and the existing social and spatial relations. The case of Santa Marta represents a particular transitory phase of the informal rooting, the slow mutation towards a different urban identity.

The Complexo da Maré – today's largest built-up area of Rio de Janeiro – has several different configurations, which partly go back to the practice of self-building and partly to state interventions. Governmental aid had already been negotiated by the first residents during the fifties. The history of this complex is emblematic. Due to the nearby new industrial district, the first illegal housings started to settle on the territory along Guanabara Bay in the forties. The settlements grow on a plain area crowded by mangroves and swampland, which is hardly attractive for formal urbanisation. The built-up mass increased over time, pushing the inhabitants to colonise water with constructions on pile foundations, while the former buildings mutated and consolidated: "while the shacks on the banks expanded, the older favelas became well established and the inhabitants, some of who had been politically organized since the 1950s, fought together to get much needed infrastructure and services including electricity, water, and sewage systems, paved streets, public transportation, and telephones. At the same time Nova Holanda project grew denser, poorer, degraded" (Fessler Vaz & Berenstein Jacques, 2004, p. 66). The guidelines of the informal urban development settle down progressively, from the edge to the bay, the soil, the compact housing units and the paths that cross and frame them, which structure the urban morphology over time and affirm main access tracks to the built-up area of Avenida Brasil. The entire available area is filled during the sixties, when parts of the settlement are subject to actions of reorganisation by the government, which introduce block buildings on grid-like subdivisions and infrastructural connections. The soil was recovered from its first pile foundations with waste materials. It serves as a base for the building of new houses and the motorway Linha Vermelha, enclosing the built-up area and separating it from the sea. The informal dynamic is adopted by the exogenous planning that takes up sea area through further recovering in order to build new settlements. The Complexo da Maré is therefore an assembly of elements: concerning the morphology of its favelas and the building types, endogenous and exogenous contributions add up and are welded together, while the motorway delimits the informal expansion and compacts its building front.

Elsewhere, governmental programs have adopted experimental plans for open spaces, residences, equipment for leisure areas, public edifices, and infrastructures. As for the most typical expressions, the architecture and architectural systems use critical urban features as a keystone on which to found their planning, acting as both symbolic elements representing a political renewal, and values concerning the local community. The plan affects the informal space in different ways, acquiring its tactics or altering it with new dynamics. These

features are also common for several experiences in South-American favelas and barrios, from Lima to Rio de Janeiro and Medellìn, as well as Bogotà and Caracas.

The third paradigm identifies a governmental resettlement intervention, which was developed as a formal housing scheme for the planned city, but was situated to its edges. City of God in Rio de Janeiro was meant to host displaced persons coming from the old squats of the city centre. Several issues led to the failure of the plan: the substantial inadequacy of the appointed structures, the lack of basic and collective services, and the lack of restructuring programs pushed the inhabitants to act on their own, subverting the existing structures and upsetting its design. Appropriation and customising processes reorganise anonymous and insufficient environments; they implement the existing structures in functional and architectural terms. Buildings and spaces belonging to the original plan do not absorb the change that swallows them up, guiding them towards unexpected consequences. From the artefact to the settlement, a vast catalogue of architectural tactics is used to decompose the formal and functional unit of modernist building blocks and the monotony of houses on regular subdivisions: additions, cuts, densifications, ornamental excrescences, changes of use, and other kinds of interventions persist upon the built environment, reshaping it depending on the changing needs of the residents. The environments are improved in their practicability and the inner workings of the favela are reintroduced, just as occurs in the typical borderline space that mediates between public and private domains. The community is subject to critical housing and social conditions, which are further enhanced by the neglect of the government. It slowly rebuilds boundaries that were torn by relocation policies and shows a strong identity and ability to self-organise in local architecture. State interventions are finally obtained for public works.

The organisation of a plan for those who are to come, besides for those who are already there – with their respective needs and sensitivities – is crucial for this kind of intervention. Architecture is literally asked to "foresee the future", demanding the ability to mutate and adapt, in relation to the solid material of which it is composed and the necessary time for adapting. In respect of this point, some interesting considerations have been developed by designers who cared most about the informal city's way of production. Since the transformations of government districts for relocated persons upset structures and plans, it is necessary to observe these plans and structures carefully, in order to understand their basic deficiencies, the kind of establishing spatial appropriation dynamics, and the destiny of the conventional plan that is subject to informalisation processes. The PREVI district in Lima is the fourth type of settlement: it is a plan that tries to meet the real needs of the communities, suggesting interventions that are able to support and entail the most radical changes. This government intervention - set up by Peter Land in 1968 and still efficient in its general planning - draws attention to the destiny of the plan in order to foresee its results. Each of the architects involved are responsible for the planning of standard housing schemes that are replicable within the lot and that

are based on the study of the inhabitants' needs in future. Architects are asked to analyse the endogenous tactics behind the informal way to produce, in order to understand the dynamics, not to propose again existing schemes and vernacular forms, but rather to increase their potential and address the transformation of the building-residential estate-city, which will have an independent evolution. The completion of each building will be accomplished by other planner-builders – the inhabitants – who will change it, whether directly or indirectly influenced by the initial setup, depending on the supervening needs and their aesthetic preferences. The approval or refusal of the program can eventually nullify the plan, depending on the case, creating an extreme informal variety. The logic of the non-finished is typical for the barrios and is reconsidered here in terms of planning. Therefore, the planning includes and tries to guide the informal development of the city rather than to contrast it.

Some informal inhabitants that settle in abandoned or neglected places meant for other purposes belong to the fifth paradigm. Those who are homeless occupy spaces and structures without any permission, building their houses on their own or reshaping the environments they found on site, in accordance with their needs. Without any doubt, el-Arafa, the Egyptian town of the dead, is a particular case: within the large Arabic cemetery situated in Cairo since the 7th century, illegal squatters have colonised every corner of the necropolis over time, transforming it into a dense urban space, which extensively developed beyond the borders of the graveyard. The place of passing away combines with the place of dwelling, as also happens in some villages in Eastern Europe where domestic gardens are used to host private family gravestones. Life and death together, chapels and the places in front of them host housings, commercial establishments, roads to shared environments, while rudimentary houses fill up the gaps surrounding the gravestones. The city of the dead is an outstanding example of how the shortfall of housings and even of space to occupy, forces groups of people to live in a cemetery. In spite of the precarious conditions, this informal built-up area is a rooted example of how a place conceived for other scopes is used as a space for housing purposes – a common practice in the history of cities – like the transformation of gravestones and necropolis into temporary shelters or real homes. The precarious living conditions and the shortfall of housings pushes the inhabitants of overcrowded cities to search for an available space in which to dwell. This research can become a surviving tactic, a strategic occupation of maybe inhabitable spaces, or spaces that have not yet been considered by other squatters.

Hence, the informalisation of the city and of urbanised territories is a process that might involve the whole environment, interstitial or available spaces in the surroundings. This can be the result of different factors or of a sum of factors, as for example: the shortfall of affordable housings for the poorest; the scarce supply of social housings compared to the demand; the inability of buildings to adapt to the changing needs of the inhabitants; the willingness to support the informal development

of the city; and the tendency of some occupied buildings and urban spaces to transform.

While the political responsibilities concerning these factors are unquestionable, the increasing urban population and the creation of informal built-up areas can be directly fostered by serious financial crisis and conflicts. The consequent demand for houses can lead to an illegal occupation of lands and urban waste areas, to the creation of temporary housings promoted by governments or, further, to a mix of both situations. As for the housing emergencies caused by armed conflicts, grouping of emergency and temporary housings can last over time, creating other types of spaces.

Long-lasting critical situations or juridical problems arising before or after wars, concern refugee camps and makeshift shelters. Sometimes they arise out of necessity and turn into informal settlements, proceeding towards proto-urban forms through rooting processes.

A paradigmatic example of that process was triggered by the deportation of about one and a half million Greeks from Turkish territories in Asia Minor, after the Greek-Turkish war and the agreement of the Losan peace treaty. Since they were faced with a real humanitarian crisis, Greek authorities could not cope with the arrival of about four million people in a country of about eight million inhabitants at that time. Refugees settled down in the northern rural regions and to the edges of cities like Salonika or Athens. There were tents, shacks, and small makeshift houses. Over time, informal settlements extended and rooted in Athens's suburbs, generating the first urbanisation process of the neighbouring areas. Those emergency built-up areas in the Greek capital are currently consolidated districts, but their past cannot be deduced from their urban design. Nea Smirne and Nea Ionia are names that reveal the origin of the deportee, Smirne and Ionia, becoming signs of a geographic and cultural nostalgia that is by now far away. The Kakuma refugee camp – on the border between Sudan, Uganda, and Ethiopia - instead, is an example of how a site meant to host refugees can become a proto-city over time, without actually having its basic characteristics (Floris, 2007). A *naked city* for a *naked life* (Floris, 2007); a proto-city because of its dimensions, its micro-economies, the references to conventional urban structures; a non-city concerning a sentiment of citizenship, a sense of community and a legal status. As for the ancient roman institution of the *Iustitium,* Giorgio Agamben (2005) transposes to the present day the problem of juridical void that was created *ad hoc* by the political power during dangerous situations for the Republic, situations that imposed a suspension of the legal system. This concept triggers important repercussions on the physical shape of the contemporary city: "This anomic space that comes to coincide suddenly with the space of the city is so peculiar that it disorients not only modern scholars but also the ancient sources themselves [...] The iustitium seems to call into question the very consistency of the public space; yet, conversely, the consistency of the private space is also immediately neutralized to the same degree" (Agamben, 2005, p. 49). The physical-juridical space of the camp-city is the borderline

case where the legal system (concerning life and the space-hosting life) is suspended as it relates to both meanings of the term: on the one hand, it is temporarily called into question, and interrupted; on the other hand, it is a precarious condition, tending to the void. In this uncertain space, public and private spheres cease to exist, as do the persons' rights and identities.

During the emergency that lasts for an undefined period, "These settlements become permanently the *living environment* for many years, consider the Palestinian refugee camps in Gaza, in Lebanon, or the camps of Afghan refugees in Pakistan or Kakuma itself. Refugee camps take roots and relate to the surrounding territory, evolving as social and economic entities, soar to *landmarks*, that is to say to the limits, to icons of social and political presences, that embody *self-asserting logics,* logics that foster themselves of 'deserts that are unsuitable for human life' and sharing with other, definitely temporary spaces the non-real belonging to a place" (Floris, 2007, p. 113).

The way to city status, an ambiguous definition, is therefore a long stretch for camps. The identities of places and non-places, as well as the identity of the citizen, establish a contrasting relationship within the contemporary space. The start of a first rooting process within these spaces, together with the improvement of the inhabitants' living conditions, could transform them into proto-urban entities over time, into informal, structured, residential estates, and could create cities in the future, as happened with the Greek case.

The recent Middle Eastern conflicts have forced hundreds of thousands of refugees to migrate to look for shelter in Europe. Improvised refuges arise in abandoned places or on the borders of the European Union, following the same process that took place in other places and at other times, where the early-arising shacks are today's extended informal settlements or parts that are already absorbed by the conventional city.

3.4 Architectural Devices

As we observed above, the informal rooting is subject to the presence of various actors in different urban contexts: endogenous actors that act independently in order to consolidate informal and exogenous actors, that is all those who act from the outside pursuing the same goal. The action of these groups can be individual or mixed. With respect to the rooting process, the devices created in spatial terms – buildings and architectural and urban tools – become devices for an enduring existence. These devices can be classified as endogenous devices that take the shape of self-built work-in-progress buildings; exogenous devices meant to be catalysing bodies, replicable prototype buildings, architectural systems that act on an urban scale like infrastructures; endogenous-exogenous devices on a double level that is informal parasites and informal hybrids. Among the endogenous devices belonging to the first type, the more developed residential buildings in some of Rio de Janeiro's favelas represent an interesting case

of informal rooting. Constructions are characterised here by smart building and organising solutions, forms of decoration and linguistic ambitions, technical equipment, and engineering. These buildings are meant to evolve over time, depending on the changing needs of the inhabitants, rising and extruding towards the open space in order to obtain small rooms and precious areas. When the buildings are not prepared to sustain a transformation, the modifications and the additions overload the structure and the composition, creating strongly heterogeneous *ensembles.* The stratification of the building processes decomposes on the facades, which are rough archaeologies of life and architecture. They constitute the spaces of transition between the public and private spheres, compensating for physical and functional defects of the interiors or the spaces in front of the ground floors. These places host generally commercial establishments and entryways like small verandas, which are considered as living areas for the community. The interiors are often worlds apart, private spheres with symbols and references interweaving local traditions and mass culture. As well as the finishes, the furniture – in terms of style, quantity and disposition – is also sometimes a further confirmation, between exhibition and identity, an individual value and adhesion to the middle-class role models.

The phenomenon of the informal rooting is mainly visible in the endogenous dimension and the arrangement of the plan: the latter – from an urban to an architectural scale – is "open", as multiple subjects define it over time. The way spaces are used, the lack or presence of commercial establishments, parties, and rites, the expansion of familial units or the interaction with the inhabitants of neighbouring buildings, all contribute to the modification of a building, its function, the design of its facades, its symbolism, and its ability to organise a space in front of itself. Even if the popular buildings composed of blocks placed on pillars hark back to modern design, the ability to alter and adapt to changes astonishes any modernist lesson on planning.

These informal architectures sometimes arise within a strongly heterogeneous landscape that includes intermediate situations and elementary buildings with some issues concerning the dwelling. Architectural features, decorations, and iron grates reveal a social scale similar to planned middle-class districts. The architecture creates landscapes composed of different subalternities, *micro-physics of the power.*

The second type of device includes different kinds of landmarks: architectures that serve as "catalysing bodies", systems that push changes in the urban context and the community. Scale, language, and programmes burst into the informal environment, working in contrasts. The goal of these architectures is to introduce acts that focus on the social sphere, which is sometimes lacking or not provided with appropriate spaces; secondly, these elements are detectable within an urban setting, without any accents, as synonyms of a social-urban redemption and an identity to which the communities can refer. This is the pursuit of architectures like the library España in Medellín, the Social Kindergarten El Povenir and the Cubierta Cazucá in Bogotà

by Giancarlo Mazzanti, or indeed the school by Wolff and Petrus in Cape Town. Informal spaces are newly interpreted by architectural planning that serves as a reorganising device. These architectures aim for a monumental scope and spread their magnetic power on an urban scale: they are the focus; they reorder the context and provide an added value. Here, the plan serves different goals and programs, but it is always aimed at introducing important qualitative improvements of the environment in which it is embedded. Planning strategies change depending on the physical contexts, the needs of the inhabitants, and the problems. Interventions like those mentioned above, express - from a qualitative point of view and with respect to the types of plans, as well as to the importance of the investments – the rooting level of the physical context, which definitely aims at a permanent condition.

On the contrary, these exogenous architectures sometimes introduce or accelerate opposed dynamics. Interventions aimed to improve the life of the residents can strain their balance, for example by increasing the rent and real estate values of lots and estates.

Another kind of exogenous device enters the context in order to test and verify the efficiency of its purposes. Acting on a small scale, this device can multiply by triggering processes that replace complicated existent situations. This is the case of experimental architectures like the floating school of NLÉ in the Lagos lagoon: half-building and half-vessel, this is a replicable element, which can be placed elsewhere and whose function can be reorganised. The use of standardisation and prefabrication lowers the building costs, while the use of elementary building techniques suggests or guides the self-built copy.

The consolidated occupation methods (colonisation of water) and the building technique (floating frameworks) are reused in the planning of this device in order to favour the restructuring of the urban material. Hence, there is no intention to act in conflict with a consolidated practice: the plan learns from the informal environment. Still, it seems that the plan might not be applied in other plans beyond the prototype, and that it struggles to mutate a system of consolidated practices and models. Furthermore, there are doubts concerning the chance to finance it and spread it as far as it would be necessary to influence the context. There is the feeling of an object caught in the experiment.

In Caracas, the association Urban Think Tank is instead responsible for an important infrastructure intervention for the traffic system in San Agustín's *barrio*, a system of exogenous devices that act on an urban scale, organising an infrastructure for the traffic system. Metro Cable is a cable car whose three stations are placed in the low-income district, connecting it to the commercial district, the heart of the city, and the urban transport network. The system winds harmoniously along the strategic parts of the city, implementing small interventions of requalification, integration, and communication in the informal sector. The connected stations in the barrio have been designed to respect the needs of the local community and offer services of public utility, thus becoming a gathering point. The flow of people quickly crosses the

system, which now connects distant spots of the city in one physical and symbolic space. As the plan involves strategic spots, it becomes a chance for a radical reformulation of the traffic system inside and outside the barrio, a chance to trigger architectural improvements and social cohesion: "Such designs are urban "acupuncture," interventions based on contextual assessments [...]. After more than a decade of studying various favelas, interviewing residents, and testing and implementing new slum-upgrading concepts and solutions, we now turn our efforts to a socially oriented, "prêt-à-porter" architecture [...]. We promote architecture as an event whose outcomes can only be realized with the active participation of the inhabitants. Our concept of architecture manages pre-existing spaces—building over, under, around and through–and creates new spheres that assuage segregation. We strive to construct bridges among cities' stratified sectors and to eliminate contention at the crossroads by maximizing the potential of the borders" (Brillembourg & Klumpner, 2010, p. 57). Considerations and actions concerning the present situation are therefore a crucial issue in Brillembourg and Klumpner's idea. From here on, they imagine the city of the future. The improvements concerning the marginal areas and the suppression of conflicts lead to an architecture that involves political and social features.

The interconnection between the architecturally and socially distant parts of a city is experimental. The barrio is subject to a constant risk concerning the increasing level of people, culture, money, and safety, which might not only lead to increased opportunities and wealth, but also to increased speculation. On the one hand, similar interventions are necessary to improve dwelling standards, while on the other hand the worthy political aims behind the plan can be absorbed by other opposed and manipulated political developments.

As for the third type of architectural device, the rooting mixes endogenous and exogenous data. Elemental in Quinta Monroy is a paradigmatic example for social housing. It is one of the most interesting examples worldwide for the "consolidation of an informal settlement in the city center" (Greene & Rojas, 2010, p. 111).

This complex of agreed-upon apartments, developed as a part of the programme of Chile Barrio, establishes a dialogue between institutions, planners, and residents, building good quality houses with a minimal budget. Elemental pursues ambitious aims such as the reconstruction of houses in a place that has been occupied for thirty years, a high housing density, the opportunity to expand the properties without deteriorating the quality of the housing as a whole, the involvement of residents in the planning process, and access to the property. Several critical issues endanger the success of the intervention, including the removal of shared spaces as a setting for situations of conflict between the residents, and the high cost of the land. Planners are forced to formulate an innovative plan because of the hurdle in finding a type of architecture approved by the residents and economically sustainable with respect to both the building and the trade.

In the wake of the PREVI experience, this architecture is prepared to host informal parasites, supervising the spaces to be colonised. Empty and full, internal and external environments are subject to the same linguistic characterisations and addition processes that can be seen in resettlements and in the features of self-built settlements. Inhabitants create individual spaces, while the architecture serves as a substrate on which to anchor, as well as an organising element for the evolution of the housing. The author's project and the informal project featuring various actors are combined, creating an assembly. Even if the original plan of this ongoing architecture vanished behind the cuts and the additions of its assembly, its goal would be achieved anyway: to foresee and support the change. Elemental's plan creates an ambiguous entity that preserves the imminence of a planning idea that changes its shape, language, and appearance: it is an architecture intended as a sort of bone structure that supports the change during an urban life.

The case study analysed by Kang (2009) is an example of a parasitic settlement. An apartment building from 1962 is subject to remarkable alterations concerning the planimetry of the units and the distributional spaces by splitting up interior and exterior additions, parasitic expansions deforming the layout of the facade and the unity of the surfaces. It is a proliferation of cell types over space and time that expand by absorbing nearby units, stairwells, and external balconies, which become rooms on which to add further volumes that protrude towards the street.

Other parasites invade spaces meant for other purposes. The former *Centro Financiero Confinanzas*, also known as Torre de David, is a peculiar case. A unique case rather than an episode marking a trend, it could become paradigmatic if it was systematically applied as a solution to the overcrowding of the cities. This office skyscraper, which measures forty-five storeys or one hundred and ninety meters in height, was abandoned during its construction in the heart of Caracas, and then some squatters started to occupy it. Infill walls, dividing walls and illegal structures were built inside, creating a *vertical slum* that hosted seven hundred and fifty families. The case was internationally supported and promoted by the association Urban Think Tank, which exposed the results of the research during the 12th international architecture exhibition *La Biennale di Venezia*. In spite of the critical mass due to the occupation and the fame achieved thanks to the group of architects, the skyscraper was cleared in July 2014, when the Venezuelan government, who owned the property, dropped the possibility to support this housing experiment in order to sell it to a Chinese investor who will complete its construction. Although it might be considered as a concluded episode, the experiment of *Torre De David* reveals scenarios that could have consequences affecting the imagery and the actions taken by global squatters: the skyscraper of Caracas is a new spatial configuration of the informal. At the same time, considering that the initial intentions of the local government, and the involvement of cultural actors, stated an eventual rooting in the community and its space, *Torre De David* is still a typical case because of the harsh change of direction concerning the persistence of an informal entity in the urban landscape. The informal

rooting can be interpreted here as an end in itself, which will conclude in taking an opposed direction.

4 Informal Dictionary

This section examines the set of planning tactics used for the urban, self-built informal system and is a premise for the case studies with which this work will deal later. What does the term rooting mean exactly? In the Italian language, the verb to root has the following meanings: "Planting or taking roots, clinging, with reference to plants and also of teeth, calluses, tumours [...] the assimilation and the perfect acclimatisation [...] with reference to persons [...] letting penetrate, inserting deeply".

Clinging, acclimatisation, definitely establishing within a place, planting roots, penetrating deeply in the mind or the environment. The verb enhances two crucial issues concerning the debate about informal rooting: the first concerns a physical adjustment strategy within a space; the second concerns the metaphorical adjustment in the mind, the ideas, and the spirit. The latter tells us about rooting in the collective memory of local communities and urban societies, but it also refers to the constitution of groups who share places and habits, efforts and a daily routine; it tells us about the groups that consider informal residential areas as spaces that are vital, necessary, and irreplaceable.

The first matter suggests concepts and practices that allow for informal rooting and state it in architectural or urban terms. The entire evolution of the informal environment can be seen from actions and smart solutions adopted by vegetal species, in the functions of the rooting system (anchoring to the soil, storage organs, hormone production), and in its different types (aquatic, hypogeum, air plants; roots that branch off from nodes like stems, or whose growth is triggered by traumatic events; roots that extend vertically due to negative gravitropism; roots of parasite plants that absorb the sap of host plants). *Clinging, air, acclimatisation, anchoring, negative, nutrition, storage, underground, parasitism, and trauma:* some terms belonging to the botanical glossary become a vocabulary of informal architectural and urban design, as an expression of their devices.

These terms are preceded by two parameters: *time* and *proliferation.* The radical proliferation distinguishes an expansion within a space – underground, air, water – that follows horizontal, vertical, diagonal, zigzag, etc. trajectories, regardless of the different species and their structures. The proliferation distinguishes a movement within a space that can occur very quickly or slowly, but progressively. The relation between accomplished space and time records the movement of a body, which is sometimes temporary and visible, sometimes continual and imperceptible. Architecture and informal cities are bodies and plastic structures that adapt and impose on the context in order to resist to uprooting.

Words will be given to the task of exploring the operational potential of the informal environment, in order to outline a *handbook under construction* as an open project for a theory concerning this informal rooting. Regardless of geographical and cultural peculiarities, this dictionary fits all informal settlements on a global scale.

4.1 Time

The first parameter focuses on the development of the process and its duration. In many current approaches concerning city planning and design "informal zones and their inhabitants are not really part of the city, being considered temporary" (Brillembourg & Klumpner, 2010, p. 127). The emblematic Brazilian experience does not correspond to the idea of a temporary phenomenon: "As they have lasted for more than a century, favelas could not be considered as a transitory phenomenon anymore" (Conde, 2004). This passage stresses the fact that the informal urbanisation of the city and its informalisation are deeply rooted phenomena that go back to early times across many global contexts.

Furthermore, the transience can be interpreted in another sense: the concept does not refer nor cannot be reduced to a short duration, nor the inexorable disappearance of the informal environment, but rather to the transition from one state to the other, from a basic level to a more advanced level. In fact, rooting entails the idea of a progressive and continuous growth. As for the Colombian case of Santa Marta, Kellett's observations, made over a period of seventeen years, transpose the idea of transience as a transition from one state to another over time. The phenomenon focuses on the house as the embryo of this evolution: "the idea of the house project as a process of change through time" (Kellett, 2013, p. 151).

Another meaning of transience refers to the opportunity to organise fluid, variable spaces. In the *kinetic city*, Rahul Mehrotra (2010) associates the concept of informality with data concerning time and dynamics of this new landscape, as a counterweight to the *static city*: "in these urban conditions, the physical manifestation of the city is reversed and, here, the "static" or formal city is most often situated in the temporal landscape of the "kinetic" or informal city [...] it is not necessarily the city of the poor, as most images and discussions of the informal city might suggest; rather the temporal articulation and occupation of space" (Mehrotra, 2010, p. 12).

4.2 Proliferation

From the house in a temporal sphere, to the house in a spatial sphere, growth and consolidation of the domestic microcosm expand to the surrounding environment "copying from the design models of the more affluent beyond the barrio for the generic design patterns, and secondly within the barrio. Dwellers recognise that they observe and appropriate selectively the designs and motifs of neighbours which

they believe express the values to which they themselves aspire" (Kellett, 2013, p. 155).

The criterion of proliferation translates into the distribution of building types, building techniques, and styles, from an architectural to an urban scale, and hence to the relations established between persons, objects, and open spaces. In fact, Hernandez's research on Bogotà's popular districts explore the consistency of the informal open space, which is the propagating medium for these kind of relations. Parks and sports fields, pedestrian streets and stairways, bus stops, internet points, and rooms and extensions of commercial establishments that look onto the street create a landscape subject to a *permanent transformation*, marked by the architecture in its configurations and outer appearance: "the inside and the outside of the house are closely related to the activities that take place in and out of doors; a similarly close relationship obtains between the housing and the physical setting. What happens to the house directly affects the image of the urban spaces, in terms of their form and language" (Hernandez Garcia, 2010, p. 231). The concept of transience described above actually acquires the spatial dimension, identifying the element that connects the inside and the outside as a medium for the proliferation of concepts, tastes, and ideas: "the façade is the transitional component between both spaces (interior and exterior, Ed.), with the interchange mediated through windows, doors, terraces and balconies" (Hernandez Garcia, 2010, p. 242). The city is a universe populated by single planning subjectivities. Each of these permeates contents and spreads them in turn.

4.3 Clinging

As pioneer species that root and grow along the edges of the streets, some informal settlements have strategic abilities and take root in uncontrolled areas. Here, a first unit of elementary housings consolidate in order to build a critical mass that discourages demolition and the destruction of what was assembled through hard work: the shelter made of waste and few relief goods. Elevations and hollows are strategic positions because they allow the context to be overlooked and a position outside the field of view of those who are in charge of supervising the areas. In rooted settlements, those who join the community later rise higher and higher, using spaces that are unused or dangerous and precarious. As a consequence, there is a hierarchical differentiation between the first and the last occupants: "Many are erecting new dwellings on previously untouched steep slopes – some close to the city center and on the hills surrounding existing settlements" (Kellett, 2013, p. 155).

These very places belong to the geography of waste. Rio's *morros* are such urban isles that brush the centre of the city, as well as Caracas' hills, where houses are placed along the elevation curves of steep and unstable slopes. Elevations alternate with soil depressions: similar to an undergrowth, where the soil grown by noble and long-lasting plants

is composed of rotten layers of residual material, the marshy chasms in Darhavi are filled with waste material.

These built-up areas are stratified on the urban topography as long-lasting, differently structured settlements. The long history of Brazilian and Indian occupations demonstrates the unshakable tenacity of the squatters.

4.4 Aerial

The informal space extends everywhere on the endless horizontal axis of the suburbs and on the new horizons of wastelands. Once the available space runs out, the sky is colonised and considered a new informal land. The vertical extension, an ancient and modern practice in every city, is established for illegal housings that plan to extend vertically right from the start, arranging thicker brickwork for the base and leaving exposed re-bars on the upper floor. Once the time is right, new volumes can stick one onto the other, preparing to host further layers, protruding as an overhang over the surrounding space in order to gain a few precious centimetres. Thus, the roof becomes a resource for physical and economic growth, a space to enlarge the house, a space in which to host new family members, or ensure rental income. New, vertically extended environments increase in quality as they are better aired and provided with natural lighting and views. In some contexts, the roof is not only used to host new volumes but it also becomes storage or a working space. In Cairo's suburbs, the *Zebeleen* sift through garbage searching for materials that can be sold, accumulating them everywhere, along the streets, inside rooms, and on the roofs of houses. The roof is not only an opportunity, but also the extreme edge of precariousness, being the last habitable space, the house of those who came last and who cannot afford to rent a house in the city, nor in the slum: "In Cairo and Phnom Penh, recent urban arrivals squat or rent space on rooftops creating slum cities in the air" (Davis, 2006, p. 13). This habit is also common in Hong Kong, where the rooftops have been colonised by those who cannot afford to rent houses with the highest prices per square metre. In *Portraits From Above*, Canham and Wu (2009) show this landscape in detail using pictures, sketches, and texts.

There are two cases that summarise opposing realities, reflected in the quality of the spaces: in the case of Kwun Tong, tensions between the residents, concerning job opportunities and the risks of clearance, create precarious, minimal spaces that do not become structured over time. On the contrary – even though detrimental to the quality of living – the Tai Kok Tsui community could develop better social relations, and therefore a consolidation of the buildings composed of rooms on different storeys in edifices built in the fifties. The inhabitants can benefit from the central position and thus from the proximity to working places and services. Nonetheless, the political strategy of the government aims at peripheral resettlements, thus favouring real estate operations for wealthy classes on lands that increased their property value.

4.5 Acclimatisation

Easing down between the folds of the built-up area, detecting invisible advantages, watching the city through different eyes, and giving a different interpretation of space. The informal way of building requires an ability to adapt to critical conditions, but also, broadly speaking, requires capable planning: "More in general, a way to use the imposed system constitutes an attitude of resistance to the historical law of a state of things and its dogmatic legitimation. This kind of practices, introduced by others, redistributes its space, creating at least a margin, in order to keep the control over uneven forces and glimpse utopian references. This is probably where the opacity of «popular» culture is displayed – the black rock that opposes to assimilation [...] A thousand ways to *support* or *destroy* the action of others, that is to say the space created by others, characterize the subtle, tenacious, resistant action of groups that have to unravel within a tangle of established forces and representations, as they do not have a place of their own. It is necessary to "make use". Among these stratagems of fighters, there is an art in scoring, a pleasure in bypassing the rules of a constrictive space" (Certau, 2012, p. 49).

