The Journal of Biourbanism JBU is a biannual peer-reviewed, interdisciplinary, international online journal. The journal takes an incisive look into the bios/life of urbanism through perspectives in architecture, planning, environmental studies, and other social sciences. The journal aims to critically review and define the notions of biourbanism. Assessing human-centered or need-based design sensibilities is a predominant concern, while attempting to address the disconnect between theory and practice in participating disciplines. The journal publishes cutting-edge research, methods, and innovative design approaches on biourbanism.

Editorial Board
Sara Bissen, Antonio Caperna, Nikos A. Salingaros, Stefano Serafini

Advisory Board
Michel Bauwens, P2P Foundation, Amsterdam, The Netherlands; Michael Batty, The Bartlett, University College London, Centre for Advanced Spatial Analysis–CASA, London, UK; Harald Bodenschatz, Technische Universität Berlin, Germany; Mariano Bizzarri, Sapienza Università di Roma, Rome, Italy; Adrian Bejan, Duke University, Pratt School of Engineering, Durham, NC, USA; Marco Casagrande, Bergen Arkitekthøgskole, Bergen, Norway; Jaap Dawson, Delft Technical University, Delft, The Netherlands; Carlos Gershenson, Universidad Nacional Autónoma de México, DF, Mexico; Alessandro Giangrande, Università degli Studi Roma Tre, Rome, Italy; Svetlana K. Gural, Tomskiy Gosudarstvenny University, Tomsk, Russia; Besim S. Hakim, American Institute of Certified Planners, Albuquerque, NM, USA; Sergey N. Kharlamov, Tomskiy Polytekhnicheskii Universitet, Tomsk, Russia; Robert J. Koester, Center for Energy Research Education Service–CERES, Ball State University, Muncie, IN, USA; Sinan Logie, Istanbul Bilgi Üniversitesi and MAD-Mekanda Adalet Derneği, Istanbul, Turkey; Sylvie R. Lorente, Duke University, Pratt School of Engineering, Durham, NC, USA; Michael W. Mehaffy, Kungliga Tekniska Högskolan, Stockholm, Sweden; Achille Paolone, Sapienza Università di Roma, Rome, Italy; Juval Portugali, Tel Aviv University, Ramat Aviv, Tel Aviv, Israel; Yidan Rofé, Ben-Gurion University of the Negev, Beersheba, Israel; Ashraf M. Salama, University of Strathclyde, Glasgow, UK; Nikos A. Salingaros, University of Texas at San Antonio, San Antonio, TX, USA; †Giuseppe Sermonti, Università degli Studi di Perugia, Perugia, Italy; Eleni Tracada, College of Engineering and Technology, University of Derby, Derby, UK; Fabrizio Vescovo, Sapienza Università di Roma, Rome, Italy; Khaldoun Zreik, Université Paris 8, Saint-Denis, France.
CONTENTS

EDITORS’ NOTE: ARCHITECTURE IS A COMMON GOOD 9
Nando Bertolini & Stefano Serafini

ARCHITECTURE AS COMMON GOOD: RECOVERING WELL-BEING AND URBAN QUALITY
PROCEEDINGS OF THE 1ST INTERNATIONAL CONFERENCE
OF THE ISTITUTO NAZIONALE DI BIOARCHITETTURA (INBAR)
AND THE UNIVERSITY OF PARMA

THE ORPHANED COMMONS 11
Giorgio Origlia

DESIGN STRATEGIES FOR EMERGENCY HOUSING IN COLOMBIA 19
Adolfo F. L. Baratta, Laura Calcagnini, Fabrizio Finucci, & Antonio Magarò

RESILIENCE BEST PRACTICES: TECHNICAL DATA SHEETS 33
FOR ESSENTIAL TEMPORARY HOUSING
Ilaria Montella & Chiara Tonelli

NEW, “GREEN”, AND SUSTAINABLE CHALLENGES 49
Nicoletta Gandolfi

QUALI-QUANTITATIVE METHODS FOR ANALYZING URBAN STRUCTURE 61
AND SUPPORTING REGENERATION POLICIES
Anna Rita Petroselli & Maria Ioannilli

ADAPTIVE REUSE OF ABANDONED BUILDINGS: 77
FROM ILLEGAL OCCUPANCY TO COMMON GOOD
Chiara Tonelli, Ilaria Montella, & Nicola Moscheni

CERTIFICATION PROTOCOL FOR INTEGRATED INTERVENTIONS “HISTORICAL SMALL 97
SMART CITIES”: AN INSTRUMENT FOR THE SUSTAINABLE REGENERATION
OF MINOR HISTORICAL CENTERS
Valentina Pica

LID SYSTEMS AS SIGNIFICANT TOOLS IN URBAN REGENERATION STRATEGIES 113
Patrizia Piro, Vito Cataldo Talarico, Aldo Pedro Ferrante,
Ferdinando Frega, Giovanna Grossi, & Stefania Anna Palermo

IF CIVIC ARCHITECTURE WAS LANGUAGE, THEN IT WOULD BE A COMMON GOOD 127
Sergio Los
Editors’ Note:  
Architecture is a Common Good

Nando Bertolini¹ & Stefano Serafini²  
¹Istituto Nazionale di Bioarchitettura, Italy, ²International Society of Biourbanism, Italy

The first international conference of the National Institute of Bioarchitecture (Istituto Nazionale di Bioarchitettura – INBAR) and the University of Parma, “Architecture as common good: Recovering urban quality and well-being”, held in Parma, Italy, May 3–4, 2018 aims at being the first step towards a relevant dialogue. The reader will not miss that, despite the international status of the conference, all the contributors are Italian. The reason is that the research and experience of INBAR represent an Italian peculiarity, which has so far been unacknowledged abroad, first because of the linguistic barrier, and second because of INBAR’s focus on local geography, issues, climate, and design. By organizing the conference and publishing its proceedings in English, we want to start sharing this experience with other communities in the world, because we believe that the mainstream, “global” approach to design has produced enough damage and it is time for a change. We do not mean to follow the same logic of global fashions and “promote” our ideas. Rather, we aim to find dialoguing friends for discussing these ideas, and to contribute the awakening of forces in order to design solutions for our civilization.

Since 1991, INBAR studies the relation between environment and architecture, calling for designing in harmony with nature. The institute seeks inspiration of good environmentally friendly design in the built and landscape heritage, which in Italy is extraordinarily important. Such a heritage, though, is nowadays at risk. Likewise is at risk the common good, to which well-being, healthcare, social justice, beauty, and wise management of resources concur, and which is the goal of every life-oriented architecture or bioarchitecture. A blind yet technically powerful individualism, desperately seeking for “individual good”, is destroying our lifes as much as it is polluting and disfiguring our cities and landscapes. Hence the relation between good architecture and common good: they cannot but come together.

The conference has featured three sections. The first one was about buildings’ recovery and urban regeneration, to discuss the state of the art of a widespread process, which represents the aftermath of industrial urban spread and cementification. How to repair the damages provoked by industrial urbanism, irresponsible real estate, and financialization?

The second section focused on well-being while living and inhabiting, i.e. the role that design can play in ameliorating and dignifying our life.

The third section focused on Architecture for housing emergency, i.e. how designers can cope with the most dramatic lack of housing and infrastructures caused by deployment of natural resources, migrations, war, and natural disasters.
The proceedings show only a fragment of the discussions occurred during the conference, but this might be enough for our scope.

We want to express our gratitude to the people of the international committee who devoted their valuable time to review the abstracts of the conference papers: Marwa al-Sabouni, Filippo Angelucci, Laura Baratin, Marco Casagrande, Carmelo Celona, Mario Cerasoli, Eva Coisson, Giampaolo Munafò, Robert Neuwirth, Patrizia Piro, Andrea Rinaldi, David Rudlin, Stefano Serafini, and Michele Zazzi.
The Orphaned Commons

Giorgio Origlia
Architect, Italy

ABSTRACT

Preserving or improving the environmental quality of our habitat is the primary objective for any local authority. Despite this ambitious goal, there is a universal, broadly shared belief that some of the most important elements of our habitat are declining. Public authorities seem to be losing their grip on the main task of preserving human environmental qualities and protecting the “commons”. This paper argues that the current concept of “commons” and its relation to the private economy is rather rigid and simplistic. Unaccepted commons still exist: they have been “orphaned” by the same authorities that should have cared for them. Urban densification concepts such as mixité and sustainable mobility describe only part of an ideal picture. An important role is played by the space-related synergies or “relational proximities” of any urban ecosystem. For preserving these synergies, we must still transform and apply them as “commons”. We need to look for new paradigms in order to reconnect the complex and fundamental qualities of our anthropized environment with the regulatory role of the local authorities.

Keywords: orphaned commons, urban ecosystem, relational proximity, behavior setting, sustainable mobility
Over the past decades, many environmental aspects have been insufficiently protected, even in countries with adequate laws, regulations, and institutions for exercising control over their territory. This has led to a general decline in standards. The Urban Regeneration Project cites the Architects’ Council of Europe’s (ACE) 2016 manifesto, which provides a clear summary of the widespread failings of European life quality:

A single-minded view of urban development has failed cities. Cities face many challenges with an urban dimension: social exclusion, gentrification, spatial segregation, deprived neighbourhoods, poor access to basic services, lack of affordable housing, urban sprawl, soil sealing, air quality, etc. All these realities have become exacerbated by the economic downturn. Cities are less resilient to the effects of climate change. Urban infrastructure and landscape planning need to inter-relate and derive from social and economic changes (Architects’ Council of Europe, 2016, p. 3)

As a result, all Western nations have now made urban regeneration a top priority by setting their sights on restoring and improving the existing fabric and, above all, correcting the serious errors made in the past. However, achieving this involves more than just identifying critical issues. One must first try to understand how and why they occurred, then correct the underlying causes, and finally ensure that past mistakes are not repeated. Thus, we need to approach this from a new perspective that differs from previous attempts.

Broadly speaking, there are two possible and opposing explanations for this failure:

1. Increasingly powerful private interests are responsible for degrading our common assets. This is partly because the resources and regulations available to the authorities are insufficient in preventing them.

2. As the Architects’ Council of Europe (ACE) states: “A single-minded view of urban development has failed, both socially and environmentally” (ibidem).

Among the two, the first theory is more widely accepted. Indeed, it is well supported by the ever more alarming damage that private initiatives have managed to inflict on our common assets at a global level (e.g. by deforestation), often with the connivance of local authorities. Hardin, in a famously prophetic article published 50 years ago, warned of this problem (Hardin, 1968). This remains the most serious issue that human civilization will have to face in years to come.

However, there is a certain weakness in this theory, which is that of the “common assets” concept. In effect, common assets (whether intangible or material, global or local, natural or artificial) are described as being non-marketable, non-exclusive, and non-removable, thus contrasting private assets. Public institutions were established to protect these common assets from the dangers of abuse and depletion. In today’s democracies, this is the only real task assigned to any form of local authority, from the British “House of Commons” to the mayor of a small town. Yet maintaining that the public-private dichotomy is the primary cause of all environmental problems presupposes that the categories of common, public, and private assets are all well-defined, which is not the case (Rodotà, 2012).
First, this is because the boundaries between common, public, and private assets have become increasingly blurred. In part, this is due to the importance assigned to intangible assets in comparison to material ones, e.g. in the case of the Internet, which has little common good. This is also due to the increasing prevalence of hybrid regimes in the production and management of assets, as seen in the privatization of public services.

The distinction becomes extremely tenuous in the wider context of environmental quality. There are private assets, such as orchards that serve habitats and drainage systems that contribute to the public good. On the other hand, assets such as buildings, parks, or works of art have generally remained in private hands but are regarded as common assets, because they form part of the country’s artistic and historical heritage (Settis, 2007). Yet if we consider the complex urban fabric of any European city, could we not also describe the local delicatessen, bakery, or bar as “common assets” because of the important services they bring to the community? If the last village grocery shop closes down because a new supermarket has opened a few miles away, is that not a loss of a common asset for those without a car? It is therefore misleading to think that urban quality can be described simply in terms of a city’s physical assets and, in particular, its common assets. This is like trying to explain the ecosystem of a pond by describing the organisms within it but ignoring the symbiotic and synergistic relationships between the organisms that actually define it.

Even less convincing is the idea that the loss of urban quality is due to the lack of sufficient resources available to public authorities. We have produced a vast number of laws and regulations; selected what to regulate and why; developed strategies and programs; instituted bans and applied sanctions. We have even tried to control something as elusive as “beauty” (demanding particular types of roofing, certain colors, types of windows, etc.). Notwithstanding, even when having sufficient resources to maintain the administrative system, we still have been unable to manage the evolution of cities in such a way as to guarantee everyone a good quality of life. Also of note is that the crisis of urban quality has not affected every city or even every district. Generally, this has not involved the established urban areas but the newly built settlements or constructed projects controlled by local authorities.

At this point, the ACE hypothesis seems increasingly plausible. Institutions have only acted upon what could be seen and ignored what they have been unable to predict. Despite the declarations, national laws, and municipal regulations, territory has always been seen by the public authorities as a resource to be exploited rather than protected. It is sad to admit it, but “progress”, today as a hundred years ago, involves transforming natural terrain into building land wherever permissible and technically feasible. This serves the Gross Domestic Product (GDP) because construction increases GDP and serves both the private enterprise as long as it can take advantage of its privileged position and the public administration whose income depends on building charges and taxes.

Unfortunately, the same approach to architecture and planning that became common at the beginning of the 20th century has helped maintain this outdated and short-sighted vision. Since then, architects and urban planners enthused by the idea of technical innovation (exemplified in Le Corbusier’s *machine à habiter*) (Le Corbusier, 1929) and by the “rational” view of human activity, supported the principle of urban development called “zoning”. This idealized model has been applied for many decades, expanding our
cities in terms of districts, industrial zones, office areas, and residential neighborhoods, all of which are well separated. Such a system rejects the value of the traditional, compact city with its mixité, ignores the connections between different but compatible functions and exalts road transportation. This indeed demands dependence. Although cloaked in rationality, this view of urban planning has proven detrimental to the quality of the environment and has created ghettos (i.e., the bleak districts designed by famous architects, such as Zen in Palermo or Vele in Scampia) or opened the gate to the scourge of “urban sprawl” (Duany, Plater-Zyberk, & Speck, 2000).

As a matter of fact, the phenomenon of the sprawling city is to be found almost everywhere in Europe and in Italy, mainly northeast of the Po Valley. These cities have progressively invaded the surrounding land, filling it with asphalt and cement and devitalizing pre-existing communities. Thus, the failure to achieve the urban standards set out by ACE cannot simply be attributed to a conflict between private and public interest but to a more short-sighted “vision” of urban development. Such a vision has favored the growing forces of financial capitalism and, sadly, has also been shared by both public administration and planning culture.

Which new models should we adopt then in order to achieve a better “vision”? A different perspective first involves recognizing that human settlements begin as ecosystems, and that even with today’s drift towards advanced technology they have not ceased to be so (Maddox et al., 2017). Yet a word of caution: the term “ecosystem” is often used inappropriately (i.e., “the business ecosystem”) (Moore, 2006) or presupposes the equally misleadingly, idealized relationship between man and nature. Here, I am simply noting that a city represents the ecosystem of a dominant species. Humankind has developed so many different specializations that it has created a sort of “biodiversity” within its own species. Moreover, the resources in terms of energy and materials on which the city relies and are translated into “artifacts” by these various specialists are so complex that they cannot be ascribed to a specific biotope. Hence, what attributes are needed to ensure the survival of a particular “urban” ecosystem? I would include all the artifacts cited above, and it is relatively unimportant whether they are public, private, or common assets as long as they are made available through a chain of symbiotic or synergistic relationships between the various organisms, which is to say, as long as every “organism” physically relates to every other.

To take the well-known model of the ecological pyramid (Moore, 2006), the structure would crumble and cease to exist if there was no physical closeness between its various layers or if the exchange of energy between such layers was controlled by law or made artificial. This physical closeness is referred to as “relational proximity”, which is transformed into a system of exchange and becomes the most important form of common asset. Without this, no other kind of material or intangible asset could be exploited. The exchange mechanism is triggered as all the cohabiting organisms adapt to the system. It requires not the imposition of any regulations but simply physical contiguity.

The “unnatural” and transgressive aspect introduced by human communities in their ecosystem has been caused by the progressive transformation of the ecosystem model from the organic, which is reliant only on the laws of nature, to the artifact-based, i.e. goal-oriented. It is thus a machine built for a particular purpose. Our ecosystem is designed in every detail to suit the logic of whoever seeks to manage it. However, replacing spontaneous symbiotic relationships with grids and charts is dangerous in itself.
The more complex an artifact-based ecosystem, the less perfect and stable it becomes. The more its equilibrium depends on regulations, coercion, planning controls, and red tape, the more wasteful and difficult it is to maintain. Moreover, it is made increasingly unstable by continuous changes, i.e., “progress” and by conflicts of interest. The artificial development of the human ecosystem is clearly irreversible, as we need to plan and manage every detail. Yet at least we are aware that this weakness is the ecosystem most dangerous feature. Therefore, what is the common, neglected good in this environment that has evolved from an organic to a mechanical system? We are giving up our power of spontaneous exchange or, more precisely, of “relational proximity” (Morgan, 2004). This includes the complex links that are referred to as a “behavior setting” in environmental psychology (Barker, 1968) and develop between people who share a certain physical place, or rather, the symbiotic and synergistic relationships that reduce and preserve energy dispersal at a minimum in any ecosystem.

Such networks played a fundamental role in the development of the first urban communities (Weber, 2013) and are still present in the market economy as long as it remains connected to its territory. This was true of cities from the first settlements to the early industrial age. One only has to think of the close practical relationships between the inhabitants, their community, market, water fountains, and streets (Braudel, 1992) which the planning system and its grand “project” began to discourage and ignore. Then, an attitude of appeasement toward the increasingly globalized financial system took place. This system was totally uninterested in the equilibrium of local ecosystems and only concerned with the “bottom line”. It became normal to drive 10 kilometers to buy a kilo of bread, sounding the death knell for a sense of community.

Yet how might relational proximity be re-established? If public administration were to make this a target, it could:

1. Promote smaller private capital initiatives that are rooted in the local ecosystem. Such promotion contributes positively to the creation and maintenance of common assets and discourages larger financial initiatives that exploit territory as a means to produce wealth that is transferred elsewhere. The fact that the latter has often been preferred for making money from building taxes shows how little this “orphaned” asset has been valued. By promoting small-scale initiatives, however, the deterioration that characterizes urban sprawl and undermines the less robust historic centers could be avoided.

2. Realize if and when new constructions are really needed. In fact, local planning schemes often have totally unrealistic objectives. Rather, encourage speculative developers to focus on restoration of abandoned buildings, and make reuse a priority for addressing the shelter deficit by reintegrating the built heritage into the relational network of the city and changing its planning status. Keep in mind that a balanced ecosystem produces no waste (Franchino & Violano, 2010).

3. Protect the natural terrain by concentrating any new settlements along routes with good services, making optimum use of existing roads and infrastructure and avoiding waste. At least 30% of covered land consists of roads and parking lots that are only used occasionally.

4. Discourage the use of motor vehicles for travel, not by introducing bans but by supporting greater proximity between different types of enterprise. This fosters
spontaneous connections in densely populated, multi-functional communities. Indeed this is possible, as shown by the U.S. architecture firm DPZ, which developed a model of urban planning based on an ordering device called Transect (Duany, Sorlien, & Wright, 2003). This device envisages human settlements as ecosystems on varying scales. Instead of setting rigid rules (do/do not), it develops options that can be adapted to the context or provide regulatory instruments that communities can use to “repair” the damage caused by urban sprawl (Tachieva, 2010).

5. Encourage habitat participated management to recreate lost synergistic and symbiotic “links” and promote them among inhabitants. In Italy, for instance a growing number of initiatives and interesting experiments for the shared management of common assets is currently under way in Bologna, Ferrara, Turin, and Naples (Ostandel, 2017). This is a good way of replacing rules with relationships. People who have an interest in maintaining a common asset create a connection with it, becoming a nexus that nourishes itself and does not require external controls or energy from outside sources. The more links replace rules, the clearer the objectives of the administrative system will become with fewer resources consumed in achieving them.

In the end, what is the real problem? Mistakes made in the past have become buildings, roads, and other forms of permanent infrastructure that will survive a hundred years. All of this, compounded with what has created centuries-long damage in the countries, will affect future generations. We may be able to prevent such damage in the future but for the most part, it has already happened. Just think of the way land has been cemented or of all the unused buildings in every city. Let us get started while bearing in mind that what we need to repair is the result of the single-minded view of those who preceded us.

REFERENCES


Design Strategies for Emergency Housing in Colombia

Adolfo F. L. Baratta, Laura Calcagnini, Fabrizio Finucci, & Antonio Magarò
Roma Tre University, Italy

ABSTRACT

The development of South American informal urban areas are the consequence of many complex factors. These factors involve social exclusion, precluded access to services, and the right to housing. Because of these issues, most Colombians live in poverty with 26.9% below the poverty line and 36% in rural areas (Departamento Administrativo Nacional de Estadística (DANE), 2017). Recent welfare interventions in Colombia have reduced this deficit by about one-third (Téllez, 2017), but it is not enough. This paper presents research from the Department of Architecture at Roma Tre University. It discusses the mitigation of housing problems in Colombian urban settlements through self-built modular units. The contribution describes the characteristics of participatory design and construction within the dialectic between formal and informal cities.

Keywords: housing emergency, Colombia, self-building, marginal areas
INTRODUCTION

This paper presents the result of a research carried out by the Department of Architecture at Roma Tre University (principal investigators include professors Adolfo F. L. Baratta and Fabrizio Finucci) and the Facultad de Arquitectura, Diseño y Urbanismo of the Universidad de Boyacá of Tunja and Sogamoso in Colombia (principal investigators include professors Juan Martin Piaggio, Edilberto Molina, and Hector Saul Quintana). Operative units in both Italy and Colombia coordinated the activities of the different research phases. These units had the possibility of drawing a synthesis during the Design Laboratories held in Tunja (2015), Rome (2016), and Sogamoso (2017).

The work focused on the typological and technological aspects for mitigating the residential emergency in the marginal urban areas of Latin America, specifically Colombia. The main goal of the research involved finding solutions for regenerating spontaneous settlements and enhancing their potential. On one hand, the specific outcomes led to a research path “on existing buildings” in the city of Sogamoso, which contribute to a feeling of permanency and of a greater community cohesion. On the other hand, a proposal “on new buildings” aims at defining tools and methods for self-construction projects of coherent and constructible housing units in marginal urban areas to be applied in the city of Tunja. The article describes this second research path. It studies the territory, style of living, and available resources, among other factors, in order to achieve design strategies.

HISTORICAL REASONS FOR HOUSING PROBLEMS IN COLOMBIA

The phenomenon of internal migration has profoundly influenced regional planning and urban form in Colombia since the 16th century. In particular, between 1850 and 1950, the combination of migratory flows, economic policies, internal conflicts, and agricultural colonization gave rise to the modern Colombian city. In the mid-19th century, the most populous cities were located in the Cordillera Oriental and the Popayán districts. A demographic imbalance toward Cordillera Central emerged just a few decades later. This shift was due to the migratory flows of campesinos (peasants) attracted by the extensive coffee cultivation. Such a demographic explosion changed the urban and territorial configuration due to the attempt of urban development to absorb the migratory flow (Bernard & Zambrano, 1993).

At the turn of the century, the structure of the Colombian socioeconomic and territorial model moves from a network of isolated urbanization to a unification of the country based on extensive agriculture, which is aimed mainly at foreign markets. During this period, critical issues related to housing problems that still characterize Colombian urbanization began to emerge (Sánchez Steiner, 2008). The process of urban formation relates to the colonization of the countryside. In a first phase, a small group of colonos pioneros (colonizing pioneers) occupy an agricultural area apparently free from property titles. Through self-construction processes the first precarious homes are built, while the land is cultivated only for the needs of the families. Subsequently, the settlements consolidate and the crops expand and diversify. Small nuclei begin to establish economic relations with their neighbors, constituting communities that organize into villages, generally close to the nearest city. A consolidation process starts and culminates in the regularization of these villages that are transformed into urban neighborhoods. The villages use services and become absorbed by the municipality (Aprile-Gniset & Mosquera, 1978). The new territorial organization requires an adequate infrastructure renewal. This radical change is not without conflicts, like the internal one between the landowners and the campesinos for land ownership.
A few steps summarize the process. The land improvement by the campesinos attracts someone, who promises safe field work wages, to buy large tracts of land from each family. In reality, he finds it more profitable to dismantle the farming and turn the areas into large coffee plantations or extensive livestock ranches. Without support, the campesinos turn again into settlers and establish other areas of the country, giving rise to the phenomenon of desplazamiento forzado (forced displacement).
The collapse of this cycle occurs in the mid-20th century. Those who had contributed to building the infrastructure of Colombia following the new urbanization claimed their payment from the State. At the same time, even the financiers of the War of Independence demanded the collection of Treasury Bonds issued for that purpose. The Colombian Government found no other solution than to equalize these economic demands with the land of which no one was owner: the one occupied by the settlers.

Latifundism becomes the new form of economic domination supported by the flourishing export market and soon leads to a bloody internal conflict. After the uprising known as El Bogotazo, which began in the Colombian capital on the day of the assassination of presidential candidate Jorge Eliécer Gaitán (April 9, 1948), the civil war known as La Violencia (The Violence) began. The Colombian rural areas were the hottest spots during the civil war. As repression, the Government assumed an authoritarian attitude declaring a state of siege in many rural areas. The political climate was becoming more radicalized and the crisis of representative democracy more evident. The armed conflict encouraged the formation of paramilitary groups made up of armed bands in the service of the opposing political parties who began to finance themselves with the drug trade, occupying rural areas, which should have been allocated to new crops instead. It is quite evident that La Violencia triggered massive migratory flows from the countryside toward the main cities. The debate on how these flows have influenced urbanization processes has lasted for several decades on opposing positions. The civil war was the main cause of the rural exodus and this certainly played a decisive role. During this historical period the social conflict between rural and urban inhabitants exploded. In fact, the political question often becomes the excuse for the expropriation of land occupied by settlers and their displacement in the city (Fajardo, 2002).

TAXONOMY OF INFORMALITY IN COLOMBIA

In Latin America, the phenomenon of informal urbanization unfolds in different ways. While in Chile and Mexico, the emergence of informal urbanization stems from people’s choices, in Peru and Colombia the informality is a consequence of low employment and the inaccessibility to housing (Fernández, Villar, Gómez, & Vaca, 2017). In general, four models of informality are present, related to the labor market (Fernández & Villar, 2016):

1. informalidad de subsistencia (subsistence informality): arises from the impossibility of accessing the formal labor market by workers penalized by a combination of low experience and education levels but, above all, external reasons linked to the places in which they live;

2. informalidad voluntaria (voluntary informality): this is a choice by those workers to take advantage of the “benefits” of an undeclared or irregular labor market such as tax exemption;

3. informalidad inducida (induced informality): typical of workers who do not belong to the two previous categories but cannot access the formal labor market due to a series of implicit barriers, such as discrimination, or explicit, like the workers’ protection taxes imposed on the employer;

4. informalidad mixta (mixed informality): corresponds to a series of causes that determine survival and voluntary informality. In general, this relates to a low level of welfare or a poorly addressed social policy.
Types of Colombian informal urbanization
Inaccessibility of formal labor market, combined with the demographic explosion that followed the rural exodus, lead to the emergence of informal urbanizations. These lack environmental, social, and economic qualities (Baratta, Calcagnini, Finucci, Magarò, Minella, & Piaggio 2016). Informal urbanizations are self-determined in areas among the most unfavorable from the topographical, climatic, orographic, and environmental perspective.

These areas are unsuitable for building: hydrogeological instability, periodic flooding, and slopes often characterize them. Informal urbanizations are usually called *barrios ilegales* (illegal neighborhoods), since they fail to meet the minimum requirements set by the safety and hygiene regulations for new constructions.

*Figure 2. Barrio Pirata* of San Lazáro in Tunja, Colombia.
The *barrios ilegales* of Colombia are distinguished in *barrios pirata* (pirate neighborhoods), i.e. settlements where residents carried out a real estate deal that was not always legal or legitimate, and *barrios de invasión* (occupied neighborhoods), which result from illegal occupation of public or private property (Torres Tovar, 2007).

The *barrios pirata* are located at the edge of the consolidated city, and vice versa, the *barrios de invasión* provide for the occupation by the inhabitants of areas, many of time central and public, which for different reasons have not been involved in urban development. Over time, the urban fabric absorbs both these types of informal settlements, if only for tax collection.

In Colombia, about 31% of the informal settlement lots are the result of occupation, while 61% are the result of a sale and the remaining 8% of inheritance or other causes. One should look critically at this relationship, because the ownership of many lots is traded after a first illegal occupation and, above all, because it is not always possible to make a complete census (Torres & Castillo de Herrera, 2011).

**Colombian housing policies: tools to support housing**

With the aim of containing the phenomenon of informal urbanization, the Colombian Government launched a massive social housing plan, with the help of two tools: *Viviendas de Interés Prioritario* (VIP) (High Priority Housing) and *Viviendas de Interés Social* (VIS) (Social Relevance Housing).

Both these tools are intended for particular categories of the population, such as those who live in extreme poverty, who have lost their homes due to natural disasters or political causes, or are victims of *desplazamiento forzado*. VIP are characterized by urgency, for example the head of a household without income or the inhabitant of an area with high hydrogeological risk. The difference between the two instruments lies in the recipient’s ability to pay a fee. VIS are therefore partially subsidized by the State, while VIP are fully subsidized (Baratta, Calcagnini, Finucci, Magarò, Minella, & Piaggio, 2016). The final difference concerns the cost of construction, which is set in proportion to an indicator of Colombian income called *Salario Mínimo Mensual Legal Vigente* (SMMLV) (Actual Legal Monthly Minimum Wage). In 2018, this was equal to 781,242 Colombian Pesos (COP) or nearly €234. Currently, each VIP can cost a maximum of 70 SMMLV (just under €16,400) while a VIS cannot exceed 135 SMMLV (about €31,600). The aim of encouraging companies to implement VIP and VIS interventions led to a widespread phenomenon of exploitation of self-construction skills of the future residents, which often happen to be workers in the construction field.

**PARTICIPATORY SELF-CONSTRUCTION AS A COMMON PRACTICE**

Many factors beyond the acquisition of land and the construction of housing characterize self-construction as a widespread social practice. Among them, the growth of households and the strengthening of the community structure (Winsenfeld, 1999). More recent definitions refer to the production of value through the manual work of nuclear families, equivalent in part to saving on external labor (Rodríguez, Romero, & Acevedo, 2004). In Colombia, thanks to the wide use of construction techniques that allow for the practice, self-construction is a historically widespread process. Despite being part of the cultural heritage, it is associated with poverty and illegality.

Self-construction offers many advantages. Self-construction overcomes the exclusion of many subjects from the urban and social fabric, generating value and strengthening the autonomy of the communities. Furthermore, the participation of future residents in the construction process stimulates the transmission of knowledge as intangible cultural heritage. However, self-construction shows disadvantages that have hitherto impeded its systematization. The lack of labor specialization
reverberates in the poor quality of construction techniques, but this is less an issue than the poor way informal urbanization uses land. Finally, the use of waste materials, characterized by poor quality and lack of wholesomeness (Baratta, Calcagnini, Finucci, Magarò, Molina, & Quintana Ramirez, 2017) is the antithesis of self-construction intended as a virtuous practice.

Based on the complexity of the processes there exist two types of self-construction:

- Spontaneous self-construction, linked with insufficient financial resources and lack of access to professional knowledge. Spontaneous self-construction is an answer to the housing problem, but it carries construction and structural problems that barely can be solved in the future (Pelli, Lungo, Romero, & Bolívar, 1996);
- Controlled or legal self-construction promoted by the Public Administration that includes housing policies. Controlled self-construction, being regulated, fosters quality in the whole building process (Wiesenfeld, 1999).

![Image of informal dwelling](image)

**Figure 3.** Informal dwelling in the *Barrio Pirata* of Santa Barbara in Sogamoso, Colombia.

**Self-building and housing policies**

The government designed VIP and VIS to cope with an explosive social emergency and to provide part of the population with the constitutional right to a *vivienda digna* (decent housing). Despite their potential effectiveness, though, the VIP and VIS tools appear insufficient for a variety of reasons. First, the government’s approach to the problem from the middle of the last century to the present has been timid. Only the mechanism of social benefits for housing, created in the 90s, succeeded in catalyzing a more effective way to deal with the housing problem. This, with ups and downs, created
a dynamic partnership between the government, builders, construction industry, and a number of social and popular actors (Vergara Osorio, 2012). During the economic crisis that hit Colombia in the late 90s, participation in the construction of VIS was a lifeline for many businesses on the verge of bankruptcy. Unfortunately, despite huge investments, the problem kept standing unmitigated and even the construction pace dropped.

Nowadays, it is not convenient for most entrepreneurs to build such settlements on behalf of the government unless they speculate on the building type or on primary and secondary urbanization works. These practices contribute to decreasing the quality of housing that is often comparable, due to lack of health and safety, to those in informal settlements. Instead, it is shown (Barajas, 1998) how the introduction of controlled self-construction in housing policies allows for rationalizing the use of land according to criteria determined by territorial planning, and saving funds (to be allocated for infrastructure) by taking advantage of purchasing groups leverage on material cost.

![Figure 4. Hypothesis of the development of the fabric.](image)

**PREFABRICATED MODULAR HOUSING IN CONTROLLED SELF-BUILDING**

The project proposal originates from the production of a masterplan, carried out during a workshop held in Colombia in 2015 aimed at controlling the development of informal urbanization. The masterplan comes after the study of both the aspects of the urban form, namely the historical colonial city overlapping the ancient indigenous routes, and its paths, after the application of a method of reading more typical of European stratified urbanizations of medieval origin (Maretto, 2008). This
method made it possible to draw up a hypothesis of the urban fabric evolution within which to match the spontaneous development of the informal settlement.

During the urban analysis phase, a critical evaluation of the current territorial planning was necessary. Some aspects emerged that the European models have definitively overcome, such as zoning, which is the indirect cause of informality. By focusing the vision on a part of the informal areas under study, it was necessary to emphasize the incompatibility of the territorial morphology with building. This analysis aimed to highlight the relationship between access to paths and houses, demonstrating that the fabric, even if unplanned, follows a rule, which has the potential to be consolidated and regenerated and thus repeated. The masterplan proposes a few yet clear rules made of dimensional parameters, urban aggregation schemes, and dislocation of nodal areas in anticipation of settling paths, through which a territorial scheme was developed in which to operate architectonic and construction studies.

**Definition of the base module and typological aggregation**

In modular design, it is necessary to search for a measure that can be used on a building scale. Historically, this measure is sought in the shapes and structures of nature or within the construction tradition. In the same way, for the choice of a base module, the research was directed towards the measurement of the traditional Colombian bamboo dwelling called *semilla* (seed). This is a 10 m² square module that forms the housing type by doubling the cells on the main road. The development in depth and the specialization between living and sleeping areas follow. The module chosen for the design starts from the aggregation of the semilla, a 6 x 6 m space, which involves a specific relationship. The first has a size of approximately 27 m², which is a value comparable to the minimum VIP required for a young couple without children.

Once the rules for the building and the base module have been determined, the requirements that the different types need to meet are established. These are: modularity of the prefabricated elements, flexibility in the interior spaces, progressiveness in the expansion, synchronicity of the settlement, and cost-effectiveness of the construction.

![Figure 5. Definition of the base module.](image)

The outcome is a self-sufficient base cell that can joint in different configurations. These define a series of typologies, which respond to the orographic issues and the masterplan constraints (Baratta, Calcagnini, Finucci, Magarò, Minella, 2016). The cell accommodates, in addition to the covered area, also for the interacting spaces. By aggregation, cells can compose a hierarchy. In the case of two attached but independent cells, the interacting spaces are transformed into orthogonal routes, which repeat on the block scale the urban system of carreras and calles (streets and avenues). The offset of the stories due to steep slopes is overcome by urban stairs that counteract the informal routes followed by the inhabitants. To define the different housing typologies, lots were chosen according to the routes, each one having a peculiarity in terms of solar orientation, slope in relation to the route, and type of road. This results in four different solutions:
- residential and productive buildings consisting of two stories above ground, intended to fill the gaps on continuous routes with a greater commercial vocation;
- terraced residential buildings arranged in the upper part of the settlement. They expand in depth;
- residential tower buildings arranged in the lower part of the settlement. They expand in height;
- consistent terraced residential buildings on the paths characterized by the maximum slope, with units offset from each other to respond to the orography.