Sacrifices and smart solutions, small marks and weaves that are invisible to the stranger's eye, daily form pieces of consolidating houses and cities.

Many statements talk about the attachment to the places conquered through hard battles and burdensome sacrifices, undergoing long processes. The inhabitants of informal areas often say that they are unwilling to move away, even if this would mean greater comforts. Adapting means therefore adapting to the conditions imposed by the context, but at the same time rebuilding an individual concept of habitat.

4.6 Anchoring

The anchor allows a temporary or permanent fix; it allows for repositioning and feeling safe. This device is characterised by several functions, standing both for fixity and mobility. The occupation of a soil is characterised by the use of smart strategies: the housings are elementary, dry construction made of lightweight materials that are easy to transport and advantageous for quick and simple assembly. This rudimentary tectonic will also allow a quick rebuilding in case of demolition. By repositioning, they can also choose to put themselves in a different, safe place. By the time they find this place, they will shape a basement made of brick, stone, and concrete aggregate, a solid base that will serve as a plateau and anchor the house onto the ground during the rainfalls that cause outwash on the slopes. In case of destruction, a new house will quickly arise on the solid basement. In some Brazilian *favelas,* this tactic has led to a consolidation of the early housing units.

Again, framework constructions arise elsewhere during the night in order to delimit a space that was taken through an illegal occupation, a space that can no longer be dispossessed. Without window frames

or infilling, those constructions faintly mark the shape of a house. In Istanbul, this first act gave rise to the growth of vast informal districts like Sultanbeyli.

Again, once the ground and the air have been colonised, the occupation changes over to water. In Makoko, in Lagos's lagoon, since the 17th century, fishermen and wood merchants have colonised the water, building informal housings made of vessels, floating slabs, and pile foundations. The amphibious landscape of houses and trunks on water is constantly changing, some elements anchor onto others, and the space between them is filled and recovered. Small isles unite and form layers of new coasts. The informal consolidates the soil on slopes as well as on the edges of the sea, where new houses, pedestrian routes or streets and industrial plants will be able to arise.

4.7 Negative

The risk factor and the myth of marginality stigmatised by Rao (2010) and Perlman (1976), both underline a crucial topic: the informal issue cannot be explained by the contrast between modern and non-modern. The increase in self-built settlements marks the failure of the big modern plan as a rational and equal space where class struggles can come to an end. This fact involves the whole city.

As for the informal rooting, the topic comprises two points of view: on the one hand, it is clear that the modern standard and its concepts of architecture and city cannot be a term of comparison for informal settlements. In fact, they are characterised by other measurements and values. On the other hand, the consolidation concerns strictly technical and technological data of settlements and buildings: installations, energy expenditure, and requalification of the buildings, must necessarily consider the agenda of those who work in these contexts. The two points of view are combined to inform the plan.

As for environmental sustainability, which is only a semi-crucial issue today, there are precise planning issues that arise and which combine urban growth, environmental care, and energy efficiency. The determination and the upkeep of intrinsic values concerning the informal, interweave with their necessary modernisation, as Beardsley and Werthmann observe: "We have two chief areas of concern. One is the severe competition between the expansion needs of informal cities and the protection of ecological and economic resources like farmlands, wetlands, and preservation areas. Witness, for instance, the squatter invasion of the forested slopes of Tijuca National Park in Rio or of the fertile farmlands around Bogotá. How are we to balance a growing population's right to shelter with the aims of environmental management? Our second concern is about the wisdom of conventional upgrades during a time of climate change: If we bring electricity to hundreds of millions of slum dwellers, for example, should it come from coal-fired plants? Or can we skip antiquated technologies and make low-income settlements models of sustainable development?

Already they have smaller environmental footprints than formal cities: They are denser and more walkable with fewer cars and more public transportation. Can the best qualities of these places be retained, even as they are upgraded? We need to work in anticipation of future conditions and constraints" (Beardsley & Werthmann, 2008).

4.8 Nourishment

Some opportunistic tactics and evaluations resort to different latitudes during the building of informal housings: the proximity to a productive area or to a crucial area related to places of work; the positioning in unbuilt areas near places to find building materials; the proximity to a transport infrastructure for mobility; or the use of an artificial barrier that separates the settlement from other urban areas. Not least, the supply of energy: the necessity to use electricity and drinking water is a triggering factor for settlements to establish nearby an existing network in order to purloin the contents. This strategic evaluation allows built-up areas to root.

The lack of infrastructures for drinking water and electricity, or the improper ways to provide for their supply (tank trucks, shafts, dangerous wiring) lead sometimes – as for the cases of upgrading – to the installation of specifically built, paid networks.

As for the architectural facts, the consolidated informal landscape is characterised by installation infrastructures that are generally concealed in formal sectors. Yet, this presence stands for disguised issues: "Gatos, if understood as emblematic of the relationship between the formal and the informal, would represent the point of transition from a controlled and regulated network to an "invisible" and undocumented complex" (Fabricius, 2008).

Just as roots do, tangled cables and pipes grab onto the host body – an urban body in this case – and translate it materially into sedimentation and rooting processes, also through the adding of networks installed at a later time, like sewage systems or water supply systems. The tangle of these improvised networks is an aesthetic element, while in technical terms it represents a hazard that can entail risks "While perhaps no more haphazard than the tangles of wires and tubes that run through the walls of any building, the lines that zigzag through a favela are remarkable in both their complexity and their fragility. Electrical wires and thin plastic tubes carrying fresh water drape over buildings, run along paths and stairs and up walls, bundling and splintering in often dangerous configurations, as when electrical wires are used to support water pipes. In some instances, electricity poles are co-opted and used as support pillars for houses. Most poles are heavy with hundreds of power lines" (Fabricius, 2008).

4.9 Underground

Plants like Bermuda grass strengthen their rooting system once they are eradicated. Just like icebergs, the visible part on the surface is a tiny part of what lies underneath. There is a problem with the interpretation of informal dynamics and forms, depending on who is observing them. Generally speaking, the unmapped parts of the city can coincide with what has not yet been ascertained. From the residents' point of view, as independent planners and builders, this white space entails meanings unknown to a stranger: "when exploring the issue with residents, ...less obvious landmarks appear" (Hernandez Garcia, 2010, p. 237). Small spaces, houses and urban objects become reference points and have a meaning only for those who know them, live them, and use them.

Another invisible or uninterpretable aspect is the plan. Although it is often considered to be the "great absent", it is differently conceived, edited, carried out, sometimes with the same ambitions and role models of conventional cities. The architecture and the open spaces around which it develops sometimes follow specific planning intentions, designs, and morphological types, expressing sensitivities and tastes.

As a confirmation, Turner (1972) and Kellett (2013) have examined on a different scale the reproduction of formal urban configurations within the morphology of settlements and buildings. "The most vital aspect of the grid layout is that it will be read as conventional and have the potential to develop and become the same as other parts of the city. The expressed aim of many settlers is to produce places that are as close as possible to the dominant formal housing areas. Hence they adopt the rigid layout of blocks and plots – and significantly they leave open spaces for squares, schools, clinics etc. In short, their collective aspiration is to create conventional, legal, fully serviced neighbourhoods" (Kellett, 2013).

Klaufus and Mitzman (2012) underline the use of graphic works as sketches and precise indications concerning the subdivision of the interiors, the scheme for decoration, the colours of the facades, and the shape of the roofs. Hernandez aims instead at enhancing the visible ambitions and dignities of informal architecture: "the richness and creativity that can be found in popular settlements confirm the existence in these areas of a design language and forms with significant characteristics" (Hernandez Garcia, 2010, p. 219).

4.10 Reserve

The area of an informal settlement differs depending on the available space. The area spreads within its physical limits (a railroad, a channel, a motorway, etc.). Some settlements occupy minimum areas; they arise on the edges of crossroads filling few square meters; others occupy vast urban areas like planned districts.

This way to create space seems to aim at taking up the entire available space. Even when built-up areas consolidate, the informal urban growth is horizontal in nature, as it cannot rely on techniques that allow a significant vertical expansion, and because the new buildings are necessarily situated at ground level.

Nonetheless, within some informal spaces, there are empty spaces, some space reserves. The community that created and saved those places agrees on their non-occupation, lending to them a symbolic value.

In Rio de Janeiro's Santa Marta favela, a small open space becomes a reserve: a rift in a dense built-up area becomes, for a moment, the set for a popular music video by Michael Jackson. This event lends an air of myth to the ordinary that is therefore saved from the urban development that absorbs any available lot or shred. It is a rare example of a public space, a space that is open, according to the meaning proposed by Jamie Hernandez, to the morphology of the favela that notoriously uses, at least at an early stage, those that can be defined as biological reserves. In fact, *morros* are urban elevations that skim the city centre, reserves for the third landscape. As they are occupied by illegal settlements, these vegetal reserves become urban reserves for residents of the favelas, and at a later time for builders and real estate speculators.

The emptiness, considered as a space that acquires weight in urban morphology, is a rare exception in informal landscapes. In a scenario that aims to occupy the entire soil, the emptiness is triggered by particular factors, especially if it is situated within the existing tissue: "The need for soil, especially for highly dense urban systems, leads to ready-made procedures applied on the architectures that shape the city [...] As for the case of Caracas, we see a different way to recycle a stadium. The new building concerns the expansion of a favela: small makeshift housing units have occupied the bleachers of the sports structure. The stands are interpreted as a soil, waiting to be built-up, while the field is ascribed the value of the emptiness that has to be preserved [...] The soccer field is instead interpreted as a public space, the representative element of the communitarian culture, as a consequence, the new settlement develops on the edges of this large emptiness" (Marini, 2008, p. 75).

4.11 Parasitism

Regarding the parasite-society relation, as it refers to the second declination of the parasite, i.e. "*who lives off others*", Sara Marini explores how the relation between the figure of the parasite and the resource, space in this case, becomes a crucial element to understand the evolution of space and time of the contemporary city. The arising concept of globalisation has in fact erased the connotation of *borders*, which is a representative feature for the spatial structure of modern politics in Europe. Now the image of the *web* translates new territorial configurations, surpassing their physical limits and nullifying the effectiveness of the tools for their supervision. The parasite plants itself

on a limit that has become ambiguous and unstable, and creates new temporal and spatial relations, revealing as "useful to the social system just as it is for the natural system: a factor that triggers evolution, yet not without the features of an exploitation, a 'state of exception' that can become 'paradigm of government'" (Marini, 2008, p. 75).

The parasite therefore defines an alternative, an evolution of urban systems that can become a paradigm. Sara Marini quotes an important passage of Luhmann: "The advantages of a deviation can be seen on the dominating habits and practices. Each order is based on exclusions, a symmetric order on the exclusion of asymmetries. This presents a *chance* that could not be possible without distinct exclusions, that is the opportunity to discover and use ordering advantages in what has been excluded. Just the well structured orders make the opposite visible – not equality, but inequality – and offer, when put to the proof, the *chance* of a bifurcation, thus the *chance* entailed by a different way which makes, when pursued, irreversible history in turn. Hence, just according to the sense meant by Michel Serres, parasites who use this chance can establish. A parasitic order arises, whose transition from the state of exception or deviation to the primary order passes nearly by unnoticed – only to be, in turn, again parasitable. *The evolution creates parasites, that, in turn, create evolution*" (Luhmann, 2008, pp. 49 - 50). The informal city is a mark of this evolution, and, once it roots, it marks the transition to a new stage of the urban shape: "As a response to the struggle for space, the space in the center and not the marginal space, the figure of the parasite propagates due to the practices of self-building that modify the city and due to the conceptual transposition into contemporary architectural strategies, marking the need of a mutation of the rules in force, concerning the occupation of the territory" (Marini, 2008, p. 50).

Today, the return to the concept of physical limit is reaffirmed by rhetorical myths of security that organise the spatial devices of new frontiers. The creation of gated communities, militarised walls between the states, and barriers between parts of the city, strengthens the social subdivision of space. Within this setting, the parasite and its ambiguous position, takes on new tasks concerning the physical and political building of the city.

4.12 Trauma

The stratification or extension of a dense residential area undergoes fragile stages that weaken its structure. Critical issues concerning hygiene and sanitary conditions, overcrowding, hydrogeological risks, illegal occupation, etc. expose it to the risk of being wiped away or relocated in resettlements. For decades during the nineteenth century, the *tabula rasa* theory has been systematically applied in South America as well as in Africa and Asia, de facto impeding a consolidation and a quicker improvement of the same issues that they tried to solve, which would have simply recurred elsewhere. The eradication of various favelas during the sixties for example, has triggered the social disaster

of thousands of people relocated in resettlements, away from their living and working places. As demonstrated by the case of City of God, these communities were forced to live in residential blocks and move every day from distant proto-suburbs without services, to the centre of the city. The tabula rasa that erased the informal environment promoted metropolitan sprawling everywhere, the dispersion of houses, working places, equipment, and basic services – as well as "formal" ones - wasting resources and non-urbanised lands.

On the other hand, just as pyrophytes reactivate and bloom thanks to fires, the informal settlements are subdivided on the level zero of the *tabula rasa*. The trauma increases the propagation of the informal environment rather than slows it down and triggers rhizome tactics of reproduction through the modification and implementation of governmental settlements, or the quick reoccupation of evacuated areas. The trauma can thus be an event around which to organise new dynamics aimed at the consolidation of a built-up area.

4.13 Rhizome

If we take the prime example of the rooting phenomenon as a reference, that is the South-American informal environment, we need to underline the significant change of paradigm that can be noticed: the transition from an unstable and temporary status to a stable and permanent status, even though it is characterised by an endemic dynamism. The theory of rooting, the botanical metaphor applied to the informal environment, reaffirms the propagation and the presence of a new phenomenon, analysing its theory observing acquired tactics and its practices observing actions aimed at a physical permanence of urban cases. Yet, it is an ongoing phenomenon, just like the urban systems and architectural tactics that it describes, and which are summarised in the dictionary of the informal rooting.

Some authors understand the root figure as a structural and hierarchical concept. In her reflection about the work of the Brazilian artist Hélio Oiticica, Paola Berenstein Jacques (2001) organises her considerations starting from the book-manifest by Christopher Alexander, *A city is not a tree*, from 1965. Alexander exposes a distinction between artificial cities and natural cities that is between planned cities and vernacular, non-planned cities. In this case, the botanical metaphor is a critic to the approach of architects and city planners that, according to Alexander, "organize the city as a tree, as they are used to a system of thought that works alike. This system of thought is rather simple, binary, and architects discover themselves unable to reflect the most complex, multiple forms, like the semi-network forms" (Berenstein Jacques, 2001, p. 107). Nonetheless, according to Berenstein Jacques, there are other urban shapes that cannot be associated with the dichotomy suggested by Alexander: favelas are in fact "much more complex than cities deemed to be natural, according to Alexander's semi-network logic [as] they are constantly arising, never terminate their evolution, nor do they stop growing, and, above all, they are not fixed

like cities deemed to be formal, whether artificial or natural, whether planned or unplanned. The special complexity of the favela mixes up with their impermanence. Hence, there is a basic difference in the way they are rooted. The planned city - the tree-city, like the tree or the concept of the tree, is strongly rooted in a root-system, an image of order; the partially planned city, the bush-city, follows the rhizome-system, which Alexander would have some issues to demonstrate in his mathematical-geographic diagrams, that are rational, Cartesian, tree-like, all in all" (Berenstein Jacques, 2001, p. 107). The rhizome, the concept that the author borrows from Deleuze and Guattari, is opposed here to the conventional theoretical structures ascribable to the figure of the root; it is a thought system which is "the opposite to the tree/root system [...] (which) in order to preserve an arborescent structure, is characterized by a false multiplicity [...] (the rhizome) is not a model [...] it does not have a precise image. What matters the most is the process rather than the formal image, the movement, the germination, the growth, the impulse" (Berenstein Jacques, 2001, p. 107).

The rhizome is therefore an operation, not an image, an aestheticisable entity. It is a headword to be included in the handbook of the informal rooting that is needed to downgrade conventional theoretical structures, urban theories, and conventional cities.

Hence, according to Berenstein Jacques, the favela is a moving entity and its rooting follows a rhizome-system, not a root-system. Nonetheless, the informal rooting, as the phenomenon that we are describing now, highlights a new issue: through upgrading processes, the favela can end up structuring spatial and social hierarchies, internalising mechanisms of real estate speculation, finishing its stage of spatial expansion, embracing plans that hybridise endogenous and exogenous actors and strategies, thus elements to organise the city. This stage seems to be more similar to a root-system: it is therefore possible that the two systems for the creation of space can coexist within an informal hybrid system responding to the dynamics studied by Roy. As Hernández and Kellett remarked with regard to the concepts of *smooth space-striated space* expressed in *Mille Plateux,* "Deleuze and Guattari (2002) underline the fact that in spite of their intrinsic differences, the two spaces "exist only in mixture: smooth space is constantly being translated, transversed, returned to smooth space" (Deleuze & Guattari, 2002, p. 474). Such a proposition is of interest for us because (we) will demonstrate, through examples from different Latin American cities, how the inherent interdependence between these two forms of space operates. Another aspect of great interest to us is the fact that, according to Deleuze and Guattari, shanty towns – or informal settlements – are the places where, as well as through which, the two different kinds of space are reversed into one another" (Hernández & Kellett, 2010, p. 9).

5 Conclusion

5.1 The Eyes of the Architect

Tearing down the wall of the unknowable that divides us from the informal spaces of the city; going beyond the hyper-complexity, the marginalisation, the physical and cultural inaccessibility of these spaces, eliminating the widespread stereotype that labels them uniformly as chaos and danger. The eyes of the architect suspend judgment by investigating with objectivity and accuracy; they bring the observation to a level of impartial evaluation of urban materials; they enhance the intrinsic spatial aspects, bringing to light the collective intelligence and effort that produced these parts of the city. Within the increasing interest in the topic of informality that we find in the international scientific panorama, the work displays a new vision: the vast literature that has been produced by the different branches of social and urban sciences – focused on examining how these settlements develop and transform themselves, the habits of the community created inside, and the ongoing dynamics involved in the action of taking roots – lacks a truly morphological study, as well as a theoretical study on the produced urban space. The study fulfils this need, configuring itself as a constant attempt to focus, to "understand through the eyes of the architect" the complexity that challenges the consolidated schemes of the interpretation of the city. It is a heritage of knowledge of important aspects concerning the informality not yet explored with the necessary attention; it is a tool, able to provide cognitive elements related to the urban informality and the city as a whole, able to inform the theory and the planning using a precise snapshot of the reality; it is furthermore an extendable method that can be exported elsewhere.

Brazilian favelas offer a favourable chance to test this analysis method, extendable to other informal contexts that display rooting processes. Crossing a faulty vision that, especially in the past, has been fostered by the "myth of marginality", the exploration has clinically surveyed the built environment in order to prove the initial assumption of the work: the informal city increases progressively in quality and joins the urban maps that enclosed it between white spaces of non-representation. Thanks to the vitality of the communities that live there, Rio de Janeiro's favelas are undoubtedly one of the most significant statements of this rooting, of a persistent and enduring process of sedimentation and growth of the extra-legal city, or extra-plan city, which increases its weight within the urban development. Here, as well as elsewhere, there is a growing necessity for an analytical and accurate study where the observation of urban phenomena can shift from the large scale to the guts of the city, down the roads of the community, in their homes, and in the complexity and widely unknown consistency of these environments; the need for a time travel and a travel inside the history of a minor architecture and city.

5.2 Urban Settings

There are crucial issues that emerge from the bottom of the urban body. First, the rooting process of the informal environment is embedded in a frame of a definite dissolution of the modernist idea of the city that is this organic vision of the urban machine, which is accurately organised within functional compartments. The informal parts of the city combine different functions like work and residence, creating a heterogeneous and mutating space. At the same time, the urban development – or the way to urbanise – as a unitary movement that fuels contemporary cities, is held by the idea of modern spatial production related to the economic concept of endless growth. Hence, it is of no concern whether this city is rigorously subdivided into residential blocks, lots and suburban villas, or shacks belonging to the new working class. The expected and predictable city, the image and the scheme of the working class and petty bourgeois city, which is perfectly logical and known, has, however, made way for an unexpected city in South America as well as in other latitudes, which is dysfunctional and populated by new shapes; it has made way for waste lands with different consistencies and inhabitants. However, just the drifts of the modern city that are the focus of the housing issue, are becoming a possible "plan B". The requalification programme of Rio's favelas and other South American metropolises overturns the base of the debate: the difficult situation that exists is not negated; it is rather consolidated on a spatial and functional level, protected in its social dynamics, which are sometimes rich in features that cannot be imitated by the planned city and its communities. Furthermore, the informal rooting itself is a process that is historically related to the city, regardless of the updating programs: many urban entities, even in the western world, seem to be associated with the idea of taking roots, the idea of transformation and progressive calcification of the poor, overcrowded, self-built parts, placed on waste and made of waste. These parts progressively become new centres of the urban system, which ends up absorbing them. The informal rooting, in spite of the single entities and their recorded qualitative levels, runs the risk of an unwilling participation in these typical dynamics commanded by real estate speculation that can be found everywhere, which may manifest as the incorporation of popular settlements within new plans or requalification, the transformation of waste into high value goods, or the expulsion of the weak parts of the population as a consequence. The point is to combine two elements that seem to exclude each other, that is to say, the wellness and the quality standards of life – not forcedly western ones, but still respectable – with the innate peculiarities of the city, the economy, the informal spaces. The access to the property, the constitution of political and economic organisations of residents, and the protection of values that support the communities of occupants and self-builders, seem to be possible ways.

5.3 Devices and Spatial Grammar

The second crucial issue emerges when changing the observation angle, moving away from the expanded urban frame and its evolutionary trends within these territories, and going deep into analysing the single favela and its urban spaces. This clarifies what is essentially the possible contribution made by the rooted informality in favour of the contemporary plan, what should be saved or introjected. A precise spatial grammar characterises the favela and contributes to guiding the activities: the built-up area, up to its limits of density, shows a strong reduction of the passages and open spaces that might serve as distributive and aggregating elements. Deemed as "informal continuous space", this fluid and dynamic sphere, defined by the residents and how they use it, entails several shades of privacy that vary according to the flows, the habits within the social life, and the community. Its capillary distribution absorbs open and semi-open areas, even arriving to the domestic interiors. Its ability to "change nature" depending on the type of use, the times of day, and the events in the community, as well as relative independence from formal support, makes it a mutating and kinetic environment. The "informal continuous space", the true essence of the favela, becomes the centre of social and economic life, floating in a continuous sphere of actions of reprogramming and reconfiguration, in the extreme possibilism that makes it vital and surprising. The space of representation of the community is often an extension of domestic life, hosted within measured, small rooms, often barely illuminated. These rooms are branches of the urban body, as if they compressed the individual privacy that melts in the neighbourhood, in the human stream that crosses the favela. The meticulous order of the interiors and the stylish options that dominate the rooms, as opposed to the *papier déchire* of the prospects looking like an unfinished construction. These extend onto the street space and into the sky, as posters of an architecture that turns the act of becoming into its instance. Hence, the facade is a diaphragm that mediates, a further architecture with respect to the exterior or interior environment, and which can be articulated on the ground floor, becoming a patio, a veranda, a store or a counter, or different elements at the same time, according to a program that is versatile by necessity. The facade is sometimes a finished architectural element, adorned, planned, a part of architectures that present remarkable stylistic and compositional solutions if framed within the self-building process and the overall condition of the settlements. The architecture of the favela roughly develops some themes that are immediately perceived by the architect as material to be given value, as elements on which to imprint an articulated reasoning about planning.

5.4 Learning from the City

The third issue concerns the theory of architecture: is it able to assimilate the settings and the grammars and translate them into precise methods of a planning action? What kind of issues does the informal rooting raise for the contemporary plan? Learning from the city seems to be a possible option for the urban and architectural

plan, both in the case of being called to intervene upon the existing, as well as when faced with spaces to urbanise from scratch. In fact, the urge to assimilate this informal vocabulary into a theory is confirmed, as in the case of many recent works that are constituting a heritage of experiences to be replicated, implemented, and monitored: to be replicated, in order to apply the successes elsewhere and to extend the experimentation, the scope of a planning ideal and a political ideal; to be implemented, in order to suppose the declinations of a strategy, to test the functioning of a method within different contexts; and to be monitored, since only time will reveal the validity of theoretical purposes, of the practices as planning methods and finished works. Learning from the city means to interpret the fragile balances, grafting spatial devices that are able to relate environment and life, maintaining the spatial features that represent the original and fundamental element of this architectural vernacular. Therefore, there are choices to be made concerning the alteration or non-alteration of the status quo, facilitated by the knowledge of the places and their dynamics. The construction of a horizontal dialogue between planners and the community of residents is vital for any type of operation. On the urban scale, the plan must respond to the openness, and the unfinished and collective nature of the informal city. It cannot avoid being a point-by-point procedure, proceeding bit by bit like the rhizome, accepting the challenge of the construction of unexpected new land and new geographies, becoming dense due to a gradual replacement of the "objects" and not only due to its expansion, arranging regulatory mechanisms of both the existing parts and the new expansions. On the one hand, there is a need for action on the issues concerning hygienic, sanitary, and ecological conditions, as well as in static and functional terms. On the other hand, we need a serious housing policy, designed according to local conditions, which may interfere with the endless expansion of the city. The choice to improve the existing situation based on the process of taking roots, is a part of this framework, with residences affected by a high housing and building density, the implementation strategies based on the unplanned processes, and investments to limit the waste of energy resources. On an architectural and spatial scale, the plan assimilates the informal tactics, appropriating, for example, the idea of the unfinished, the participation in the creative process, and the self-building of parts of the work. The invention of new housing opportunities based on the procedural idea of conceiving the house, the possibility of social coexistence within this density rather than in a rarefied environment, and the constant fluctuation and transformation of the "informal continuous space" that is able to trigger very strong, social-identity dynamics, represent some of the topics around which the planner has to think case by case. Undertaking this approach, the architect is conscious of having lost his "authority" within the urban setting, and he searches for a way to emphasise the urgency of his authorship. From the heart of the informal city, there are important issues that emerge concerning the impact that the architectural and urban plan has on reality, on its ability to introject changes and drifts, on the ability to create a dialogue with the existing environment. There are also questions emerging on the role of the architect, that are profoundly called into question, and are brought back to the focus

of the debate: if the city is a self-made product, what kind of future awaits the architect in this process? The concept of cure seems to suggest some hypotheses. Several shades of meaning characterise it: cure meant as a medicine for the illnesses that affect a body; cure meant as protection, a caring attitude towards something or someone; cure meant as an organisation and a managing of the contributions that characterise the figure of the curator. This figure, very tied to the world of arts, has had different interpretations in the course of history: "In the Roman Empire, in fact, the "*curator*" is responsible for the management of various public works: transport, health, police, sewage, aqueducts, navigation, roads, games, even the examination of the accounts. He performs a "repairing" function in a culture that prefers to restore and reuse, rather than a tabula rasa. Such prosaic activities take a more spiritual turn in medieval Europe, where the effective "regard" manages both the souls and the earthly affairs. This function certainly describes the responsibility of the modern "curator", who is, first of all, the one who takes care of what happens to the objects, once they have been created" (Lebovici, 2015). Borrowing this concept, the curator whom the city needs, is the architect: the physician that heals the illnesses affecting the city; the custodian of its goods, of its assets; the organiser, manager of contributions within a culture that cannot help but fix its mistakes, that must recycle its waste; he (or she) who is, or will have to be, responsible for the cure, the fate of the plans, the fate of the city. In the informal environment, the figure of the architect seems to become that of the self-builder, or the independent planner who plans or creates, who takes care of the city that he built, and even more, who is on the frontline of the struggle for the right to have a house and the right to share the resources. The interest, primarily ethical, of the architect – understood this time as an author – concerning this city, cannot avoid being evaluated on an aesthetic level also, at the level of architectural theory. In this scenario, the architect's "domain" – architecture and the city – is obviously no longer his exclusive prerogative. To reconnect with this domain - that became independent because of its demerits, or because it has been exiled from the world - he can only be a curator, which means to transfer his work from the object to the system of objects, or better said to their organisation, their conservation, and their management. However, the cure defined as the organisation of the different contributions to this city, runs the risk of becoming complicated in terms of authorship. There is a need for a curator-architect for the self-made city, a figure that does not abandon the architecture, being conscious that he could not extend his control to the entire urban setting and sometimes to the single work: physician, custodian, manager of contributions, but also an actor - or author - on stage. An effective response is, in fact, provided by those plans, where tactics belonging to the informal environment – self-building, parasitism, etc. – are assimilated and supported by the architect, who acts as an organiser of contributions without disappearing behind them, without sacrificing his authorship, finding instead new ways to express it and putting it at the service of the collectivity.

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Urban Resilience in the Suburbs _
Urban Acupuncture

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ABSTRACT **Investor urbanism advocates the privatisation of public space, which results in unification of amenities, detachment of dwellers, lack of urbanity, escalation of vandalism, and marginalisation of community. Urban acupuncture, as an implemented tool for community recuperation, provides an alternative to investor urbanism by motivating marginalised dwellers to take part in the process of place-making. A case study, the implementation of a project called CULBURB in six Central European cities, is described in depth to provide insight into the urban situation in the suburbs.**

KEYWORDS urban acupuncture, urban resistance, community building, built environment and communication, place-making, investor urbanism

1 Introduction

Public spaces in the suburbs of Central European cities bear witness to a lack of activities. The public capacity to participate in public life is low. While the prominent central parts of the city are experiencing gentrification processes, the suburbs are home to an increase in vandalism and crime. The lack of communication among stakeholders in an urban environment can result in disconnection between the suburbs and the city centre. Thus, the marginalised suburban neighbourhoods are becoming abandoned, vandalised, and neglected due to lack of programme. Neglect leads to unmitigated urban sprawl. Smith (2002) argues that gentrification has become a global urban strategy, influencing local urban environments around the world. The speed and the scale of gentrification in large cities have increased enormously as these cities are faced with an influx of global capital concentrated in their urban centres.

Urban acupuncture is a small-scale practice in micro urban environments, intended to encourage residents to take part in the creation of their local public space. It is a strategy for approaching urban renewal or development projects that address the needs of local stakeholders. It puts an emphasis on place-making and creating shared commons that will be accessible to people inhabiting the area's immediate surroundings. Urban acupuncture promotes community building where dwellers take common ownership of public space to express and reinforce their local identity. Within the context of this strategy, urbanists conduct research to include local residents' perspectives in the planning process and then carry out targeted actions to change public space and improve the quality of life (Bugarič, 2017).