The building system and the neighborhood building site
The deepening of traditional and more widespread building techniques has favored the conscious choice of the building system, i.e., reinforced masonry. First, the adoption of reinforced masonry was subject to compliance with the stringent anti-seismic regulations undertaken in Colombia. The project proposal creates residential modules whose measure does not conflict with the variation of the types. The construction system is based on the assembly of a few building components: a foundation plinth, a precast wall, two beams, a wooden loft, and two windows. All components are prefabricated at the building site.

![Figure 6. Typological aggregation.](image)

The reinforced masonry panel is the key element of the entire structure. This guarantees the connection with the foundation, with the beams in two directions and with the possible corresponding septum for raising. It therefore has a molded head in reinforced concrete. The negative of the curb that is on the head and the foot of the septum is the foundation plinth: the particular shape of the double comb serves to facilitate the installation of the septum, which in this way is not only accepted but remains in place before the completion phase with the concrete casting.

As for mechanics, the system ends with modular beams that adapt to overcome all the spans that are in the cell. Even the window frames and the loft can be prefabricated. In particular, the latter is mono-directional in *abarco* wood joists, one of the most widespread species and with the best
resistance/cost ratio. The conception of this construction system go hand in hand with the organization of the building site. The underlying idea of urban regeneration is the synchronic construction of settlement in the form of Vivienda de Interes Social y Prioritario Difusa (High Priority and Social Interest Diffused Housing) as part of a controlled self-construction building site that involves the inhabitants of the neighborhood.

CONCLUSION

Technological research can substantially contribute to a regeneration process through the development of design hypothesis. The research has therefore proposed an integrated and multidisciplinary approach to design, substantiating the material and immaterial technical content in opposition to approaches mainly oriented to the figurative aspects of architecture. For this reason, the research has developed a project proposal able to control a construction process firstly oriented to social enhancement. Much remains to be done, precisely because the project proposal constitutes a moment of critical synthesis. For example, the economic assessments have shown how the cost of such a house is equal to 2/3 of that set by law for a VIS and equal to that expected for a VIP. The application to an urban regeneration intervention with self-building practices allows for further cost reduction.

![Figure 7. The construction system.](image)

Experts, designers, and important masonry companies highlighted the difficulty in tackling with the anti-seismic regulations for those units that provide for two stories elevation. A prefabricated node that connects the elements and thus guarantees structural continuity overcomes such an issue. A further advancement of the research lies not only in the updating and improvement of what has been done but also in understanding and envisioning possible developments. This is a methodology that can mitigate discomfort through a verifiable and shared process for informal urban areas regeneration.
REFERENCES


Fajardo, D. (2002). *Para sembrar la paz, hay que aflojar la tierra: Comunidades, tierras y territorios en la construcción de un país* [To sew peace the earth must be loosened: Communities, land, and territories in the country’s construction]. Bogotà: Universidad Nacional de Colombia, Instituto de Estudios Ambientales.


Torres, C., & Castillo de Herrera, M. (2011). *Caracterización de la ciudad, el hábitat y la vivienda informal en la Colombia de los años 90* [Characterization of city, habitat, and informal housing in Colombia during the 90s]. Bogotá: Universidad Nacional de Colombia.


Resilience Best Practice: Technical Data Sheets for Essential Temporary Housing

Ilaria Montella & Chiara Tonelli
Roma Tre University, Italy

ABSTRACT

Several elements of social and demographic hazards, such as adverse economic conditions, resource shortage, climate change, and growing immigration flows are affecting the stability of cities. Conventional urban planning lacks adequate emergency responses and struggles to find fast, low-cost solutions to cope with the absence of urban structures and houses. Indeed, the housing sector is one of the action areas considered by what is known as a City Resilience Framework to be essential in improving urban resilience. The latter is a study on existing resilience requirements that began as a Ph.D. thesis and actually focuses on the parallels between the informal and the resilient city. It analyzed 19 case studies and borrowed examples of resilience from them in order to draft a framework of technical indications for essential, new, and temporary housing construction. The resulting “Technical Data Sheets for the Design” offer technological, typological, functional, and procedural information to be applied in preventive planning in order to promote resiliency.

Keywords: resilience, inclusive processes, temporary housing, minimum living standards, adaptive design methodology, social inclusion, housing emergency, informal settlements
CONTEXT AND RISK FACTORS

Recent migratory trends shed light on the links among housing issues and different factors. More and more people in search of better life conditions head towards metropolises, which are seen as places of economic opportunity (McKinsey Global Institute, 2011) while a share of the local population still has no access to the real estate market, including rental, due to their poor economic conditions. Global demographic trends show that the current 7.6 billion world population will grow to 8.6 billion in 2030 and to 9.8 billion in 2050. The latest United Nations report (United Nations Department of Economic and Social Affairs, 2017) shows a steady population growth of approximately 83 million per year.

In Italy, where the birth rate stood at 8.18 births/1,000 of the population in 2016 (ISTAT, 2017), there has been a demographic increase during the 2011–2014 period because of immigrants, which represent approximately 8% of the total population (United Nations Population Fund, 2014). This highlights that, although migration is not sufficient to offset the demographic decline, it can mitigate the negative consequences of an aging population. Despite the local scale of its scenario, the growth in numbers related to continuous migratory events foreshadow both significant urbanization and exacerbation of Italy’s housing problem, where 68% of the population already lives in urban environments. Besides that, we must also consider the continuous impact of two stressors on the urban system, namely: 1) continuous voluntary or forced migrations, and 2) the socio-economic crisis that challenges families, making access to housing difficult even for local inhabitants.

To date, 15.5% of Italian families have no access to housing and are already experiencing constant housing discomfort, while 2.8% (roughly 650,000 families) risk being unable to bear the household costs. Forty percent of families state that housing makes up the main expenses of their budget (ISTAT, 2017). The economic context puts a large population segment in a condition of housing discomfort, despite Italy having more home owners than renters. On one hand this is due to high rental prices and, on the other, to the growth of home management costs for owners. Therefore, more and more families are losing their home ownership. A growing share of owners is so burdened by house-related expenses that they cannot live and keep their own house with dignity. Paradoxically, they cannot access public housing because their income is not considered low enough. Even if not homeless, these people belong to the so-called “gray area” of homeowners who can barely manage housing upkeep expenses.

As of now, 650,000 citizens have been on the social housing waiting list for years. According to ISTAT, 71,101 were self-declared slum dwellers in 2011, while approximately 80,000 underwent immediate home eviction in 2014 (ISTAT, 2017). One possible cause of intensified forced mass migration during the years to come is climate change (Musco & Zanchini, 2013) and its effects, such as: desertification, drought, glacial melting, rising sea levels, loss of soil productivity, and extreme events like floods, hurricanes, fires, earthquakes, and violent rains.

INADEQUATE BUILDING HERITAGE
AND THE NEED TO REDUCE RESOURCE WASTE

The heterogenesis of housing emergency comes with an energetic and technological building inadequacy, a microclimate impact of anthropic presence in urban contexts, and a change in social morphology. Another aspect, which is significant and must be underlined in this area of research, is the transformation of the family model that is no longer limited to the traditional one. Alternative households with different needs call for new interpretations of the housing model. We refer here to singles, elders, those who live in the city for short periods, young people who are away from home, and house owners who have no sources of income and are forced to sublet a portion of their house.
These users are all different from each other. Therefore, they require different approaches in relation to both house accessibility and economic maintenance, flexibility and adjustability of distributive spaces, and the way they live in a house in terms of habits and customs.

A novel, diverse social morphology enters here, where the nuclear family shrinks to the individual (e.g., in the case of singles, temporary city users, nomadic workers, elders, and the divorced). This affects lifestyles and methods, housing sizes, and typologies. The multitude of factors mentioned above, and the incapability of municipal urban planning to provide adequate responses to these new needs of the last decades, have worsened the general living conditions of both immigrants and residents. On the other side, the housing market meets the demands of these new users who are more fluid, versatile, and multi-ethnic.

Laws against land consumption are based on worrying data. Indeed, according to ISPRA (Higher Institute for Environmental Protection and Research), land consumption in Italy has become unsustainable and is to break the record of 7 square meters per second. In addition, existing residential buildings are energetically inadequate and make up most of the country’s energy. Despite national measures aimed at saving energy, a 4% increase in primary energy demand has been recorded in 2015. In particular, compared to the previous year, the residential sector in 2015 determined a 2.7% increase of the total 116.4 Mtoe energy consumption. Residential buildings represent just 10% of energy end users but absorb 27.9% of produced energy (about 24Mtoe/year), while transportation consumes 34% and industry 22.3%.

**AFFINITY BETWEEN INFORMAL SOLUTIONS AND RESILIENT PROCESSES**

Although Italian cities are certainly much smaller than the world’s megacities, planning has been unable to provide adequate, quick, efficient, and low-cost responses to the aforementioned issues. As a result, risky, informal, self-managed settlements are rising, as pointed out by the Centro Studi e Ricerche Idos (2012) and Médecins Sans Frontières through its 2016 Fuori Campo (Beyond Reach) report (Medici Senza Frontiere, 2016).

Starting from this, the research investigated to what extent cities can respond to the housing emergency, not only by using the existing real estate but also by adopting fast, temporary, and noninvasive solutions that can at once avoid land consumption. In fact, Italy can offer a variety of housing solutions already present in its territory. Practices to make private and abandoned buildings available and re-utilize them for housing purposes already exist. However, even with respect to land conservation, an anachronistic and sometimes reductive idea of densification focuses just on volume increase. We should rather consider the still unresolved Italian dichotomy between lifestyle modification (the requirement of smaller, flexible, and evolving spaces) and distribution of the existing real estate, which is still static, crystallized, and bound to the needs of the traditional and large family of the past.

This point of view leads us to think of temporary settlement strategies which have a relatively short life cycle and therefore are not of concern for land conservation, while not imposing definitive and long-term urban modifications. Moreover, the concept of building permanence is linked to a condition of wealth. In times of crisis, concepts of transitoriness cope more with the actual use of the building and its duration. This is true from both a physical and a legislative point of view (Bishop & Williams, 2012).
A significant example of a large-scale temporary settlement was presented at the 2016 Venice Architecture Biennale in the “Ephemeral Urbanism” exhibition. It was the result of a research project by architects Rahul Mehrotra and Felipe Vera (Mehrotra, Vera, & Mayoral, 2017) on transitory urban settlements and the temporality of contemporary urban planning culture. The exhibition showed *Kumbh Mela*, a Hindu festival that takes place every 12 years in India on an area of 19.4 square kilometers and is prepared in just two weeks. The festival receives a continuous flow of about 19 million people during the two months of the religious holiday, reaching a peak of 7 million people present at the same time. With an assembly time of 3 months and a disassembly of only 2 weeks, the site, organized as a real city, disappears with the monsoon when the rain increases the river’s level, erasing the entire settlement and leaving no trace of it. Such an urban planning practice that is temporary, fast, and low-cost hints at the temporary nature of informal settlement and resilience.

Indeed, forms of traditional urban planning, which view the city as a static organism, become the background of the kinetic panorama of the informal city (Mehrotra & Vera, 2013). The city planner Rahul Mehrotra thus proposes to go beyond the opposition of formal/informal by introducing the concept of a spontaneous “kinetic city”. This opposes the “static city” with its model of dynamicity, flexibility, temporality, recyclability, mobility, and reversibility—a model of resilience in many respects.

Both the static and the kinetic city live together in the same urban territory and grow with opposite and different methods. One is static, material, and permanent, while the other is evolutionary, transforming, and with associative places and occupation models that determine its shape, essentially characterized by temporary drives. Although this may seem a provocative statement, there is a strong affinity between the concept of the “kinetic city” as it relates to the informal city, and the concept of resiliency and its aspects in the urban context.

A sense of the similarity between *Kumbh Mela* and the concept of resilience lays in the corpus of knowledge and procedures that this operation, almost spontaneous yet coordinated, can suggest for managing transitory urbanization processes and, with innovative methods, housing emergency. Starting from these ideas, the research has investigated the meaning of resilience and how it can be applied in urban contexts through the direct and concrete contribution of architecture. Many initiatives have been taken nationally and internationally in order to stimulate all the urban stakeholders towards virtuous paths of resilience. Among these, the 100 Resilient Cities project proposed by The Rockefeller Foundation and joined by Rome, stands out as a relevant example because it helps cities implement strategies for increasing their resilience capacities, including housing. Housing is the only form of construction included within the City Resilience Framework that was conceived by Ove Arup & Partners International Limited for The Rockefeller Foundation, following their strategy for improving urban resilience (Fig. 1).

Considering resilience as the result of coordinated processes aimed at increasing the adaptation capacity of the city and its inhabitants, the research investigates how a large city such as Rome can integrate resilient procedures in its process of hospitality methodology, as well as respond to the housing emergency and the possible, consequent informal dwellings. Specifically, the question is whether architecture can give a methodological contribution to the resilience strategy, providing some requirements and practical recommendations that, if applied to the planning phase, may support a resilient housing response.

Next page: **Figure 1.** City Resilience Index developed by Arup, supported by The Rockefeller Foundation, 2017.
RESILIENCE STRATEGY AND ARCHITECTURAL CONTRIBUTION

Further considering migratory flow as a chronic, disruptive cause of the emergency, the research used the methodological framework of the 100 Resilient Cities project (Arup, supported by The Rockefeller Foundation, 2017) to source macro data about the shocks and stresses that affect Rome. The authors identified continuous migrations and housing emergencies as fields of interventions to contribute resilience to the overall system.

Although the concept of resilience echoes in everyone’s imaginary as adaptation and flexibility, thinking of housing responses trigger the idea of tuning the space for the sake of the specific user who will live in that house. However, users are significantly diverse from each other despite they may share similar conditions of need and poverty. All of them have their individual necessity not only to find a house but also to find a home, to relate with the place and the neighbors, and to appropriate the
space in order to belong. Possibly, for these reasons, reflecting on technological criteria and methods for urban resilience in housing emergency should not turn into mere formal design solutions. These would in fact be too narrow, static, and poorly capable of adapting to different users and needs.

Rather, technology can feed resilience by considering the variation of the standards. Thus, it should plan preventive processes and identify general supportive indications or methods, resilience requirements, and technological characteristics of the buildings. Designers should follow the modifications of the society and recover the existing buildings in order to adapt them to different uses and solutions. Respect for the environment and participatory, engaging procedures for saving resources should be encouraged along with self-construction practices. The latter, especially, can unfold social inclusion processes and avoid “banlieue-like” ethnic ghettoization.

Accordingly, such a kinetic development of cities must organize and implement resilience strategies with the aim to survive, adapt, and keep developing without compromising its own structure regardless of the type of acute shock or chronic stress cities may pass through. Possibly, this means that the rich housing scenario that Italy can offer has the potentiality for highly versatile solutions. This calls for a relevant contribution by architects to the overall resilience strategy.

The goal of making people “feel at home” by formalizing the applicable characteristic of informal typologies led the research to deal with space shared by both formal and informal urban realities. The researchers wanted to identify what kind of contribution to urban resilience can come from housing interventions. They decided on a methodological level to select case studies which, when analyzed in their architectural and procedural characteristics, can represent a source of best practices. The purpose was to contribute a preventive methodology and provide professionals with some technological recommendations designed to increase the overall resilience of the system. Even the very choice of the case studies represented a reason for research because it required a reflection on the best managerial and participatory characteristics of the project towards resilience and adaptation processes.

In light of the framework and the preset objectives, this study proposed the minimum requirements of an essential housing response for the reference target and provided a methodological metadesign contribution structuring a framework of technical, technological, and procedural guidelines for an essential, new, and temporary housing solution (Montella, 2017). Such an outcome is structured in data sheets that contain typological, technological, functional, and procedural guidelines for the planning phase. These guidelines upgrade informal solutions and downgrade the formal ones in order to facilitate urban resilient processes.

**METHODOLOGY FOR THE MINIMUM REQUIREMENT DEDUCTION OF HOUSING**

The methodology used for the minimum requirement deduction has taken into account the change in the standards established by law. These follow societal changes as well as the acceptable size and type of minimal housing solutions. Due to the high heterogeneity of the target (i.e., low-income or undergoing temporary discomfort; single individuals living under difficult circumstances; people on the housing waiting list; documented, low-income immigrants; asylum seekers awaiting status decisions, and the “new poor” such as young individuals, young couples, single-parent families, et cetera), a common set of needs shared by all the profiles was identified with the purpose of including more profiles of need.
The non-negligible aspect common to all users’ segments was taken into account not only in reference to the possession of a home but also to “feeling at home”. The work highlighted social ties and the links people have with their own space.

**Figure 2.** Deductive Methodological Framework of minimum requirements (Image by Montella, 2017).

More specifically, as shown in the Deductive Methodological Framework (Figure 2) the inference of minimum requirements has passed through the following checkpoints:

**User profile frequent characterizing features**
It was found that users shared a desire to change the received shelter into their own home. Also, the authors found that people sharing the condition and temporary nature of the stay had a stronger drive towards socialization and were more likely to emulate the others, e.g., through consumerism. They also suffered a state of emotional deprivation, and a disposition towards entrepreneurial initiative as a reaction to difficulty. Hence, they shared strong inventiveness in turning the inhabited space into self-construction, et cetera.

**Study of legal border marks as margins for downgrading standards**
The researchers identified the border marks between formal settlements for subsidized housing and standardized solutions for emergency use in Italy. For the first category, the dimensional housing standard of the July 5, 1975 Italian Ministerial Decree was considered and analyzed as a codified solution commonly adopted for civic houses. This was based on the standards established by the legislation for Italian subsidized formal housing and used as a legislative reference for possible law exemption from the standards. For the second category, the standardized solutions were considered with reference to the Civil Protection Operational Manual. This represents the first standardized and codified essential solution, after self-built slums, which is used as housing, even though in emergency procedures.
Informal settlement characteristics study as a border mark for standards upgrading

Spontaneous settlement practices and habits can offer relevant clues for profiling needs and solutions that are useful for the purpose of resilience research. Furthermore, transferring the identified characteristics into “formal” housing practice can contribute a sense of belonging to people while providing an effective response to their practical needs. Next, self-built informal housing from scratch and informal occupation of existing buildings for housing purposes have been analyzed. For the first category, a typological study was carried out in the Jardim Colombo favela of São Paulo, Brazil to deduce “dimensional standards”. For the second category, the David Tower in Caracas and Spin Time Labs in Rome were analyzed as practical responses to users’ specific needs. These offered solution guidelines with characteristics similar to those of the resilient processes.

Case studies selection and analysis

Case studies have been selected among virtuous projects that have already solved or prevented informal settlement solutions and, through some methodologies or practices, have already produced resilient-like procedures. The selection of the case studies was made not because those were “resilient projects”, but actually because one of the objectives of this study was to identify which planning, procedural, or technological requirements may have consequences that increase the inclination to resilience. On the contrary, the standard used for the selection aimed at identifying projects representing the selected and above-mentioned categories by management models, applied procedures, project typology, building practice, and user engagement.

Indeed, the objective of this study was not to outline a project or to compare case studies, but rather to analyze each case individually, highlighting the replicable patterns picked up from their characteristics and best practices. More specifically, the researchers selected the following categories of social housing best practices: State-dwellers-banks collaborative projects for preventing informal settlements; abandoned real estate reuse projects, and architecture competitions for low-cost shelters able to exalt the creativity of professionals in facing the challenges related to the housing emergency with characteristics similar to the resilient processes.

The selection of case studies was made by using three macro-categories:

I. Cooperation projects between the State and inhabitants to prevent informal settlements:
   1. Minha Casa, Minha Vida – Brazil
   2. FUCVAM Federacion Uruguaya de Cooperativas de Viviendas y de Ayuda Mutua – Uruguay
   3. Elemental, Vivienda Incremental – Chile
   4. Elemental, Antofagasta, Vivienda Incremental – Chile
   5. Elemental, Quinta Monroy, Vivienda Incremental – Chile
   6. Techo – Un Techo para mi País (UTPMP) – Argentina
   7. PRO.CRE.AR. BICENTENARIO – Programa de Crédito Argentino del Bicentenario para la Vivienda Única Familiar – Argentina

II. Reuse projects of abandoned real estate for social housing purposes:
   1. Le CaSette, informal occupation and Cooperative for Energy Production – Italy
   2. Spin Time Labs, informal occupation of existing public and disused buildings for housing purposes – Italy
   3. Condominio Solidale, A Casa di Zia Jessy, solidarity condominium as social and mutual experimentation – Italy
III. Architecture competitions for low-cost projects for social housing purposes:

1. **Casa Fenix** – For Emergency post-Natural Impact eXtreme, project submitted to the Solar Decathlon Europe 2014 competition – Chile
2. **Ressò** – Restoration and Sustainability, project submitted to the Solar Decathlon Europe 2014 competition – Spain
3. **Society Lab**, project submitted to the From Border to Home: Housing Solutions for Asylum Seekers competition – Italy
4. **We House Refugees**, project submitted to the From Border to Home: Housing Solutions for Asylum Seekers competition – Italy
5. **Enter the Void**, project submitted to the From Border to Home: Housing Solutions for Asylum Seekers competition – Germany
6. **New Building: Residential and Community Buildings**, project submitted to the Berlin Award 2016: *Heimat in der Fremde* competition – Germany
7. **Dwellings for Refugees and Homeless People**, project submitted to the Berlin Award 2016: *Heimat in der Fremde* competition – Germany
8. **Container Villages**, project submitted to the Berlin Award 2016: *Heimat in der Fremde* competition – Germany
9. **Refugee Residence**, project submitted to the Berlin Award 2016: *Heimat in der Fremde* – Germany
10. **Social Facility**, project submitted to the Berlin Award 2016: *Heimat in der Fremde* competition – Germany

**Case studies best practices deduction**

The analysis data sheets of each case study were organized by identifying detailed planning and procedural aspects. About planning, specific attention was paid to typological aspects (type of building and related interior division, users, combination of volumes, and functions), technological aspects (main technology, systems typology, assembly typology, construction system), and both the users’ and functional mixité. The procedure study focused mainly on managerial and organizing issues, namely management operations and users’ involvement in the constructive process. The analysis allowed for extracting some technological, typological, and managerial best practices (Figure 3), as well as practical actions, cooperative procedures, participatory processes, and laws and regulations to cope with the Italian context. This translated into procedural and planning guidelines that were added to the data sheets of the final outcome.

The resilient systems inferred from the case studies include the following general patterns: participation of inhabitants in the construction of a home; presence of an architect as a facilitator in the participatory process; common services sharing; creation of a network of relations among the inhabitants; functional mixité features; self-building of personal space to reduce public cost; space permeability; short construction times; possibility to personalize private space; spirit of emulation that triggers the desire for consuming goods with a symbolic value, and flexibility in the use and duration of private space, depending on dweller’s conditions and needs.

The procedural and design/planning guidelines garnered from the case studies are as follows:

**Typological features.** The most efficient models tend to be those that do not exceed four stories high despite of being in conditions of high density ground conservation. These models include collective spaces for neighborhood services, surface areas that allow users to expand their living spaces, and furniture elements that make space flexible.
**Technological features.** The most suitable technological systems are in wood. This is due to the fact that they are ecological and low-cost, prefabricated, and can be dry-assembled by the users themselves. Components must be designed in standard transport dimensions. Structural frameworks and shell must be independent of one another. Housing systems must be outside the house or in any case easy to inspect in order to allow replacement over time.

**Mixed-use development features.** In order to favor processes of integration, it is preferable to establish new residential complexes near centers of economic interest. Also, the set up of neighborhood services inside the complexes will support integration and cooperation between inhabitants who face professional difficulties.

**Organizational management features.** Differentiated rental fees based on income and self-building completion levels are advisable. An app for finding buildings on the market is also a good support.

---

**FRAMEWORK BEST-PRACTICE OF CASE STUDIES**

<table>
<thead>
<tr>
<th>CATEGORY OF PROJECT</th>
<th>COOPERATION PROJECTS BETWEEN STATE AND INHABITANTS</th>
<th>PROJECTS OF REUSE OF ABANDONED REAL ESTATE FOR SOCIAL HOUSING PURPOSES</th>
<th>ARCHITECTURE COMPETITIONS FOR LOW-COST HOUSING PROJECTS FOR SOCIAL HOUSING PURPOSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCHITECTURE COMPETITIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROJECT LOCATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROJECT NAME</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TYPE OF BUILDING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTERIOR DIVISION TYPE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMBINATION OF VOLUMES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUNCTIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAIN TECHNOLOGY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSTEMS TYPOLGY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASSEMBLY TYPOLGY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTRUCTION SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLANNING OF PLANNING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIXTURE OF USERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIXTURE OF FUNCTIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANAGEMENT OPERATIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USER INVOLVEMENT IN THE CONSTRUCTIVE PROCESS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.** Summary of best practice case studies (Image by Montella, 2017).
Help from a privileged source
Field research sessions and meetings with experts represent a privileged source for inferring requirements in support of the whole analysis. A team participation in the Solar Decathlon Europe 2014 architecture competition referred to the first category as an occasion for analyzing and studying resilient-like housing solutions. This included the research on the unlawfully occupied building Spin Time Labs, Rome, as an informal housing solution and direct expression of profile needs. The second category has been addressed by interviewing the Spin Time Labs occupiers, i.e., the players of the self-built housing process, thus profiling their essential needs. Professionals and research experts such as anthropologists, urban planners, urban economists, and social architects have also been interviewed. These professionals facilitated choice and analysis by mediating concepts already codified in the reference literature.

“Data Sheets on Characterizing Requirements” draft
Specific data sheets on the planning characterizing requirements were drafted for each section of the Deductive Methodological Framework. These include information on users’ needs and characterizing features, as well as the surface area ratios and the common, essential, and basic equipment.

Finally, in sorting the needs described in the “Data Sheets on Characterizing Requirements” by similarity, a new set of requirements and needs was eventually developed. Such a set is typical of essential, new, and temporary housing solutions. More specifically, the requirements were subdivided into two main sections and in turn defined by specific sections and related needs:

- With regard to the context:
  - Proximity of interests and city services
    - Living near an urban context, workplace, and educational service
  - Social relations
    - A place that fosters interaction between social groups and favors a participatory, sharing-based lifestyle
  - Soil conservation
    - Guaranteeing protection of the environment through low land consumption

- With regard to the building:
  - Belonging
    - A place that gives the idea of “feeling at home” (physical and mental place of social and individual identification) borrowing best practices from informal practice to provide this opportunity
    - Ability to fulfill technological, functional, and spatial imitation needs
  - Technologies, completion time, and low cost
    - Housing that is available and easy to build in a limited time
    - Housing with low construction and management costs as well as low rent costs
  - Flexible, functional organization and evolutionary potential
    - Space flexibility and adaptability (also in height) to the changing needs and use of additional functions (i.e. working, hosting people) also with exemptions from the standards
    - Having the possibility to develop the outside of the house over time
Comfort and sustainability
- Basic comfort that is an upgrade to the previous conditions
- Having an energy self-sufficient house to reduce management costs and safeguard resources

Sharing
- Having a crossable border between public and private spaces on the ground floor with the introduction of additional services
- Basic services in the private space while sharing common services and semi-private spaces with other inhabitants

“Technical Data Sheets for Planning”: the framework of technical guidelines for essential, new, and temporary housing solutions draft
For each need, specific characterizing requirements were elaborated which, after being described in detail, led to draft the final data sheets. The image below (Figure 4) represents a data sheet belonging to the building context, name and description of the requirement, planning recommendations, technological guidelines and procedural suggestions, reference planning or procedural examples, guidelines for the reuse of existing buildings, relevant laws and regulations, and suggestions from experts. Every design and procedural recommendation is accompanied by drawings and ideograms.

Cost and time hypothesis for affordable housing
In order to parametrize economy and timing, a grid of costs and times is associated with the realization of the basic housing module, according to the rules contained in the “Technical Data Sheets for Planning”. Due to the state of emergency, time and cost have a decisive relevance. In order to devise the cost per square meter and the construction times, the drafted hypothesis was based on the minimum equipment that could be sorted from the “Technical Data Sheets for Planning”. Additionally, the hypothesis considered giving an economic value to users’ work contribution for the completion of the houses, and to the subsequent evolution of self-construction. For this purpose, items have been extracted from the cost per square meter in order to define their cost difference, thus becoming able to attribute a hypothetical cost for the participation of the user. The information has therefore been divided into four sections: construction, users, time, and cost.

The construction sector considered the preventive actions (setting up the area and preparing the meta-project), basic equipment (bathroom, kitchen, and air conditioning), constructive specifications (structure, windows, envelope insulation), and energetic autonomy (measurements and systems preliminary hypothesis).

The users sector considered the self-building (user house completion).

The time sector considered the assembly and production times (three months for a customized project, one month and one week for a large-scale production, one month and a half for a large-scale production of 10 modules).

The cost sector considered the hypothetical price of 700 euro per meter for an essential house module, including every detail such as furnishings, interspace systems, frame of the whole casing, external and internal lining, interior and exterior doors, finishes, pre-assembly and on-site mounting, basic platform, transport, planned area setting, possible outer plateau, possible predisposition of water and electricity systems, and further hypothetical equipment, i.e., thermal solar systems, increased-insulating thickness and its resulting structure, and double-glazing windows.
The cost reduction by self-building completion was also considered:

Option 1 considers the company to finalize the whole production and assembly.

Option 2 considers the company to produce only a few items, while completion is up to dwellers’ self-construction.

Option 3 reduces the total cost of Option 2 by a further 10%, where the company produces only kits for module realization, and assembly is totally under the responsibility of final users after training courses and provision of an instruction manual.

Having worked out a cost of approximately 780 euro per square meter for the essential module (Option 1), the user’s participation in self-construction completion (personal furnishing, painting and floor laying, and furniture fitting) can decrease this figure by approximately 18% reaching 641 euro per square meter (Option 2). This can finally cut another 10% as per Option 3, thus achieving a cost of 577 euro per square meter, which excludes the burden of assembly as inhabitants need only to buy an assembly kit.

In the end, taking into account the average market for basic construction elements, the cost to be further considered is that of single modules used for primary housing such as self-supporting staircases required for elevations. Users can buy them for the possible subsequent evolution of their home in the future.
CONCLUSION

We are living in a time of transition towards a different economy that turns away from the capitalistic 20th century world. The call for new types of economies should pay attention to the persistence of obsolete ways in pursuing the housing goal. It is thus consequent to deal with housing problems not only from a managerial point of view, because such ways often lead to simplistically expect the State to carry out solutions that it cannot perform anymore due to economic non-viability.

The cases presented here rather suggest organizing users by considering their needs and aggregating their demand. People’s needs, actions, and behaviors can delineate a framework of necessities and help to find, although with few means, formal solutions to skip the State’s intervention and provide services that produce wealth. Planners and architects used to focus on shaping spaces and deciding functions for the users. Maybe it is time for them to listen and observe the hints, which users themselves offer while occupying and transforming spaces into houses, generating income out of some part of their unused building, exchanging services with their neighbors, and carrying out practices that are not always measurable but still have economic consequences, even in terms of saving if not of income. In this scenario where quick and final solutions to steady social and economic issues are missing, the active involvement of the user, and his inventiveness in solving problems becomes central.

Most probably, the trend to generate income out of unused parts of the house means that it is too often out-of-scale with respect to the actual average family and the decreased number of components per household. The phenomenon of a one-parent and single household should reflect the need, partly of a social nature and partly of a purely distributive and economic nature, in order to extract from private dwelling parts devoted to services that can be shared in semi-private zones. These can perform as a platform for the exchange of competences, places of sociality, and solutions to reduce waste of spaces and resources.

Therefore, in this perspective, the densification of the existing estate no longer translates into the addition of covers or infills in the façades. It rather follows the urban transformations with functional changes that look for exemption from obsolete standards and copes with the mobility of users and spaces. In the increasingly temporary-oriented cities, densification becomes a platform for income creation and fosters sociality and social integration. Probably these new forms of living, often self-produced as a response to a compelling economic system, can provide more clues of what people think. Users see themselves not as passive inhabitants of the architecture but as active collaborators in the creation of spaces. This makes possible the generation of virtuous practices that give, as a whole, a contribution to the resilience strategy of the general system.

Self-recovery and self-building projects, where municipalities grant unutilized structures or municipal land and financial institutions, give microcredit facilities, make restorations, and constructions from scratch possible. These initiatives address the housing problem at a significantly lower cost also in the case of newly constructed buildings and relieve the municipalities from the maintenance expenses of public buildings by granting the inhabitants the right to self-restore at their own expenses. This dynamic is still in its first phases in Italy. It can be compared to the projects by Elemental (Aravena, 2012) which, in a perspective of saving State resources, put the user at the forefront in the future completion of his/her own house, even if he/she foresees its expansion in the beginning. Probably there exist many more similarities than one can imagine between the self-building practices occurring in the slums of the world and the squatting phenomena in the center of a city like Rome.
An illegally occupied building is a self-produced expression that is similar to the one of a slum. The possibility of clearing out are about the same, such as occupation of the land, space appropriation, tendency to perform work in the house, and readiness to share. In both cases there is often no census and inhabitants cannot register. In absence of this institutional legitimation, they are denied a series of benefits, such as a State nursery school for their children, paying for services, getting an internet contract, or receiving mail. Despite this, these are solutions which can somehow create a virtuous circle and offer housing solutions in an already urbanized space, re-utilize an unused building, and autonomously ensure its maintenance and improvement, produce services for themselves as well as other citizens, and have an immediate consequence on income production.

Therefore, this is perhaps one possible way to rethink urban regeneration under the light of resilience. One should observe that, despite the illegality of some practices and the slowness of law to adapt to a mobile society, the longed-for individuality is again leaving room to sociality, sharing, and participatory forms, where inhabitants become the center and operative collaborators of their own destiny. All these aspects that increase the inhabitants’ capability to adapt themselves and shape their spaces as an expression of the social, spatial, and economic mobility that is characteristic of our time, presents some affinities with resilient processes.

The purpose of this research and complex methodology is to translate the collected and typical urban best practices into essential housing solutions and promote resilient processes as forms of sustainable development. Referring to metadesign means to work with emergency procedures that patch effects but do not solve the problem at its source. The final product is a box of data sheets structured like a guidance manual to support administrators, designers, and urban planners involved in advanced adaptation and resilience-oriented urban processes. Another goal of this research is to codify the concept of resilience by proposing a new class of resilience requirements for housing systems. These requirements support a strategic approach and ensure the resilience of architectural planning contributions in a clear, direct, and measurable way (Lisa, Schipper, & Langston, 2015).

REFERENCES


Arup, supported by The Rockefeller Foundation (2017). City Resilience Index. [PDFs (6 research Volumes & 1 Brochure)] Retrieved from https://www.cityresilienceindex.org.


New, “Green”, and Sustainable Challenges

Nicoletta Gandolfi
Architect and Journalist, Italy

ABSTRACT

Urban planning instruments and community policies have led to a renewed project approach that is increasingly aware of territorial issues. Key points include the following: a new perception of design and the recovery for unused building stock; increased public-private dialogue; enhancement of green areas; optimization of energy efficiency, and buildings’ economic properties. Similarly, a human-friendly approach focuses on green areas, social interaction, and services. Welcoming, efficient, and healthy environments are regarded as the foundations of the mind-body balance, which in turn promotes a natural harmony with the environment. This paper aims at illustrating this concept through the following examples: Cascina Merlata (Milan) by EuroMilano; Sempreverde Atelier B&B in Punta Secca (Ragusa) by Arch. Danilo Olivo di Schininà, and Stanford University Central Energy Facility by ZGF Architects.

Keywords: sustainability, bio-building, green, energy saving
INTRODUCTION

Bio-building stems from the need to live in a welcoming, beautiful, and healthy environment that is aware of the mind-body balance and of sustainability. A building can reach different degrees of sustainability based not only on the design choices, but also in the environmental context in which the building is located, a planned degree of energy autonomy, and last but not least, economic constraints (Dall’Ò & Galante, 2010).

This new sensitivity has become a sort of mission for several designers while also promoting a dialogue between corporations and public administrations in order to enhance the green areas as well as the energetic and economic efficiency of real estate. City planning is now paying more attention to issues like population well-being, energy saving, social inclusion, and community involvement in decision-making processes when transforming cities. Moving from within citizens’ needs, planning focuses on the population and the community. It thus contributes innovative design tools and practices that meet international environmental policies.

NEW, SUSTAINABLE CHALLENGES

High-level sustainability in architecture requires energy-efficient solutions and a well-designed casing, which allows the use of natural, renewable energy sources in harmonious relationship between the inside and the outside. This means that designers must carefully assess the orientation of the building and the slope of the land, as well as its hydrogeologic conditions, vegetation, and height of the surrounding buildings and existing infrastructure. Addressing such issues means satisfying thermal, hygrometric, acoustic, visual, and electromagnetic comfort.