Acupuncture urbanism engages urban actions with a situational approach to engage dwellers in the creation of their part of the city. Gruber (2012) defines acupuncture urbanism as the one that identifies neuralgic points for focused interventions on the basis of an inductive reading and physiological understanding of an urban milieu. According to Gruber (2012) urban plans must be implemented in a bottom-up incremental manner through constant feedback and readjustments. The predisposition of acupuncture urbanism draws from the Situationist's theories of the *Right to the City* and Jane Jacobs' self-organising behaviour of cities, which she recognises as problem of organised complexity, and from a more contemporary theory of the in-between city or *die Zwischenstadt* by Thomas Sieverts.

Jane Jacobs' anthropocentric concept of city development is a critique of modernist urban planning policy from the 1950s, deemed responsible for the decline of city neighbourhoods in the U.S.A. Going against the modernist planning dogma dominating the era, Jacobs (1992) proposes a newfound appreciation for organic urban vibrancy. In the book *The Death and Life of Great American Cities,* Jacobs states how streets are the most vital organ and therefore the most important public spaces of the city. According to Jacobs (1992), a city can only be interesting if its streets are interesting. Mixed uses can help better diversity in the

city as it creates conditions for spontaneous development. Today, cities in U.S.A. are dealing with the growth of suburbs due to the formation of the mortgage market in the mid-thirties, which was established to promote housing construction in the suburbs.

The second important movement organised by social revolutionaries such as Guy Debord, Constant Nieuwenhuys, Henri Lefebvre and others, was called the Situationist International (SI). In Europe, intellectuals, artists, and theorists joined international organisations between 1957 and 1972. The movement derived from Marxism, Dada, and Surrealism movements, which represented a modern critique of mid-20th century advanced capitalism. One of the most important texts of the movement is *The Society of the Spectacle* by Guy Debord. The main observation about space by Debord (1958) is that contemporary architecture and urbanism are nothing less than the logic of alienation and reification written in stone, the capitalist refashioning of space into its own décor. For Debord (1956), *Dérive* represents experimental behaviour linked to urban society; it is a technique of an unplanned walk through various urban environments where dwellers communicate their everyday relation and let themselves be drawn by the attractions and the encounters they find on their way. Constant, in his 1960s essay Unitary Urbanism, observes how the architect deals with a change of profession as the preoccupation with formality makes contemporary architecture extremely boring (McDonough, 2009). The new concern of the architect must be the effect that architecture has on its inhabitants. The case of Constantin's New Babylon "envisaged a space where people were free to engage in creative work, shaping the world in accordance with their desires." (McDonough, 2009, p. 17). The idea, condensed into a slogan *"Right to the City"* was first proposed by Henri Lefebvre in his book *Le Droit à la ville* (1968). Lefebvre (1996) summarises the idea as a "demand...(for) a transformed and renewed access to urban life". David Harvey (2008, p. 23) described the right to the city as something that "is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization. The freedom to make and remake our cities and ourselves is, I want to argue, one of the most precious yet most neglected of our human rights." The more recent *Digital Right to the City* involves the virtual city and its digital information.

The last interpretation of the *In-between City* or *die Zwischenstadt (in German)* learns from processes of city transformation and introduces new terms. The definition of the *In-between City* includes all settlements, which are barely separated by countryside; this settlement form is car dependent and lacks urban-ness. Sieverts' (2003) prediction for future city life states that half of the world's population will live in the in-between cities, which would reach 10 million inhabitants, and even up to 30 million in some cases. Sieverts (2003) defines new relations between centre and periphery and introduces the post-Keynesian urbanised landscape. The results of the emergence of *In-between City* include, according to Sieverts (2003), food production in an urban farming

ecology, as well as the recuperation of water. Urbanised landscape highlights important issues connected to urban ecosystem research that suggest how cities must integrate into the surrounding landscape. Ripl and Hildmann (1997) stress that the procurement of drinking water should, in the medium-term, be redirected from the utilisation of groundwater to the use of surface water and a lower degree of wastage. According to Ripl and Hildmann (1997), the exploitation of wastewater should, be similar to that of rural settlement areas; in order to reduce the heat absorption of the city, as much vegetation as possible should be planted on rooftops, facades, and around buildings. Furthermore, rainwater should not be drained away, but used for cultivation.

If urbanisation takes place in an economic and political context that is inherently opposed to planning, Sieverts (2003) points out at which level to intervene. According to Sieverts (2003), suburbia in the *In-between City* behaves as the aggregate product of uncoordinated singular decisions. It is equipped with limited means and power, as the essential parameters of control, and is left undetermined with respect to individual interests. Without synergies between individual interests, we have to deal with marginality, lack of facilities, degradation of space, and a high level of vandalism in suburban neighbourhoods.

2 Centre Versus Suburbia: Active and Passive Public Space

Urban centre is "a place in which everything important can be found and form which all mayor developments start" (Sieverts, 2003, p. 25). There are few program relations between centre and suburbia; centre is the carrier of city identity while suburbia merely services the centre. The processes shaping these two entities are different as well, the centre is more affected by gentrification and touristification, so its primal identity becomes blurred by global trademarks, while suburbia develops mixed networks of non-places lacking public programme. Through the evaluation of parameters that define public space it is possible to define both. On one hand, the centre develops overdesigned public spaces, which do not allow spontaneity. Urban design is defined by programme appropriated to the users from higher social classes; they are monitored by different systems of control (CCTV, cameras, police) due to constant fear of diversity. On the other hand, the public space in suburbia lacks programme, it is vandalised, vacant, and has no future perspective to offer to the dwellers.

Both cases can lead to disconnection between dwellers and public space, which can be used as an opportunity for place-making, a method of neighbourhood, city, or region improvement, where dwellers collectively reinvent public spaces as the centre of their community. Place-making creates a boundary between people and places. In a collaborative process, a public space can be shaped in a way that maximises its shared value. Not in a sense of promotion of urban design, its products or its authors, but rather through establishing patterns useful for

FIG. 2.1 Vacant public space lacking communications with dwellers in Ljubljana's suburb Zalog *(Photograph by Domen Grögl, 2013)*

the creation of spatial, cultural, and social identities that define a place. Projects that prioritise place-making should be implemented by incorporating community-based participation so that they result in the emergence of high quality public spaces that contribute to a better quality of life (Bugarič, 2017).

Growing disconnection between users and public space creates perfect conditions for the development of investor urbanism, where developers dictate the programme and design of public space. Investor urbanism forms spatial developments in which investors and/or politicians make decisions about a city's further development without giving residents or other community representatives the possibility to provide their input. This process creates racial, economical, and sexual or gender segregation amongst the dwellers of the neighbourhood.

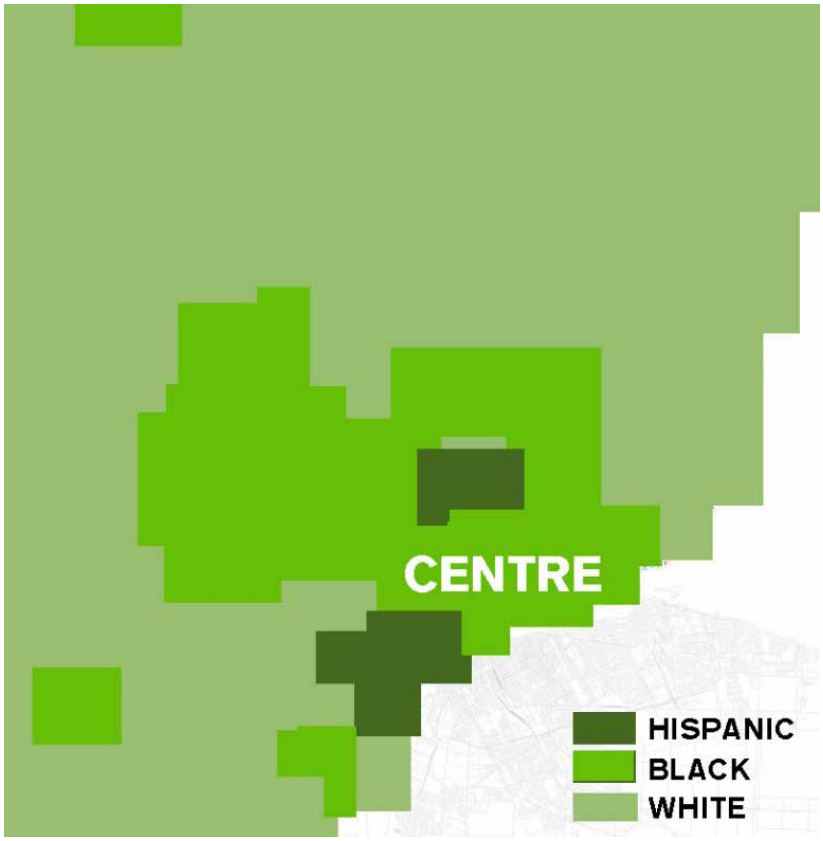

FIG. 2.2 Detroit exhibits strong racial segregation: the city centre became a ghetto, housing former workers after the devastation of the car industry while the higher classes have moved to the suburbs *(Fischer, 2017) (Image by Bugaric, 2017).*

The urban places of the 21st century will be represented by public spaces between the virtual and physical world, where people will meet and talk either online or offline. Merrifield (2014) is convinced that this will erase the difference between public and private space and bring a new definition of space: passive or active. The active places will encourage active meetings of users while the passive ones will be reconciled with their inert character. This is the future of the global city, the development of two opposite features. Sassen (2017) argues the thesis that the global city plays on a strategic frontier zone and thus empowers those who lack power, the disadvantaged, outsiders, and minorities who are discriminated against, i.e. the modest middle class. "The disadvantaged and excluded can gain presence in such cities in a way they cannot in neat, homogenous provincial cities. In the global city, they become present to power and to each other, which may include learning to negotiate their multiple differences. They can hack power and they can hack their differences of origin, religion, phenotype." (Sassen, 2017). Such organisation develops communities, which, connected by similar interests, start to impact on the physical as well virtual city development.

3 Neighbourhood Communities

Neighbourhood is a social community, a spatial unit within a larger city, town, suburb, or rural area with face-to-face interaction among members. Schuck and Rosenbaum (2006) define it spatially as a specific geographical area and functionally as a set of social networks where residents seek to realise common values, socialise, and maintain effective social control. Mumford (1954) referred to the existence of neighbourhoods wherever human beings congregate in permanent family dwellings. So, what is a neighbourhood in a global city? It shares the diversity in local identity and the needs for global survival in the time of ecological disasters, climate, and economic change. The primal idea of the neighbourhood involves three parameters: natural micro-climatic, socially cohesive, and economically independent. According to these, different typologies of city infrastructure can be developed, which function as a framework for the sustainable community of the 21st century. There are three basic points that shall be reconsidered when we create a new community system infrastructure: development of green areas, distribution of water, and migration flows. There is no sense in differentiating between central and suburban neighbourhoods, but rather in defining those that will contribute to the ecological self-sufficient use of space, goods, and relationships. As deregulation, privatisation, and new fiscal and monetary policies on governments take effect in the corporate sector of global cities, Sassen (2017) is convinced that "in this sense, then, the corporates hacked the city because that making of new instruments was a way of constructing the equivalent of the old military "fort" of the historic frontier: the corporate zone in our cities is a protected, private space. And corporate actors have been doing this since the late 1980s in city after city, worldwide, to ensure they have a global operational space that suits their interests." Hacking the global city means, in a way, to create a frontier zone in which power can no longer have access. This zone is created by a strong sense of community.

3.1 Green Areas

After the Second World War, a process of modernisation drastically changed the structure of the city through the process of rebuilding the destroyed infrastructure and constructing new housing typologies. The new neighbourhoods become a space where many people emigrated from rural areas, thus creating a need to build new houses, which affected the green areas. The necessity of building new housing greatly reduced the surfaces of green areas, which is one of the main reasons for microclimatic changes in cities, as the micro-climate used to play a role in water circulation. It is important to embrace a more sustainable type of urbanisation, which will help to regenerate the former microclimatic situation within cities.

3.2 Water Distribution

According to the UNESCO Report (2016), megacities face the threat of climate change affecting their water-related needs. By 2030, over a billion people will live in approximately 100 very large cities and 60 % of the world's population will live in urban areas, so sustainable water management is particularly important (UNESCO Report, 2016). The cities will be exposed to extreme risks in terms of negative impacts of climate change on water and sanitation infrastructure and services. At the Habitat III conference in Quito a publication "Water, Megacities and Global Change" was launched, and which describes 15 emblematic megacities: Beijing, Buenos Aires, Chicago, Ho Chi Minh City, Istanbul, Lagos, London, Los Angeles, Manila, Mexico City, Mumbai, New York, Paris, Seoul and Tokyo, their unique circumstances and how they are addressing shared water governance challenges (UNESCO Report, 2016). These cities have often failed to develop their urban services, including those relating to access to water, sanitation, and rainwater drainage. The demand for drinking water is a challenge for several megacities, most notably for Mumbai, where the distribution system is almost non-existent in slums, which, according to the UNESCO Report (2016), host 56% of the city's population.

Water should be a constitutional right, not regulated by monopolistic companies but supplied equally to all users. Slovenia has, for example, made drinking water a public good, a good that cannot be privatised and is primarily used sustainably for the care of the population and animals. Only once these are taken care of can it be used for the economic needs of Slovenia, and finally for export, if the supply of drinking water permits it. Article 70a of the Slovenian Constitution gives everyone the right to drinking water and the water resources are a public good under government management. This is a fully demonstrated case of the right to water.

3.3 Migration Flows

Migration flows have already changed the structure of the world and political, economic, and social migrations are shaping the cities of tomorrow. One of the possible future causes of migration will be the lack of water and basic food supply. Europe is already facing the challenge of different migration flows; many newcomers are coming in search of asylum, fleeing from wars or trying to satisfy some of their basic needs. The cities shall implement new ways of food production and water recuperation as people continue to emigrate from rural areas. At present, more than half of the world's population is living in cities. In the future, the proportional prevalence of cities over rural areas will further increase. The city will therefore need to become a site for the development of more sustainable ways of eating, living, and moving. It should become climate-friendly with the goal of preserving natural resources. The voids or empty spaces in the city shall be used as green areas, which will increase biological diversity and contribute

FIG. 3.1 Prinzessinnengärten is a pilot project that started in 2009 on wasteland at Moritzplatz in Berlin Kreuzberg. It represents an urban place of learning, where users can learn about organic food production, biodiversity and climate protection. The photo shows Die Laube in the garden *(Photograph by Boštjan Bugarič, 2017).*

to a better micro-climate. Simultaneously, a sense of community shall be developed through the exchange of competencies and knowledge. In accordance with the New Urban Agenda of Habitat III (2017), it is important to embrace more appropriate policies and assist governments in addressing challenges through national and local development policy frameworks. The New Urban Agenda of Habitat III (2017) is to promote the adaption of national urban planning and planned city extensions to climate change, as well as to increase biological, social, and cultural diversity in city neighbourhoods with new ways of living together. The integration of equity into the developmental agenda creates an environment for social justice, ensures access to the public sphere, extends opportunities, and increases the scope of shared commons (New Urban Agenda of Habitat III, 2017).

4 Communication Process

As defined in Habitat III, one of the changes shall start at the neighbourhood level, with the challenge of how to attain a sense of community awareness among the dwellers that in turn will get involved in the communication processes. The first step starts with the so-called small actions and "do it together" urbanism. Basic small actions like planting trees, collecting water, and including the individual in community life, lead towards the creation of a better environment on a small scale within the city. Sicking (2017) explains that (pre-)conditions of sustainable spaces include safety, diversity, and inclusion; there is no sustainability in places where people feel unsafe - and safety comes with the social coherence in which people watch over each other. Mono-functional areas are unsustainable, and only diversity of

functionality can lead to the development of places where people like to live. This can be achieved by including local dwellers in the renovation of their neighbourhood; through the process, they also get to know one another and regain contact with their own environment. Sicking (2017) notes that people, once they are proud of their neighbourhood, start to take care of it. This starts with the participation of inhabitants in the renovation of their built environment and the establishment of new modes of communication.

Implementation of urban acupuncture is based on temporary action, which gains continuity through the process of participatory design. In the context of neighbourhood recuperation, an urban acupuncture treatment for suburban neighbourhoods will be introduced here. Bugarič (2017) defines urban acupuncture as an implementation of a small-scale action in public space, where dwellers are encouraged to take part in the co-creation of new amenities. This was the topic of the project Cultural Acupuncture Treatment for Suburbs (acronym CULBURB), which was implemented by the Centre for Central European Architecture (CCEA) in Prague and co-organised by local partners in six participant Central European cities: Slovenia - Ljubljana/ Zalog, Czech Republic - Prague/ Psary, Austria - Vienna/ Sandleiter, Slovakia - Bratislava/ Rusovce, Hungary - Budapest/ Delegyhaza, and Poland - Warsaw/ Ursus. The project ran from 2010 to 2013 and was funded by Culture Programme – Education and Culture.

4.1 Suburban Locations

European suburbia develops in borderless landscapes on the outskirts of historical city centres. "Around Central European capital cities there are traditional villages already filled up with factory workers since the second half of the 19th century; these communities were usually annexed to the cities during the 20th century, sometimes evenly urbanized to form sub-centers of the cities, but sometimes still keeping the form of an interior suburb, with much poorer infrastructures than interior parts of the urban areas. This first wave of suburbanization occurred as an effect of the industrialization, arriving late to Central Europe. The same process lead to the formation of the first upper-class suburbs, where aristocrats and richer layers of the society escaped from the centres affected by noise, pollution and the more and more visible working class. All these first suburban areas – originally characterized by mono-functional living environments never seen before – today form part of the cities themselves" (Kádár, 2012). To be more concrete, let us take a look at six different contemporary European suburban sites and theirs main characteristics.

In close proximity to the city border of Prague lies Psáry. This area is strongly influenced by the massive immigration of the middle class to new large houses in the countryside. The area is, therefore, mono-functional, with a high-density of housing estates and a lack of services that can afford a high quality of living. The public housing neighbourhood, Sandleiten in Vienna, is located at the north-western

edge of Ottakring. Sixty thousand apartments were built in this biggest housing complex between 1919 and 1934. By 1990, 80% of dwellers were 70 years old or older. With an influx of immigrants to Sandleiten, the dwellers no longer felt safe. A village called Délegyháza lies beyond the southern edge of Budapest. The area of 300 hectares has many natural lakes, which have been a site of recreation and development of leisure tourism since the early 1980s. The original working class population of the old village has found itself cohabiting with people moving to the area after retirement. Bratislava's non-urbanised zone, Rusovce, is separated from the city centre and represents an example of suburbanisation. A real estate boom created an urban sprawl in all directions around Bratislava where fields were turned into building sites. The proximity of people from different ethnic backgrounds has created an increase in nationalism. Ursus is situated in the western part of the densely built-up area of the Warsaw conurbation. A process of urbanisation, whereby the old individual houses in the area were replaced with new standardised structures, accompanied the industrial development of the area; after the end of the Second World War, Ursus became the world's leading site in the production of tractors, with production peaking in the 1970s (Urban Acupunctures in the suburbs – CULBURB, 2013). Today, it is marked by a growing unemployment rate, a rapidly aging population, and environmental threats (Urban Acupunctures in the suburbs – CULBURB, 2013).

Zalog is located at the eastern edge of Ljubljana. In the Yugoslavian era, the area experienced intensive immigration from various parts of Yugoslavia, which produced a local generation with a very diverse mix of cultural backgrounds (Urban Acupunctures in the suburbs – CULBURB, 2013). It is still not an area with a predominantly Slovenian population, and it has proven difficult to integrate local youngsters into their city, as they have developed their own urban identity (Džokić, Neelen, & Bugarič, 2011).

4.2 Urban Acupuncture

Urban acupuncture creates points of engagement of dwellers within a local community. Small actions in micro-urban environments create diversity in the programme of public spaces and foster interactions between inhabitants, which in turn have an impact on community life (CULBURB, 2013). Gruber (2012) talks about urban acupuncture as a set of actions "based on an inductive reading and physiological understanding of an urban milieu. It identifies neuralgic points for focused interventions that promise to add-up to more than the mere sum of their parts. (...) Only then might urban plans be implemented also bottom-up and incrementally through constant feed-back and re-adjustments." Before starting any urban acupuncture action, it is important to carry out research about the residents' needs and the kind of programme that should be developed. The implementation of a suitable programme is the basis of place-making. Only continued feedback loops that allow readjustment enable the building of trust within the community, which strengthens the impact of the process at each location.

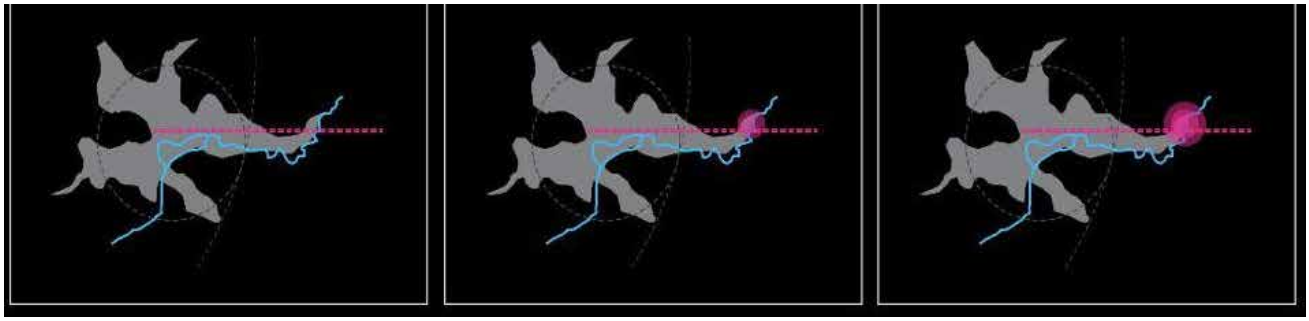

FIG. 4.1 From Zalog to city centre of Ljubljana drives a regular six minutes train *(Source KUD C3).*

Actions set up using minimal means create interaction between inhabitants and have an impact on community life. The process of implementing urban acupuncture is structured in three phases: research, urban content observation and action planning. The method can only create notable results after long-term implementation (Bugarič, 2017).

Phase one – research involves all parties into the process of creating amenity and collaborating with local stakeholders to build general trust. In **phase two - urban content observation**, dwellers are involved in communication with experts through social media, which helps to design amenities according to the needs of local community, which are identified by means of observing the target group. **Phase three - action planning** is the implementation of urban acupuncture on location, through collaboration of actors in the process of place-making. Neglected or vandalised space thus becomes a neuralgic point of community recuperation.

LOCATION	PUBLIC SPACE	PARAMETER	IMPACT/USERS
Slovenia Ljubljana, Zalog	- vandalised space - lack of interactions - growing nationalism	Physical	Creation of a new meeting point for the neighbourhood
Czech Republic Prague, Psary	- suburban housing - lack of interactions	Physical Social	Development of new relationships in the neighbourhood
Austria Vienna, Sandleiter	- lack of interaction - growing xenophobia - ageing population	Social	Recuperation of community: newcomers – elderly dwellers
Slovakia Bratislava, Rusovce	- urban sprawl - growing nationalism	Physical Social	Discovering, creating new amenities for the dwellers
Hungary Budapest, Delegyhaza	- touristification - lack of diversity	Physical	Creation of the relationship between nature and the city
Poland Warsaw, Ursus	- high unemployment rate - ageing population - environmental threats	Physical	Redefinition of the amenities for the urbanised area

TABLE 4.1 Comparative analysis of several sites of urban acupuncture projects according to parameters and impact

The presentation of all implemented acupuncture actions is available at www.culburb.eu, and the synthesis of their influence on public space is presented in Table 4.1, where we can observe how different parameters support the recuperation of the community and revitalisation of public space.

4.3 Urban Acupuncture Implementation in Ljubljana

The urban acupuncture process in Ljubljana took place in the suburb of Zalog. A non-governmental society, KUD C3, was the coordinator responsible for associating youngsters' perception of space with stakeholders' interest during a long-term process. These efforts resulted in the renovation of the playground, which became a new meeting point for the neighbourhood. The implementation of the project started in April 2010 and finished in June 2013. KUD C3 coordinated the activities of institutions and stakeholders, including the Municipality of Ljubljana, the local church in Zalog, the local community of Polje, the primary school, the kindergarten, the retirement home, and the Youth Centre Čamac.

The youngsters from the Youth Centre Čamac - Zalog got the opportunity to communicate their needs in relation to their direct environment. The goal was to actively involve them in shaping the environment according to their needs to overcome their usual passive critical attitude towards public projects and exploit their often-undervalued creative potential. The project focused on possible changes in Zalog that could be made without large financial investments. Reconstructing the vandalised playground in Zalog represented a possibility for a common project, directly self-initiated by the local youth and concerning the reconstruction of their immediate environment. This location had been a favourite meeting place for the young but came with a long-standing problem of vandalised benches and housing illegal activities, no available drinking water and no adequate lighting, which could help to stop vandalism and drug dealing.

The manual "*This place exists only while we are here*", published in collaboration with STEALTH.unlimited, Džokić et al. (2011), presents research on actions from Ljubljana's neighbourhoods, Šiška, Bežigrad, and Zalog, and highlights the problems of Ljubljana's youth and their perception of public space. In particular, Ljubljana's suburbs are characterised by a relatively large population of second-generation immigrants, descendants of newcomers from other parts of Yugoslavia. In Zalog, these second-generation immigrants were born into mixed marriages or are children of immigrants from Serbia and Bosnia and Herzegovina.

4.3.1 Research of Built Environment - Phase One

KUD C3 collaborated with the Youth Centre Čamac as research partner. By working together, the collaborators defined the location and content of renovation in Zalog. Together with the city municipality of Ljubljana and the Zalog primary school, a process of building trust had begun. Research results were presented by Džokić et al. (2011), and at events in several public spaces in Ljubljana in collaboration of institutions like the Modern Gallery Ljubljana, ŠKUC Gallery and the Zalog primary school. These events brought the local population together with architects, artists, designers, sociologists, cultural anthropologists, writers, and curators. They were encouraged to start active participation in the shaping of the environment they live in through lectures, discussions, art interventions, exhibitions, and participation in workshops.

A

B

C

FIG. 4.2 A+B+C: Place-making in the suburb of Zalog in Ljubljana *(Photo: Domen Grögl, 2013)*

4.3.2 Urban Content Observation - Phase Two

Youngsters communicated with experts through social media channels (mostly Facebook). In this way, the suitable content for public space was defined according to the needs expressed by the target group. The most important time for the introduction of this phase was the first year of project implementation. KUD C3 created connections between the Youth Centre in Zalog and potential partners, while holding weekly meetings with different stakeholders and observing the needs of focus groups over a long period. There were approximately 100 youngsters involved in the project, and around 700 other people from the Zalog neighbourhood, present when the project was presented in other institutions and cities, among them the Parsons New School for Design in New York, the Faculty of Architecture in Belgrade, the Faculty of Architecture of the University of Ljubljana, the Deutsche Architektur Zentrum in Berlin, the Architekturzentrum in Vienna, the Academy of Design (Slovenia), and Soho in Ottakring (Austria).

This phase included the feedback from social media, weekly interviews, and hanging out at the playground performing a study of the behaviour of youth gathering there. The distribution of the conclusions drawing from these observations was carried out via social media channels and at live conferences and different platforms designed to involve as many individuals from the local community as possible and reach the largest possible audience.

4.3.3 Action Plan for Urban Acupuncture - Phase Three

The main focus in Zalog was devoted to the playground called Plata, which had become a place used by drug dealers. This place was transformed into a community meeting spot over the course of five years when the urban acupuncture strategy was implemented and the playground was outfitted with lights, new benches and water fountains. In addition to young people, the space attracted elderly residents and mothers with kids, all of whom played a role in the making of what was once a vandalised area into a community gathering space. This phase was executed between 2011 and 2015. Five artist residency programs were carried out in the Zalog neighbourhood in coordination with KUD C3 and were described by Bugarič (2017); they will be presented below.

FIG. 4.3 *Down by the Water* urban acupuncture; building a new water fountain *(Photograph by Domen Grögl, 2013)*

FIG. 4.4 *Design Your City* urban acupuncture with the architect Daniel Diaz Vidaurri from Mexico City and DJ Borka *(Photograph by Domen Grögl, 2012)*

FIG. 4.5 *Conversation* urban acupuncture was carried out by artists Yane Calovski and Hristina Ivanoska from Macedonia, developed with the creative participation of designer and researcher Anette Lundeby from London *(Photograph by Domen Grögl, 2013).*

The first acupuncture intervention, entitled *Down by the Water*, was designed as a cooperative act between youngsters and experts. The project involved reusing old materials in the renovation of the vandalised playground; it gave the youth a greater sense of responsibility for their environment. The young people's attitudes have, in this way, turned from those characteristic of a consumer society to those marking a society with a higher awareness of spatial, ethical, and ecological aspects of their environment. The experience was focused on the topic of water recuperation and was carried out in 2011-12 through a collaboration between the KUD C3 expert team and the young people from the Youth Centre Čamac.

The second acupuncture intervention was organised in December 2012 in collaboration with the architect Daniel Diaz Vidaurri. His approach was a workshop Design Your City, in which he encouraged the youth to design their ideal city, illustrating the way they perceive public space and the way they would like to break the social and physical barriers to link up with the areas in the city they do not usually use (Urban Acupunctures in the suburbs – CULBURB, 2013). Conversation, the third acupuncture intervention, engaged citizens in a dialogue about their personal and collective expectations concerning public space via a collective performance entitled Stone Soup, based on an old folk story. The performance was a participatory way to draw out the youth's opinions about public space. The acupuncture intervention was realised in March 2012 and mostly involved the children from the Zalog primary school.

FIG. 4.6 *The Meeting Stripe* urban acupuncture with designers Nina Mršnik and Vahakn Matossian Gehlhaar *(Photograph by Domen Grögl, 2013)*

FIG. 4.7 *Womenspace* was created by Tanja Maljevac, Tina Cotič, and Ida Hiršenfelder *(Photograph by Domen Grögl, 2013).*

The *Meeting Stripe* acupuncture intervention, executed between November 2012 and June 2013, was at a patch of grass next to the playground in Zalog. A meeting place was designed for local youngsters, who were also partners in the creation process, and they, in turn, become proud owners, who take good care of their new meeting spot. During workshops, they took formal decisions when encouraged to talk about what is needed in the area, constructed models, and made good choices. The intervention featured collaboration with local artisans and businesses, in order to source the necessary materials, and show the young people how they can initiate the processes and source the materials themselves at some later point.