Green areas play a fundamental role because they avoid the “heat island” and drain rain due to soil permeability typically found in urban areas.

The casing, which is considered the “third skin”, needs to be an intelligent barrier able to preserve as much heat as possible in winter while keeping cool temperatures in summer.

Local, environmentally friendly materials and green roofs also play a relevant role (Dall’Ò & Galante, 2010), as manufactured materials interact with the environment and its characteristics.

Sustainable architecture is a cultural approach leading to a design and construction that minimizes the impact of buildings on human health and the environment. It does so by limiting the consumption of non-renewable resources and the use of non-harmful materials, safeguarding the relationship between humans, buildings, and the environment. The transition to sustainable construction is necessary to improve the quality of life, decreasing energy consumption, providing greater value to homes, and reducing emissions and energy dependence for Italy. Therefore, sustainable architecture aims at recycling all, or almost all, of the architectural products. Structures should be built so they can be broken down into elements and materials, which can be easily recycled, reused, and disposed of without causing further pollution when the time for demolition comes.

Sustainable architecture cannot be broken down because it affects a fundamental and intrinsic wholeness of factors belonging to our planetary existence. The success of any architecture or urban project lies in the choices that make them ecological and influence their users to be sensitive to waste and energy consumption. In addition to technical issues, not only must the environmental aspects be considered but also the social and psycho-sensorial ones.
THE ROLE OF GREEN AREAS, NOW AND IN THE PAST

Green areas such as parks, gardens, avenues, and tree-lined squares, represent an aesthetic, cultural, and environmental improvement of landscape and urban livability.

Green areas planning should start from the territory, involve the landscape, and end at the garden (Mengoli, 2013). Just as if it were a building, the inclusion of green areas requires a site evaluation. The green space actually covers two-dimensional elements: the “space” or reception point in a frame dominated by biotic components, and the “path” or territory infrastructure capable of connecting different parts of the city by pedestrianizing them (Mengoli, 2013).

Green area have aesthetic, environmental, protective and therapeutic functions. They provide for oxygen production and enhance biodiversity, contribute depolluting the environment, fight soil erosion and noise, and offer healing places (Mengoli, 2013). The correct use of vegetation contributes to a better territory management that allows upgraded interventions in road traffic, the recovery of degraded areas, the maintenance of fluvial areas, and the adoption of innovative green solutions, such as a hanging and wall green. The latter comes with trees, tree-lined squares, traffic divisions with greenery, roundabouts, public and private gardens, and urban gardens (Mengoli, 2013).

Such architectural greenery beautifies cities by reducing the visual impact of certain buildings, improve the passive cooling of façades, absorb noise, and provide shade. Social rehabilitation through urban gardens is another benefit. To a certain extent, it also constitutes a natural and free therapy, as cultivating a garden, organizing crops, cleaning a plot, and contemplating its fruit is important in the treatment of various mental and psychological diseases, such as depression (Price & Skolits, 2017). Natural areas provide direct contact with plant and animal species during various seasonal cycles. They also guarantee an environmental education for young and old, a wider knowledge of the surrounding natural environment, and respect for all green-related values.

The process to reach this point has been slow. Our community is becoming aware of the need for green areas. They use them and even actively participate in their care. Another important contribution made by the natural environment is linked to the psycho-physical well-being for those who directly enjoy it, for example, healing occurs much faster if patients are placed in visual contact with natural environments (Ulrich, 1984; Kaplan, 1995). This has also relevant economic side effects, i.e. fewer costs for the public health system and more work productivity (Terrapin Bright Green, 2012).

A greater presence of natural, public areas also means that population will be more in contact with nature and therefore more likely to practice sports, to keep fit, and to be therefore physically, psychologically, and socially more healthy. It is now undisputed that the increase in biodiversity and natural ecosystems generates a huge flow of positive effects both for the environment and the humans who inhabit it.

THE PROJECT OF CASCINA MERLATA, MILAN

One example of careful planning that takes into account the multiple needs of modern living is the so-called “UpTown District” of Milan, which is part of Cascina Merlata’s masterplan (Figure 1). Here, the designers, CZA-Cino Zucchi Architects, Scandurra Studio, and Zanetti Design Architecture, to name a few, decided to create an innovative, “Smart District”, paying close attention to technological innovation and social cohesion (Figures 2–3).
Figure 1. Masterplan of the UpTown District of Milan (courtesy by EuroMilano).

Figures 2 and 3. Rendering of the street level (courtesy by EuroMilano).
Figures 4 and 5. Views of the park (courtesy by EuroMilano).
Cascina Merlata is considered the biggest social housing intervention in Italy (Roda, 2018). Under the coordination of EuroMilano it has been built together with the inhabitants of UpTown, the first “Smart District” of Milan, who signed the Cascina Merlata Partnership with some building companies. Cascina Merlata includes an agreement to manage the park’s safety and maintenance through placemaking events (“Cascina Merlata, ecco”, 2016; “Cascina Merlata, al via”, 2018).

EuroMilano is in charge of creating a gas-free neighborhood in UpTown, which features district heating, geothermal energy, photovoltaic panels, LED lighting, ecological paints, community electric car sharing, bike sharing stations, and an ATM bus line near the MM1 red subway line. It combines the concept of smart city with urban regeneration: modern buildings, home automation, and high technology (“UpTown district”, 2017). With humans at the center, this intervention radically transforms an empty box into a living reality.

Two key points are fundamental in achieving this: safety and social organization of events. While designers have worked a lot on home automation, energy savings, and 360-degree connectivity, they have also emphasized the need for giving vitality to the neighborhood, starting with a wide-range plan for a large park that extends for 250 thousand square meters around the buildings (Figures 4 and 5). The organization of routes that branch out into the park is an important opportunity to stay in contact with nature. The green blanket also helps to remove smog because plants filter dust and particles. This offers large amounts of oxygen and alleviates the bioclimate during the hot season. Leisure activities such as yoga and fitness are organized in the park during the summer.

We need to underline the choice of designing and implementing a zero-impact district using environmentally sustainable technologies such as heat pumps that take advantage of geothermal energy and the heat from the nearby Figino waste-to-energy plant, LED lights in common areas, and self-sufficient buildings powered by photovoltaic roof panels. The latest news on the “Smart District” involves the mobility sector. A community car sharing service will be provided for the inhabitants, who will take advantage of special rates according to how often electric bikes are used. Projections about the use of this transportation are favorable because Milan has already been top-ranked among car sharing cities (“L’esperimento”, 2018).

The desire to create a strong sense of social integration does not stop with the actions and projects described above. Over the next years, a completely refurbished community center will be created inside Cascina (Figure 6). This community center will be equipped with a work desk; an e-commerce drop-off; a bike shop and mobility center; a rehearsal room; a conference room, and a “zero kilometer” food products store from the Parco Agricolo Sud Milano (Milan South Rural Park). A shopping center with bars, restaurants, shops, and mid-sized supermarkets will be added to this. There will also be a school complex for approximately one-thousand children and a basic medical clinic. The “acupuncture” of the intervention is then added to the gathering areas on the building’s ground floor: co-working environments, a children’s space, a kindergarten, a laundry, a gym, and a communal kitchen.

In light of climate change and the ever-increasing number of natural disasters, the entire international community has come to understand that the “renaturalization” of urban spaces (in contrast with the overdevelopment and impermeabilization of the soil), especially if unused, is both a necessity and a considerable source of infinite advantages for both the environment and the individual. Indeed, Milan is getting ready to become a very “green” high-impact city in the years ahead (Panarella, 2018) by creating new urban parks, like the one presented above.
SEMPREVERDE: THE B&B AWARDED FOR ITS SUSTAINABILITY

A smaller project inspired by sustainable construction is the Sempreverde Atelier Bed & Breakfast in Punta Secca, located in the Ragusa province’s area of Santa Croce Camerina. This 110 square meter structure made of laminated fir wood, comes from the renovation of an old building with a new extension made of wood and straw bales (Figures 7, 8, and 9). Sustainable building techniques include raw-earth plaster and floors, thermal and acoustic insulation with cork panels that act as a coat, and a choice of recycled furniture. Insulation is guaranteed by approximately 350 straw bales, a recovered waste material that allows for significant energy savings.

The project received the 2017 “Sustainability Award” with the top score from the Energy and Sustainable Development Agency, AESS Modena (“Un B&B costruito”, n.d.), a national prize that aims at promoting good building practices and selecting and disseminating projects that respect the construction principles of bioarchitecture and energy efficiency.

The following aspects were considered: respect for and integration with the natural environment; control of energy consumption; use of non-polluting materials and non-harmful techniques for human health, and socioeconomic sustainability and innovation.

The project is in line with the increasing appreciation for wood in construction over recent years, followed by a sensible Italian lumber market growth. This takes into consideration that wood is a superior material that guarantees exceptional results in terms of solid durability. It is now clear that these construction systems are as valid as steel, concrete, or masonry from a structural point of view. In addition, wooden structures have some advantages. Despite being an “engineered wood” (i.e., lamellar wood undergoes an industrial process of glueing the slats to give greater resistance and eliminate the natural defects of the material), the transformation phases are less impactful than the production of other...
Figures 7 and 8. Sempreverde façade and terrace (photographs by Licia Perna).
construction materials. It is also a renewable source, capable of reabsorbing and transforming the carbon dioxide (CO2) that has been introduced into the environment with oxygen during the production cycle.

Wood also has a lower thermal transmittance compared to other structural materials and is able to guarantee a natural hygrometric balance to the building. Straw, as an interstitial insulator between the uprights and wooden crosspieces, is a valid alternative to mineral and glass wool that is currently on the market, with a very low environmental impact.

Finally, following a European trend, in Italy and in particular, Sicily, wood is nowadays more often reused, sometimes by adding straw and further increasing the wood’s insulating power.

The example shows that the recovery of an old building has given life to a new structure. This happened through elements that guarantee excellent integration with the environment and the surrounding landscape; great reduction of energy consumption; low impact on the environment, during both the production cycle and the construction phases, as well as the innovation of this constructive system, especially in Sicily.

ENERGY FACILITY AT STANFORD UNIVERSITY: A DIALOGUE WITH NATURE

The Stanford University campus in Palo Alto, California was designed by architect Frederick Law Olmsted, one of the first landscape architects in history who is famous for being the designer of Central Park in New York City. Located to the west of the Stanford University center, the new ZGF-designed power plant is on an area of almost 12,000 square meters and considers the original axial
orientation of the campus designed by Olmsted in 1888 (McKnight, 2016). The design has been awarded by the American Institute of Architects.

The university has introduced a new heat recovery system that reduces the use of carbon, the emission of greenhouse gases, fossil fuels, and in part, the use of water (“Stanford University Central Energy”, 2016). Furthermore, the purpose of the building is to produce energy that restricts as much fossil fuel as possible. Stanford University itself created the project. Its complex system is based on the recovery of waste heat generated by the campus cooling system. This recovery produces hot water that flows through the heating system of the building and returns to the plant for reuse, with the subsequent energy and cost savings. At the heart of the plant is a new Central Energy Facility (Energy Central Structure) that is at the forefront of heat recovery methodologies (“Stanford University Central Energy”, 2016). The heated and cooled water are stored in three large tanks. Everything is monitored by a sophisticated Stanford-designed computer system that indicates the energy needs of the served buildings, such as consumption (prices and energy) and water conditions (temperature, pressure, etcetera). This leads to optimal performance efficiency in real time.

Certainly, one of the biggest challenges that ZGF has faced is alleviating the visual impact of the three, central, cylindrical volumes that contain 45 million liters of cold and hot water. This has been achieved through the use of light architecture; using steel beams and pillars; large windows; ethereal and functional solar screens (150,000 photovoltaic panels); perforated curtains that generate volumes with little impact, and the planting of species that increase the green impact and decrease that of the building. In the distribution court, designers have decided to leave one of the three large tanks visible. This becomes a fundamental element of the project. It was painted in Stanford Red. At night, it turns into a huge illuminated volume that is made visible through the perforated steel diaphragms that cover it.

The relationship with nature and the surrounding landscape in this project is also very interesting. Greenery was used as a tool to lessen the visual impact of the structure, mainly at the “back” of the building where there is a square with electrical transformers and systems. Here a curtain has been designed in order to recreate a spatial unity with the tree-lined mass that overlooks the nearby golf course. Separately, the main front has its own architectural essence with a soul that is light, pure, and transparent. The integration of green here aims to blend in with the architectural language created by ZGF. It is a green area made of hedges and local bushes, as well as sparse and low trees that guarantee the right amount of light during the day, eliminating unwanted solar reflections.

CONCLUSION

Through these case studies, it is possible to understand the important consequence of the “green strategy.” These environmental benefits are due to CO2 and “heat island” reduction, and the use of sustainable and certified materials. Also, the fundamental role of the “sense of community” carries a socio-cultural objective and a benefit that perhaps represents the strongest glue in keeping any project alive and sustaining it, from the city district to the urban neighborhood vegetable garden.
REFERENCES


Quali-quantitative Methods for Analyzing Urban Structure and Supporting Regeneration Policies

Anna Rita Petroselli & Maria Ioannilli
University of Rome Tor Vergata, Italy

ABSTRACT

This study focuses on a method based on the morphological-typological analysis of urban settlements, where some qualitative-quantitative indicators are identified. These indicators compare the metrics of the buildings with their conservation status, in order to gain useful information concerning the needs and potential strategy of intervention and provide an overall picture of the state of deterioration of urban aggregates (such as architecture, structure, and energy usage). Further, they allow for a first economic estimate of the regeneration of the entire urban space. The study occurred in the district of Villa Adriana in Tivoli (Rome), which due to its almost spontaneous origin, suits well the application and validation of the proposed method. The method has potential to address all the functional, urban, and territorial deficiencies in order to spread space regeneration.

Keywords: urban quality, regeneration, urban policies.
INTRODUCTION

Italy adopted a National Urban Development Law (LUN 1150/1942) during the Second World War. However, this law did not apply when, in 1945, the reconstruction phase began.

In fact, damages were huge and involved buildings, roads, and railway infrastructures. The need to respond quickly to such problems led to the abandonment of the LUN. Reconstruction occurred through the enforcement of emergency reconstruction plans, which were simple tools for quick rebuilding the demolished areas. Municipalities included in special lists drawn up by the Ministry of Public Works, were required, within three months, to approve these plans, which were financed by the Ministry itself.

The reconstruction plans had to respond to the real and urgent demand for housing, but the choice to set aside the LUN led to the dominance of urban speculation mechanisms. In fact, the reconstruction plans did not foresee the organic reconstruction of the cities, the integration with the new buildings, nor the implementation of the necessary services and green areas.

These plans seemed to respond to an objective of economic development, but they actually promoted the development of a construction industry based on land speculation. Moreover, precisely because of the speculative nature of the reconstruction process, they failed to meet the growing demand of housing due to the massive immigration phenomena from the south to the north of Italy, which was very relevant at that time.

Also due to this inability to meet the housing demand, many spontaneous housing units came to life in the same period. The resulting settlement systems were built with poor material and low architectural quality and were often spatially ill-organized. To make things worse, the application of urban plans did not intervene on these spontaneous aggregates, for example by expanding streets or providing the establishment of new qualified spaces within them. On the contrary, these settlements were assumed as historicized urban forms where “the prevalence of previous abusivism is legalized, binding the interstitial areas left free by redevelopment interventions” (Clementi & Perego, 1983).

Therefore, urban policies adopted in the various time phases of the building development, instead of improving the environmental and settlement conditions, have contributed to deface many urban scenarios. The presence of historical centers often abandoned and ghettoized, or suburbs disconnected and fragmented compared to the rest of the original city are now evident; peri-urban areas increasingly consumed by new settlements are often still of poor quality.

Nowadays, the dissatisfaction generated by this territorial, economic, and social scenario, especially concerning urban form and quality, encouraged a debate on plans and redevelopment projects oriented towards the material transformations of the settlements.

Today, in order to refrain the expansion of cities and bring back acceptable profiles of urban livability, scholars and designers are focusing on the qualitative aspects that were neglected when the only objective was the quantitative development.

Intense urban growth, the fragmentariness of the peri-urban areas, and the consequences of wrong and unaware planning policies, have led to present-day interventions with a “mending and repair” attitude, which includes a hydrogeological, seismic and aesthetic care (Piano, 2014).
This is the current conformation of the post-modern city that we are required to confront with, where the lack of urban quality concerns both the public component (public space, services and infrastructures) as well as the private (building) component.

INTERVENTION POLICIES

Until recently, the concept of redevelopment of the urban areas (building and public spaces) mainly regarded punctual insertions, within degraded contexts, of “quality” elements to improve the outward appearance of the (generally public) space, yet without substantially addressing the surrounding conditions of degradation.

In some cases, such interventions may have improved the quality of squares or open spaces of historical centers but left the suburbs in a state of increasingly widespread decay.

The empirical observation shows us today how the punctual addition of qualitative elements, without the support of other interventions in the neighboring space, loses effectiveness in a relatively short time, undermining the benefit produced at the time of their insertion.

The cognizance of the scarce effectiveness of the policies so far conducted changes the approach to the question, also in lexical terms.

No more repair or redevelopment, but urban regeneration

The reference frame, for the topic of urban regeneration, is certainly very broad as it contains the “physical, social, cultural, economic, and aesthetic aspects that influence individuals and communities and which determine their forms, characteristics, systems of relationships and survival” (Filpa & Talia, 2015).

In order to improve the environmental, territorial, social and economic profiles of contemporary urban areas, it is therefore necessary to adopt suitable urban regeneration programs aimed at raising the widespread quality of urban space and of public and private buildings for the re-use of contaminated or decommissioned areas. These programs should guarantee a consistent and adequate containment of land consumption. This implies, however, a revision of the development areas included in the already approved urban and territorial plans, and the drafting of new forecasting tools. These will joint better information and participation systems, until now almost completely ignored, allowing for the assessment of the options that best fit the specific planned context.

A high-quality environment can improve the feeling of well-being in a certain place and, therefore, its utility. Further, it can also create a sense of community, communication/relational networks, social capital, and civic spirit. In other words, beauty (an aesthetic value), produces economic, ethical, and cultural values along with the perception that “it is good” to take care of that site (Fusco Girard, 2004).