The fifth acupuncture intervention, *Womenspace,* took place between January and April 2013 in various public spaces in Zalog. Within this series of workshops and interventions, the team explored the relationship between women and public spaces in Zalog. Women of different ages and backgrounds talked about how they are involved with public space, how they experience it, and what accommodations they need and wish to install there. The collection of their thoughts in the form of stories, drawings, and mental maps can be used to move forward when working on the improvement of public space for women (Urban Acupunctures in the suburbs – CULBURB, 2013).

The final review of the results of the CULBURB urban acupuncture strategies were presented and evaluated at the Forum Acupuncture Conference in Ljubljana in April 2013. Each of the local coordinators and authors from the six cities involved presented five implemented urban acupuncture actions.

5 Results

An analysis was performed that compared the research approaches used in three suburban locations: Psary, Sandleiter, and Rusovce, with those used in Zalog. The process of urban acupuncture implementation was compared in terms of continuity of the process and strategies for revitalising public space, which include trust building among dwellers, horizontal stakeholder's collaboration, community involvement in the planning process, and development of intergenerational communication. Results are presented in Table 5.1.

	PSARY	SANTLEITER	RUSOVCE	ZALOG
Research Process	Conducted during the same period, producing the basis for urban acupuncture.			
Duration of the process	During project implementation	Lack of communication	During project implementation	Continuation after project implementation
Parameters for revitalisation of public spaces				
1.trust building	1. YES	1. NO	1. NO	1. YES
2.horizontal stakeholder's collaboration	2. YES	2. YES	2. YES	2. NO
3.community involvement	3. YES	3. NO	3. YES	3. YES
4.intragenerational communication	4. NO	4. YES	4. NO	4. YES

TABLE 5.1 Locations and revitalization/ recuperation parameters

The research performed in all four locations followed a similar methodology. It was conducted in the same time period, and produced similar research structures and comparable bases for implementing urban acupuncture. The continuity of the process strongly increases positive effects, like the gradual build-up of dwellers' trust and the identification of proper amenity for public space. Though some clearly visible progress was made in Zalog, the horizontal stakeholder's collaboration was not achieved as planned, so the process of urban acupuncture partly failed its purpose. This is demonstrated in the fact that the community centre in Zalog was demolished. The new building only houses commercial use on the ground floor, while public facility is set up on the first floor with no direct access to public space. The Youth Centre was moved to another location to make room for new shopping infrastructure. Fig. 5.1 shows the oversized building that does not satisfy the needs of local community.

The Youth Centre Čamac is now situated in the old library building. Performing place-making in the new location of Čamac, an urban amenity observation with students of Faculty of Architecture, University of Ljubljana, was carried out between February and April 2017. "Creative and experiential learning and work help us to build values, skills and knowledge with everyday work and social experiences" (Fikfak, 2013, p. 265). The needs of youth were communicated via new communication tools. Observing the communication of youth in Ljubljana, we discovered that they only raise their voice using social media. This is a channel that gives them a sense of safety.

FIG. 5.1 The new building in Zalog combines commercial and public amenities in an oversized format and has no communication with public space *(Photograph by Domen Grögl, 2017)*.

The basis for the place-making was developed on the grounds of research during the process of urban acupuncture applied within the CULBURB project in the period from 2011 to 2013. Table 5.2 presents the most important results of the impact that urban acupuncture in Zalog exerted upon public space, development of communication, and involvement of the local population.

URBAN ACUPUNCTURE	COMMUNICATION DEVELOPMENT	IMPACT ON PUBLIC SPACE	INVOLVEMENT OF LOCAL RESIDENTS
Down by the Water	Excellent: connection between Youth Centre and municipality, primary school, retirement home and local stakeholders	Excellent: reconstruction of the Plata playground	Youth 11-25 years Elderly 60-70 years (possibility of intragenerational connections)
Design Your City	Very Good: connection between Youth Centre and municipality, collaboration of international institutions	Very Good: identification of dangerous spaces and spaces related to neighbourhood identity	Youth 15-20 years
Conversations	Very Good: connection between Youth Centre and primary school	Good: educational impact	Children 8-11 years
The Meeting Stripe	Excellent: connection between Youth Centre, primary school and local stakeholders-craftsmen	Excellent: identification of the meeting point for dwellers	Teenagers 11-18 years
Womenspace	Excellent: connection between Youth Centre and local activists	Excellent: identification of safe spaces for women in the neighbourhood	Women 10-60 years

TABLE 5.2 Place-making - implementation analysis of the CULBURB project in Zalog from 2011 to 2013

6 Conclusions

The neoliberal capital flow strongly influences the spatial development of neighbourhoods in post-transition Eastern European countries. Investor urbanism represents a form of spatial development in which investors and politicians make decisions about urban development without the involvement of the city's population and experts. This results in a lack of diversity of facilities, and development of the one-way communication of interests of the political elite and capital investors, i.e. the developers. It is not possible to fight investor urbanism

directly, but rather from the bottom up, starting from creating better communication within a particular local community and thus creating a self-sufficient micro-urbanism. Civil society organisations need to amplify community voices, lobby against investor urbanism, and counteract some of its destructive effects. Without an alternative to investor urbanism, urban space stays under the control of gentrification policies, as Florida (2003) first observed in The Rise of the Creative Class. His basic idea is that attracting creative people to the city will strengthen its economic performance, but as Riegler (2013, p. 3) notes, gentrification is just a sugar-coated term like urban renewal, urban regeneration, etc. Policy makers can hide behind Florida's (2003) theory and promote an urban environment composed of neighbourhoods, which favour the young, urban, creative elite while completely ignoring the needs of the current residents. In response, Florida, in his recent interview (Chamberlain, 2017), opens a new chapter addressing the new urban crisis of the growth of poverty in the suburbs. The reason behind the new crisis lies in the fact that people who move to the suburbs today are those who are less advantaged and have been pushed out of the city centre. This increases spatial inequality and, with that, a decline of the middle class in city neighbourhoods. The nature and dynamics of urban sprawl in Central Europe (Couch, Petschel-Held, & Leontidu, 2007) takes on different dimensions: infrastructure-related sprawl can be seen around Athens; sprawl in the post-socialist cities, such as Warsaw and Ljubljana; sprawl based on the development of second homes in Austria. "Some qualities of these undefined, transitional landscapes should be discovered, and reformulated to give a new sense of place to these often non-places. The traditional urban planning policies will not work here. The efforts to tie these areas to the cities are too big and expensive to be feasible." (Kádár, 2012).

Using urban acupuncture, which focuses on small-scale projects in the city, makes it possible to connect investments in public space with the residents of neglected areas. This can give rise to resilience projects based on community needs and active participation of dwellers. The open public space of the playground in Zalog is an example *par excellence* how these kinds of interventions can change a neglected space into a main meeting point for a neighbourhood. The case of the Youth Centre Čamac, displaced to another location because of investor urbanism, shows how the interest of capital took precedence over the interests of residents. This happened after the conclusion of the urban acupuncture process, when investor urbanism took over planning in Zalog. The Strategy of Urban Acupuncture should always be part of place-making in locations where investor urbanism takes control over an urban space, depriving its residents of their own right to the city.

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Participatory Revitalisation of Urban Public Open Space _

Urban Planners' Skills Needed for Improvement of Urban Public Spaces in Participatory Manner

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ABSTRACT **Urban regeneration is a complex process that involves a variety of actors with different interests, roles, and powers. In recent years, an awareness has risen that local communities have valuable knowledge and abilities that can contribute to the success of the urban regeneration of local environments. On the other hand, there is still bias against a more direct involvement of civil society in the urban planning process due to additional organisational and financial efforts needed, but also due to inadequate knowledge in the field of participatory urbanism on the part of urban planners. The paper discusses people's motivations to self-participate in the reclamation of urban public open spaces and the skills that urban planners need to efficiently cooperate with local initiatives in the urban regeneration processes. Based on a review of scholarly work and case studies throughout Europe, collected within the Human Cities project, it points out the important issues that urban planners have to bear in mind for a better cooperation with citizens. It discusses the expertise and skills needed for an urban planner/designer to be able to moderate such processes and thus contribute to a more sustainable urban development based on local knowledge and skills.**

KEYWORDS urban regeneration, public participation, urban planning skills, civil initiatives, urban public space

1 Introduction

Public participation in urban planning has been a well-developed concept within the profession for many decades. It is often regarded as a measure of how inclusive and democratic an urban planning process is (Dargan, 2009; Socrates, 2009; Juillet, Sauriol, & Rochette, 2015). In scholarly investigations, there seems to be a wide consensus on its advantageous effects for the parties involved (Arnstein, 1969; Kaza, 2006; Denters & Klok, 2010; Moore & Elliott, 2015). At the same time, a discussion is ongoing about the definitions and attributes of truly participatory processes in contemporary urban planning (Beebeejaun, 2016).

Chattopadhyay (2012) argues that there is still a large gap between constitutional provisions for participation and their actual implementation. His distinction between so-called numerical and effective representations addresses an important question: to what level is a general public able to truly get involved in participatory approaches. He argues that most of the citizens, especially those from socially and economically disadvantaged environments, are unable to directly raise any issue and/or participate in discussions, so the numerical representation cannot be automatically translated into the effective representation. This stresses the role of the urban planning profession in setting up the supportive environments for people of all walks of life to become active players. On the other hand, this can only be achieved when trust in the participation process among inhabitants is established (Aitken, 2012).

This relates to the ladder-hierarchy of levels of participation developed by Arnstein (1969). She structured the community participation in eight levels and classified them hierarchically. The first two, manipulation and therapy, are regarded as nonparticipation with the reasoning that their main purposes are to educate or cure the community members. The following three levels are informing, consultation, and placation, and she describes them as tokenism - the participants act as advisories rather than decision makers. The highest levels are partnership, delegated power, and citizen control, which allow the participants to have a stronger voice in the decision-making process. These three highest levels are particularly important in urban public space design because public open space is a common space of everyone and in one way or another affects the lives of all citizens and only a truly inclusive co-design can bring benefits to a wider community (Mitchell, 2012).

In the last two decades, urban open public spaces have been given new attention within the urban planning profession (Madanipour, Knierbein, & Degros, 2014; Andersson, 2016). It has appeared as one of the key topics in the strategic documents that are guiding the future development and qualitative growth of urban settlements at a global scale (Habitat III, 2017) as a part of a sustainable development agenda. Novel approaches to public space activation have been encouraged in order to address the social component of the sustainability agenda, and, among others, the engagement of the civil society in planning

and implementation processes. Through the self-organisation of local communities, public space is seen as a venue for social interaction and public presence, in which tolerance and diversity are also promoted (Holland, Clark, Katz, & Peace, 2007).

If we accept community involvement as a tool to achieve better urban public open space, we have to rethink the established modes of operation of the urban planning profession too. Participation has been embedded in urban planning processes in different planning systems in various forms (Lang, 1987; Carp, 2004; Laurian & Shaw, 2008; Wilson, Tewdwr-Jones, & Comber, 2017; See et al, 2016). Our aim is not to focus on planning systems and their provisions for public participation, but on the role of urban planners in the participatory approaches to urban public open space. In this context, it is crucial to understand the roles of the other key players too – the community and its active citizens, investors, owners of properties affecting public space, local businesses etc. These actors also have to be considered as all of them have their own expectations, demands, and needs, as well as abilities and responsibilities, and only well-balanced and moderated relations between them can lead to a successful co-design process. However, among all these actors, local community has a special role as it acts as a provider and a consumer of a co-created urban public space at the same time.

2 Public Participation and Urban Public Open Space

According to Beebeejaun (2016), the urban planning profession is getting more receptive to bottom-up initiatives. This may partly be grounded in the economic difficulties caused by the global economic recession from 2008 onwards, which forced local governments to rely on local resources, skills, and knowledge to be able to implement urban development strategies (Nikšič, 2014; Resnick, 2016). At the same time, it may be a result of a rising awareness that, after the decades of a rather rhetoric approach to sustainable development, the theoretical concepts must be practiced in everyday life. Both aspects were concisely expressed by Barton (2017), who said that planning is for people, and that the intention must be to evolve towns and cities that are good for people to live in - not for just some people, but all people, no matter what their incomes or abilities.

When the profession is ready to give more power to those who use the end result of spatial planning, i.e. the citizens and other users of the urban environment, this cannot be a rapid change - the whole process is firmly embedded in wider socio-economic environments that are still very much driven by the neo-liberal agendas primarily seeking monetary profits (UNRISD, 2010; Nikšič & Sezer, 2017). The willingness to pass the planning power to people is only one step, albeit a very important one, towards a truly participatory practice. It is essential to offer citizens a variety of options for participation that are also close to their everyday mode of operation (Forester, 1999). In other words, urban

planning professionals shall not only wait for the initiatives to start to exist and act, but shall also propose and develop workable mechanisms and tools for truly participatory urbanism.

Within these endeavours, it is necessary to reveal citizens' motivations for participation in urban planning procedures and analyse the existing approaches to civic improvements of public spaces to understand what does (not) work in practice.

2.1 Citizens' Motivations to Participate in Urban Planning Procedures

Since the 1960s, when the official planning systems were opposed by strong, organised civil movements, a lot of scholarly work focused on the motivations of citizens to get actively involved in urban planning matters. The first investigations were mainly focused on the movements arising as opposition to official planning policies (such as Jane Jacobs's movement, 1961) and only later focused on the initiatives that did not necessarily arise from a protest movement, but in which active involvement in urban planning processes came from other motivations. Some selected studies are presented below, with the aim to set up a workable conceptual framework of citizens' motivations for active participation in urban planning and development.

Rosenstone and Hansen (1993), who studied the link between inequality and representativeness, claim that citizens are motivated to participate based on their personal costs and benefits. Similarly, Kaza (2006), based on a research of individuals' and groups' incentives to participate in planning procedures, points out that if these costs outweigh the perceived benefits, it would not be in one's interest to participate, or even communicate, within the participatory processes.

Xu (2007) argues that the dependency on public services is an important motivator for people to (not) take a proactive role – the more dependent people are upon these services, the more motivated they are for these services to be of a correct level – which makes them more involved in common matters and participation. Along with a review of some other studies done in the global west (Rubin & Rubin, 2001; Steggert, 1975) Xu argues that gender, educational and income levels, occupation, ethnicity, living arrangements, and membership of certain types of groups are the key factors that distinguish people who participate in community affairs from those who remain uninvolved. Additionally, she stresses that these factors are deeply culturally conditioned so any worldwide generalisations are not possible. On the contrary – based on the findings of her research in China – she finds some major differences between Chinese and western practices.

The socioeconomic status of the participant is also an important factor according to Verba, Nie, and Kim (1978). They studied the socioeconomic circumstances of individuals, and how these influence the likelihood of their participation. The findings show that socioeconomic status leads

individuals to develop a certain set of civic attitudes, which further leads to a higher or lower probability of participation. According to their findings, participation is higher in smaller communities, while urbanisation decreases participation. Besides economic status, Smith Reddy, and Baldwin (1980) point out that general wealth is an important factor too – they claim that people working in professional occupations, along with those with higher levels of education, more often become involved in organised community activities. However, Xu (2007) came to the opposite conclusion based on research of Chinese practices, claiming that in urban settlements people with lower levels of income and education were more likely to participate. This can be once more explained by their greater dependency on, and thus involvement with, the public programmes and amenities, and again points out the cultural embeddedness and the complexity of mechanisms that influence people's (motivations for) participation.

Rosenstone and Hansen (1993) link the question of active participation to the question of inequality and representativeness by arguing that the level of participation is an indicator of inequality – the lower the level of participation is, the higher the degree of political inequality and the more serious the problems of representativeness are. This clearly puts part of the responsibility for the operational participation into the hands of politics and official procedures.

The role of administrative structures is pointed out by Denters and Klok's study (2010). They studied a participatory approach to urban planning in one Dutch city after it experienced a devastating fire. They investigated the role of former residents in the reconstruction of a devastated district in the city centre, and showed how a well-ordered process and a mobilisation campaign helped to keep people motivated and actively involved throughout the entire urban reconstruction. By studying people's subjective interests, place of residence (i.e. the distance of their home from the epicentre of destruction), and home ownership they concluded that the two most important motivational factors are people's (various) subjective interests and the physical proximity of their homes to the place(s) that is being examined.

Property ownership was also identified as an important factor in a study by Hooper and Ortolano (2012). It showed that, contrary to the expectations of movement leaders, the question of property (non) ownership was central to the decision of whether or not one would take an active role in a civil movement. The authors report that people who were the property owners were significantly more likely to participate in risky and time-consuming activities than the renters were. The three factors that favoured participation by the owners in this study were the nature of expected payoffs, greater belief in the efficaciousness of the action, and greater connection to place. Renters may be unlikely to participate in activities focused on long-term future payoffs. The authors conclude that it is important to determine what stakes would be attractive enough for all parties, including non-owners.

Pares, Bonet-Marti, and Marti-Costa (2012) pointed to another important issue. Based on the study of ten deprived neighbourhoods in Spain, they argue that it is not the lack of opportunities for participation, but sometimes it is rather the inflation in the number of participatory forums without proper coordination, that limits the range of the participatory approaches, which can ultimately result in a participatory fatigue. Similarly, the inappropriate response of the administration - the production of participatory structures that respond to the functional logics of the administration rather than to the capacities, interests, and dynamics of the local network of civil society organisations - can again lead to the reduced motivation by citizens.

This brief review of selected scholarly work reveals a variety of citizens' motivations to participate in urban planning procedures. There are many factors that may influence a citizen's decision to actively participate, and many of them are culturally conditioned. These factors must be thoroughly considered by urban planners when attempting to revitalise urban environments in a participatory manner (see Table 2.1).

Institutional framework	Amount and supportiveness of administrative structures, level of existing public services	Xu (2007), Denter & Klok (2010), Pares et al (2012)
Community	Size of community, membership of groups, ethnicity enclaves, inequality issues, cultural differences	Verba et al (1978), Xu (2007), Rosenstone and Hansen (1993)
Individual	Gender, education/occupation, income levels, level of social equality	Hansen (1993), Verba et al (1978), Xu (2007)
Residence conditions	Home (non-)ownership, proximity of home to place of intervention, feeling of belonging to the place	Hoger & Ortolano (2012), Xu (2007)
Cost benefit balance	Level of fulfilment of individual's interests versus needed inputs	Rosenstone & Hanson (1993), Kaza (2006), Denter & Klok (2010)

TABLE 2.1 The factors that influence the citizen's decision to actively participate - conceptual framework

2.2 The Existing Approaches to Improve Public Open Spaces. A Participatory Manner in Europe – Human Cities Experience

In order to understand some practicalities of participatory provision of urban public open space, this section reviews selected case studies of citizens' appropriation of urban public open spaces in Europe. The review is based on the Human Cities project, which is an EU funded project that has been ongoing since 2008 (Houlstan-Hasaerts, Tominc, Nikšič, & Goličnik Marušić, 2012; www.humancities.eu). It aims to promote urban public open space as one of the key components of urban environments for wellbeing and focuses on the social dimensions of urban public open space by analysing the existing approaches used by citizens to reclaim cities' public spaces. It also supports some existing initiatives in partner cities in their endeavours to improve local public spaces.

The Human Cities experience shows that citizens are no longer merely waiting to be asked for their opinion but get actively organised by themselves too. On the other hand, the initiatives that are successful in

the long term are often related to some forms of institutionalised power, which helps them sustain their activities in the long term and is a basis of a win-win situation for the citizens as well as cities' administrations.

2.2.1 Case Study 01: Jardin aux Fleurs, Belgium

Brussels capital region has indicated a need for a comprehensive urban regeneration of some aged and vulnerable neighbourhoods through targeted interventions. The main aim was to improve the living environments by redevelopment of public spaces. The final goal of the interventions is to strengthen these vulnerable environments to stand up to the economic, social, and environmental pressures. The specifics of the neighbourhood Jardin Aux Fleurs are its high unemployment rate, low levels of education and income of inhabitants, and poor public service provisions, including public spaces. As the bottom-up participatory activities were insufficient and unorchestrated, the city supported two local non-governmental organisations, both in administrative and financial terms, to lead the participatory activities. In order to attract and encourage the local community to participate in developing the urban renewal strategy for the neighbourhood, strong interactive communication materials were developed (posters, stands, videos etc.) related to one of the central open spaces of the neighbourhood (Jacques Brel square). This led to a set of one-day moderated workshops where locals expressed their ideas and concerns about the neighbourhood and its public spaces. These meetings were also an experiment to bring in other people from a nearby neighbourhood that borders Jacques Brel and has a very different (trendy and well off) character, and thus functioned as a tool to overcome the social barriers to set up a truly participatory regeneration process.

2.2.2 Case Study 02: Unlimited Cities DIY, France

Unlimited Cities DIY is a free smartphone application developed by a group of architects and urban planners as a start-up. It aims to help various stakeholders in the urban development process, from municipalities and public bodies, to communities, citizens, and private institutions, in finding the common visions of future development of concrete spaces, and thus enable and ease the participatory decision making processes. The app is a user-friendly tool that enables an upload of a photo of a concrete place and allows the user to change its appearance by adding pre-designed or newly designed elements to it (such as greenery, street furniture, users etc.). In this way, people that would normally have difficulties in graphically expressing their ideas and wishes regarding the redesign of concrete space can communicate the ideas to others. By uploading these images to the common database, one can also discover the ideas of other users for the same place or check similar ideas in other parts of the world. Another benefiting party can be a municipality – the tool allows a crowdsourcing of ideas for

concrete places and thus provides a wide collection of citizens' opinions and ideas. However, as any approach, this approach has a limitation due to the fact that such an application will be used only by ICT-literates.

2.2.3 Case Study 03: THINKtent, Serbia

THINKtent is a travelling physical tent (5 x 5 meters) that travels from one community to another, to provide a safe and intimate space for conversations and dialogue on important issues regarding life in the community. Its main aim is to invite citizens to share their ideas and reflections on the issues of common matters in a less public way, which enables members of different sub-groups within a community to come together and share opinions without any public exposure. The intimate inner space of a tent within an open public space invites people to slow down, reflect, and exchange views and ideas away from the distractions of daily life. It eliminates expectations and hierarchies related to age, gender, ethnicity, citizenship and expertise - everybody is welcome and all become equal inside the tent. The THINKtent as a participatory urban planning tool proves to be particularly successful in the environments where there are many open or hidden tensions among different social or ethnic enclaves. Each session is moderated (see Fig. 2.1) and has a predefined topic to ensure open and focused dialogue, as well as a vibrant discussion that is respectful to different opinions. Facilitation is needed to ensure that the discussion and sometimes-intense emotions are constructive and not destructive.

FIG. 2.1 THINKtent used as a tool for encouraging public debate and participation where the moderator's role is crucial to assure a safe environment for everyone to express freely *(photo source: Human Cities Ljubljana archive).*

2.2.4 Case Study 04: Zusammensetzung mit Abstimmung, Austria

With the increasing diversity in the European population, the differences between people in local environments grow too. Graz, the capital city of Styria, is, officially, a hospitable city where diversity and differences are welcomed and where any conflicts are negotiated in a constructive way. This, however, proves to be a challenge in practice. The open public space of the city is seen as a suitable place to solve these conflicts in an open way. The Zusammensetzung mit Abstimmung initiative came from the cultural sector. An artist designed a clearly visible open-air sculpture in the form of a long winding table, which invites people to join and discuss common matters in a public open space. This allows people of different social backgrounds to express their opinions in a relaxed atmosphere and confront them with the opinions of the others. These public sessions encourage people in public space to get active, participate, and take a role in improving their living environments across the social and economic boundaries that exist in the city. It also re-inaugurates urban open public space as a place of discussion. The involvement of the city representatives in the process meant that the opinions of attendees could be heard at the decision-making levels.

2.2.5 Case Study 05: V Troje, Slovenia

The Slovenian initiative V troje was set up by an interdisciplinary group of young professionals who wanted to introduce new approaches to decrease the carbon footprint in Slovenian cities. It encourages people to use bicycles instead of cars as a mean of transportation in their daily routines, and by doing so not only contribute to better air and a less congested city, but also introduce a healthier lifestyle (see Fig. 2.2). Each year a one-month campaign was organised, which encouraged co-workers to set up teams of three people willing to ride a bicycle to and from work every working day. The teams whose members biked to work more days than drove the car were eligible to win a prize. The initiative was based on a scheme of successful precedents from other countries, but was adjusted to the local scale and cultural patterns – instead of a competition of large teams, a race between groups of three people was introduced. Lately, the initiative has received larger support, and has also grown in organisational terms. It is now known as Pripelji srečo v službo and was recognised by some official institutions, media, and large employers that started to encourage their own employees to bike to work with their own supporting mechanisms within companies.

FIG. 2.2 Slovenian civil initiative V troje started as a bottom-up participatory activity to promote cycling to work, but over time grew into a more institutionalised form within an urban planning framework *(photo source: Human Cities Ljubljana archive).*

2.2.6 Case Study 06: Tallinn for All, Estonia

In Tallinn, the need to make the city more accessible for all was recognised and addressed by a group of designers, who recognised that the community of disabled people did not have enough strength and power to improve the accessibility of urban locations. To kick-off the process they invited some well-known professionals from other countries to lecture on inspiring projects from around Europe. This was followed by mapping and interviewing exercises in the city, which analysed the situation and started to brief the action plan. The mapping work was mainly done by students and disabled people themselves. All the gathered data was then presented to the residents of Tallinn in a form of so-called Gulliver map for three chosen topics: accessibility in the old city, information design of public transportation, and products and services for visually impaired people. A big map was placed in one of the central city squares where passers-by could write about their experiences in the city while concentrating on the issues of accessibility and functionality for all. This offered the citizens the possibility to express their feelings and aspirations on the exhibited topics. The final goal of all activities was to shed light on the issues that are often overlooked by mainstream society and to find a consensus on strategies for improvement.

2.2.7 Case Study 07: M3 Odblokuj!, Poland

M3 Odblokuj! is a platform for spatial and artistic activities for the improvement of the living environment. The activities are organised by the association "Odblokuj", in which architects, designers, graphic designers, artists, and sociologists gather. They carry out a number of interdisciplinary urban projects that aim to show alternatives to existing living standards in a residential area of Warsaw. The main tools are exhibitions and participatory workshops that involve all age groups of the inhabitants of the concerned area. They aim to strengthen the links between neighbours and support the exchange of knowledge and experience among them. The artistic interventions aim to provoke reflection on local identity, usage of public space, and natural resources. M3 Odblokuj! is an example of the participatory processes led by local professionals that successfully use their expertise and experience to lead the participation process and thus show the way towards a more active citizenship. One of the important outcomes is a rise of social capital of the neighbourhood.

2.2.8 Case Study 08: Caravanserai, Great Britain

Caravanserai is a public space for locals and visitors that has a commercial and educational function and contributes to the cohesion of a community in Eastern London. It was initiated by a local architectural firm and has many beneficiaries, including trainees involved in the work, local start-ups, and micro-enterprises, as well as the broader local community. The initiative started as a part of a transformation of the wider part of the town during the preparation of the Olympics in London. The idea was to regenerate the area without any prefabricated element. All interventions were designed and constructed locally, thus many local enterprises, groups and individuals were involved. The main idea was to offer visitors food and rest as well as opportunities for cultural exchange and business. In order to set up a supporting environment, many new amenities were provided in a co-creation process (e.g. sheltered tables, community garden, children's play area, open-air theatre, market kiosks for local entrepreneurs, and a micro-manufacture workshop). These facilities gave the once leftover part of the city a central stage for local events and activities, that are collaboratively created by hosts and guests.

2.2.9 Case Study 09: Coltivando, Italy

Politecnico di Milano experimented with part of the open space on its premises at Bovisa and turned it into a co-created and co-maintained public green area. In the initial stage, the project started as a part of the study curriculum with the mission to develop a concept of community garden. However, the participation of community members was inevitable and many workshops were organised to involve community

and other stakeholders at an early stage. This cooperation delivered a service model of the garden, sustained by about 30 permanent members and an increasing number of visitors who also take part in maintenance activities, spend time in this green area, or simply enjoy it (see Fig. 2.3). Thus, Coltivando became a public space where interested locals can grow vegetables in an urban environment within the university premises. It also functions as a local meeting point where locals, staff, and students meet and socialise. Even if it officially belongs to the university, it acts as a truly public space of the broader Bovisa neighbourhood. It shows how the readiness to cooperate in a joint endeavour between an institution and the members of the local community can contribute to adding social and environmental values to the local environment.

FIG. 2.3 Coltivando initiative at Bovisa campus of Milan's Politecnico offers a good example of a collaboration between an institution and local community, providing better and socially more inclusive local public open space *(photo source: Human Cities Ljubljana archive).*

2.2.10 Case Study 10: Restaurant Day, Finland

The idea of the Restaurant Day was born in Helsinki and has spread around the world. It is a one-day festival that can happen many times in a year, where anyone can set up a restaurant or a café for a day. The only requirement is to register the event on a global web portal and assure the specified quality and sanitary standards. These pop-up restaurants can take place anywhere, most often in an open public space with provisional equipment set up for a day. The Restaurant Day initiative initially grew out of the resistance towards bureaucracy involved in running a restaurant, but later grew into a convivial gathering of locals for the sake of socialising, along with the enjoyment of food and drinks. It also helps in developing the businesses of local restaurants as it offers a cost-free opportunity to pre-test new dishes and menus, showing what are people (not) interested in and what is in demand. It also shows the success of the schemes that build the participatory

approach around the elements that are part of one's daily routines (production, preparation, and consumption of food) and thus invites everyone to participate.

3 The Urban Planner's Role and Skills Needed in Public Space Related Participatory Processes

In the rapidly changing role of an urban planner, from decision maker to decision making moderator, a need for new, sometimes experimental, approaches is present. A few skills need to be embraced by the profession in order to be able to act as a relevant and helpful part of the democratisation of the urban planning process, where the citizens will be given real opportunity to co-design their living environments and contribute their skills, knowledge, time, and ideas for a better future city. Reaching this goal would represent an important step towards a more sustainable city, which uses existing resources in an efficient way.

3.1 Enabling Citizens Operation Within the Institutional Framework

Civil initiatives or groups of self-organised citizens are rarely equipped with the skills and knowledge about the administrative structure of a city, especially in cases where the cities are managed in a typical top-down manner. On the other hand, the successful initiatives are most often linked in some way to decision making or administrative bodies of the city or other institutions (see Case Study 01: Jardin Aux Fleurs and Case Study 09: Coltivando). An urban planner shall usually have an excellent overview of city's organisation and its departments, and can help to advise the active citizens about whom to address their concerns and ideas regarding built environment improvements, as well as the best communication channels. This initial support to link the citizens to the right departments or people within local administration would normally not require substantial input in terms of the invested time, but may be of crucial importance for the success of an initiative. In an ideal situation, this form of support would be part of public services that are offered to active citizens. These scenarios demand that an urban planner has a detailed insight into the responsibilities and administrative duties of various cities' departments and other relevant authorities. It also demands that an urban planner has the well-developed communication skills to link different stakeholders, as well as promote successful cases of bottom-up projects to the governing structure and the wider public.

Another important institutional aspect of the urban planner's support function to participatory practice is the advocating for funds in city's budgets that would be dedicated to the implementation of the bottom-up initiatives. In particular, initiatives at an early stage of their existence may be dependent on financial supports that may be very symbolic in terms of total amounts, but which are crucial for the development of the

proposed ideas. Urban planners with a comprehensive understanding of space and its dynamics can more easily predict the long term benefits of bottom-up activities and can be relevant advocates of civil initiatives proposals when the city budgets are distributed. This role is even more important when the civil initiatives have not yet been well established, and are thus not broadly recognised.

3.2 Understanding the Community and its Inner Logics of Operation

Each community has its own characteristics and dynamics. In order to achieve a fruitful cooperation with the members of the local communities, an urban planner must understand each community's very own logics of operation. These may include a detection of the sub groups that may be formed around various factors (age, ethnicity, needs, interests etc.) at an early stage and encourage cooperation and exchange across the boundaries of such groups (see Case Study 04: Zusammensetzung mit Abstimmung; Case Study 01: Jardin Aux Fleurs; and Case Study 09: Coltivando). This task is especially important in culturally and socioeconomically diverse communities, and in communities where relations between different groups are difficult. Safe environments for cooperation shall be provided by an independent third party from outside the community (see Case Study 03: THINKtent), and urban planners may take the role of moderators. The ability to understand the functioning of the community must not be limited to the residential population, but should consider other local actors such as locally based enterprises and small businesses (see Case Study 08: Caravanserai).

New technologies can be of great help to an urban planner in gaining better insights into the functioning of a community. The analyses of crowdsourced information can provide important insights (see Case Study 02: Unlimited Cities), while social media and other applications can be also used as efficient tools to encourage discussions between the local players. Therefore, at least a basic knowledge in the field of ICT and social media must be welcomed.

3.3 Paying Attention to Individual Cases, Especially People with Specific Needs

Official participatory urban planning agendas must also address the needs of individual members of the community and not succumb to the generalised and superficial understanding of the community. The living conditions of people on the social or economic edge, people discriminated upon due to their personal characteristics (such as age, gender, disability etc.), or people with any kind of special needs must be given special attention. This demands at least some basic knowledge in the field of unprivileged urban groups and the ability to involve additional specialists when needed. The practice shows that disadvantaged people are most often not given a real chance to express

themselves and participate (see Case Study 06: Tallin for all), even if the general participatory processes within a community are ongoing.

The individuals-tailored approach proves to be successful in the cases of non-marginalised groups too – getting to know the specific needs, habits and desires of an average local inhabitant can contribute to the success of any campaign that seeks a collaboration between urban dwellers (see Case Study 05: V troje). In these endeavours, the urban planner's ability to do a crowdsourced data collection is very helpful in the analytical phase, while literacy in the usage of social media is an asset for co-creating individuals' willingness to participate.

3.4 Respecting the Importance of a Physical Location and Locals' Affiliation to It

Many studies prove that our living environments shape the way we lead our lives and vice versa (Madanipour, 1996). This finding is important in participatory practice in the sense that the stronger the attachment to one's living environment, the more likely one will get actively involved in its co-design and reshaping (Resnick, 2016). Urban planners shall take the right planning decisions to form a physically and functionally high quality urban environment upon which strong feelings of belonging can develop. This refers not only to physical form and function but also to other intangible conditions, such as employment possibilities, the ratio between rented and privately owned properties, level of public services, amenities etc. Public space is an important medium in this process as it is a common space of everyone and thus exists the element of a common construct of place identity, as well as development of a feeling of belonging to the place.

In this respect the role of urban planning and related disciplines is not limited only to their official positions, but also to their citizenship – as holders of a specialist knowledge they can act as important initiators or catalysts of participatory changes in their own local environments (see Case Study 07: M3 Odblokuj! and Case Study 08: Caravanserai). People with specialist knowledge can play important roles in urban co-creation processes in their home environments as they are better equipped with knowledge and can better navigate through the administrative structures of any city. This also enriches their personal experience with participatory urbanism– they can experience the process from the other side, through the eyes of the citizen, which helps them understand the obstacles in the processes they would normally not recognise.

3.5 Taking a Cost-Benefit Balance into Account

The busy daily routines in the lives of contemporary citizens make one's spare time a precious resource. As the time spent in participatory activities is the most common investment of an average citizen, the participation is less likely to happen if a citizen will not get something in the return for their invested time. The urban planners that aim

to moderate the participation processes based on the voluntary cooperation of citizens must be well aware of this and give realistic promises to the participants in terms of what can be achieved in return for their participation. An effective tool that urban planners can use is the creation of the window of additional opportunities through official plans for the active members of the local communities (see also Case Study 10: Restaurant Day) – e.g. in a form of urban planning and management regulations that are tailored to some specific local needs and initiatives. Thus, a tribute to active communities can be made and participatory activities rewarded.

Table 3.1 upgrades the previously set up framework to reflect the skills and competences needed by an urban planner to successfully support the participatory urban planning in the field of urban public open space provision.

Institutional framework	- urban public open space is a common space of everyone and can act as a space for open dialogue – make it an important part of urban (re)development agendas and invite citizens to have a real say - introduce supplementary participatory tools and approaches to rather rigid top-down official procedures – experiment to find the most suitable approach as there is no one-suits-all recipe
Community	- develop communication skills in various communication channels (oral, graphic etc.) and technical modes (one to one communication, use of ICT etc.) and use a common language, as not everyone can understand the professional terminology - learn to listen and hear the community groups and individuals - be aware of differences and possible tensions within communities – they are not one homogenous group - build on a roll-off effect – expose good examples to attract the wider community into participatory processes, at the same time be aware that bad publicity also spreads fast - pay tribute to cooperative communities by flexible and supportive urban plans and policies
Individual	- do your best to make the voice of marginal and often excluded parts of the community heard - employ specialists who can deal with specific demands of gender/education/occupation/income etc. differences within communities when needed - provide safe space where individual points of view can be freely expressed and respected - pay special attention to individuals' knowledge and skills
Residence conditions	- support designing of the pleasant living environments where people will love to live and develop a feeling of attachment to the environment, thus increasing the probability of constructive participation - aim for a diversity of urban environments in terms of programmes, housing types and users - a variety increases the participation capacity at different stages of the process
Cost benefit balance	- residents' willingness to contribute to the participation activities is not always self-evident – learn to communicate the benefits of taking part in participation processes for any individual and/or the community as a whole

TABLE 3.1 Skills needed by urban planners in participatory processes

4 Conclusions

Urban open public space is a common space that belongs to everyone and represents an ideal venue for an urban dialogue on the possible futures of the city. The sustainable development agendas must therefore pay special attention to development of this space in a truly participatory manner. In this way, the knowledge, skills, and abilities of citizens can be recognised and implemented for common good and the sustainable future of a city where existing resources will be fully utilised. In such conditions, the role of urban planners and related professions has been, and will be, further challenged and changed – from the head of these processes to the moderator and facilitator of the processes. This does not decrease the importance of urban planner's

role; on the contrary – all the traditional urban planning knowledge will be needed to successfully moderate these complex processes. What will be changed further is the level of skills and competences that an urban planner will inevitably need: the ability of analytical work and comprehensive strategic thinking will have to be upgraded with strong communication, moderation, and mediation skills. In the long term, this will most likely result in new specialisations within urban planning, especially in relation to the use of new ICT technologies to support participatory urban planning processes. It should not come as a surprise if urban planning partly merges with some newly-emerging professional disciplines.

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The Concept of Sustainability in the Context of Brownfields Regeneration

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ABSTRACT **Brownfield locations are abandoned and underused spaces whose regeneration is threatened by actual or potential environmental contamination. Contaminated brownfields are scars on landscapes that threaten the environment and human safety, but they also have the potential for renewal and reuse. In this chapter, the concept of sustainability will be explored in the context of the regeneration of brownfields. The basis of current and future sustainable development strategies for European cities is the efficient use of urban land, and brownfield locations are great land resources for many cities. Therefore, their regeneration is necessary in that they are sustainable in the long term and resilient to intensive changes in urban systems confronted with demographic growth, rapid urbanisation, climate and many other natural changes and disasters.**

This chapter explores the definition, classification, and critical analysis of brownfields' impact on the environment before and after their regeneration, in the context of development that accords with *sustainability science*, development that is based on economic, environmental and social sustainability in the field of urban planning and urban design. The characteristics of all three stated sustainability fields are synthesised in order to define economic instruments used to reduce environmental pollution, and strategies for the building of environmentally and socially resilient systems, instruments, and strategies, which are used as guidelines in the process of sustainable brownfield regeneration. In addition, the sustainability goals that will be achieved through the regeneration and redevelopment of brownfields are defined by, and based on, future development potentials, the improvement of economic, environmental and social values, and the qualities of these spaces and their surroundings.

KEYWORDS brownfields, land use, sustainability, resilience, brownfields regeneration

1 Introduction

The subject of this chapter is brownfield locations. They are previously used locations that are now abandoned and underutilised spaces, mostly with a developed infrastructure that makes them easy to regenerate. Brownfields can be located in developed or partly developed urban areas and they represent great land resources, which need to be activated and connected with urban life. On the other hand, rapid urbanisation is indicated by the appearance and ongoing growth of mega-cities. These cities need to be smart and resilient because they have to survive shocks from global economic crisis, environmental catastrophes, and population growth (Desouza & Flanery, 2013 in Trkulja, Aleksić, 2016). Brownfield regeneration can contribute to the development of smart cities, particularly to the process of efficient land-use management.

The observation that cities are not environmentally sustainable is not a value judgement, simply a fact. Only two percent of the planet's surface is occupied by cities. Cities use up to 75 percent of the planet's resources and they generate the same proportion of waste. Intense economic processes and immense levels of resource consumption in cities increase and further stimulate their resource needs. Most cities today function on essentially linear based metabolisms. Resources move within urban systems without concern about those resources' origins or the impacts on waste destinations. Linear systems such as this are significantly different from natural dynamic circular system metabolisms where output is simultaneously input, self-renewing and thus sustaining life. In order to be sustainable, city systems must be based on a circular dynamic metabolism, which, by its essence, can improve itself, and efficiently use and re-use resources, thus, minimising material use and waste disposal into the natural environment (Girardet, 1996; Petrić, 2004).

Brownfield locations can sometimes be threatened with actual or potential environmental contamination. The existence of contaminated locations is an ecological problem that is becoming more and more pronounced. In the context of sustainable urban planning and urban design, in recent years a growing interest in the implementation of urban environmental management policies with mechanisms for effective land-use has been noted. It has influenced the development of *land-use planning* (Kaiser, Godschalk, & Chapin, 1995). *Land-use planning theory* mainly uses a model based on *rational planning*. This process implies that primary decision makers decide what is significant, viable, acceptable, and feasible from economic, political, ethical, and technical aspects (Essoka, 2003). In the period after World War II, the original scientific contribution was made by *urban land rent theory*, according to Alonso (1964) and Muth (1969), which was not clearly concentrated on environmental and spatial external effects. In recent years, politics and science have shown increasing interest in land-use change due to climate change, loss of biodiversity, and pollution. As a result of this, land use has been at the core of the sustainability debate (Nijkamp, Rodenburg, & Wagtendonk, 2002).

Land use is a multifaceted phenomenon that can be viewed from several aspects. It affects sustainability and ecological resilience, but also economic competitiveness and social equity. Therefore, it is important that the redevelopment of urban land be aligned with future development potentials and intergenerational issues. A very complex issue is the inclusion of urban rents as they can provide continuing sustainability in the urban area. However, with regard to governmental matters, this issue is usually dealt with in terms that emphasise the value of urban land (Nijkamp, Rodenburg, & Wagtendonk, 2002).

Nijkamp, Rodenburg, and Wagtendonk (2002) identified the unstable success factors for a useful clean-up policy for contaminated locations, and according to Kaiser et al. (1995 in Essoka, 2003) land-use planning is concerned with three sets of land-use values. The first set is of social use values regarding links between quality of life and the physical environment. The second set is of market values (commodity values of land), and the third is of ecological values.

Efficient use of urban land is the basis of current and future strategies for the sustainable development of European cities. Through trans-disciplinary planning and design, sustainability is promoted through the idea of urban resilience. This holistic planning method brings together all actors involved in the planning process, academic fields, professional areas, and all stakeholders. This approach allows different groups of actors to be involved in the urban planning and design process, creating a greater chance of meeting economic, environmental and social sustainability goals, and not just goals within one aspect (Ahern, 2010).

Desouza and Flanery (2013) acknowledge that the imperative for cities that can be considered smart is to be resilient. This means that resilience must be the most important aspect for the intelligent planning and design of the city. Surjan, Sharma, and Shaw (2011) consider that spatial or city planning procedures, based on the information available and static projections in current conditions of dynamic changes of urban patterns and climate, are gradually becoming redundant. Sudden extreme events have the potential to cause interruptions in urban environments, so city planning and design should pay attention to these issues in order to ensure a resilient future. Desouza and Flanery (2013) state that planning for resilience involves an estimation of cities' vulnerable network components and the understanding of their relations, as well as the ability to design different components in order to achieve resilience.

The economic, ecological, and social structure of a city is seen as the network of components of that city that are in interaction with each other. Inefficient land-use negatively affects all three components. The goal of urban space transformations is to satisfy the changing needs of their users in a characteristic XXI-century dynamic life. Therefore, the connection between society and space is a key cause and effect relationship that requires not only flexibility and transformability of space, but also that space's sustainability. So the question that is asked is how do brownfield locations regenerate in order to be

sustainable through efficient land-use? In order for the process of brownfield regeneration to be better managed, the strategies for the building of resilient economic, environmental and social components of cities must be defined. These strategies will emerge from research on brownfields, sustainability, and resiliency, and thus they will link all the key elements of this research. Brownfield regeneration plays an important role in the management and planning of cities that seek to become sustainable. Therefore, it is a necessary and inevitable element of sustainable urban design.

2 The Theoretical Basis of the Brownfield Concept

2.1 Definition of Brownfield Locations

The issue of brownfields appeared among the political issues of developed countries in the 1970s as a result of structural changes in society and innovations in transport, construction, and production (Trkulja, 2016). Brownfield locations are abandoned and underutilised spaces that are places of actual or potential environmental contamination. The reason for the discontinuation of use of those spaces may be: functional - brownfields without prior activity but with the owner or user; legal - brownfields without the right to use or at the stage of bankruptcy or liquidation; property - brownfields with disputed or unprotected property relations; and physically - when the former owner or user left the location and left it under the jurisdiction of the municipal or city administration (Stojkov, 2008). The decline in traditional industry and the carelessness of former industrial land users have left what are, due to real or potential pollution, scars upon the urban landscape, most in North America and Western Europe (BenDor, Metcalf, & Paich, 2011; Perović & Kurtović-Folić, 2012), and brownfield issues have become an integral part of the concept of sustainability. Therefore, it is necessary to give an insight into the American and European experience of defining the term *brownfield* because there is no internationally agreed definition for this term. However, the most widespread are three definitions: the definitions from the United States (USEPA, 2002), the European Union (CABERNET, 2006) and the United Kingdom (EP, 2003). Also, Yount (2003) claims that two forms of brownfield definition are needed. The first is a wide, generally agreed upon conceptual definition, and the second implies a standardised definition. Conceptual definition should include terms that are unequivocal, and should permit practitioners and policymakers a wide latitude of solutions to the environmental, economic and social problems of brownfield sites. A definition satisfying these criteria was developed in 2001 in US federal law by the "Brownfields Revitalization and Environmental Restoration Act" (BRERA), and Yount believes it is better than other definitions that are in use and should be implemented by local and state governments. According to the Act, the "term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential

presence of a hazardous substance, pollutant, or contaminant" (US Congress, 2001, in Yount, 2003, p. 26). The same author believes that BRERA's conceptual definition is better than other definitions because it can encompass the issues of current and previous property use, site scope, perception of contamination, type of contamination, being subject to other programmes and laws, the effects of pollution on redevelopment, and redevelopment potential. Other definitions mostly deal with these issues only in part.

Six years before the BRERA definition (1995), the US Environmental Protection Agency (USEPA) officially launched its "Brownfields Action Agenda" under which brownfields were defined as "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination" (USEPA, 1995 in Yount, 2003, p. 27). However, in 2002, USEPA changed the definition of brownfield, aligning it with the BRERA definition, so the term brownfield represents "a site, or portion thereof, that has actual or perceived contamination and an active potential for redevelopment or reuse" (USEPA, 2002 in Yount, 2003, p. 28).

At the European level, there is no general definition of brownfield. The *Concerned Action on Brownfield and Economic Regeneration Network* (CABERNET, 2006, p. 23), revising the definition by CLARINET (the *Contaminated Land Rehabilitation Network for Environmental Technologies*), has defined brownfields as sites that: "have been affected by the former uses of the site and surrounding land, are derelict or underused, may have real or perceived contamination problems, are mainly in developed urban areas and require intervention to bring them back to beneficial use". The CABERNET definition puts emphasis on the need for intervention as a common characteristic of all brownfields.

A survey by CABERNET revealed that there is an obvious contrast in the presentation of the term *brownfield* between the nations of Western Europe and Scandinavia and a difference is seen in relation to the population density and competitiveness. The rest of Europe revealed a wide range of brownfield definitions with dominant issues being contamination (for more details see Table 3.1: *Definitions of 'brownfield' land in European nations based on the responses of members of the CLARINET and CABERNET networks* in CABERNET, 2006, p. 29-30).

Based on the CABERNET survey, it is obvious that the lack of a general European brownfield definition and the scarcity of brownfield data in some European countries are the most important barriers to the successful monitoring of brownfield flows. Therefore, improving the complementarity of data for all European countries is crucial to solving the problem of brownfield locations. Presenting a successful brownfield regeneration and urban land management plan can increase brownfields' competitiveness and accelerate their renewal (Oliver et al., 2005).

The CABERNET definition is analogous to the commonly used definition of brownfield in the United Kingdom according to which the term denotes "previously developed land – PDL" (EP, 2003, p. 3), and therefore

encompasses a wider area and range of sites. However, the United Kingdom is well known for the redevelopment of former industrial locations and two beautified meanings of the term *brownfield* (of which one has been mentioned earlier). The second meaning interprets brownfield as a "chemically challenged" land (Nathanail, 2011). Alker, Joy, Roberts and Smith (2000) discussed, examining the brownfields problem and its significance for UK government policy, the need to define the term 'brownfield' examining it from a multidisciplinary perspective. They revised the use of the term 'brownfield' at that time and suggested that a brownfield location "is any land or premises which has previously been used or developed and is not currently fully in use, although it may be partially occupied or utilized. It may also be vacant, derelict or contaminated. Therefore a brownfield site is not necessarily available for immediate use without intervention" (Alker et al., 2000, p. 49).

These different definitions are due to the fact that certain locations are considered brownfield locations in one but not in other definitions. These different definitions are due to the fact that certain locations according to certain definition but not according to all brownfield definition. However, the common view is that there are obstacles to such sites' redevelopment. Unfortunately, less widely appreciated are developed infrastructure, good access and the position of brownfields (Nathanail, 2011).

USEPA estimated that there are more than 450,000 brownfield locations across America (Howland, 2007) and that their renewal will require from 100 billion to over 650 billion dollars (Schädler, Morio, Bartka, Rohr-Zänker, & Finkel, 2011). According to a CABERNET survey of 22 European countries, there are more than 950,000 brownfield sites, with an area of more than 2 million hectares, requiring 100 billion euros for their renewal (Schädler et al., 2011). These data indicate a large spatial resource of brownfield locations that can accept new functions and contents that would significantly affect both the quality of life and the safety of people (Trkulja, 2015a, 2016).

In the Western Balkan countries, the phenomenon of brownfield locations has not been substantially explored. The problems and potentials of these areas are not recognised. There is no official definition or categorisation, nor a clear vision for their renewal at the local or national levels. The practical problems of brownfields are solved only partially (at the level of local communities) in the main, because there are still not firm and clear official strategic and management platforms at national levels. Partial consideration of the importance of brownfield locations, the non-inclusion of all potential stakeholders in the process of their regeneration, ignorance of the degree of sites' pollution, and the possibility of ecological problems occurring are just some indicators of the non-strategic regeneration of brownfield locations in the process of sustainable urban planning and design. On the other hand, efficient land management and adequate presentation of brownfield locations would encourage investment in brownfield regeneration and promote their sustainable development (Trkulja, 2015a).

2.2 Classification of Brownfields

In the literature, there is no wide range of data on the classification of brownfield locations. However, the classification of brownfields is most often considered in relation to their position within an urban community, the sites previous purpose, the market relations of a brownfield's location, the profitability of regeneration, and according to potential environmental pollutants. According to the position within the urban tissue, there are three characteristic brownfield types: in the central area, on the city's periphery, and in historic areas (Perović & Kurtović-Folić, 2012).

According to their previous purposes, brownfields are usually considered abandoned or underutilised. Previous purposes were those such as: industrial zones, railway complexes, military complexes, coastal areas, municipal public service facilities (hospitals, prisons, schools, cultural centres, agricultural cooperatives, agricultural combines etc.), mining installations, closed gas stations, devastated residential buildings, neglected monuments, and crowded garbage dumps (Danilović, Stojkov, Zeković, Gligorijević, & Damjanović, 2008; Nathanail, 2011; Perović & Kurtović-Folić, 2012).

Regarding market relations to brownfield locations, there are four different types of these spaces: spaces left exclusively to the market; spaces that the market comes to after the identifying and removing of environmental damage at the location; spaces that emphasise social and ecological values above real market value; and spaces that have an active health and ecological hazard without economic justification (Jackson, 2006 in Stojkov, 2008).

Depending on the profitability of regeneration, CLARINET (Ferber & Grimski, 2002 in Nathanail, 2011) suggested a threefold classification of brownfield locations that represents economic components of brownfield locations: profitable locations (category 'A'), locations on the 'Break Even' Value Line (category 'B') and unprofitable locations (category 'C'). This model is particularly useful because it examines the extent to which it is possible to achieve productivity by use of brownfield locations. This classification of brownfields can help institutions responsible for local and regional development and investment to define a strategic framework for the brownfields' development (Djukić et al., 2014).

USEPA (2001 in Perović & Kurtović-Folić, 2012) classified brownfields based on their previous function but from the aspect of pollution: oil and petroleum facilities, manufacturing (for example, cement plants, pesticide facilities, plastics facilities, etc.), recycling, treatment and repair facilities, and miscellaneous (for example, agri-business, landfills and dumps, quarries, print shops).

Unlike the above classification, which relates to what brownfields *are*, Nathanail (2011) has offered a few examples of what brownfields are *not*: in-use military ranges and factories, houses where people live,

construction areas, farmland, overgrown gardens, scorched forest areas, and recolonised mines.

Finally, it is important to note that classifications based on economic, environmental, or social factors are still developing. They can be of great importance for any level of government management in defining the objectives of brownfield regeneration. The classification of brownfields determines their basic characteristics (position, previous purpose, profitability, level of pollution), which can be crucial not only for the flow of the regeneration process and for the urban design, but also for the urban management and planning process.

2.3 Influence of Brownfields to the Environment Before and After Their Regeneration

Brownfields have a negative influence on their wider environment in economic, environmental, social, psychological, and aesthetic terms. Some of the negative influences of brownfields are that: there is a loss in the economic value of land in the brownfield environment; they are sources of infection, contamination of the land and ecosystem disturbance; they can contribute to the development of social pathology, having a negative psychological effect on the citizens in the neighbourhood; they threaten the identity of the city; and they frequently display bad aesthetics of space (Stojkov, 2008). In addition, Ferber and Grimski (2002) believed that brownfields are characterised by unattractiveness for new investors, the collapse of economics, high unemployment, and social conflicts that adversely affect urban life and reduce tax income for the communities. All of this initiates a greater use of greenfields. Because of these characteristics, it can be concluded that brownfields also negatively influence human security by emphasising the relationship between environmental quality and human security. These relationships are close because human security is connected to environmental changes, and environmental changes are directly and indirectly affected by human actions and conflicts. The human security agenda focuses on protecting and improving human security by emphasising, inter alia, prevention of ecological crises in ways that cure their causes, not just the consequences. Therefore, brownfields need to be renewed, thus preventing degradation of the environment, and thereby preventing the disturbance of human security (Trkulja, 2015b; 2016).

USEPA and BMBF (*German Federal Ministry of Education and Research*) created a bilateral working group to share information on the regeneration of contaminated locations. Steffens and Vieten (2000 in Weber, 2008) wrote the final report. Both countries (USA and Germany) had the same opinion: it is necessary to solve five problems that obstruct brownfield regeneration. These problems related to assessment procedures for previously used sites, analyses of markets for the reuse locations, cost-financing calculations, financial risk management reports, and cost benefit analyses.

Among the risks we should include are site pollution, counterproductive structural support for the further development of greenfield locations, marketing problems that are created by the earlier bad image of brownfield locations, possible problems related to the building organisation and harmonisation of actors, etc. (Stojkov, 2008).

For investors, brownfields pose a particular challenge because investing in them in urban spaces has both risks and many advantages. They can be viewed with regard to economic, environmental, and social sustainability goals (Trkulja, 2016). Positive economic effects are enabling the development of a wider brownfield environment, benefitting from the additional value of the land, reduction of economic losses due to the excessive spread of cities, reduction of traffic, urban infrastructure improvements, and increased investment power. Renewal of brownfields can also lead to positive environmental effects such as elimination of health risks (contamination), removal of 'wild' solid waste, elimination of the risk of underground and surface water pollution, elimination of soil contamination, reduced risk of hazard and increased quantity of high-quality greenery (Stojkov, 2008). Smart reuse of brownfield sites is a necessary prerequisite for egalitarianism and astute environmental management (Nathanail, 2011). In this regard, the renewal of brownfield locations can lead to the following positive social effects: elimination of poverty, more active employment in traditional industrial zones, the possibility of achieving more vital cultural projects, preservation of cultural heritage, promotion of social equity in brownfields, increasing the level of citizen security by providing a healthier living and working environment and absolutely improving the image and identity of the city (Stojkov, 2008).

Based on all of the above, it is concluded that brownfields have negative effects on their environments and create different economic, environmental, and social problems. They endanger the economic development of their surroundings, the quality of the environment and urban life, social well-being, and human security. Additionally, they aesthetically endanger the image of the city and contribute to its bad image. On the other hand, brownfields represent significant reserves of infrastructure, buildings, land, and greenery. Thus, the occupied brownfield space can accept different functions and activities, primarily recreational, entertainment, cultural, and service. The economic, ecological, and social potentials of these locations indicate their importance for the urban community, and point to the necessity of their renewal (Trkulja, 2015a).

3 Concept of Sustainability

The sustainability concept was created in the early 1970s as a reaction to a huge growth of urban systems and modern development practices leading to a worldwide environmental and social crisis (Wheeler, 2004 in Trkulja, 2015c). The term 'sustainability' means "the ability to sustain, or a state that can be maintained at a certain level" (Kajikawa,

2008: 218). In the early 1980s, the term 'sustainable development' was first used for the global strategy for preservation of nature adopted by the *International Union for the Conservation of Nature* (IUCN) and the *World Wide Fund for Nature* (WWF). The concept of sustainable development was promoted in 1982 at the *United Nations Conference for Environment and Development* (UNCED), held in Nairobi in Kenya, and in 1983, the *United Nations General Assembly* brought a resolution to take the initiative to establish the *World Commission on Environment and Development* (WCED), known as the *Brundtland Commission*. The paradigm of sustainable development rose to fame in 1987 when the Brundtland Commission, in their report "Our Common Future", created the generally accepted definition of sustainable development, which says "Sustainable development is a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 8). This definition attracted broad attention and became widely used (Dovers, 1993 in Kajikawa, Ohno, Takeda, Matsushima, & Komiyama, 2007), so many authors took it as relevant (Bătăgan, 2011; Bell & Morse, 2005; Dovers & Handmer, 1993; Franz, Pahlen, Nathanail, Okuniek, & Koj, 2006; Janić, 1997; Kajikawa, 2008; Williams & Dair, 2007; Wu, 2010).

In 1999, the *Board on Sustainable Development* compiled the report "Our Common Journey", fronted by the *US National Research Council* (USNRC), which described a transition toward sustainability as a process between the following two generations that "should be able to meet the needs of a much larger but stabilizing human population, to sustain the life support systems of the planet, and to substantially reduce hunger and poverty" (Kates, NRC, BSD, 1999, p. 4). The USNRC report suggested the development of a *sustainability science* that gained significance in academic circles after the publication of the article "Sustainability Science" in *Science* magazine in 2001. In this article, Kates et al. (2001, p. 641) described 'sustainability science' as a new field that requires us "to understand the fundamental character of interactions between nature and society and to encourage those interactions along more sustainable trajectories". Many authors have taken this definition of 'sustainability science' that emphasises the interaction between society and nature (Carpenter et al., 2009; Clark, 2010; Potschin & Haines-Young, 2013). In the field of urban planning, *Sustainability science* is based on intertwined relations between economic, ecological, and social sustainability.

3.1 Economic Sustainability

Although sustainability directly relates to biology and ecology, the concept of sustainable development also includes elements of economic activity, i.e., sustainable economic development (Portney, 2003). The effects of climate change and global environmental change, which are related to the loss of drinking water and the loss of biodiversity, are increasingly present. Therefore, economists and society as a whole consider that the economics should also deal with issues of sustainability (Baumgärtner & Quaas, 2010). In 1920, the English economist and theoretician Arthur

Cecil Pigou, in his work "The Economics of Welfare" (1920), made the most significant shift in the understanding of ecological problems and the elaboration of their possible solutions in the sphere of economic sciences. The significance of Pigou's elaboration is not only in the fact that he brought some basic problems of environmental protection to the forefront, but also that he indicated the question that later got its serious foundation in "economic instruments in the field of environmental protection" (Slijepčević, Marković, Ilić, & Ristić, 2013).

For decades, economists have contributed to discussion about different aspects of sustainability, but only recently has the term *sustainability economics* been explicitly used in environmental protection. Baumgärtner and Quaas (2010) systematically defined *sustainability economics*. They explained its evolution, its subject focus, and the aims of its study. The evolution is based on the idea of justice, which relates to the equal rights between present and future generations of humans. Its subject focus is the humans–nature relationship. Sustainability economics is moving towards the long-term and uncertain future; economic efficiency is seen as a saving in the distribution of natural goods and services. According to the same authors, *sustainability economics* lies at the crossroads of *ecological economics* and *environmental economics* (see more in Field & Field, 2008; Kolstad, 2000; Wiesmeth, 2012) and uses their concepts and methods. However, it has a specific evolution and subject focus.