The deep interest in this issue is documented within the national, European, and worldwide policies aimed at solving, at least in part, the problem of drop in urban and environmental quality. There are many examples of urban regeneration policies in Europe, such as:

- Madrid (2008), with the redevelopment of the popular district of Lavapiés, an area with substantial decay and squatted or empty houses.
- Ghent, where a strong incentive is expected after involving the population on smart city development policies;

- Copenhagen, where the application of a simple but effective model of urban regeneration still follows the integrated and sustainable approach of the 1947 *Finger Planen* and its directions of urban development and environmental planning. Such a plan today directs new models of urban regeneration.

As Forgione (2008) says, “Quality refers to certain characters that are strictly and directly related to the current processes of development of the urban economy;” nevertheless, the Italian planning practice has significantly neglected this correlation.

**URBAN QUALITY**

The concept of urban quality is actually very complex and articulated and it is quite difficult to summarize it in a single definition.

We can quote Zaffagnini (1980) who says,

Urban quality is not identified only with respect to the provisions contained in urban planning instruments ... to urban planning standards ... in the availability of services ... in the definition and adoption of an optimal building type ... in the differentiation of building types, in their volumetric and altimetric counterpoint ... with the good architecture of the buildings ... not even [is] the result of the sole participation or decentralization or self-management choices inherent to their habitat ... Urban quality is not achieved automatically by giving everyone a home ... Urban quality is none of these conditions, if taken separately, but it is the set of all and many others that are difficult and, perhaps, impossible to find because they are linked to facts that are not always objectifiable or constant over time.

Attempting to define a metric, which can return urban quality indicators even though centered on the physical component of the aggregates, is certainly a partial and perhaps not entirely shareable objective. However, by focusing on robust information that is viable to the public authorities and useful for the formulation of new urban policies, we cannot escape from it, while being aware of the simplifications that will be introduced in the determination of these indicators.

In addition to the morphological aspect of urban contexts, the concept of quality defines more immaterial and perceptive characterizations of the territory and its content. A perceived quality through “the interpretation of how the inhabitants of a city perceive it and therefore find some parts either unpleasant or repulsive and others pleasing and attractive” (Lynch, 1960).

Again, according to Zaffagnini, urban quality,

… is the color of the walls, the texture of the road pavements, the differences in height and between the paths; a lawn without litter and needles, a tuft of trees not poisoned by carbon monoxide, the vine that covers a wall at the end of the street; a sidewalk clear of cars, a bench in the summer shade, a porch on rainy days, the phone booth when you need it; the scent of lime trees and roast chestnuts; the cheerful shouting of children leaving school and the sad trampling of those who slowly accompany their friend on their last journey. It is education, civic sense, solidarity; it is awareness of its citizens’ rights. It is culture (Zaffagnini, 1980)
However, in this research study we have tried to give a quantitative substance, albeit partial, of the quality of the settlement system, which we analyse in terms of architecture, structure, and energy with a specific reference to private space.

The defined indicators make it possible to identify, under the minimal evaluation hypothesis, the possible interventions required to raise the quality level of a specific urban component.

APPLICATION METHODOLOGY:
FROM CONTEXT ANALYSIS TO URBAN QUALITY INDICATORS

To obtain the above-described results, we hypothesize that a typological analysis should be carried out to highlight the real condition of the buildings in an urban aggregate, considering both their constructive characteristics and their state of conservation and use.

This would guarantee a reasonable degree of success when redeveloping the private building heritage. Moreover, this kind of analysis also allows for highlighting the generative phenomena of the urban organism and, more generally, of the built-up environment, by taking in account its social and economic context.

Facing the problems of architectural, structural, and energetic quality of the building system from a typological point of view, allows us to somehow define the transformability degree of each building and to assess the effect of the intervention on the entire urban system.

For this purpose, the first required analytical step is a survey of the state of facts and the characteristics of the built-up space, in order to produce a sort of preliminary “snapshot” of the urban context. It will be then possible to outline upon it the potential “tweaks” for an improvement of the image of the city as a whole.

The definition of the applicable interventions on each building or private space in general (for example, an adjacent green lot) enables us to assess the effect generated in the surroundings. In this way, it becomes possible to make some general predictions. Such a positive feedback can show up in the building complex and even more in the urban settlement.

Recognizing the technical characteristics and the state of conservation of the building heritage and typifying the possible interventions aimed at its redevelopment, offers the possibility of defining targeted intervention policies, which are easy to communicate to the owners. Therefore, each single private investor will owe the evaluation elements with respect to his potential “economic” involvement in the redevelopment process.

The analytical process required to obtain such informative products is the following.

1. First, an analysis is performed at global (urban) and local (district) scale, concerning the arrangement of public and private spaces. This kind of analysis allows for evaluating the specific local context (the district) compared to the whole urban area. Then, on a local scale, all the buildings are analysed in terms of dimensions, characteristics and use, and finally categorized in order to define specific categories of intervention that one can enforce.

2. A second-level analysis concerns the potentially transformable areas. At this level, the analysis focuses on the physical consistency of the different urban components (buildings,
roads, empty spaces, green areas etc.). Each space (public and private) is therefore qualified and classified according to the characteristics of the component parts. For the public space, the components taken into consideration are the roadway size, sidewalks, lighting, road and road surface conditions, and all those elements that can offer indications for subsequent interventions. For the dimensional classification of private space (buildings) the canonical surface, height, and built-up volume metrics will be used. About the greenery, one shall evaluate, besides surface, the waterproofed surface, trees (if present), and their state of maintenance.

3. The same physical elements are then classified according to a possible intervention, leading to deciding if a restructuration is effectively needed. When dealing with the building heritage, the architectural structure (simple or complex) and the building’s “aptitude” for a tech redevelopment (façades or solar panels, for example) are among the most significant characteristics.

4. For each type of settlement present in the area, it is then possible to identify the intervention requirements, in terms of quantity and quality, by assessing the state of degradation and the vocation to re-use or redevelopment.
5. All the categories of intervention are then defined from the points of view of landscape and environment, of public space and transportation network, and of private properties. All the elements that compose each category and the relative times and costs of realization need to be specified.

6. Finally, administrative procedures are outlined, to make the various interventions viable and “stimulate” their application.

The implementation of the above analytical process produces the informative synthesis presented in the following section.

**BUILDING SHEET**

This sheet records all the geometric characteristics of the private buildings and the pertinence lots, as well ad their use. The following image represents the reported variables.

<table>
<thead>
<tr>
<th>SURFACE</th>
<th>VOLUME</th>
<th>H</th>
<th>I. SHAPE</th>
<th>I. COVER.</th>
<th>LOT SURFACE</th>
<th>GREEN SURFACE</th>
<th>PAVED SURFACE</th>
<th>USE DEST.</th>
<th>CONSERV. I.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R M C</td>
<td>0.42</td>
</tr>
</tbody>
</table>

They define the metric characteristics of the building

They define metric characteristics of the private space

They give information on the possible variations on use destination
R: Residential
M: Mixed
C: Commercial

It gives information on the state of conservation of the building. It allows to evaluate the economic level of the intervention

*Figure 2. Building sheet.*

**ABACUS OF BUILDING INTERVENTIONS**

The Abacus collects all the general information. It is therefore applicable to various urban contexts, thus constituting a useful support to the widespread application of the regeneration process to different urban settlements.

The Abacus of the intervention reports the contents, aims, and good rules of intervention on buildings and open spaces.
SYNTHESIS MATRIX

The Synthesis Matrix summarizes the principal types of processes required for the redevelopment of each building, providing for work guidance.

The interventions are classified into four types:

- structural, including demolitions and reconstructions, even partial, elevations to standardize the heights of buildings, replacement of roofs, closing of terraces, etc.;

- architectural, including reconstruction of façades, elimination of poor quality surfaces or parts, inclusion of decorative elements, etc.;

- energy, including solar façades, photovoltaic panels, or use of other technologies;

- urban furniture (decorum).

By applying the Synthesis Matrix to the Building Sheet, it is possible to define, for each building, an Intervention Index ($I_i$) which represents, by means of an indicator whose normalized value is between 0 and 1, the total burden of the hypothesized intervention. This is possible having defined a weight for each intervention belonging to the different types described above. Increasing values of the $I_i$ Index indicate that, in order to redevelop a single building, substantial or multiple operations are
necessary. This therefore offers a representation of the poor state of maintenance of the building itself. On the contrary, low $li$ values show that the state of conservation and maintenance does not require relevant redevelopment interventions.

<table>
<thead>
<tr>
<th>CRITICAL ISSUES</th>
<th>INTERVENTION</th>
<th>STRUCTURAL</th>
<th>ARCHITECTURAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>ENLARGEMENT</td>
<td>1 Raising</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Closing balconies</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DEMOL./RICOSTR</td>
<td>3 Degraded buildings</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>4 Superflous</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5 Dangerous volume</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Lean-to</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>7 Non-decorative elements</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>FRONT</td>
<td>8 Exterior finishes restoration</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>9 Plaster realization</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>10 Exterior patting</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11 Railing, sunshade</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 Facing</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 Standing finish</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>14 Coverage remaking</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>15 Extraordinary maintenance</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>16 Restoration/improvement</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>17 Redevelopment</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>18 Eternit removal</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4. Synthesis Matrix.**

**QUALITY CARD OF THE URBAN BLOCKS**

With the aim of reconstructing the overall picture of the qualitative status of the urban settlement upon which the regeneration process will be applied, the urban blocks are subject to a classification process in function of:

- the quantitative characteristics of the construction contained therein, namely: Coverage Index ($S1$); Index of Construction Fragmentarity ($S2$); Medium Form Index ($S3$); Form Homogeneity Index ($S4$); Volumetric Density Index ($V1$); Medium Volume Index ($V2$); Volume Homogeneity Index ($V3$); Mean Height Index ($H1$); Height Homogeneity Index ($H2$);

- the state of conservation of the block, evaluated by operating a weighted average between the number of buildings requiring only architectonically interventions and those affected by structural issues, with respect to the total number of buildings present in the block, and normalized with the most burdensome condition (both structural and architectural);

- the percentage of permeable area (ISV), i.e. the private greenery present in the block;

- the Architectural Homogeneity (OA) determined by the ratio between the (prevalent) number of buildings sharing the same kind of façade;
architectural features, such as painting or small brick, and the total number of buildings on the block.

Figure 5. Classification of the urban block.

THE REFERENCE CONTEXT FOR EXPERIMENTATION: THE DISTRICT OF VILLA ADRIANA IN TIVOLI (ROME)

Located in the wide and sunny Piana Tiburtina, at the foot of the historical center of the city of Tivoli, the district is located near the archaeological area of Villa Adriana, hence its name. The birth of the first “urban” settlements along Via Tiburtina dates to 1943, yet it is the rapid economic and industrial growth after the war that attracts numerous immigrants in the surroundings of Tivoli. Such an important demographic increase caused the actual urban expansion.

The post-war small aggregates of scattered houses near the factories of the Piana Tiburtina, often “spontaneous”, began to expand “wildly” during the 1970s, without any urban or territorial planning (the only Regulatory Plan of the Municipality of Tivoli dates to 1973). In this period, in fact, there was an increasingly rapid and spatially broader growth, due the fact that the 1962 Urban Plan had excluded most of the areas of the eastern slope from legal expansion. “It was easy to foresee that the presence of the large centers located outside the municipal territory (Tivoli, Guidonia, and Monterotondo) would have favoured a spontaneous urbanization in this territorial sector after 1962” (Garano, 1983).

The industrial development and the considerable number of unqualified workers generated a gap over time between the minoritarian middle class and the massive working class. A process of marginalization caused profound lacerations in the social and economic context, with a sort of “ghettoization” of the working population.

In the ’80s, the territory of Tivoli was therefore already sufficiently anthropized in the area surrounding the travertine quarries (near Bagni di Tivoli) and the Pirelli factory, i.e. the district of Villa Adriana.

Born spontaneously, like many other Italian urban areas, the district of Villa Adriana, also called Adrianella, presents features and very simple regulatory layouts that are common to other informal lots. The district is “governed by the elementary geometry of the orthogonal grid, which refers to the
archetypes of the city of foundation of the past. Indeed, the space-ordering techniques have neither the symbolic dimensions nor the ritual forms that presided over the birth of the city of the past ... which had streets, squares, and other spaces for collective activities, completely disappeared in current realities” (Clementi & Perego, 1983).

However, the arrangement of most of the blocks and that of the buildings inside them seems to obey a sort of “planning” because they are arranged along a virtually regular mesh formed by orthogonal axes.

To maximize the buildable area, narrow roads were created, without sidewalks, “connoted only by the endless repetition of the same reticular splitting and of the same building type” (Clementi & Perego, 1983).

In addition to the typical spatial arrangement, which is a peculiarity of spontaneous anthropization, the district of Villa Adriana also presents morphological-typological characteristics of spontaneous construction with a very modest architectural, structural, and material quality.

By analyzing the evolution of the urban fabric between the approval of the Urban Plans of Rome (1962) and Tivoli (1973), it is possible to highlight how the settlement development has always occupied new areas, rather than completing those already partially built.

Moreover, as often happens when planners try to intervene on unplanned building settlements, the insertion of new buildings in such a fringed context exhibits a striking contrast in terms of dimension, typology, and formal solutions. Therefore, these interventions made the context of Villa Adriana worst, instead of recovering it and making it more “pleasant”.

The most important among these types of interventions was a great public residential building, built between 1978 and 1985, and named “Triangle” because of the triangular shape of its inner courtyard. The “Triangle”, although innovative in its architectural configuration, represents a very critical element in the context of the district, both for its dimension, marginal and separate location, and for lacking public spaces, which were considered in the project but never realized.

The dynamic “spontaneity” of the district unfolded in different temporal phases and produced a widespread urbanization, with variable density areas yet with a certain typological homogeneity (two-three storey buildings, often with flat roofs), although differing in dimension and use of materials.

After the adoption of the General Urban Plan (1973), and the approval of the Parcelling Plans, 5 years later (1978), a new and more “ordered” development process began, which integrated the pre-existing settlements. The uniformity, again, occurred mainly in the typology.

The urbanization of the last twenty years is neater in the form and choice of materials, even if it presents an increase in both surfaces and volumes of the buildings. The only partially built urban blocks were completed and “saturated”, while those that had not yet been used were filled, except for the parts facing the main street, i.e. Via Tiburtina.

**APPLICATION OF THE METHODOLOGY TO THE REFERENCE CONTEXT**

To apply the proposed analysis, we performed the preliminary subdivision of the entire district into urban blocks, which are spatial units enclosed between four vehicular roads. Thirtyfive individual blocks of different sizes and with different buildings were identified.
The results of the spatial analysis outline the general characteristics of the district.

First, data show a variability of the built-up area, in terms of density (S1): 37% of the blocks present dense buildings within them; 31% are medium dense, while the remaining 31% of the buildings are thin.

In most of the blocks (71%), a certain discontinuity in the built-up areas (S2) emerges and this leaves us to assume the possibility of interventions.

54% of the blocks are composed of buildings whose shape is averagely compact (S3), 25% of the blocks have a very compact shape, and the remaining 17% have a fragmented shape.

The shape of the buildings, whether compact or not (S4), is almost similar in plan for 77% of the blocks while only 3% of them present a significant heterogeneity.

In terms of volumetric density (V1), the blocks that are sparse, i.e. where the consumption of soil is limited, amount to 9%, while 53% is medium dense and 38% dense. This means that the space has been almost completely saturated. However, if we analyze the results of the indicator V2, which represents the “volumetric profile” of the building, it is easy to see that 50% of the blocks contain buildings with a relatively low volume, 29% feature a medium volume and 21% a relevant volume.

From the homegenity point of view, 35 blocks present a very articulated configuration, consisting of several adjoining buildings that are dimensionally, in terms of volumes and heights, very different. Finally, in terms of volume (V3), 44% of the blocks are composed of generally homogeneous buildings, 38% are averagely homogeneous and only 18% are non-homogeneous.

Finally, in terms of height (H1), 40% of the blocks are composed of 1-3 storey buildings; 54% of 3-5 storey buildings, and 16% of more-than-5 storey buildings. Regarding the homogeneity of heights (H2), 44% have an average homogeneity, 26% are homogeneous, and 29% are non-homogeneous.

In terms of the conservation condition of buildings and of possible interventions, not only architectural but also structural, the district is uneven. 46% of the blocks have a good quality level with the presence of buildings that can be improved mainly with external painting; 42% are of average quality, and only 12% would need substantial redevelopment.

About adjacent lots it emerges that 57% areas are impermeable with or without little possibility of greenery improvement; 29% have a smaller part of a permeable surface, and only 4% are almost completely devoid of flooring.

Finally, the architectural homogeneity (OA) is very low. In fact, 76% of the blocks are composed of buildings with different finishing characteristics, while the remaining 24% (positioned in the flat area of the district) is divided equally between blocks with medium and high architectural homogeneity.

**INTERVENTION POLICIES THROUGH THE ABACUS AND THE SYNTHESIS MATRIX**

To support the intervention policies, the Synthesis Matrix, available for each building, is compared with the Abacus of the interventions, in order to identify what work is needed.
By means of this comparison the matrix identifies the work necessary to raise the quality level of the “private” component of the urban area for each building of each block.

![Matrix Diagram]

**Figure 6. The Abacus and the Synthesis Matrix**

After that, through a detailed metric calculation that describes each category of intervention, it is possible to evaluate the financial commitment needed to redevelop the properties and how to undertake the economic issues such as direct investment and tax incentives.

**CONCLUSION**

The rapid, often spontaneous growth of industrial cities around their historical core produced a reorganization of the urban physical space, generating settlements of poor architectural, structural, and environmental quality, characterized by physical and social issues such as traffic congestion, unhealthiness, and inequality.

A large stock of public and private housing, mainly built during the economic boom, often undergoes serious degradation in contemporary Italian cities, and the application of traditional urban plans and intervention programs has not substantially changed this condition.

In this context, the implementation of widespread and interstitial urban regeneration policies becomes indispensable.

Due to the amplitude and the capillarity of such urban degradation a widespread knowledge about the state of the places is required in order to achieve a structured picture of the need for retrofitting and make its implementation realistic.
This knowledge concerns, in particular:

- the settlement systems of both old and recent construction;
- the degree of transformability of these systems, in a perspective of cooperation with the owners of the buildings;
- the sustainability and the level of environmental compatibility of potential interventions.

The present study, via the morphological-typological analysis of urban settlements, adopted a method for identifying some qualitative-quantitative indicators, mainly with reference to the private components of the urban areas. By combining the metrics of the buildings with their conservation status, these indicators offer useful information concerning the need and the potential strategy for intervention.

In fact, these indicators, in addition to an overall picture of the state of deterioration of urban aggregates, offer an initial indication of the required economic commitment, both public and private, for the regeneration of the urban space as a whole.

The proposed method was first applied to the district of Villa Adriana in Tivoli (Rome), which, due to its conformation and its state of conservation, presents all the urban, architectural, environmental, and social shortcomings complying with the implementation of a new urban regeneration policy.

REFERENCES


Adaptive Reuse of Abandoned Buildings: From Illegal Occupancy to Common Good

Chiara Tonelli, Ilaria Montella & Nicola Moscheni
Roma Tre University, Italy

ABSTRACT

Demographic change and housing emergency characterize the Italian situation in a context of institutional stasis. Climate change, lack of resources, and soil exploitation are the main factors demanding new urban management models towards innovative forms of living. This paper illustrates the possibility of restoring energy-intensive building stock and confronting the housing emergency through the recovery of abandoned buildings in metropolitan areas following the conscious management carried out by the inhabitants. The research group developed a building renovation model starting from a spontaneous building squat to a participatory project path shared with the occupants. This innovative process of common empowerment allows the inhabitants to achieve awareness among a population experiencing hardship conditions. In addition, the recovery of existing buildings is an energy-saving opportunity via sharing practices to generate economic and social value through inclusion.

Keywords: innovative housing model, urban regeneration, squat, housing emergency, social inclusion
INTRODUCTION

This research stems from a cooperation between Roma Tre University, the University of Tor Vergata, and the University of Salento. It has been coordinated by Chiara Tonelli and carried out by Ilaria Montella, Barbara Cardone, and Nicola Moscheni with the participation of the following Master’s degree students: Sara D’Arcangeli, Lorena Di Bari, Marco Gesmini, Ilaria Grossi, Cecilia Mattera, Matteo Molinari, Andrea Piattella, and Giulia Zambon. The scientific committee included Francesco Careri, Giovanni Caudo, Luigi Corvo, Roberto D’Autilia, Raffaele Di Raimo, Silvano Falocco, Fabrizio Finucci, and Angelo Romano.

The main purpose of this work is to develop a model of intervention for the reuse of abandoned public buildings located in the consolidated area of the city. The method is founded on the idea of a recessive model, based on an ecological and collective idea of society. This approach is a political and cultural alternative, capable of undermining the private property in a system of “common goods”. Within it, the “new commons” represent communication between individuals (Ugo Mattei, 2011). The uncontrolled expansion of suburbs through new satellite cities without services can be solved with an alternative solution, exploiting the public abandoned or squatted buildings.

This research started from the analysis of the illegal occupancy of a public building located in the center of Rome, reading it as a manifesto of the current housing problems. Indeed, it represents an informal reaction to the problem of the housing emergency through the appropriation of disused buildings for housing purposes reconversion. The interpretation of these phenomena leads to the elaboration of new intervention models with urban regeneration aims. If the right to housing and the access to energy are today interpreted as primary goods, the reuse of abandoned public buildings represents an opportunity for the return of these places to the community itself, which could appropriate them as common goods.

THE HOUSE EMERGENCY CONTEXT

The housing emergency is nowadays a distinguishing factor of the economic and social context. Natural disasters, conflicts in underdeveloped states and urbanization processes in our cities led to a wide amount of people coming from other countries. Italy is at the center of this in the Mediterranean area. On January 1, 2017, the foreign population that had settled in Italy was estimated at almost six million (documented and undocumented) with an increase of 87,000 units compared to the previous year (Fondazione ISMU, 2017). Italy is also among the first in Europe for citizenship acquisitions. If we consider the European overview, Italy was ranked first for the number of citizenship granted (201,600) in 2016, followed by Spain (150,900), the United Kingdom (149,400), France (119,200), and Germany (112,800) (EUROSTAT, 2016). According to forecasts from 2017–2019, there will be 620,000 new citizenships. Overall, from 2017-2026, new citizens will be somewhat less than two million (Fondazione ISMU, 2017). This view indicates a considerable increase in the demand for housing, especially affordable rent.

Not only immigration but also the demographic and structural evolution of the country has affected the context. On one hand, there is a household change. Traditional families decreased compared to the early ’70s (Istituto Nazionale di Statistica, 2011). Single-parent families, couples without children, and single elders. The changed social morphology also denounces a structural deficiency of buildings. Nowadays, only one or two people dwell in 13 million apartments, of which 4 million exceed 100 square meters of surface area (Istituto Nazionale di Statistica, 2011). The Italian housing stock is underused and from an energy point of view, they are obsolete and in poor conditions. On
the other hand, institutional stasis has led to the inability to respond to the new housing demand. In 2016, the eviction orders in Italy were 54,829 (Ministero degli Interni, 2016). This fact highlights how the crisis puts families in difficulty, forcing them to apply for affordable public housing. A prompt response is difficult to find. There are 1.7 million families living in a situation of economic hardship, and the assets managed by the public building sector amount to just over 850,000 houses with very low turnover rates (NOMISMA, 2017). In fact, approximately 650,000 applications are filed with a positive outcome inside the municipalities’ assigned housing waiting list (FEDERCASA, 2015).

A housing crisis is ahead of us. Migration flows increase population and the economic situation affects families, while the adaptation of living spaces have not coped with the substantial demographic. Thus, existing assets and public administration are inadequate to provide a structured response.

**OCCUPANCIES: AN INFORMAL RESPONSE**

New bodies are providing bottom-up solutions, e.g., slums and squatting in buildings are becoming widespread. In 2011, approximately 71,000 people lived in informal settlements in Italy (Istituto Nazionale di Statistica, 2011). These establishments are placed within urban voids. These spaces are filled with informal structures that do not respond to functional and technological law requirements. At least 10,000 are asylum seekers and refugees in the dozens of informal sites arising spontaneously around the country. This population lives outside the reception system in conditions of precarity and marginality without any institutional assistance and with little access to healthcare (MSF, 2016). They are shantytowns and disused occupied buildings in both rural areas and in city centers.

Due to the emergency, this precarious situation gave rise to social movements asserting the right to housing. Housing struggle movements find the answer to the problem through the illegal occupancy of disused buildings that are restored through self-sheltering practices.

**A city case study: Rome**

Rome is a symbolic case. For years, the housing struggle had begun as a long and complex process of active and subversive territorial participation with an independent answer to the demand for housing. According to estimates made by the movements themselves, around 4,800 households are settled in the city in roughly 145 abandoned areas (Fig. 3). In a 2016 approval by the Region of Lazio, 79 estates were officially registered (public or private properties) as inappropriate for residential purposes.

Occupancy of abandoned public or private buildings that are strategically positioned in the urban fabric become a way to access not only housing but also the city. As a matter of fact, such an act is not for safe refuge alone; it is also an instrument that lets inhabitants benefit from the city, i.e., health, education, work, and transport. At the same time, some facilities are included in the building to provide squatters with support and work to be utilized themselves and the neighborhood. Buildings initially respond to housing needs, then become social hubs for the entire city in an attempt to integrate with the resident population.

Next page: Figures 1 and 2.

Informal settlement in the suburbs of Rome.

The Tor Fiscale area with illegal buildings next to an ancient Roman aqueduct (Images by Lorenzo Procaccini and sourced by the Authors).
Such is the case of Il Metropoliz, a former cured meats factory in the eastern suburbs of Rome, which was occupied for residential purposes. It is a disused factory in a vast area where approximately 200 people from Italy and around the world live together. The factory was squatted in March 2009, and has since hosted MAAM, Museo dell’Altro e dell’Altrove di Metropoliz (Metropoliz Museum of the
Other and the Elsewhere), founded by the squatters themselves (Fig. 4). It is an informal museum complex that has been exhibiting works by internationally renowned artists for years, making it a global attraction. Metropoliz inhabitants refurbished the building through an important cultural program, and they managed to attract external visitors, thus producing economic activity to support employment.

Figure 4. MAAM entrance, Rome (Image sourced by the Authors).

The Porto Fluviale building is a similar case in that it is an illegally occupied building less than 3 kilometers from the Colosseum. The building is a former air force depot and has been occupied since June 2, 2003, to give accommodation to a heterogeneous community. The extension exceeds 500 square meters and 3 floors. There are homeless shelters within, as well as services like a tea room, bike storage circus school, theatre course, goldsmith laboratory and useful structures to organize events and activities that involve the city community (Fig. 5). Despite some integration difficulties,
the building is frequented by many outside citizens, creating a very active neighborhood community in a participatory reality.

These examples demonstrate how such environments are integrated into the urban fabric, momentarily leaving behind the occupancy’s illegal aspect. Alternatives to these occupied spaces is total abandonment and complete inactivity to the point of becoming like cancer for the city.

**Figure 5.** Porto Fluviale internal courtyard during a public meeting in Rome (Image sourced by the Authors).

**CASE STUDY: SPIN TIME LABS**

The building known as *Spin Time Labs* is the primary case study considered throughout this investigation. It is a former office building located in the center of Rome. Formerly, it was the vacant headquarters of INPDAP (National Social Agency for Public Administration Employees). It was occupied in 2003 by Action, a member of the Roman housing movement. This case is considered because it highlights the phenomena of re-appropriation of disused spaces in Rome. Spin Time Labs is not only an occupancy for housing purposes but also an attempt to restore value to a public good that had represented a physical and social void in the city.

The informal settlement model becomes a starting point for the research, where new approaches can be investigated through the active involvement of the inhabitants. This paper’s elaborated model attempts to legitimize an illegal occupancy by reading it as an innovative approach to settlement. A building on Via di Santa Croce in Gerusalemme (Fig. 6) is populated by 323 foreign squatters of varying age groups who are organized in 184 different-sized family units. The dwellers are distributed
in 16,000 square meters of surface distributed throughout seven residential floors, two of which are for services.

The building encompasses a true generational and ethnic “melting pot” with ages ranging from two months to more than 60 years old among 25 nationalities. The complex was designed and built as a public office building in the early ’60’s. It was then readapted by the occupants for residential purposes without architectural changes from the initial structure. According to its previous use, the space is marked by small rooms, common toilets, and larger spaces originally designed for representative purposes. Nowadays, inside the former cellular offices, there are lodgings for the occupants (Fig. 7). The common areas become shared bathrooms, kitchens (Fig. 8), and drying racks. In some cases, corners of single housing units are equipped with autonomous gas stoves. The residents independently provided the system parts, such as pipes and electrical panels, as well as the connection to the city energy systems.

**Figure 6.** Exterior of Spin Time Labs in Rome (Image by Giovanni Barba and sourced by the Authors).

**Next page: Figures 7 and 8.** Interior of one of the housing spaces. Shared kitchen. (Images by Giovanni Barba sourced by the Authors).
Figures 9 and 10. Residential type floor plan and ground floor plan: services (Images by Master’s degree students sourced by the Authors).
Housekeeping is also shared. In an alternative form of co-housing, all inhabitants are required to clean and care for common areas. A central committee, composed by Action militants and an assembly of occupants, takes all the fundamental decisions and regulates cohabitation within the building. Over the years, the occupants have spontaneously set up a series of self-managed activities that cater to both the members of the internal community and the neighborhood (Fig. 10). There is a gym (Fig. 11) inside the building, as well as a guest house, carpentry shop, disco, and working-class school. These spaces host a series of useful activities and events that produce economic income for the occupancy. It should be emphasized that these self-produced activities take advantage of the abilities and skills of the dwellers, who make themselves available by creating economic opportunities useful for personal and community support.

![Figure 11](image-url)

**Figure 11.** The former Council Meeting Room that is repurposed as a gym (Image by Giovanni Barba and sourced by the Authors).

Disused buildings like these are important parts of the building heritage of large cities, and they give an architectural and urban prospective. If abandoned, they are unexploited and potentially dangerous places for the neighborhood where they stand. At the same time, the communities that spontaneously set up within these places are a latent and unexploited force. Skills would not be included in the job sector and inhabitants of the city would not be integrated into the community.

**Legitimizing squatting**

Using those places means to find an answer to an ever increasing housing emergency. This kind of operation that underlines community integration for those that have settled spontaneously is dictated by the emergency itself. These solutions found little space in the institutional and juridical dimension, because of their illegal status. However, it seems that some institutions are moving to a new direction. An example is that of the July 18, 2017 Region of Lazio Decree No. 7 concerning “Provisions for Urban Regeneration and Building Recovery”. Following Paragraph 4 of Article 1:

The areas subject to urban regeneration interventions are priority areas for the allocation of European structural funds to support economic and social activities. The Region introduces specific criteria in the definition of calls for proposals on European structural funds for the areas subject to urban regeneration and experimental urban regeneration projects aimed at innovation, the implementation of forms of circular economy, and social inclusion.
This means that new attempts towards urban regeneration can be accepted with a priority in experimentations with innovative features in social inclusion. The focus on Spin Time Labs investigates new approaches that can hold these aspects together. In an attempt to consider these types of operations as experimental actions, we tried to envision a way to legitimize occupancy. According to this vision, illegal issue lies in the lack of answers for people deprived of primary assets: housing, facilities, and resources. Instead of denouncing the occupancy as illegal, we took the opportunity to read it as an informal act that needs to be codified, regulated, and implemented.

AN INTEGRATED MODEL FOR THE BUILDING RECOVERY

Over two and a half years, this research involved an academic group that was in close contact with the Spin Time Labs squat. The elaborated approach is the result of three connected models that include:

- spatial re-purposing through a new architectural design that reshapes living areas and services;
- energetic independence study through a refurbishment of the entire building;
- process authentication through an economic feasibility study.

In every case, the approach intends to verify how the squatters’ skills become a foundational aspect for regenerative interventions.

The housing emergency literature and the building survey show that the current situation is closely depends on the distribution of living spaces and services and the condition of the building. This stage was followed by an indirect cognitive phase where a census of the entire building was conducted. The obtained results translate into the composition of the lodgings, the ethnic distribution of the various floors of the building and the occupants’ skills into a general map of consistencies. The result is an organized internal social structure regarding both its conformation and its operation. The picture that emerged was then confirmed and sustained by a direct cognitive phase by interviewing the inhabitants. Since the occupancy’s beginning, they have gotten used to the sharing lifestyle and express a positive evaluation of the spontaneous settlement model where they are inserted. Instead, there are some co-housing concerns in common areas, such as shared bathrooms on the floor. At the same time, the negative aspect reported by the interviewees is the profound discomfort of the internal environments and the deficiency of thermal and acoustic performances. This first phase of investigation led to the finding of an existing yet spontaneous settlement model.

This first overview was useful to pre-design the building re-purposing. This included interventions on typological/distributive, as well as functional and managerial features. Through a top-down process, the group designed new space modules on the housing floors and new services on the lower floors. New questions arose during the project’s elaboration, submitted to the inhabitants in the form of a questionnaire focused on the subjects of the house, services, and indoor comfort. This phase helped to clearly define the most adequate housing sizes, services to offer, and how to handle discomfort. This was necessary for elaborating the definitive renovation design.

Therefore, the project has been submitted to the inhabitants through group workshops and assembly debates during the last phase of active involvement. This participatory design laboratory allowed for obtaining a definitive formal project strongly influenced by the occupancy’s informal experience.
Architectural design model: functional building recovery

1. The housing space. The housing model is based on two principles: co-housing and experimentation with new housing standards. For rethinking the distribution of the standard plan for the co-housing model, we focused on Spin Time Labs’ settlement approach in terms of both its shared space and its dimensional aspects. Currently, each level has four kitchens that serve four different floors. In the new project, the floor was divided into four macro-lodgings served by a kitchen, a laundry room and a common dining area (Fig. 12). Through this partition, the common areas are open only to the macro-housing inhabitants, avoiding overcrowding.

There are several sizes of private residences within these macro-dwellings. The four types are focused on the preliminary study of occupancy needs, and on the three main categories of inhabitants (single, couple, and family). The common point between the different sizes is the optimization of space and the mixing of several areas of the house in one room, just as in the informal settlement of employment. This is possible only if the interior space capacity is understood in an alternative way. Italy legislates that the minimum dwelling area for a couple must be 38 square meters. Our project dedicated a space/residence to 14–22 square meters as some spaces are shared and are no longer part of the inner private house.

![Figure 12. Standard floor plan](image)

This type of approach can increase the number of housing units in Spin Time Labs from 300 to 500 inhabitants, growing the possible revenue-generating of the entire building. The building will not only be available to current occupiers but could be managed for other types of public housing. The repurposing of the offices in the living area intensifies the level of occupiers’ integration according to two fundamental aspects. On one hand, individuals are free to find a formal, guaranteed place that they can call home. On the other hand, the building is no longer exclusive to the occupancy, and it opens up to new families looking for an accommodation.

2. Facilities. While the upper floors are designated for residences, the ground floor and the first basement floor are open to the city, just as in the Spin Time Labs model. The intent is to offer new,
affordable meeting spaces to the neighborhood’s community that are suitable for increasing the quality of services in the area and capable of obtaining profits that stem from new activities (Fig. 13). Commercial services open to the public will also be available for external users with reduced rent fees. Almost all existing and operating services are maintained, because they already produce good profits. In some cases, the spaces are moved to more easily accessible areas. For example, a tavern is now located in the basement and not at street level. This hinders a fluid accessibility. On the other hand, some elements have been removed, such as the working-class school for the majority of youth occupants (around 20%). The aim is to encourage inhabitants to enroll the children in nearby public facilities to promote the integration with the neighborhood. In addition, new services become necessary for the support of the Spin Time Labs community and are useful for the surrounding neighborhood.

This design strategy is suitable for encouraging a continuous relationship between the internal and the external areas of the building. Occupants are encouraged to become involved in internal activities, whereas the population of the surrounding urban fabric is attracted by newly offered services.

The energetic model: building refurbishment
From initial inspections, the construction presented evident technological problems. It was built in the early ’60s without following any energy efficiency and reduction of energy loss requirements. The renovation is necessary, both from a technological and environmental points of view based on social regeneration. Spin Time Labs is disconnected from the legitimate city grid (electricity and water). The occupiers use electricity and water illegally. Redeeming the occupancy by formalizing it achieves two goals. First, adequate indoor comfort needs to be ensured through rehabilitation of the outer shell. At the same time, the project considers self-produced energy through the implementation of solar systems. Secondly, a predominant fact is the will to guarantee energy access to those who cannot afford it (so much so that the occupiers were forced to illegally take possession of it). A kind of “energy democracy” guarantees electricity and water (today’s basic needs) to a disadvantaged population. Three redevelopment scenarios were considered in terms of efficiency and initial investment (Table 1).
The first case concerns a radical intervention that involves cladding reconstruction, fixture replacement, and a solar greenhouse. A heating and cooling system is included through radiant floor panels (housing) and fan coils fed by a heat pump combined with an air treatment system (services). These systems also include the production of DHW with a heat pump, production of electricity from renewable sources (photovoltaic), and rainwater collection. The intervention is expensive but leads to a reduction of losses and an enhanced performance. This would significantly reduce the environmental footprint of the building and nearly zero operating costs, which would result in better liveability and indoor air quality.