The subject focus of these sciences/areas, which study the relationship between people and nature in order to create a sustainable environment, has led to the definition of 'economic instruments in the field of environmental protection'. These are emission tax, product tax, tax differentiation, subsidies by country, and marketable permits.

– *Emission tax* is the classical *Pigou Tax* where the amount of tax burden is determined by the polluted emissions unit – measuring harmful emissions (discharged emissions). It is a complicated and expensive technique (Baumol, 1972; Slijepčević et al., 2013). It is used to return environmental changes to effective distribution (Wiesmeth, 2012).

– *Product taxes* tax products, which almost invariably generate pollution, either by their production or consumption (input taxes and taxes on final products). They take the form of existing value-added taxes or excises, and they are often used (Slijepčević et al., 2013).

– *Tax differentiation* implies a different tax burden for similar products that are different in their ecological characteristics. The use of these taxes was particularly present in the 1990s, especially in the Scandinavian countries that had implemented a comprehensive ecological tax reform. Namely, these taxes are often called *Ecotaxes* or *Ecological taxation* and are related to taxes that promote environmentally sustainable activities through economic incentives (Slijepčević et al., 2013; Wiesmeth, 2012). *Ecotaxes* include *green taxes* and *pollution taxes*. Green taxes help to ensure efficient regulation of the physical environment. Ideally, green taxes should account for all social costs that are not included in the

normal/internal costs charged by private actors and that arise from the polluter. Green taxes relate the tax burden from taxation of income and capital to fossil fuel consumption, resource extraction and pollution creation, and would discourage economic activities based on intensive use of materials and energy, favouring the provision of services and activities through intensive work (Slijepčević et al., 2013). Pollution tax is used to achieve an environmental standard. Ecological efficiency has replaced economic efficiency (Wiesmeth, 2012).

– Direct and indirect *subsidies by country* include exemptions from paying taxes if these funds are invested in ecological equipment (Janić, 1997) in order to reduce pollution in the production process. It is a *Pigouvian subsidy* (Turvey, 1963).

– *Marketable permits* include trading emission permits. The environmental authority can directly issue the requisite number of permits in order to achieve the prescribed ecological standard. Once the initial distribution of permits is done, polluters can freely trade these pollution permits. The basis of this system is the fact that a company that determines that it is easy for it to reduce its pollution level will buy a pollution permit from a polluter whose pollution reduction is expensive. The total environmental standard has been preserved because nothing has happened that would change the total number of permits, and this is exactly what determines the level of pollution. The efficiency of marketable permit systems is directly related to the competitiveness of the markets in which polluting companies compete (Taschinia, 2010).

Subsidies and taxes have completely opposite effects on the production profitability in a polluting industry: subsidies enhance profits, and taxes reduce them (Taschinia, 2010).

3.2 Ecological Sustainability and the Concept of Resilience

The focus of ecological sustainability is the reducing of harmful effects on the environment, resources preservation for future generations, and maintenance of ecological standards: clean air, soil and water, and the presence of various plant and animal species whose habitats are regularly maintained to ensure sustainable development. It implies the protection, preservation and improvement of the environment (Slijepčević et al., 2013).

Aspects of ecological sustainability are explored within *urban resilience theory*, which aims to understand the dynamics of well-defined coupled social–ecological systems (Jerneck et al., 2011). In this chapter, research on *ecological resilience* is emphasised, while in the next section, *social resilience* will be explored.

Nowadays, after sustainability, resilience seems to be the new in-word in urban and regional issues. Resilience is for the period after 2010 what sustainability was from the 1980s to 2010 (Foster, n.d.).

Etymologically, the term *resilience* is formed from the Latin *resiliēns*, the present participle of *resilīre,* which means to rebound or to recoil (Barnhart, 1995 in USAID, 2006). However, what exactly does it mean for urban planners, designers, and ecologists? The leading global network committed to building a sustainable future, *ICLEI – Local Governments for Sustainability*, added the theme of adaptation to its strategic plan in 2006, and in 2010 the *City of Bonn* (Germany), the *World Mayors Council on Climate Change* and *ICLEI* started work on *Resilient Cities*, as the first *World Congress on Cities and Adaptation to Climate Change*. In 2012, it was renamed as the *Global Forum on Urban Resilience and Adaptation* (*Resilient Cities series*).

The concept of resilience in ecological systems was first presented in 1973 by the Canadian ecologist Crawford Stanley (Buzz) Holling in his article "Resilience and stability of ecological systems" (1973) to describe the observed dynamics of the ecosystem, exploring the relationship between resilience and stability. Independently or with groups of authors, Holling published several articles defining the term *resilience* at the end of the 20th century and the beginning of the 21st century, and some of these definitions are listed in Table 3.1).

Holling, 1973, p. 14	resilience is "a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables"
Holling, 1986, p. 297 in Reggiani, Graaff & Nijkamp, 2002, p. 215-216	resilience "emphasises the boundary of a stability domain and events far from equilibrium, high variability, and adaptation to change"
Peterson, Allen, & Holling, 1998, p. 10	ecological resilience is "a measure of the amount of change or disruption that is required to transform a system from being maintained by one set of mutually reinforcing processes and structures to a different set of processes and structures"
Holling, 2001, p. 394	the adaptive capacity; that is, the resilience of the system: "a measure of its vulnerability to unexpected or unpredictable shocks; this property can be thought of as the opposite of the vulnerability of the system"
Walker, Holling, Carpenter, & Kinzig, 2004	resilience is "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks – in other words, stay in the same basin of attraction"

TABLE 3.1 Definitions of resilience according to Crawford Stanley (Buzz) Holling

After Holling's definitions, the beginning of the 21st century brought many articles and many discussions about the definition of resilience. Many other authors have defined the term (Ahern, 2010; Elmqvist et al., 2003; Folke, 2006; Henstra, Kovacs, McBean, & Sweeting, 2004; Klein, Nicholls, & Thomalla, 2003), and summarising these definitions, it is concluded that resilience is the reaction of the ecosystem to disasters created as a result of economic activities and other natural phenomena (detailed classification of Natural and Technological Disaster Classification, see in Jha, Miner, & Stanton-Geddes, 2013, p. 168). However, according to Gil-Romera et al. (2010, p. 45) "resilience not only refers to the ability of an ecosystem to recover after an impact, but also to the ability to learn from the disturbance, i.e., to reorganize in a way that buffers future disturbances".

According to Folke et al. (2002), for social-ecological systems (SES) resilience is related to three parameters. The first is "resilience as persistence", the ability of SES to absorb shocks and remain within a

certain state. The second is related to SES' adaptation to the shocks, and the third to the transformability – the ability of SES to start new developmental processes and to remain stable.

Several authors (Ahern, 2011; Godschalk, 2003; Jha et al., 2013; Wilkinson, 2011) have defined strategies for the building of ecological resilient systems.

– One of them is *multifunctionality,* which implies interweaving and combining different plant species in order to create a multifunctional ecological system. In addition, it includes the creation of a green infrastructure that is a feature of the resilient systems (for example: the Portland Green Street Program; Banff National Park in Alberta, Canada; Buffalo Bayou Park in Houston).

– Then, there are *redundancy* and *modularization*. Redundancy is the inclusion of more functionally similar components that act as support to each other, to guarantee that the breakdown of one component does not lead to the breakdown of the complete system (for example: Illinois Green Alleys program). Modularization is dispersion of ecological systems (separation into basic parts) and spreads risks across more different systems, rather than relying on a centralised system (for example, the Augustenborg Housing Project, Mälmo, Sweden).

– Another strategy is the protection of *biodiversity*. It can be grouped into two categories: *functional diversity* that includes different ecological functions in order to protect the system against various hazards; and *response diversity,* which, in ecological systems, implies the different species within functional groups that have certain responses to hazards (for example, Natur-Park Schöneberger Südgelände in Berlin, Germany).

– Ecological resilience also implies the existence of *multi-scale networks and connectivity*, i.e., ecosystem functions that affect the distribution of resources, species, energy, information, and transport. The interdependence of these elements influences the sustainability of the city (for example, the Staten Island Bluebelt in New York). It can also be defined as *interdependence* or integrated systems of components for mutual support (for example, High Line in New York, USA, and Promenade plantée in Paris, France).

– An ecological resilience system should be *effective* to create a positive relationship between received and spent energy. There should be *autonomy*, the capability of the system to operate independently of outside control. The ability of a system to anticipate a change or disaster is defined as *strategic forecasting*. The natural environment should be *inexhaustible* and *invulnerable*, and it has a *strength* and *power* to resist danger or other outside forces. The system needs to be *adaptable* and to have the ability to organise itself, adapting to changes or disasters (*self-organisation*).

– *Adaptive planning and design* is a strategy that puts urban design in the context of resiliency. It affects how well the plan will adapt to changes

in the environment. Urban plans and designs should assume possible effects on specific landscape functions or processes. In addition, implemented plans are 'research polygons' for experts and decision makers to learn from, through monitoring and analysis. With adaptive planning, urban plans adapt to disasters, and they are variable (for example, the SEA Street project in Seattle, Washington; the Emscher Landscape Park in Duisburg, Germany).

Landscapes are heterogeneous spatial entities and their sensitivity to disturbances varies by the sort, frequency, and power of those disturbances. Therefore, it is essential for landscapes or cities that planners and designers identify potential disasters, their frequency and power, as well as the possibilities for these landscapes or cities to adapt to such disasters and remain resilient. Thus, urban resilience precedes the protection of urban ecosystems with the planning for possible environmental disasters (Ahern, 2010).

3.3 Social Sustainability and the Concept of Resilience

At the centre of social sustainability is a person or a group of people, or a specific society. The sustainable society is "the one that lasts for several generations, which is far-sighted and flexible and wise enough to prevent destruction or undermining of the physical and social systems on which it stands" (Janić, 1997 in Trkulja, 2015c, p. 48). Therefore, social sustainability implies "avoiding possible tensions or serious social conflicts" (Slijepčević et al., 2013 in Trkulja, 2015c, p. 48). It also implies a "fair distribution of products and narrowing the gaps in levels of development between different social and territorial groups" (Vujošević & Spasić, 1996 in Trkulja, 2015c, p. 48).

Aspects of social sustainability are examined within the purview of *social resilience* that complement the understanding of the dynamics of well-defined, coupled social-ecological systems, within urban resilience theory. Sociologists use the term *resilience* to describe the possibilities and ways that human abilities, after absorbing stress, return to normal states (Surjan et al., 2011). Adverse effects need to be transformed into personal, relational and collective growth, by strengthening existing and by developing new relationships (Cacioppo, Reis, & Zautra, 2011). Murray and Zautra (2012) have used this wider conceptualisation of resilience in order to describe the term as an adaptive reaction to disasters expressed through three processes: recovery, sustainability, and growth.

Many authors have given their definitions of the term *social resilience* (Cacioppo et al., 2011; Lang, 2010; Longstaff, 2005; Murray & Zautra, 2012; Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008), and in summarising these definitions, it is concluded that *social resilience* represents the ability of individuals or groups to be flexible when responding to danger, to compensate for the damage incurred, to recover from stressors, and to continue their existence.

Social resilience is "a multilevel construct because it represents a feature of groups as well as a feature of the individuals in the group" (Cacioppo et al., 2011, p. 46). Therefore, it is studied as an *individual resilience* and as a *community resilience*. Individual resilience represents "the processes of, capacity for, or patterns of positive adaptation during or following exposure to adverse experiences that have the potential to disrupt or destroy the successful functioning or development of the person" (Castleden, McKee, Murray, & Leonardi, 2011, p. 372). On the other hand, *community resilience* is "a complex process as it involves the interaction of individuals, families, groups and the environment" (McAsian, 2010 in Withanaarachchi, 2013: 6). The latter is more popular and has been explored more than *individual resilience*, and thus many authors have defined the concept (Adger, 2000; Ahmed, Seedat, vanNiekerk, & Bulbulia, 2004; Brown & Kulig, 1996/97; Bruneau et al., 2003; Coles & Buckle, 2004; Ganor & Ben-Lavy, 2003; Jha et al., 2013; Kimhi & Shamai, 2004; Maguire & Cartwright, 2008; Norris et al., 2008; Paton, Millar, & Johnston, 2001; Pfefferbaum, Reissman, Pfefferbaum, Klomp, & Gurwitch, 2005). Summarising these definitions, it is concluded that *community resilience* represents the ability of a community to respond positively to changes or stress, to deal with them, and maintain the core community functions. Discussions about community resilience often point out that the whole is beyond the sum of its parts, which means that "a collection of resilient individuals does not guarantee a resilient community" (Norris et al., 2008, p. 128). Also, Brown and Kulig (1996/97, p. 43) noted that "people in communities are resilient together, not merely in a similar way" which means that the community resilience does not guarantee the same individual resilience.

Several authors (Bruneau et al., 2003; Jha et al., 2013; Wilkinson, 2011) have defined strategies for building social resilient systems. One of them is *robustness,* or the ability of the community to hold out against a stress without distress. Then, there is *redundancy*, a measure of the interchangeability of damaged or destroyed elements. It refers to the resource of diversity: communities that depend on limited resources are less capable of coping with changes involving consumption of resources (dependence on resources as opposed to redundancy). The power of a community to deal with a change (*strength*) and the capacity of a community to achieve goals in a timely manner with minimal losses (*speed*) are also characteristics of the resilient community. Also recognised are *adroitness* or *resourcefulness*, i.e., the capacity of the community to, if compromised, identify problems and mobilise resources.

Social integration helps in improving the quality of life and the elimination of bad images of communities. *Cultivation of systems and education* involves the use of moveable knowledge, skills and resources that have an effect on social systems, as well as the combination of experimental and experiential knowledge. Information on a disaster or change gives community members a basis for determining the priority measures for its alleviation, but also the involvement of community

members and stakeholders in urban projects, including public-private partnerships (*participation*).

The ability of the community to strategically anticipate future changes (*ability to predict*), as well as the ability of the community to organise itself (*possibility of self-organisation*), are significant features of a resilient society. Urban poverty is especially sensitive to the effects of changes and disasters due to the location of homes of poor community members, lack of income and lack of reliable basic services. *Reduction of urban poverty* is definitely one of the goals of a resilient community.

All these strategies help urban designers to create the spaces needed for the development and social integration of resilient communities.

4 Towards the Sustainable Regeneration of Brownfields

Because, in this chapter, the concept of sustainability is explored in the context of the renewal of brownfields, it is necessary to place brownfield locations in the context of sustainability. Williams and Dair (2007) defined their approach to this topic. They believe that it is primarily necessary to establish a definition of sustainability in line with brownfield development. Based on it, precise sustainability objectives should be developed. They are achieved through brownfield regeneration and learning from existing examples of brownfield regeneration.

The definition of sustainability in line with brownfield development is similar to the definition of sustainable brownfield regeneration that many authors have described (Franz et al., 2006; Nathanail, 2011; Schädler et al., 2011; Perović & Kurtović-Folić, 2012; Thornton, Franz, Edwards, Pahlen, & Nathanail, 2007). Sustainable brownfield regeneration includes "making abandoned, underused, derelict and, only occasionally contaminated, land fit for a new long-term use in order to bring long-lasting life back to the land and the community it lies within" (Nathanail, 2011, p. 1079). It is not a destination but a journey, and it may include several cycles of land reclamation, redevelopment, or refurbishment (Nathanail, 2011). If the concept of sustainability is a reference to practical problem solving, it is necessary to develop a specific framework that defines what sustainability is and what it is not. Thus, RESCUE (*Regeneration of European Sites in Cities and Urban Environments*) built up an approach to sustainability that is operational in the brownfield regeneration context. This approach is based on four dimensions of sustainability: economic, environmental, social, and institutional (UN Commission on Sustainable Development, 2001 in Franz et al., 2006). Based on these dimensions, a definition of sustainable brownfield regeneration was established:

"Sustainable brownfield regeneration is the management, rehabilitation and return to beneficial use of brownfields in such a manner as to ensure the attainment and continued satisfaction of human needs for present

and future generations in environmentally sensitive, economically viable, institutionally robust and socially acceptable ways within the particular regional context" (RESCUE, 2003 in Franz et al., 2006, p. 139).

This definition of sustainable brownfield regeneration suggests that sustainable development should be viewed as a journey that balances four dimensions of sustainability, and not a destination that needs to be reached in the future. The focus is on the flexibility of sustainable development instruments and the flexibility of the process (journey) in order to adapt to changes made during the brownfield regeneration. This is very important in defining objectives and indicators of sustainable brownfield regeneration (Franz et al., 2006).

In the framework of the broad sustainability components (economic, environmental, and social), it is necessary to determine objectives suitable for brownfield redevelopment projects (Williams & Dair, 2007). Objectives should be broadly defined in order to include possible changes at locations. In this regard, the general objectives of sustainable brownfield regeneration are separated. One of these is the promotion of brownfield projects in order to increase the stakeholders' participation in projects' emergence and implementation. By involving more stakeholders, projects will be more socially acceptable and better.

Additionally, fair discussions, achieving better quality information, and adequate information exchange are needed, not only during the project's development, but also during site operations. Transparency in decision-making will improve communication structures. During site operations, it is necessary to manage the risk from contamination, prevent adverse impacts on the environment and protect human health and safety as well as the environment. Re-use and reconstruction of existing buildings and infrastructures on brownfield sites are primary. In order to ensure cost effectiveness in the location, production of renewable energy is one possible avenue. A significant objective of sustainable brownfield regeneration is to promote employment and economic development, as well as harmony between the regeneration of brownfield locations and regional land management. It is certainly necessary to advocate an approach that integrates economic, environmental, and social aspects (Franz et al., 2006).

Brownfield regeneration can contribute a lot to sustainable economic growth. Namely, in the process of brownfield regeneration many companies are involved, which thus provide jobs and salaries for their workers. Property investors can increase their rental incomes. The regeneration will contribute to an increased value of property in the environs, which is a benefit for all residents of the surrounding settlements of the former brownfields. These benefits become possible if three economic sustainability objectives are met: providing opportunities for more efficient and competitive business, providing employment and supporting local economic diversity. Clearly, there is the potential for these to be fulfilled through the development of brownfields.

Literature that links environmental sustainability with brownfield locations is more developed than literature about economic and social sustainability. The objectives of environmental sustainability that can be achieved with the renewal and redevelopment of brownfield locations are to minimise the use of resources and to minimise pollution. Resource use can be reduced in the construction and end-use of objects, but without disturbing their functionality. Reducing the use of resources also means waste reduction and energy-use reduction. Reduction of pollution refers to site remediation and the cleaning up of contaminated land, construction techniques that don't pollute the air and don't make noise, the choice of less polluting materials, etc. Furthermore, space users should not pollute the air, ground, or water.

The objective central to the sustainability debate is to look after the natural environment and its biodiversity. If a location is undeveloped for some time, it is necessary to make an environmental study and assess the development of flora and fauna. On-site habitats should be linked to neighbouring habitats. It is also necessary to provide open spaces and gardens in residential areas. Water areas and flows must be protected from pollution and flooding, and water recycling systems should be used (Williams & Dair, 2007).

On the other hand, brownfield development projects offer an opportunity to achieve social sustainability. The primary objective of social sustainability in the renewal and redevelopment of brownfield locations is to observe ethical standards during the process of brownfield development. It is necessary to provide a safe and healthy work environment, reasonable working hours for workers, and so on. This contributes to the improvement of the quality of life of each individual, but also helps communities to increase social capital by providing space for social interaction (Williams & Dair, 2007).

Adequate local services and facilities to serve the development are needed, such as community buildings, open spaces and playgrounds, shops, and schools. Provision of services enables people to satisfy their individual needs for education, healthcare, leisure and so on, but also helps communities to develop social capital by providing space for formal and informal social interaction.

If a brownfield is suitable for housing it is possible to regenerate it for housing to meet local needs. It is desirable that the project is in accordance with the principles of sustainability. Housing provision in brownfield renewal locations may affect the demographic trends of the population and the broader development of the city.

It is necessary to integrate local development into the development of the city and the region. This is especially important in industrial brownfield locations that were once isolated and lacked good connections to the rest of the city. If it is planned to organise housing areas in these locations, it is important to connect them adequately to the rest of the city and thus avoid social exclusion. Physical integration is particularly important for vulnerable societies that are often physically isolated.

Integration can be achieved by creating better connections with other neighbourhoods and by creating better traffic infrastructure. It is essential that the project design will involve various users: the elderly, teenagers, children, and people with disabilities.

In brownfield regeneration, it is necessary to integrate sites into the environment and make them attractive to live in. It is also necessary to provide economic cost-effectiveness for the companies that would operate there. This enables high quality and liveable development.

Brownfield development projects should conserve local culture and heritage. Brownfield locations often have strong cultural or social meanings for people. There are many studies on the preservation of culture and the social importance of space. They show different techniques used to revive past cultures. These include the retention of existing buildings, the use of local knowledge in new development, and the introduction of public art into space. However, the historical context may sometimes have negative connotations for local people. In such cases, it is necessary to create a new image for these areas (Williams & Dair, 2007).

Kilper and Thurmann (2011) elaborated upon the link between space and society in the context of resilience. They understand the space as a social construction. Space is created by people. It is a result of their actions. Resilience includes social interaction and integration. Thus, people easily overcome negative images in their own eyes, as well as negative images in the eyes of other people. Therefore, social interaction and integration contribute to the improvement of the quality of life and the image of the city.

All of the above-mentioned strategies for the building of environmental and social systems, as well as economic instruments in the field of environmental protection, as listed in the previous section, are applicable as principles or guidelines in the process of the renewal of brownfield locations.

In order to achieve sustainability objectives through the reuse of brownfields, it is necessary to search for practical examples. Namely, it is necessary, beyond merely defining the terms and objectives of sustainability, for local governments to move quickly towards the implementation of urban adaptive planning. The *ICLEI - Global Forum on Urban Resilience and Adaptation*, which has been continuously hosted in Bonn (Germany) since 2010, helps local governments and other organisations to achieve sustainability objectives in brownfield locations by offering practical examples from around the world, case studies, innovations, ideas, suggestions, lessons, and advice on how to create resilient cities (Resilient Cities series).

The process of brownfield regeneration also requires an interdisciplinary approach and staff with specific skills, as well as specific databases. Sustainable renewal of brownfield locations is only possible if there is

competence and the ability to communicate with different experts in order to solve problems in better ways.

5 Conclusions

This research into brownfield and economic, environmental, and social sustainability has allowed a broad elaboration of these topics highlighting the need for sustainable land-use.

Brownfields constitute large land resources for many cities, and efficient use of urban land is a significant basis of current and future sustainable development strategies. Therefore, the question is raised as to how to renew brownfield locations to be sustainable.

The answer to the research question has been synthesised through the consideration of sustainable brownfield regeneration definitions and the definition of both economic instruments in the field of environmental protection and strategies for the building of environmentally and socially resilient systems. Additionally, the sustainability objectives that should be achieved through the renewal and redevelopment of brownfield locations are listed. It is emphasised that the sustainable development process requires continuous revision in order to adapt to changes, priorities and the development of knowledge and technology that take place during the process of brownfield renewal. It can be seen that much greater flexibility in managing this process is needed. To this end, it is necessary to observe cities as complex adaptive systems with interconnected structural components (economic, ecological, and social), each of which can be planned and designed individually. This view of cities enables higher quality and more resilient improvements.

Resilience is "a complex, multi-dimensional challenge for urban sustainability planning and design" (Ahern, 2011, p. 343) which requires an adaptive capacity in urban plans with regard to environmental changes, such that planning may be more flexible in the future. Therefore, urban planning does not have to be rigidly defined, and environmental changes should be understood as opportunities for analysis and learning. Resilience requires the monitoring, assessment, and innovative renewal of urban plans in relation to current and future situations. Resilience is the key for local development, as urban systems and communities need to be able to anticipate, ameliorate, and survive stressful situations, and adapt and recover after them. The capacity and ability for this are possessed only by the resilient city, so in planning long-term sustainability cities have to improve their resilience and manifest a synergy between sustainable planning and the reduction of stress risks.

To these ends, it is necessary firstly to note that brownfield locations typically represent economic, environmental, and social problems for cities, and to define the strategic concepts and priorities for the development of these areas. It is essential to adopt a policy of attracting and directing investors to brownfield locations, eliminating existing legal

barriers to their renewal and giving stimulation for investment in their renewal. It is also necessary to educate the public about the benefits of reusing brownfields, and to disseminate information and knowledge about successful examples of sustainable brownfield regeneration. These actions will contribute to a more comprehensive consideration of both the problems and the potentials of brownfield locations, thus initiating the development of better design for brownfield renewal.

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The Revival of Industrial Heritage _
Business and Production Complex "Trepča"

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ABSTRACT **The subject of this paper is the urban regeneration of Business and Production Complex "Trepča", its industrial heritage, and the possibility of its renewal. The focus is placed on the industrial complex that is territorially situated on the boundary zones of Zvecan and Kosovska Mitrovica, which has a complete physical structure that has lost its function, but has a historical, social, and architectural value today. The paper examines conceptual solutions and the proposed model for future revitalisation of the Business and Production Complex "Trepča" from the theoretical and methodological levels, as well as applied ways of improving business-production complexes in international practice in the field of regeneration of neglected industrial systems. The approach and processes of urban regeneration, in the context of both the individual complexes and the whole Business and Production System "Trepča", can be revived by a collaborative programming model and transformed into new forms of industrial business according to the model of a technology park, whereby successful realisation requires the gathering and compliance of all stakeholders at once, from the international, regional, national, and local-city level. The modern model of the technological park, as a result of the urban regeneration of Business and Production Complex "Trepča" is a unique example of a comprehensive spatial and urban planning solution for sustainable development of this area.**

KEYWORDS industrial heritage, Business and Production Complex "Trepča" (BPC Trepča), urban regeneration, transformation, technology park

1 Introduction

This paper examines, on a theoretical basis, and on the basis of experiences of industrial heritage as the driver of urban renewal, the possibilities of the transformation of BPC "Trepča" as an urban area, through the categorisation of the potentials of an abandoned, or partially abandoned, industrial site, which can serve as an initial step in the process of reuse.

In order to categorise some industrial objects or artefacts as industrial heritage, they need to possess some values, in terms of having marked some space or society in a certain period, whether in architectural, social, technological, or historical terms. Industrial heritage consists of industrial buildings, but also machines, mines, infrastructure, housing facilities built for workers, and similar. It is the memory of the life of workers, often a symbol of progress and pride for the local community, a part of local history and identity, which nowadays means that many buildings represent important landmarks in the city (TICCIH, 2003). Although stories about the difficult position of the working class were linked to the period of industrialisation, many industrialists were trying to improve the living conditions of workers, so the construction of factories was followed by the construction of apartments, public buildings such as bathrooms, schools, and hospitals, and the industry has also influenced the development of infrastructure, and therefore the overall development of cities. Many of the old industrial plants and machines are still preserved and can be used to follow the development of science and technology. All these values and potentials of industrial heritage have been used in urban renewal in the last few decades, especially in cities that have experienced a decline in industry and economy, and are now looking for new development options (Cizler, 2011).

BPC "Trepča" was a source of progress for a long time, not only for Mitrovica and Zvecan, but for the wider region. Its value extends to a symbolic meaning of great value for the local population. BPC "Trepča" is an important benchmark in the region, and the role of this industrial heritage is an option for new regional urban development and promotion aiming at achieving social and economic benefits.

2 Modern Experience and Practice of Urban Regeneration

There are many examples of reuse and regeneration of abandoned industrial complexes in the world, where the potentials of these spaces are realised in different ways. In order to attract investment, areas that once relied on industry had to re-create their own identity and dominant function. Culture is considered a magical substitute for all factories and warehouses, as an instrument that will create a new image of urban environment making the city more attractive to capital and professionals (Hall, 2000). In this way, the industrial heritage of the city is used for the development of cultural and educational tourism. The development of

this type of tourism involves the opening of the Museum of Industry and the integration of cultural and educational routes and programmes that connect industrial monuments, such as the European Cultural Routes and the European Route of Industrial Heritage - ERIH.

A good example of the regeneration of an industrial site in a tourist and recreational centre is Castlefield in Manchester, England, established in 1982. The history of this site dates back to the Roman period. In the industrial sense, the significance of this location is reflected in the first built industrial channel in the world in 1764, and the last station of the first passenger train, built at this location in 1830, with the first railroad warehouses built in 1831. This area was designated for conservation in 1980 and was granted the status of the first United Kingdom Urban Heritage Park in 1982. The area, marked by the beginning of the industrial revolution, became defunct and was abandoned during the 20th century, exactly when the conversation about this significant space began. Although most of the facilities were devastated, the potential of this area was recognised and acknowledged by the local plan of 1982, which was actively supported by the Museum of Science and Industry. £40 million sterling from the public sector was invested in the first park of urban heritage and its regeneration. The Central Manchester Development Corporation was established in 1988, and had the task of designing a regeneration policy for about 187 hectares of the central Manchester area, as well as integrating the private and public sector in the regeneration process. The entire Castlefield development policy was based on strengthening tourism, consolidating and supporting political activities, as well as establishing a housing community. It was planned to regenerate the objects, channels, viaducts, and open spaces in accordance with high standards of urban design. The former industrial area is now fully revived with new functions. In this area, warehouses have been turned into modern apartments, bars and catering facilities, and television studios, as well as several radio stations. A well-known music festival is also held here. A number of archaeological excavations were performed here, which revealed numerous data on the earlier history of the city, as well as the emergence of Manchester. Today, this revitalised part of the city is an obligatory tourist attraction, as well as a summer destination much visited by both tourists and by residents of Manchester. Industrial buildings of red brick construction, interesting bridges, viaducts and canals, Roman excavations (fortification and granary), the Museum of Science and Industry, and numerous bars and restaurants, have fully revived the former industrial space that testifies to the roots of the city of Manchester, the industrial revolution, and the first passenger railroad in the world.

Successful examples of the transformation of industrial sites are St. Katharine Docks in London, where the abandoned storage facilities were closed in 1968 due to insufficient capacity and inability to handle contemporary ships. They have been transformed into modern office buildings, while some warehouses were later transformed into luxury apartments. The regeneration of the London docks was primarily initiated for economic and social reasons, but on that occasion, the industrial heritage of a large part of eastern London was preserved.

When the regeneration of this area began, many facilities had already been destroyed and demolished, and for the remaining facilities, the view was taken that they should be preserved and integrated into a massive investment programme, in order to contribute to the constant regeneration of the area and retain the memory of "The Greatest Port in the World ". Donations and legal agreements enabled the preservation of the most of the buildings of historical significance. During regeneration, the entire area was divided into eighteen conservation areas, groups of buildings, and land and water areas. Six of these areas were classified as areas of national importance. Some objects, such as Wapping, Limehouse, Bermondsey, and Rotherhithe, were protected by conservation. The buildings and areas protected by conservation have maintained the character of industrial sites. All newly designed objects in this area were of a high design standard and gave a positive contribution to the conservation area and the character of the area. Preservation of the architectural and industrial heritage of the docklands was accepted as a key part of the London Docks Rehabilitation Strategy.

The Czech Republic, a former socialist country, possesses many industrial facilities, and has a highly developed industry, primarily in beer and sugar. It took a long time for the Czech Republic to change perspective regarding industrial heritage and to recognise the potential of abandoned industrial buildings. The Czech Republic has provided good examples of the transformation of abandoned former industrial facilities. Vanjkova, a former machine factory of Friedrich Vanjek's in Brno, was registered in 1992 on the list of significant monuments of the architecture of the Czech Republic. As a very important symbol of innovation and technological progress of the city and the area that was originally outside the city, it later found itself in the central zone by means of the expansion of the city core. The local population - the Citizens' Association Vanjkova, in cooperation with the non-governmental organisation from New York, Project for Public Space (PPS), played the main role in the regeneration of this complex, which began in 1994. The Foundation was set up in the same year in order to support the idea of the reconstruction and revitalisation of the complex, and its conversion to cultural, educational, and commercial purposes. This foundation dealt with the information and animation of other participants and stakeholders, and during the long-term work, it collected funds from the City of Brno, the Open Society Fund, and the Partnership Foundation. In addition, they organised many workshops and exhibitions in order to introduce many visitors to their objective. Thus, the idea of regeneration was joined by many other social and interest groups, as well as institutions. In 1997, they launched the pollution research in the Environmental Protection Department of the City of Brno, which confirmed suspicions about the level of pollution and threats of even higher levels of pollution. Through joint work, associations began reconstruction and reconstructed the facility bit by bit, with minimal interventions. The work of students at workshops, and professors from New York, Dortmund, and Vienna, crystallised the idea of the future purpose of the building: the modelling room and the moulding room were kept for non-commercial purposes while machine workshops and smelters were converted into commercial facilities. Only

when the issue of ownership was solved, an investor emerged. With the activities of the associations, the revitalisation project included not only the local population, local authorities and investors, but also experts from around the world, and their active participation contributed to the quality of the project. The whole building has been turned into a large mall; only the mechanical workshop and the administrative building have been retained, while the facades of the moulding room and smelter have been integrated into the new construction. A former mechanical workshop was equipped with a multi-purpose hall, and a public competition was announced for its use. The association that was the initiator of the entire project received a space on the ground floor of a former smelter, with a long-term lease under very favourable conditions.

The salon Vanjkova, a space for the use of the NGOs of Brno and its surroundings, was also opened, as well as the information centre, the cafe club, shops selling products from the workshops, the hall for non-profit actions, and many open public spaces within the complex.

Industrial heritage can be used to improve the ecological image of the city and neutralise the experience of BPC "Trepča" as an ecological black mark. In recent times, ecology was the most important problem of the city, and this can be a motive for future strategic development. In the time of global warming, increased resource consumption and waste production, the reuse of objects allows resources to be saved. Preservation of old buildings prevents construction on green and arable land. The Emšer Regional Park, in a large former industrial area of Germany, spans 116 km in the east-west direction and 67 km north-south, and has 53 towns. The main reconstruction strategy was to connect industrial buildings and nature to a continuous network - a park where green surfaces interweave with industrial remains that have been given new functions. This example is significant due to its integrative approach to renewal and the great commitment to the issue of ecology. It shows that even polluted industrial areas can be converted into green and sustainable areas, with the preservation of the material remnants of the former industry. Environmental issues in this project were as important as the economic and functional, and their treatment was consistently implemented in all aspects of planning, design, and construction (for example, using clean energy sources, rainwater utilisation, healing the soil, etc.) (Bajić-Brković, 2009). Furthermore, this project shows how a negative perception of places with a long industrial history can be overcome. The above-mentioned methods of promotion and re-use of industrial heritage could be applied to the example of "Trepča", together with measures such as the introduction of filters, emission control, afforestation, and solutions for waste water, which would all contribute to solving the ecological situation in the city.

FIG. 2.1 Position of the BPC "Trepča"- wider area

FIG. 2.2 Position of the BPC "Trepča"- inner area

3 Business and Production Complex "Trepča" - Formation, Development, State

From its very formation, the Business and Production Complex "Trepča" was located in the crude material resource core of the Kosovo-Moravian region. It was created on the basis of its original raw material capacities and developed into a mega-structural production system, which was the backbone of the development, not only the significant for the region, but for Serbia as the whole, and indeed the whole Balkan region. In some of its segments, it even developed into a business-production network with elements of European and world importance. The head office of the business and production system "Trepča" is located in Zvečan. The municipality of Zvečan is located in the north of Kosovo and Metohija, in the Kosovo basin of the Ibar River, which is bounded by the volcanic cone of Zvečan, Mali Zvečan, Sokolica, and the Majdan mountain in the southeast. The municipality is surrounded by the slopes of Kopaonik, Mokra Gora, and Rogozna mountains. Zvečan has a favourable transit position as it has a connection with central Serbia through Leposavic, with central Kosovo through Kosovska Mitrovica, and with Montenegro through Zubin Potok.

The business and production system "Trepča" was organised through mines and flotations, lead and zinc metallurgies, chemical product factories, and gold and silver haberdashery which are located in different areas of Kosovo and Metohija.

The Kosovo-Morava mining area is very old. The settlements around the mines in which objects from the Roman era were found testify that even the Romans exploited the ore in these areas. Exploitation of mineral resources in this area began in 1303, in the time of King Milutin (1282-1321), and lasted until the end of the 17th century. Between the two world wars, the British company - Trepča Mines Limited - started the works in the Trepča area in 1927, opening the mine in 1930 and constructing a lead smelter in Zvečan in 1940. After the Second World War, its property

was nationalised and a Mining-Metallurgical-Chemical Combine of Lead and Zinc Trepča was made, which, at one time, employed about 20,000 workers and produced about 70% of the mineral resources of the former Yugoslavia. Due to the specific situation in that part of Kosovo, most of the Trepča combine is not operational, and has the added problem of obsolete and worn out equipment.

Business and Production Complex "Trepča" is an integral part of this industrial giant and represents an industrial complex of extinguished production located on the edge zones of the municipalities of Zvečan and Kosovska Mitrovica, along the main road connecting them, and surrounded by the Ibar River.

3.1 BPC "Trepča": Problematic–Spatial Situation on the Ground

The causes that led to the decline of BPC "Trepča" have been shaped by complex circumstances, which took place over time in the surroundings of this area, more intensively in the last three decades. These causes can be seen from various aspects, especially the technical and technological. The process of abandoning the BPC "Trepča" occurred as a result of accelerated modern technical and technological development, changes in political and doctrinal approaches to urban and economic development, social, demographic, economic, and built structures, and the disappearance of entire economic branches, plants, market constraints, and the emigration of qualified labour. In the end, the process of transformation of the socio-economic order that has been ongoing since the 1990s, and especially after 1998, has led to its abandonment, and the insufficient and inadequate use of this industrial system as a whole.

FIG. 3.1 Business and Production Complex "Trepča"

FIG. 3.2 Facilities within the BPC "Trepča"

After 2000, this industrial complex became non-productive and now accepted tertiary activities while production plants were physically collapsing, and the equipment became unusable and obsolete in technical and technological terms.

The area in which the Business and Production Complex "Trepča" is located includes three functional units: business-technical block, production and technology block, and a waste ash-gravel tailings area. The business-technical block includes the administration building, and the institute's building, or Research and Design Centre. Both buildings are functional but with a reduced capacity of employees. The production and technological block or lead metallurgy includes a smelter with a lead pellet, a refinery, and a recycling plant for accumulative waste, as well as a power plant. Within the lead metallurgy, only the recycling plant for accumulative waste is periodically operational. Two chimneys that are part of the lead metallurgy are not operational. In the immediate environment, in direct contact with the industrial complex, is the landfill of waste ash-gravel. This landfill represents potential sources of environmental pollution, and it is very interesting from the aspect of valorisation.

The area in which the BPC "Trepča" is located is shadowed by the ecological load that was caused by the pollution produced by the previous method of use. The intensity of the pollution of this location depended on the industrial activity that was previously performed in that area, as the production processes produced by-products, and their consequences were reflected on health and the environment. In the period when the BPC "Trepča" was in the process of production, depending on the workload of the production facilities, huge amounts of pollutants and other toxic gases, ash, soot, tailings, and slag from flotation were released, which have endangered and degraded all elements of the eco-system of working and living environments. Bearing in mind the dominant position of urban parts of the city, the

north-south direction, which is also the dominant direction of airflow, meant that the municipality of Kosovska Mitrovica was exposed to a number of pollutants emitted by these plants from industrial sources as products of industrial metabolism. Unofficial sources say that this level of pollution is significantly lower today.

This industrial complex, with its physical built structure that is typical of the industrial character of the 1970s and 1980s, still has a dominant visual effect in relation to the surrounding architecture and its accompanying structures. Furthermore, it is located along the strongest transit road, which contributes to the experience of this complex as "the city in the city" – complete and isolated. It has all the archetypal, constitutive, and symbolic spatial elements of the city: several entrance gates, fence-walls, a street network, and typologically different objects and common open spaces. An authentic design of tht facility within the fence makes it a material and immaterial testimony of an epoch in the disappearance.

The image of the damaged area is completed by the "medieval city as a whole that was the expression of the characteristics of the Middle Age in its spatial organization with its own individuality, where the correlation of forms in the city as well as of the city and nature is the imperative of fundamental principles" (Božović, 2015, pp. 152), where, simultaneously with an industrial complex, it forms a comprehensive totality - a *place* that, according to local outlook, has a special identity.

FIG. 3.3 Panoramic view of the BPC "Trepča"

4 Theoretical and Methodological Basis of Urban Regeneration

Urban regeneration in its essential meaning is a comprehensive and integrative vision and set of activities aimed at solving urban problems and achieving the required improvement in environmental, social, economic, and technological and physical conditions in space (Perić, 2013).

The main direction of urban regeneration is towards improving conditions in the space, through the introduction of different types of transformation, such as:

- Economic, in terms of introducing new production activities, new companies, and new managerial models of the organisation
- Ecological, improvement of environmental conditions by reducing or "abolishing" the negative effects of waste materials and degradation of the environment
- Urban-planning, in the form of modernisation of urban spaces, restructuring of urban space, renovation of building structures, as well as redesigning of all the engaged space
- Social measures in the form of improving living conditions, as well as employment opportunities

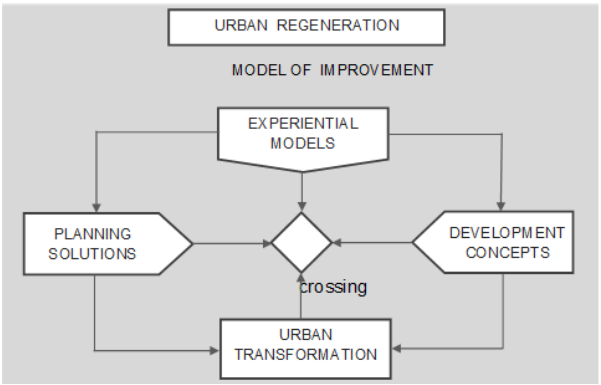

FIG. 4.1 Model improvements of urban regeneration

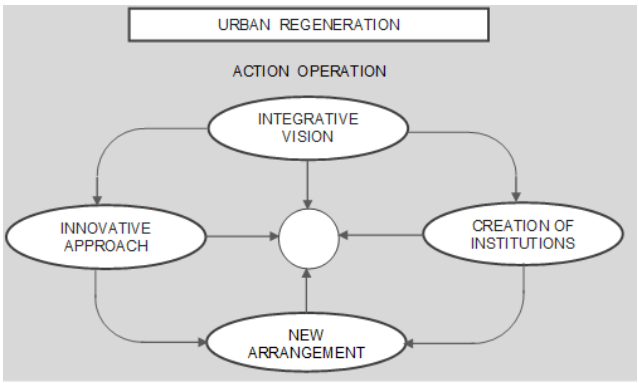

FIG. 4.2 Action operations of urban regeneration

It is important to note that urban regeneration represents the basic vision and form, instrument and mechanism of the sustainable development model, from which it follows that the essential meaning of urban regeneration is management, rehabilitation, environmental soundness, economic viability, institutional strength, and social acceptability within a certain regional context (RESCUE, 2003). In order to study trends and improvements, and the development of a region, it is worth mentioning the definition of urban regeneration by the Toledo Declaration (IMMUD, 2010) where the term "integrated" urban regeneration is introduced as a key approach in creating a "model of an intelligent, sustainable and social city", which represents an introduction to the design of the "creative city" model (Rivas & Bravo, 2013).

Methodical-modelling coverage of urban regeneration can be seen as:

- comprehensive vision of future urban model in space;
- integrative activities aimed at achieving the previous vision;
- urban transformation of structure aiming at improving the urban conditions;
- improvement of economic, social, and technological living conditions;
- innovative approach, through a range of different formulations of various development policies;
- improving institutional forms of action;
- expanding the offer of procedure of arranging various stakeholders, interested stakeholders, and other actors in the decision-making process;
- changing the development policy and conceiving a new urban policy of integrated development, by introducing new (creative) development concepts;
- introduction of a land policy concept for the purpose of rational management of the territory;
- comprehensive transformation of existing urban structures in order to improve the economic, social, and environmental development requirements; and
- offering new planning solutions at all urban levels, and regeneration such as:
    - reorganisation of purpose, activities, and contents
    - reconstruction and restructuring of physical and technological structures
    - reprogramming
    - remodelling... and all other forms of urban renewal.

4.1 Possible Directions of Urban Regeneration of the Industrial Heritage BPC "Trepča"

Business and Production Complex "Trepča" represents a "passivated" complex; though production has stopped, the intention of being able to restart it soon has not been abandoned. Therefore, in the present and in the near future, it may become one of the further explored "theoretical models", interpretations, ways of solving and revealing developmental strategies for improving this area, such as:

- **Industrial heritage treatment model**, which, according to the large number of experience models, represents a consequence of the accelerated development of cities and even more accelerated technological development of industrial production. This resulted in either lagging behind in the monitoring of industrial innovations so industrial production became obsolete, or due to the rapid expansion of cities, there was an annihilation of a suitable location.

- **Brownfield location model** implies land in urbanised areas that was previously built and used for industrial or production purposes, to be abandoned in the meantime, thus adversely affecting its wider environment in an ecological, economic, aesthetic, psychological, and social sense. It is important to note that the negative effects of brownfield

locations on the environment in ecological terms are mainly studied in developed countries, while the economic and social risks of brownfields in a sustainable urban environment are expressed within the context of developing countries. Regeneration of brownfield locations is a priority due to the decontamination of the specified zone and the preservation of the wider area, as well as public health in general (Damjanovic, 2008).

– **The model of industrial-technological-scientific parks** primarily contains the concept of urban design of production areas and zones and their development into highly regulated urban areas with multifunctional facilities in the area, all with the aim of forming a business complex that includes, in addition to scientific- educational facilities, accommodation-urban and business-distribution facilities.

– **The recycling process model** is based on modern technology capabilities and primarily includes the recycling of waste materials and their reconversion into "new raw materials", as well as the ecological revival of the entire area, which is primarily based on concepts and models of re-greening and revitalisation of natural resources following the examples of "green" architecture and urban spaces.

– **The model of market-location treatment** of the business and production complex and their evaluations of market value and comparative value, which it possesses in relation to the natural-raw material, technological-entrepreneurial, and social-qualitative resources that exist in that area.

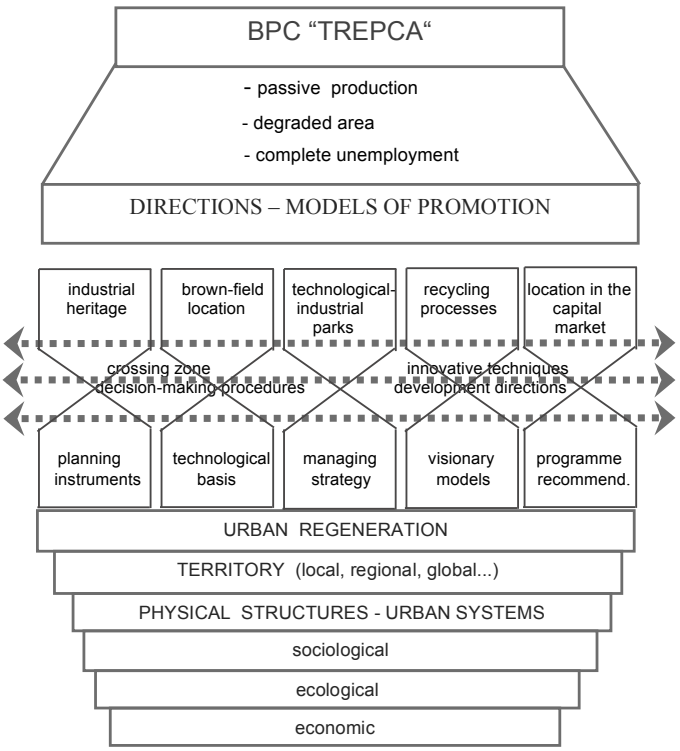

FIG. 4.3 The proposed structure of the regeneration process of BPC "Trepča"

All of the above elements are absolutely integral and necessary parts of the approach to urban regeneration comprehensiveness in the relation to:

A technological-production basis
B types and forms of planning
C managing strategic scenarios
D relevance to local, regional, and international level

4.2 Systematic Approach to Urban Regeneration of BPC "Trepča"

In the theoretical-model classification, BPC "Trepča", by its characteristics, is the closest to the model that includes the term brownfield location, in terms of the importance of coverage, content, and treatment of problems of industrial heritage.

The basic approach to solving brownfield location is a sustainable development model that is considered a basic component in order to achieve sustainable urban regeneration, which implies sustainable land use in the first place. What makes the brownfield regeneration distinct to other forms of urban regeneration is the complexity of the process itself, which is particularly reflected in the demand for compliance of interests of different stakeholders, as well as the integration of all sectors, disciplines, and institutions (Garb & Jackson, 2010). Sustainable brownfield location regeneration involves the management, rehabilitation, and appropriate repurposing of the brownfield, which ensures the achievement of the goal, and meets the needs of present and future generations in an environmentally sound, economically viable, institutionally strong, and socially acceptable way within a particular regional context (Perovic & Kurtovic-Folic, 2012).

Problems and obstacles in the revitalisation of brownfield locations are numerous, such as lack of education, information and experience, coordination and motivation, and insufficient understanding of the size and essence of the brownfield problem. This problem relates to the economic and social aspect, low level of political commitment to land reuse, lack of reuse strategy, lack of cooperation and exchange of information between different sectors and institutions, lack of potential interest in the regeneration of brown-field sites, investors, local administrative bodies and representatives of ministries, absence of unique records of these locations as well as records in general, absence of analytical instruments and principles for determining priority investments in locations, insufficient financial instruments and incentives, unresolved property-legal relations, environmental burdens and damage, and lack of tools for solving, which is evident in the case of BPC "Trepča".

A systematic approach to BPC regeneration requires the compliance of the interests of different stakeholders, and involves the integration of different sectors, disciplines, and institutions. The regeneration of this industrial complex along with the entire physical structure should be carried out within the framework of plans and strategies, at the regional, state, and local levels. Establishing the right link, linking the individual and creating common objectives of all stakeholders and actors of revitalisation, co-organisational planning, and monitoring and coordination of the regeneration process, are key elements of the successful realisation of BPC "Trepča". In order to efficiently conduct planning according to the principle of collaborative approach, it is very important to strengthen the horizontal and vertical ties of all participants in the planning process, where the competencies of all participants are clearly defined, and to harmonise the planning policy among different sectors and disciplines. It is very important to make connections at the national, regional, and local levels, in the state, regional, and local self-governments, agencies, and between all institutions, governmental and non-governmental organisations, citizens' associations, citizens' representatives, investors, construction companies, foundations, etc.

In case of the regeneration of BPC "Trepča" as a brownfield site, ecological analysis of site pollution, assessment of the value and creditworthiness of facilities should be made, on the basis of which it would be decided whether the objects will be preserved or demolished. After that, measures would be taken to eliminate possible pollution, and then proceed to possible demolition. If the buildings are not demolished, the next step is their regeneration, by reconstruction, conversion, and other methods that will ensure new life will be brought to the location in new conditions, and in accordance with urban plans, strategies and action plans that are primarily focused on the needs of the population and the interests of all actors in the regeneration. A strategy of preservation instead of demolition, adaptation, conversion and reuse – in other words, transformation – would have great significance for the environment and the region where this industrial complex is located. It would also prevent further suffocation of valuable surfaces with new buildings, while preserving and reusing materials from historical buildings, saving the energy that is required for demolition and rebuilding, and prevent the accumulation of large amounts of waste material that needs to be removed. In times of increased costs of energy production and the use of natural resources as well as construction materials, where there are conditions of increased waste production, a completely different approach is needed: energy savings, preservation of valuable resources, and reduction and rationalisation of waste. In the long run, preservation and careful management of resources would improve the environment and significantly reduce costs.

A very good example of industrial heritage regeneration is the attitude of the administration of Liverpool City, which is clear from the noteworthy Liverpool Management Plan of 2003. Conscious of the historical and industrial significance of the city, they preserve and regenerate their industrial heritage. Significant funds in foreign countries are given to the

purpose of registering and maintaining national cultural heritage, and are used for analysis, projects, and heritage interventions, such as the Historic Preservation Fund HPF, founded by the US government. There are also numerous non-governmental organisations whose goal is the registration and care of the heritage, the Save organisation in England, as well as Europa Nostra, which brings together several European countries. In 1995, the first foundation dedicated to the protection of industrial culture monuments and their re-use was established in Germany – the North Rhine-Westphalia Foundation.

4.3 Technological – Scientific – Industrial Park: Urban Transformation Model of BPC "Trepča"

The modern model of technology parks represents the creation of new - and transformation of existing - industrial complexes (which is the nearest closest thing to BPC "Trepča") into multifunctional business-production zones. These are based on the urban concept of organising, arranging, and designing spaces, which, in addition to production, necessarily include science, development, business, distribution, marketing, as well as the introduction of city support services, housing for employees, central functions, recreation, sports, culture, entertainment, and thus could be seen as a small city in itself.

The Technology Park is a new form of entrepreneurial infrastructure (Petković, 2006). Physical infrastructure (buildings and other regulated business premises), science (research centres, innovative centres, laboratories, etc.) are functionally connected within it, along with new business entities (new small enterprises, new production units of large corporations, financial and accounting services, etc.), and is the most recognisable form of transformation of the BPC "Trepča" at the moment.

The first technological parks appeared in the USA in the middle of the 20th century. Today, they are being developed in both developed and developing countries, representing attempts to move and encourage the development of entrepreneurship through the establishment of knowledge - based small and medium-sized enterprises within a country (Ilic, 2006). Therefore, the participation of scientists from the institute and university is almost obligatory in these parks. They introduce innovations (the latest technological achievements) into enterprises, raise their competitiveness in the market and form incubation centres (for the development of new enterprises), and at the same time transform universities from classical and lecture-oriented to entrepreneurial. They are considered the most profitable and most effective forms of development of the area, which function on the principles of innovation and technology transfer. This is a suitable model as there is a University in the vicinity of BPC "Trepča", in Kosovska Mitrovica, which has top professional staff in all areas. This urban model of transformation or *re-activation* is closest to reality and it would gradually, in the best and fastest way, solve the problem of the existence of the population and economically re-activate the entire area.

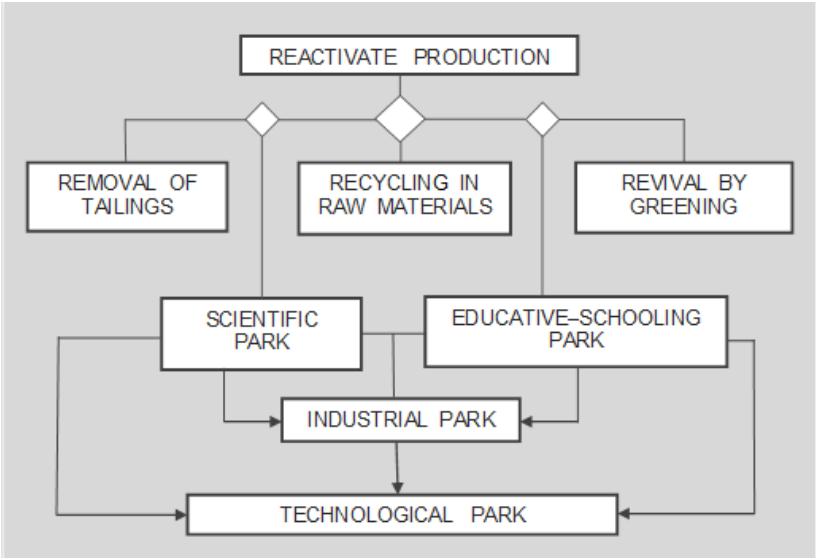

FIG. 4.4 The model-based development concept of the BPC "Trepča"

Development directions would be oriented towards the following model concepts:

- Improvement in the direction of modernisation of existing tertiary technological production and "deconstruction" of existing obsolete business structures;
- Introduction of technological forms of impermeable filters, large protective capacities for environmental protection;
- Establishment of a Research and Development Centre for the improvement of production and operations in the spirit of modern technologies of industrial production;
- Converting the whole complex into a technology park, which would include a part of the "waste tailings" along with environmental protection interventions;
- Introduction of educational function of technical and technological development, precisely because of the proximity of the existing University Centre in Kosovska Mitrovica;
- Converting the entire complex into a reception camp in the form of a university campus (in the area of the recycled "waste" zone);
- Formation of accompanying service - cultural contents with the possibility of accommodation capacities for young researchers;
- Forming accommodation capacities for business management (and possibly for employees);
- Development and establishment of an institution for inter-regional development.

5 Conclusion

The vulnerability of industrial heritage can lead to destruction or improper use, so it is important to point out the importance and possibilities of its conservation and reuse. The aim of the paper was to point out the problem and examine the possible ways of restoring the industrial heritage of BPC "Trepča". In the context of studying from the theoretical and methodological level, and having already applied ways of improving business and production complexes in international practice, it can be seen that similar industrial heritage restoration principles were applied in most projects. Current trends in this area are mainly based on retaining and promoting the aesthetics of industrial spaces, with the introduction of new activities. Thus, new functions often involve a combination of commercial and cultural content, the former to achieve economic sustainability, the latter in the aforementioned goal of promoting the industrial past and creating a particular image. The actors involved in the reconstruction process are different, but implementation of projects by local communities or the creative sector has proven to be a frequent and good example. In all renewable projects, industrial heritage has been recognised as a value and potential for the sustainable development of the local community. Accordingly, they seek to preserve as much of the original remains of the industry as possible and, in general, to preserve the specific characteristics of the space. This is the possible direction to be taken in the transformation of the BPC "Trepča", which would be directed towards modern forms of industrial operation, according to the technology park model. The modern model of technological parks represents the creation of new, and transformation of existing, industrial complexes, which is the nearest applicable example for BPC "Trepča" to follow. It would mean its conversion to multifunctional business-production zones, based on the urban concept of organising, arranging, and designing spaces which, in addition to production, necessarily includes science, development, business, distribution, marketing, as well as the introduction of supporting city service, housing for employees, central functions, recreation, sports, culture, entertainment, which would represent the design of the creative city model.

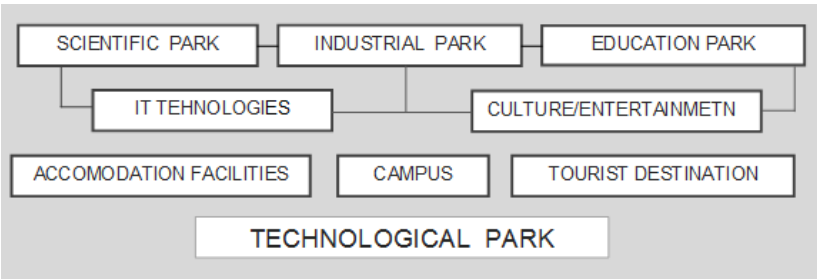

FIG. 5.1 Transformation of the Business and Production Complex "Trepča"

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Spatial Regulation for Change _

Business Zones as Areas of Continuous Transformation

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ABSTRACT **Within the context of the sustainable planning of a productive business environment, business zones represent large spatial areas that change continuously with regard to various conditions (business environment, strategies for promotion and development of economy, production of spatial planning documents, etc.). This calls for the continuous transition of internal programmatic and morphological design, as a result of which it is becoming increasingly difficult to provide high-quality and sustainable justified urban design and architectural solutions at these sites. This chaotic situation also diminishes the business competitiveness of such zones, as well as their developmental and visual significance in a wider area. This paper highlights the individual regulatory measures at planning and implementation levels that, under given conditions, allow for the development of a productive business environment and positive implications of the zones for a wider area.**

KEYWORDS business zones, sustainable doctrine of planning and design, impacts and connections, regulation, morphological structure

1 Introduction

Over the last couple of decades, in West Balkan countries (WB countries) distinctive free-market economy conditions have evolved, under which the formation of business environments has become the priority of various development strategies. Here, business zones play an important role as places of siting, business operations, and the permanent existence of economic operators in certain environments. Zones are primarily the engines of economic development, directly affecting the general social and physical contexts. Business interests and processes of contemporary industry, services, and trade materialise therein. Globally, business environments are changing rapidly. It is necessary to appropriately address these challenges by offering a flexible range of business areas and structures. Because of this trend, special conditions of continuous change are established in the zones, which, with a view to regulating the situation, require an appropriate professional approach. In this sense, it is essential to put in place the concept of sustainable urban design. Indeed, the location of new and existing zones, their scale, internal organisation, and environmental impacts, as well as other synergistic effects, make it necessary for the profession to plan for the reciprocity of its fundamental sustainable goals in the society–environment–economy triangle.

The management of business zones in developed western countries nowadays is characterised by various regulatory trends that are being implemented increasingly in WB countries. Many institutions and associations are being established at the local, regional, and transnational level, which are organisationally, financially, and structurally supplying individual zones, thus striving to increase their competitiveness and effectiveness. Zone management is in the interest of cities and regions as it is directly linked to attracting new investors (Clark & Moonen, 2013), creation of jobs, and providing the conditions for permanently retaining companies in a given location (MacCarthy & Atthirawong, 2003). Zone management also means physical space management as a public interest element (Fig. 1.1). Competent services (city and municipal administration), which directly take part in developing and regulating the zones with their spatial planning documents, play an important role in this process.

The zones as we know them today are areas of predominantly mixed use, allowing for the siting of industrial, service, storage, and similar activities (Čok, 2004). In theory, and in the profession, the term *business zone* (hereinafter: BZ) has been used as a cover term for areas where entities of various content operate. Below, this term refers to a common label for all types of zones, i.e. with mixed, mostly industrial, trade, business, or storage uses. In developed western countries, there are only a few that are located in traditional industrial locations, as intensive urbanisation in the second half of the 20th century significantly changed the settlement structure and morphology of many towns and cities (Assink & Groenendijk, 2009).

In the context of creating a sustainable environment, zones play a vital role, so it is of utmost importance to address them both appropriately at the macro level of sustainable planning and the micro level of sustainable urban design. This contribution is trying to provide an outline of potential spatial regulatory instruments that can increase the general effectiveness and competitiveness of the individual zones. The presented outcomes and proposals are based mostly on experience in zone planning and design in Slovenia and Croatia (Čok, Kavaš, & Zimmermann, 2016) over the past 25 years. Due to their common recent history (the existing situation concerning zones in both countries is based on the early industrialisation of space in the Austro-Hungarian monarchy, followed by common legislation and planned economy of the Socialist Federal Republic of Yugoslavia, and today the EU market and legislation frame), the outcomes can be also applied to other countries in the economically connected WB region.

FIG. 1.1 Business structures as major phenomena in relation to existing spatial entities (zone Mažinjica, Buzet, Croatia)

2 Timeline of Business Zones' Development

Spatial forms of organisation of business activities in the physical space of the European continent (and beyond) can be chronologically followed from the first wave of industrialisation in the 17th century (Košir, 1993), when primary manufacturing was replaced by mechanised manufacturing and later by technologically sophisticated machine production. The siting of the early industrial complexes of the time followed primary locational criteria: energy products (water force, coal), access (transport corridors, watercourses), and labour force (proximity of cities) (Badri, 2007). The 19th century also saw the development of the theoretical approach to the spatial placement of the industry. In 1826, Von Thünen developed the locational rent theory, while in 1909 Weber defined the location theory. The central-place theory was introduced by Christaller (1933) and Lösch (1940). Through electrification, automation of work processes, and spatial automation, and additionally the introduction of protective environmental parameters, the traditionally organised production in the form of single-culture industrial zones became obsolete. In terms of location, an increasingly independent *footloose industry* (Toffler, 1981) started to gain ground, which is a general term for an industry that can be placed and located at any location without effect from factors such as resources or transport. The social and technological development in the second half of the 20th century also strengthened the sector of business activities, services, entrepreneurship, and other *dispersed* content, which needed a new typology of *multi-purpose zones* with flexible conditions of business conduct. Such zones were an important developmental element in the extensive post-war urbanisation of the European space.

3 Regulatory Flexibility as a Development Opportunity or a Spatial Problem

Nowadays, on the extreme end of this trend, the so-called NoLimit zones are being established, as sites that are practically without any limitations regarding the activities allowed and the regulatory criteria for urban and architectural design of the buildings therein. The existing zones with more rigorous conditions adapt, with various results, to the market of business real estate using partial regulatory measures. Such a philosophy corresponds to the current demands but, on the contrary, it also represents the failure of "instruments" for regulation of space, which is what cities, regions, and other administrative units should possess should they want to comprehensively plan their living and working environment (Gabrijelčič et al., 2016). Many cases of designing almost chaotic situations are testimonies to this fact, as they reduce the business attractiveness and efficiency of zones as potential development locations, e.g. some BZs in eastern EU countries with programmatically and architecturally unregulated situations, i.e. unattractive appearance of some buildings and coexistence of exclusive content as a result of extremely loose conditions for building design, following the principle "anybody–anything–anywhere".

A

B

FIG. 3.1 A+B: Flexible regulatory conditions allow for various architectural interpretations in the design of individual structures (zone Mala Huba, Buzet, Croatia).

In these areas, spatial planners have a broad range of regulatory instruments available (see chapter 5), which are unfortunately often not used due to: (a) established professional practice (non-motivated participants); (b) lack of understanding by investors and decision makers; (c) principle of reducing investment costs; and (d) other known or unknown reasons (e.g. inappropriate inclusion of the public in adopting and implementing a spatial planning document (PIA)).

Despite the evident growth of environmental awareness that we have faced in the last decades, and the implementation of sustainable planning in national legislation, we still encounter an incomprehensible disinterest for the aesthetic *dimension* (Fig. 3.1) in designing spatial solutions (Gabrijelčič, 2013). Sustainable qualities of buildings are not only numerically determined (and achieved) standards in terms of energy efficiency, recyclability, etc., or economically justified spatial developments, but rather socio-cultural qualities underpinned by the aesthetic dimension. This refers to the culture of building design and external areas. In the zones, this dimension/quality is reflected in visually attractive (and healthy) working and business environments, which can be more stimulating and thus more productive.

A well-organised and attractive environment is also an economic category, so the response of zone managers to market needs, asking for an increased flexibility of internal programmatic and design conditions, should be very careful. In the field of planning residential and hotel complexes, shopping centres, and other similar typologically completed spatial entities in WB countries, this awareness is high, in terms of both users and the investment companies who plan and build these complexes. For the BZ domain, this "aesthetic aspect" is only recently becoming more prominent in its actual, and indeed economic, dimension.

FIG. 3.2 Comprehensively designed urban and architectural concept as a consequence of an efficient professional approach and quality design conditions (Technology Park Ljubljana).

At the design level, the concept of internal technological processes for the individual industrial, business, service, etc. buildings and their overall functional planning and energy efficiency, the profession possesses a comprehensive line-up of recommendations, rules, and guidelines (Wiendahl, Jürgen, & Nyhuis, 2015; MODON, 2012; PURES, 2010).

At the planning level of site selection for zones in the field of architectural design for internal buildings, we record a lack of professional initiative and thus fewer good practices (Potts Carr, 1998). The architectural aspect of zones is left to the individual approach of investors (entrepreneurs) or their business and aesthetic views (Fig. 3.2). In this sense, the mostly passive role of the included public should be emphasised, which, under the law, has the right to take part in the drafting of spatial planning documents. Generally, there is still the belief that zones are isolated areas with no need for aesthetic considerations, as their image is formed by standardised technological processes. Such a technocratic doctrine covers the established viewpoint that aesthetic measures are irrelevant, and in some cases even restrictive, for potential investors.

4 Planning and Design of Business Zones

The planning and design of the zones are two processes that are chronologically separate, but, indeed, complex and, in many parameters, reciprocal. Both the planning and design levels are relevant for their final efficiency, which represents a synthesis of the programmatic, functional, morphological, and architectural design. Bearing in mind that zones are primarily the engines of economic development, they are, at the same time, major spatial entities with many environmental implications. In the process of their planning and design, it is thus necessary to consider their spatial and economic aspects separately.

This contribution is focused on the problem of spatial zone regulation, so below we outline the economic and general geographic aspects only in principle.

4.1 Zones as Contributors to the Business Environment

The network of modern-day zones in the developed western world is relatively well diversified, thus the competition and competitiveness among them is logically justified. This practice is now also implemented in WB area.

A competitive *business environment* in a zone is the result of many economic and spatial parameters (Koman, Rojec, & Kavaš, 2012). Along with conventional location factors of zone establishment and regulation, such as (a) economic (tax rates, costs of raw material, energy products, price of land, etc.) and (b) spatial ones (location, appropriate surface area and possibility of expansion, transport accessibility, internal infrastructure, presence of service activities, proximity of labour force, limitations regarding potential environmental impacts, etc.), other factors are increasingly important as well: (c) integration of the zone in stimulating development programmes encouraging zones with financial support and administrative and organisational management, and (d) updated database on the situation in the zone (implementation level, availability of land and facilities, expansion and migration, utility infrastructure, ownership, services, etc.).

Nowadays, the economic paradigm is increasingly characterised by the fast changing free-market economic parameters, to which companies respond with fast migration, organisational changes, takeovers, etc.; thus, along with the aforementioned location factors the following factors are also important: (e) fast response of the administrative procedure in acquiring spatial documentation (building and operating permit) and (f) flexibility of design conditions for planning buildings and exteriors.

The mixture of all these parameters *more* or *less* forms an attractive environment when making the decision about placing a certain business entity in a zone. The prescribed conditions for planning internal urban fabric also affect its spatial appearance, i.e. both its interior and exterior. The relevant prescriptions can lead to the formation of an attractive, i.e. compelling, working or business environment or, in contrast, an amorphous situation without the dimension of stimulatory productivity. In this sense, the understanding of the described complexity is among the key elements of approaching zone planning today.

4.2 Starting Points and Goals in the Planning and Design of Business Zones

The basic goal of regulating both existing and planned new zones is the provision of good conditions for the operation of in-house companies and, while mitigating environmental impacts (Čok, 2016). In doing this, it is necessary to put emphasis on the zone's *visual impact* as an occurrence in a certain spatial context and *internal architectural setting* contributing to perception quality of the zone as a complete spatial entity. The visual dimension as part of the socio-cultural qualities of

sustainable planning (guideline) is defined as a component of a quality business or working environment.

In both cases (existing and new BZs), both planning and design are based on the individual starting points leading the processes to a desired outcome.

The key starting-points in the **planning level** include:

- Coverage of the territory (municipality, region, etc.) with the relevant range of land and facilities to be developed (diversified zone network allows for various conditions in various locations; e.g. cheaper land and labour in the catchment area or more accessible locations in terms of transport and concentrated labour force near urban centres, etc.)

- The compatibility of settlement system planning and transport, energy, and economic infrastructure (followed by planning distinct types of zones, their size, programmatic orientation, etc.)

- Provision of attractive conditions for encouraging new investment and for permanent retention of the existing companies (this is one of the starting points of economic development – spatial and economic strategies must follow common goals and ensure coherent implementation of individual sectoral measures)

- Concentration of environmental impacts in a single place (zone location) and its control (dilemma: dispersed structure of many small zones or a small number of large zones)

- Provision of development phasing of zone network (implementation of planning strategy according to the needs).

The key starting-points at the **design level** include:

- Relevant range of activities allowed (the nature of the activities affects the technological processes in the zone as a whole and in individual buildings, environmental impacts and their remediation, zone scope, internal sectoral division, etc.)

- Rational and efficient infrastructure (transport, energy, utility infrastructure, etc.)

- Flexible while still efficient regulatory provisions for building design, such as:
    - Rational and efficient design of the basic plot raster
    - Instrument of modular connection or division of building plots
    - Conditions for designing buildings using sustainable planning principles

– Phasing of development and the possibility of zone expansion as a whole (this is an important regulatory and implementation quality, particularly when zones are being slowly filled in with companies, as is the case for smaller zones in the hinterland, which are established by municipalities to boost local entrepreneurship or, on the contrary, for strategically more significant zones that, at a certain point, require expansion)

– Development of spatial form of the zone as a whole, which is acceptable in connection with neighbouring areas (most zones are located in the *relative proximity* of urban structures so their dimension and form are, in various aspects, automatically integrated in the context of the impact area).

4.3 Reasons and Opportunities for Planning, Design, and Regulation of Business Zones

Zone planning and design involves a distinctly interdisciplinary approach. Along with spatial planners, urban designers, and architects, it involves the participation of economists, geographers, sociologists, and other experts contributing their perspectives, so that the zone, with its structural elements, is based on appropriate expertise. This process must, in an appropriate form and scope, include the lay public and professional community. Public participation in preparing implementation documents is justified by the law in practically all WB countries. In the case of zone planning, there is a relative lack of interest for public participation (except for ecologically controversial content). One of the tasks that producers of spatial documents take on is to inform and motivate the public. This is the only way to make land development more legitimate, while the possibility of the actual implementation becomes more feasible.

Zone designers, planners, and managers respond to the current requirements (economic, technological, real estate) with various measures. It is first necessary to stress the administrative situations or opportunities where there is a chance of developing the internal zone structure or the option of influencing the basic parameters of planning new zones (Čok et al., 2006). In principle, this framework involves two basic situations: (1) regulation in the locations of existing zones along with the opportunity of changing the applicable implementing spatial document; or (2) planning and design of new zones in new locations (i.e. *greenfields*) with the opportunity to prepare a new strategic planning document at the level of a municipality or a region.

OPPORTUNITIES FOR BZ REGULATION	
↓	↓
1 / REGULATION OF EXISTING ZONES	**2 / DESIGN AND DEVELOPMENT OF NEW ZONES**
• programmatic/ownership reorganisation	• preparation and implementation of development strategies
• spatial reorganisation	• preparation and implementation of spatial plans
• upgrading of infrastructure	• new zones as a consequence of revitalisation of built-up areas
• changes and amendments of PIA	• realisation of an actual initiative
• implementation of contemporary standards	• production of an original PIA (National Spatial Plan – DPN)

FIG. 4.1 Opportunities for regulation of business zones.

Given the extensive locational and morphological heritage of urbanisation so far, there are far fewer opportunities for establishing completely new zones in new locations compared to the regulation of existing ones. This is particularly prompted by: (a) increasingly rational management of land as a limited resource (sustainability principles) justified with the limitations regarding the balance of planning quota of a particular type of land use (agricultural, building, etc.) or with difficulty to prove requirement to develop new locations along with the available land quota inside the existing zones; (b) administrative and temporally complex, expensive procedures of changing zoned land use in spatial plans; and (c) long-lasting design and many limitations in realising interdisciplinary spatial and economic development strategies (dichotomy between strategic planning and the implementing level).

The domain of regulating the existing zones includes the following opportunities:

– Internal reorganisation of the zone because of changed ownership structure (new needs) or change of the implementing document introducing a different programmatic concept due to internal exclusion of activities (coexistence) or environmental impacts (impact on neighbouring areas)

– Spatial reorganisation because of technological needs of companies (expansion of built or open spaces, internal migration of companies, changed transport infrastructure, etc.)

– Modification of infrastructure lines due to deterioration, changed needs, or implementation of environmental standards (transport, energy, information technology, landfill sites, etc.)

– Zone enlargement due to the needs of in-house entities and arrival of new ones, if there are spatial possibilities available, environmental conditions, and all other relevant parameters (transport sustainability, energy products, manpower, etc.)

– Changes and/or amendments of the applicable spatial planning document as a consequence of introducing new regulatory measures (e.g. phasing out of disturbances, changes due to strategic documents – new zone typology, new profiling of the programmes allowed, etc.)

– Introducing contemporary standards in terms of environmental impacts (emissions, energy efficiency, etc.), building and exterior design (introduction of green elements, urban furniture, etc.), transport design and pressures, etc.

All of these situations require a formal change of the implementing spatial planning document (PIA changes and amendments), representing the opportunity for the *redesign* of practically all regulatory provisions. These procedures are rather simpler than developing completely new zones. The better financial and temporal feasibility allows them to be implemented in a longer sequence (e.g. 10 years), as well as repeatedly, and thus gradually influence the formation of a more quality and attractive internal environment (business and visual). The ecological aspect is inherent in the dilemma of redesigning the existing and establishing new zones. Opening new locations means, in one way or another, the emergence of new hot spots with certain environmental impacts, consumption of space as a finite resource, etc. Generally, the existing locations are already integrated in a certain spatial and social context, while the existing situation can only be improved by modifying them to meet contemporary environmental standards.

The domain of design and development of new zones includes the following opportunities:

– Preparation and implementation of strategic sectoral strategies. This opportunity makes it possible to harmonise various development interests and develop a zone network of various typologies. Development strategies in modern economies are becoming more and more frequent. This is prompted by increasingly changeable characteristics of a complex post-information society (many social, administrative, political, environmental, etc. aspects) leading to its fast response and the need for changing the living and working environment.

– Preparation and implementation of new spatial planning documents at the municipal level. This process is an opportunity to review the existing situation, valorise potentials and constraints, and thus introduce change at the land balance level (removal of certain zones, development of new ones, change of locations, etc.). Preparation of a completely new spatial planning documentation is typical for post-socialist countries that initiated a complete overhaul of sectoral legislation and practices in the process of implementing western, sustainable development standards.

– Change in spatial plans is also an opportunity to revitalise the existing situation. Non-active locations (e.g. industrial complexes in decline) with appropriate spatial measures (environmental rehabilitation, change in land use, etc.) are profiled into new programmatic and spatial forms (industrial or technology parks, mixed use, public content, etc.)

(De Cesaris & Del Monaco, 2011) that are acceptable for the city organism. Although the changing of spatial plans is an extensive and long-lasting process, many municipalities opt for repeated changing and amendments to existing plans.

– The change in plans is an opportunity for realisation of a concrete development incentive. Precisely specified real estate investments in the field of establishing new zones or the need for actual new-build developments for a known user at a known location can provide a justified *input* for the change of plan.

– Changes in administrative legislation and policies are thus accompanied by changes in the spatial planning area. At the level of establishing new administrative units, in this context new spatial planning documents and/or development projects are developed (e.g. national development programme) introducing specific measures for the general spatial and economic development (e.g. economic centre of SE Slovenia, regional technology park, etc.).

  These opportunities do not present themselves often, as they involve the drafting and adoption (under administrative procedures) of general spatial planning documents, with both strategic and implementing parts (Plazar Mlakar et al., 2007). Various sectoral interests are confronted in these documents. It is necessary to define the appropriate starting-points and goals and justify them using credible expert studies. These procedures are relatively complex and long-lasting, while the adoption of planning documents asks for a general administrative and political consensus. Nevertheless, producing spatial planning documents is the most realistic opportunity to ensure that comprehensive planning and design of zones takes place. These documents lay down their location, number, size, typology, organisation (internal regulation), and other key elements determining their overall programmatic and spatial design.

5 Elements of Regulating Business Zones

5.1 Regulatory Elements at the Planning Level

Along with the starting points of economic geography stemming from the strategic goals of spatial planning policy and development of the economic sector in a certain planning area (municipality, region, etc.), three *planning measures* are significant in the process of developing new zones (or in the recategorisation of the existing ones) (Fig. 5.1):

PLANNING LEVEL – SPATIAL SITING AND PLACEMENT OF ZONES		
Planning measures and regulatory elements		
↓	↓	↓
1 / LOCATION	**2 / SCOPE AND EXPANSION**	**3 / TYPOLOGY**
• macro/micro location criteria; infrastructure, labour force, etc.	• available surface area	• programmatic design
• interaction with neighbouring areas significance	• possibility of expansion	• typological profiling, size
• business environment in the region	• sectoral division	• definition/strategic
• environmental impacts/boundary conditions	• implementation phasing	• role and significance in zone network

FIG. 5.1 Key regulation elements in planning BZs

– Choice of the appropriate location, which affects its necessary supply (staff, energy-generating products, raw material, etc.), absorption of environmental impacts, and avoiding conflicts in relation to other spatial entities; this selection provides the fundamental strategic measure, so the location must be checked from various perspectives and harmonised with the underlying goals of economic and social development of a certain administrative unit (municipality, region, state); efficient size of the area providing its long-term existence and possible expansion;

– Efficient size of the area providing its long-term existence and possible expansion;

– Typological profiling determining its significance and programmatic direction (prevailing use and significance, e.g. a zone of local, regional, or national significance with prevailing business, service, etc., activities).

In the spatial planning process, certain parameters (Table 5.1) can be influenced in each segment, thus regulating the individual characteristics of a zone as a whole.

PLANNING MEASURE	CHARACTERISTICS AND SIGNIFICANCE	SUBJECT OF REGULATION
Selection of locations	- location in the settlement system (area of impact): with distance from urban areas we influence the availability of workers and thus the length of home-work-home commuting	- **presence of capacity**; appropriate staff, services, existing management in the region, etc. - **environmental implications**; regulation of the length of commuting journeys (environmental and financial aspects)
	- **infrastructure:** location in relation to transport, energy, and utility infrastructure corridors	- **effectiveness:** zone's connection to existing networks - **environmental implications**; regulation of the length of connecting segments
	- boundary conditions in terms of absorption of environmental impacts, presence of waste management centres	- **environmental acceptability:** regulation of the range of activities allowed - **economy:** regulation of operating costs
	- price of land, public utility charges, ecological fees, construction industry services, etc.	- **investment:** regulating the costs of building the zone and individual facilities
	- cost of workforce (in the local and regional sense)	- **competitiveness**: regulation of operating costs
	- presence of existing and envisaged financial incentives	- **investment and competitiveness**: regulation of operating costs
	- presence of administrative management	- **operating performance**
Providing for the appropriate dimension	- size of land (in ha) is the basic precondition for: specifying the zone typology, its programmatic design, sectoral division, occasional structural reorganisation, and the possibility of long-term expansion.	- **efficiency and competitiveness:** sufficient surface area allows for introduction of a wide range of activities, structural flexibility, placement of auxiliary support activities, etc.
		- **sustainability of operations:** sufficient surface area allows for eventual expansion of in-house companies and thus sustainable operations in a given location
Typological definition	- strategic definition: according to the macro location in a settlement system, size, and programmatic orientation, the zones provide an *instrument* for plan implementation, - their typological profiling allows for embedding companies with various requirements regarding their size, programmes, and connection to infrastructure networks - supply and demand doctrine, a network of various zone types allows for various business environments in different locations	- **strategic importance:** zone of local, regional, or national significance
		- **programmatic competitiveness:** with a clearly defined programmatic focus the zone is marketed as: a universal zone or a zone with a prevalence of production, commercial, service, storage, etc., content
		- **flexibility**: programmatic diversity allows for embedding a wide range of activities and also the possibility of reclassifying the companies at the same location

TABLE 5.1 Measures and regulation elements at the planning level

5.2 Regulatory Elements at the Design Level

At the design level, the planning of a new or the modification of an existing zone typically involves the following three design measures (Fig 5.2):

– Definition of the programmes allowed, significance of careful selection according to the existing boundary conditions and the zone's strategic orientation (typology). The nature of these activities affects the micro design of buildings, their functional conception, urban design, and architecture. This measure provides the opportunity to control the introduction of compatible or exclusive programmes (e.g. noise, light, technological cycles: day–night, etc.);

– Structural design directing the morphology of the construction, supply, equipment, and design of the sectors with various programmes. If possible, we make use of rational network structures allowing for an adequate organisational flexibility at an individual plot (or block), but, at the same time, we should also define other architectural parameters preventing the monotony in design and thus unattractive internal environments;

– Conditions for the design of buildings and exteriors, which lay down the quality of the built structure and open spaces. The conditions are either common or partial for individual sectors; they can be defined as general orientations or precisely defined for certain typological elements of buildings. These conditions directly affect the final design of a zone.

DESIGN LEVEL – INTERNAL STRUCTURE PLANNING

Design measures and regulatory elements

↓ 1 / ALLOWED	↓ 2 / STRUCTURAL DESIGN	↓ 3 / DESIGN CONDITIONS FOR BUILDINGS AND SURFACES
• range of programmes	• basic raster	• structure, plot subdivision
• mutual effectiveness	• building situation	• building size, micro regulation
• exclusion	• area for building development	• conditions for urban design
• zone profiling (prevailing use)		• conditions for architectural design

FIG. 5.2 Key regulatory elements in BZ planning

In the design process, certain parameters (Table 5.2) can be influenced in each segment, thus regulating the individual characteristics of a zone as a whole.

DESIGN MEASURE	CHARACTERISTICS AND SIGNIFICANCE	SUBJECT OF REGULATION
Range of the programmes allowed	- the range of programmes lays down the boundary conditions for embedding companies according to their primary activity. This range can be very wide or, on the contrary, highly limited. It depends on the strategic orientation of the zone and external location limitations. After its definition, it is necessary to allow for the potential exclusion of individual programmes.	**- development possibilities of in-house companies:** they depend on the range of the programmes allowed and their mutual compatibility (programmatic expansion of operations, e.g. production + sales)
		- flexibility and management: various programmatic possibilities allow the zone to quickly respond to the changing conditions of the contemporary market; precisely defined programmes also enable the operator to effectively operate the zone (e.g. the risk of commercialising a zone)
		- competitiveness: zone attractiveness for potential investors depends on the range of possible activities
Structural design	**- basic raster:** the concept of dividing the zone into urban blocks and its supply immediately impacts the functionality of an individual block or zone as a whole, the coexistence of programmes, potential internal allocations, and expansions. **- implementation phasing:** allows for a gradual implementation in accordance with the needs	**- supply flexibility of building blocks:** an appropriate concept of dividing and combining can form various spatial characteristics of the individual blocks (different size of building plots)
		- environmental impacts: locational clustering and division of actors with evident environmental impacts affect their absorption (noise, emissions, etc.)
		- sectoral division: the basic division of the zone into sectors can allow for formation of rounded-off programmatic segments allowing for undisturbed mutual operations (coexistence)
		- effectiveness: appropriate distribution of programmes (production, storage, landfills, parking areas) impacts the functionality of the zone as a whole.
		- investment: regulating the costs of building the zone and individual facilities
	- transport supply: access to the zone, its connection to the primary transport network and internal supply (raw material, energy products, personnel, clients, etc.) representing the key elements of rationality of internal processes	**- rationality and efficiency:** quality design of supply and traffic-calming areas **- investment:** length of external and internal routes **- environmental impacts:** rational solutions reduce traffic flows
	- land allotment and building structure: (a) *building situation* as a completed urban design solution with prescribed building size and orientation (b) *building development area* as aconcept of a flexible area allowing for the construction of various forms with prescribed admissible factors of land use	**- (a) rationality:** fully planned development with a certain tolerance, complete land utilization **- (b) flexibility:** complete adaptability of spatial development conditions, suitable in zone planning for unknown users; while, on the contrary, too loose conditions lead to a chaotic structure (!) **- morphological structure:** as a consequence of guiding partial development
Conditions for building design	**- building line and size:** vertical and horizontal	**- size of buildings:** surveillance of building volume composition development, mutual interactions (shading, access, etc.)
	- orientation and division of building masses: general and detailed conditions for site selection and placement of buildings in a given development situation	**- internal division:** e.g. control of building design with separate production and business segments; allocation of access, business, storage segments, etc. **- health:** provision of natural lighting in the workplace **- architectural setting: design of high-quality spatial situations:** primary and peripheral facades, position and orientation along the central supply avenue, etc.
	- facade envelope: general and detailed conditions for building design, materials allowed, colours, configuration of the building envelope, etc.	visual image: individual buildings and larger complexes (blocks) **- architectural setting of the whole:** architectural space on the inside and outside (facade of the zone as a whole) in relation to the exterior – view of the zone (!) **- competitiveness:** attractive appearance is an economic category (attractiveness of a zone as a whole)
Conditions for the design of external surfaces	**- external public and green public areas:** (lines of trees, green plots, urban furniture, etc.) important in designing a recognisable and *humane* business or working environment in the zone as an *isolated technological environment*, **- technological areas:** landfills, parking areas, etc., as the subject of design	**- perception quality:** business and working environment, psychological effect on workers and clients **- competitiveness:** attractive appearance is an economic category (attractiveness of a zone as a whole)

TABLE 5.2 Measures and regulatory measures at the design level.

6 Approach to Planning and Design of Business Zones

The planning and design of BZs is, in principle, undertaken by formal procedures in the framework of the applicable spatial legislation. Individual countries have different provisions and professional practices in this field, whereas with zones as *complex projects* the so co-called informal approach of everyone involved is essential, particularly the producers of spatial planning documentation. The efficiency of final solutions in the framework, along with the established steps of the administrative procedure, depends on the following parameters:

A **Personal and professional initiative of participants:** approach of planners, designers, investors, developers, and other decision-makers who can, with an appropriate personal engagement, encourage the drafting of a document and support good-quality decision-making. This approach involves the following: work team motivation, willingness to understand the individual aspects, willingness to compromise, ability to exclude unacceptable demands (e.g. investment aspect only), etc.

B **Commissioning and production of good-quality expert studies,** variant solutions, and implementation scenarios: quality professional initial preparation is the guiding starting point of a successful project. Along with the basic project analysis and feasibility studies, expert studies should be produced, which reveal the specificities of a place (boundary limitations, social potential, existing spatial strategies, etc.).

C **Understanding of the wider economic and spatial significance** of the zone and its synergistic effects triggered by the wider environment: in each case, the zones influence the physical and social environment; along with expected benefits, we should also know and address their negative effects. In site selection and placement of a zone and in designing the regulatory instruments, it is necessary to assume the potential response, correlations between employers and employees, willingness of the local inhabitants to accept novelties in a perceived environment, etc. Only through careful consideration of all these aspects will it be possible to implement the zone in a given situation.

D **Knowledge of BZ potential:** modern, particularly programmatically mixed zones are always competitive to a certain degree, therefore the knowledge of competitive locations and their internal operating conditions is one of the basic starting points when deciding about the typology of the newly planned zones, or the regulation of the existing ones.

E **Information and inclusion of the public in due time and manner:** public participation in developing the projects of this size is extremely important so it should be stimulated and included in the individual steps (formal and informal procedures of document preparation). Zones should be understood in a broad social context; in the project promotion and development, everyone involved must be prepared to take the consequences – likewise in challenging situations, e.g. the NIMBY principle (not in my back yard). In fact, the design of acceptable spatial forms and a constructive approach from those responsible in the public discussion can convince the

sceptical public to listen to the arguments and take a constructive part in designing harmonised spatial solutions.

7 Conclusion

In principle, zones are major and complex spatial phenomena. They are monotonous technological and business environments, as well as workplaces where workers spend an important part of their lives. They can be tackled as risk projects presenting an unavoidable infrastructure in the planning and design system or, on the contrary, as a professional challenge for setting up a high-quality area where the work process takes place, accompanied by social correlations between the employed, clients, and other participants of the internal environment.

In the planning and design process, it is critical that the response to the current trends that require flexible internal conditions is professional. Each operating or programmatic requirement can be appropriately interpreted and addressed. This is not to condone conditions that might lead to a chaotic situation, as we have a wide range of regulatory options available. The question is whether they are, in fact, used, i.e. whether we actually have the possibility of using them or the professional mandate.

In modern society, along with increasing the environmental standards (environmental impacts), awareness about the significance of aesthetics in space and the connection between working and living environments is increasingly being raised. One of the key breaking points will be (already is) the realisation that a high-quality design and consequently stimulating and attractive business environment is not only an aesthetic but also an economic category.

In this sense, WB countries have a certain advantage. By changing the national government framework, transition into the market economy, and introduction of sustainable planning principles in accession processes, a special development impulse is present in these countries. National spatial legislation and planning practices are seeing a revival where there are many opportunities and space for promoting quality innovation.

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