The second scenario presents an external coat and a ventilated wall that envelopes the building façade. In this hypothesis, the financial commitment would still be considerable, maintaining the renovation benefits, even if it would be reduced compared to the previous case. Indeed, the realization of this scenario would entail an 87% reduction of management with a considerable decrease of the environmental impact and an improvement of internal comfort.

The perspective shifts in the third scenario. People self-build an inner insulation layer and restore the existing fixtures. The plant is improved by the use of solar panels with the contribution of a centralized gas boiler only for the production of DHW and by the installation of infrared radiant plates for heating individual rooms. The investment is lower than the previous two scenarios (roughly 85% less), thus ensuring a considerable reduction of the operating costs (-86%). The comfort benefit in the third scenario is also lower in comparison. Therefore, it does not satisfy occupiers’ needs. However, the third scenario assumes a very high social value over the others. In this case, the construction requires less work, and it could be conducted by the inhabitants themselves with the support of trained professionals. This functions as a form of self-construction facilitates money savings and contributes to occupiers’ training. This provides them with their first job and prepares them for work with new skills.

The three scenarios show different approaches. Nevertheless, they represent three valid interventions. The most appropriate choice will be made based on the financial power of the hypothetical investor and the dominant priority vector, efficiency or social inclusion, or on the proportion of both via an interpolation of the objectives.

Economic model: the feasibility study
This research concludes with a feasibility study. One of the main factors to consider is the analysis of re-purposing costs of the building and its energy renovation. The redevelopment was hypothesized through functional sections to be carried out in successive stages and at different times: one floor at time, starting from the ground floor, following the basement then the accommodation floors. This process lets occupiers live inside the building during the renovation. The primary objective is the recovery and the reuse of the building section used for retail, as these will produce the income quickly recover the initial investment and subsequently produce profits. The energetic renovation also plays a part in this. The efficiency of the building and the related revenues are linked to the implementation cost due to lower energy consumption. Aiming at a cost reduction of demolition and interior renovation, the labor of the occupiers has been considered. Thus, internal spaces are partially self-built with the support of cooperatives. The inhabitants become an integral part of the process through active participation in the construction phase.

Next page: Table 1. Summary of three energy scenarios
(Table by Master degree’s students and sourced by the Authors).
<table>
<thead>
<tr>
<th></th>
<th><strong>Scenario 1</strong></th>
<th><strong>Scenario 2</strong></th>
<th><strong>Scenario 3</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor daylight</td>
<td>Glass surfaces enlargement</td>
<td>Glass surfaces enlargement</td>
<td>-</td>
</tr>
<tr>
<td>Natural ventilation</td>
<td>Strategic demolition of specific inner walls</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Thermal bridges</td>
<td>Cladding reconstruction, external thermal coating, ventilated façade</td>
<td>External thermal coating, ventilated façade</td>
<td>Inner thermal coating</td>
</tr>
<tr>
<td>HSW system</td>
<td>Heat pump system with energy provided by solar panels</td>
<td>Solar thermal panel, accumulator</td>
<td>Solar thermal panel, accumulator</td>
</tr>
<tr>
<td>Heating system</td>
<td>Radiant floor system (lodgings), fan coil (services) units, heat pump system</td>
<td>Radiant floor system (lodgings), fan coil units (services)</td>
<td>Infrared radiant panels</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Radiant floor system (lodgings), fan coil units (services), heat pump system</td>
<td>Fan coil units (services)</td>
<td></td>
</tr>
<tr>
<td>Air treatment</td>
<td>MEV system (lodgings), air treatment units (services)</td>
<td>Air treatment units (services)</td>
<td></td>
</tr>
<tr>
<td>Sun shadings</td>
<td>Brise soleil (first floor), second skin (west façade), curtain system (lodgings)</td>
<td>Brise soleil (first floor)</td>
<td>Homemade curtains</td>
</tr>
<tr>
<td>Fixtures</td>
<td>Replacement with more efficient ones</td>
<td>Replacement with more efficient ones</td>
<td>Renovation</td>
</tr>
<tr>
<td>Water collection</td>
<td>Collection tanks for toilets and garden watering</td>
<td>Collection tanks for toilets and garden watering</td>
<td></td>
</tr>
</tbody>
</table>
1. **Revenue generation in the facilities.** We classified the facilities into three macro-categories: hot, warm, and cold. Hot facilities are fully self-financed, i.e., activities that have an intrinsic capacity to generate income through user revenue and where the investor obtains the highest return on invested capital (a restaurant or bike sharing). Warm services are partially self-financed, meaning they are insufficient to generate adequate economic returns for the investor but can generate significant positive consequences in terms of social benefits (study rooms, co-working, auditorium). Finally, cold services are activities that are unable to be self-financed, where the overall costs of construction and management are higher than potential revenues and maintain a very high social value (after-school programs, library, and welfare services). The service area rents are identified based on three price categories: 1) quasi-market rental prices; 2) social rental prices, and 3) free of charge for services that will be managed entirely by the inhabitants of Spin Time Labs.

2. **Three economic scenarios.** In the feasibility study, there were three scenarios for evaluating the economic effectiveness of the interventions. The verification is carried out through two economic indicators. The net present value (NPV) is sum over time, offset by the risks of all the revenues and costs that the project can generate. This value must exceed zero because it makes sense to invest in the property. The second value is the internal rate of return (IRR), which indicates how profitable the invested capital is.

In the first scenario, the building’s renovation costs are assumed by an external private financier with the main purpose to take economic profit from the capital invested in the building renovation. The public administration grants the concession term to the lender for 12 years, after that the property returns to public ownership. In this scenario, the renovation costs of the building are held by the investor and all commercial activities are rented to third-party users. The operation presents extremely positive results, with a return time of a few years and revenue at the end of the concession tripled than the initial investment. However, a private investor would not be obliged to consider the occupiers as an integral part of the process, leaving the social domain in the background and failing the driving principle of the whole regeneration operation. For this reason, we decided to consider the public administration as a promoter for the other two scenarios.

The analysis of the second scenario focuses on the cash flows over a period of 12 years in order to compare it with the previous one. In this case, the numbers confirm that the investment is always positive with the added value deriving from the social aspects of inclusion. To achieve the set objective, all activities must be at full capacity. For example, all the spaces are regularly active and the full rental amount is paid. It could happen, however, that this extremely positive scenario does not occur. In this case, being unable to estimate the operating costs or the living revenues for each service, we cut rents to 50% because it may happen that the activity could not be totally functional throughout the 12 years, and the administration could not be paid the due rent. The economic return balances with the initial investment with a few years of delay than the second scenario without making the investment useless. The return on the initial investment for any of these economic scenarios is likely to occur in a short time. The difference between the examined three scenarios is that the last two take into account, as well as the economic aspect, the social impact that the renovation process could have on not only the inhabitants of the community but also on the surrounding district.

3. **Cost-benefit ratio for energy scenarios.** The real difference is given by the added value of the energy building renovation. The analysis focused on the impact this operation would have on the second economic setup, reminding the differences between the three energy scenarios (Table 2). In the first case, the one of a massive renovation involving the dismantling and reconstruction of the external envelope, the total investment is about €19.6 million with an annual savings amount around
€2 million. This means that the investment would recover in less than 10 years and it makes the operation attractive. For this type of operation, the impact of the building site is certainly very high, considering its duration and the impression of the activities involved. Besides, compared to a very high investment, there is a radical improvement in indoor comfort conditions and a strong decrease in management costs. The socially relevant aspects of the inhabitants’ participation in the process are neglected. It is a project that must be reserved for specialized workers and cannot be provided with self-construction involvements.

The second energy scenario provides the use of an outer coat, and the economic analysis highlights that with an investment of €16.2 million, the return would be around 8 years due to an annual revenue of around €2 million. In this second hypothesis, the building site has a less significant impact, and the work could be partly entrusted to the more experienced inhabitants in very limited forms. The financial power required is reduced but the degree of efficiency obtained is still high.

In the third scenario, the investment for interventions in complete self-construction amounts to around €550,000 with annual revenues of around €390,000. A turnaround time of less than two years is certainly one of the most ideal solutions for an investor. At the same time, the management costs are higher and the degree of efficiency is seriously reduced. However, we need to consider that this scenario contains in itself a very high social value.

<table>
<thead>
<tr>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction cost</td>
<td>€19,608,886</td>
<td>€16,202,581</td>
</tr>
<tr>
<td>Building site duration</td>
<td>28 months</td>
<td>21 months</td>
</tr>
<tr>
<td>Management costs</td>
<td>€2,483/year</td>
<td>€65,188/year</td>
</tr>
<tr>
<td>Payback time*</td>
<td>9.5 years</td>
<td>8 years</td>
</tr>
</tbody>
</table>

Table 2. Summary of the three energy scenarios from an economic point of view
(*Comparison of the scenario through the initial management costs, i.e. €455,740/year)
(Table by Master’s degree students and sourced by the Authors).

Following the explained analyses, each of the three scenarios is a feasible alternative, reading them in the light of different priority vectors (Fig. 14). The only alternative would be inactivity and abandonment.

Next page: Figure 14. Vector priorities diagram.
Image edited by a multi-criteria comparison software.
The project criteria (such as design quality, comfort, construction costs, social involvements, etc.) were combined into project evaluation factors: technicians, inhabitants, and public administration
(Image by Master degree’s students and sourced by the Authors).
CONCLUSION

The process for the definition of the various scenarios highlights the importance of involving the occupiers, or more generally, the communities settled in a territory for this type of intervention. This is an opportunity for urban regeneration that becomes an important instrument for social inclusion. The theorized model is an integrated work that concentrates different visions: architecture, energy, and economy. These are held together by the will to make the inhabitant an integral part of the process. Considering all the variables taken into consideration in the analyses performed, the model could be exported to other similar realities that would enjoy the same effects.

The codification of this model would allow the Public Administration to identify the buildings that can be used for settlement purposes and start an innovative regeneration process. There is no need to act intensively on the extended territory of the city. It is suitable to build a city map that detects urban fabric needs (who needs what, who is homeless, who would like to do activities), then to identify hierarchies of intervention. The priority must be given to areas with a high level of needs. The aim is to simultaneously highlight the problems of an area and its unexpressed potential. These can be abandoned places or buildings, (common) goods to be reopened to public, and associations that otherwise would not have a space. In other words, they represent areas able to achieve urban regeneration with opportunities for social, economic, and environmental renewal through the direct participation of the settled communities.
REFERENCES


Certification Protocol for Integrated Interventions
“Historical Small Smart Cities”: An Instrument for the Sustainable Regeneration of Minor Historical Centers

Valentina Pica  
*Roma Tre University, Italy*

**ABSTRACT**

This paper presents an environmental and cultural sustainability research in progress about designing an integrated interventions certification protocol for regenerating small historical centers affected by depopulation in Italy and Spain. These centers, especially in Italy, are for the most part located in less accessible *internal areas*. The Historical Small Smart City Protocol is a tool of territorial governance for municipalities. It aims to involve all stakeholders while stimulating the municipal authorities to apply to regional or European Union (EU) funds. The protocol includes “smart city” categories or priority action areas applied to historic towns and contains instructions and guidelines that explain their realization methods.

**Keywords:** certification systems, sustainable development, urban regeneration, cultural preservation, smart governance, minor historical centers
INTRODUCTION

In a time of slowing urban growth and suburban sprawl in several European territories, it becomes urgent to pay attention to the rehabilitation and expansion of the concept of historicity in urban peripheral areas and rural landscape (Sacchi, 2017). Instead of keeping suburbanizing and aiming at new expansion areas, one should look for existing territory elements to be conserved and ameliorated. Such a shift in attitude would avoid further land consumption and resource waste. In 1972, the European Soil Charter stressed that soil functions are essential for humankind. However, it was not until recent years that this alarm had extended into the public realm of opinion where soil consumption became a widely used term when facing the overflow of urbanization.

This perspective calls for a critical re-establishment of guiding principles in order to innovate and coordinate the actual tangle of planning tools that are no longer able to regulate the new urban development phase. Such a task is indeed difficult, especially in Italy where the environmental crisis, the lack of disaster management linked to building speculation, and the scarce attention provided by policies to these urgent issues are pushing the country to confront huge economic problems (Sylvester, 2018). On this respect, the Italian Law No. 129 on land consumption, enforced in 2013, has so far not encouraged relevant urban recovery plans that involve private investors and has been less effective than promised.

Besides the wide perception of how traditional planning tools have been insufficient to enhance urban regeneration and sustainable development, it is well known that the built heritage, unlike the natural one, is a non-renewable resource that has to be protected and enhanced (Aristone & Palazzo, 2000; Palazzo, 2017). Cultural heritage and sustainable development should be considered indissoluble in future policies because both express the logic of transmission and transgenerational solidarity. This is also necessary to ensure harmonious living conditions. Here, the debate shows a need for innovative tools (Rodwell, 2008). In particular, historical centers have a great environmental and cultural value within Italy. They can also be economically profitable, not only for the tourism industry but also for urban recovery and the reduction of land consumption (Associazione Nazionale Centri Storico-Artístici (ANCSA), 2017). Historical centers represent a very vulnerable common good that might be included in the extended concept of anthropized or cultural environment (Associazione Nazionale Centri Storico-Artístici (ANCSA), 1990).

Nowadays, historical centers are frequently located in the poorest, marginal areas of the country. They are threatened by depopulation as well as other factors that stem from an unsustainable capitalistic growth: climate change, insufficient resources, social imbalances, territorial competitiveness, and tourism pressures. All of these factors can damage the material and immaterial integrity of a small historical centers’ cultural heritage. Due to the identity value of these centers and their long-lasting role in favoring and distributing the local economy across rural areas, they can and must rebalance the territory and modify the historic trends of urban concentration and metropolization (Cerasoli & Biere Arenas, 2016).

Far from traditional studies that have focused only on protection and preservation for a purely aesthetic fruition, the present research highlights the concept of “active protection” through the management and enhancement of historical small cities that are considered sources of income. This involves attributing identity value to a place that is meant to be a cultural landscape or urban ecosystem. Such an approach is inspired by the European Landscape Convention, signed in Florence on October 20, 2000, according to which the territory, and more generally the environment, begins to assume the role of resources.
For these reasons, the present research has adopted an integrated and innovative approach to the small historical city. Such an approach should be adopted in all new initiatives for sustainability because of its ability to immediately face the difficult management and cultural heritage enhancement tasks, as well as those related to environmental protection, energy saving, and economic sustainability. Its goal is to establish a shared action strategy (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2011; Bandarin & van Oers, 2015).

As a result, our work focused on an integrated strategy that combines heritage recovery with the strategic planning of large areas and the use of technological tools. This was done according to the procedural lines that have been identified in the Smart City conceptual framework. The goal of this study has been the development of a “smartness” certification tool: the Historical Small Smart Cities Protocol. The experimentation of the protocol is being carried out in the historical center of Sutri (Viterbo). Hopefully, it will be scaled to fit and carried out in other Italian and Spanish centers thereafter. The tool intends to leave margins for adaptation, modification, and further development in relation to local specificities.

The research began in December 2017 and will end in December 2019. The general structure of the protocol is expected to rank the smart sustainability of the smaller historical centers. Good practices and/or measures that have been carried out according to the attached guidelines are awarded bonuses that raise the score. In this way, the system encourages municipalities and local authorities to support policies and processes of sustainable urban regeneration in the small towns that were surveyed. As a projection of the future community, the “smart city” is an applicative and conceptual space defined by a set of needs and objectives that are realized through the technological innovation of different domains or fields of action, such as energy, environment, governance, mobility, and health.

The protocol’s performance criteria are set according to the recent Italian concept of the sustainable Historical Small Smart City (Cassa Depositi e Prestiti (CDP), 2013; FORUM PA, 2014). The latter includes the new action categories of “Smart Tourism” and “Cultural Heritage” within the classical European Smart City model, which is promoted by the Strategic Energy Technology Plan (SET) through the “Smart Cities and Communities” initiative (2010). The specific content of the protocol unfolded based on sustainability certification models such as the LEED Historic Building; LEED for Cities; ITACA Protocol; LEED and Italian GBC for Neighborhood Development Protocol (2009); CASBEE for Urban Development (2007); and BREEAM Communities (2012). Notwithstanding, these models completely exclude the evaluation analysis of material and immaterial cultural heritage, which is among the main contributions of the research. The protocol aims at integrating the combination of recovery with urban renewal. This is a conventional dichotomy that can be resolved through a strategy attentive to protection. At the same time, it is suitable for transforming the historical fabric, as explained in the points ahead.

Previous experiences carried out in Italy since the post-war period, especially since the ‘60s, has allowed urban planners and builders to draw up strategies for the recovery of the historical urban tissue (Giambruno, 2007). New technologies and materials for energy retrofit and renovation, done without affecting building structures and other valuable elements, now allow for updating these planning actions. Further, the introduction of technological elements such as home automation or energy saving increases their real estate value (Stara, 2014; Musetti, 2014). Besides retrofitting buildings, the categories of intervention must be integrated into a framework that implements all aspects of the Historical Small Smart City: services, connectivity, accessibility, and security, among others that are included in the protocol. They will be analyzed below.
The protocol can be an effective contribution to the field of urban studies and planning. It is a useful tool for supporting traditional plans by encouraging local entrepreneurship and creating employment in the territory. Eventually, this aims at increasing the “attractiveness” of housing, virtuous synergies, and new development opportunities.

CONTEXT OF APPLICATION AND THE STRATEGIC FRAMEWORK

Many beautiful historical centers across Italy are, like Sutri, situated in rural and marginal zones of the country. They are referred to as internal areas (De Vincenti, 2015). They are geographically intermediate or peripheral areas that are far from major centers and generally have less than 5,000 inhabitants. These centers are affected by depopulation, lack of services, and are frequently disconnected from the main routes of a territorial communication network. Nonetheless, they are rich in important environmental and cultural resources and quite diversified in their natural and historical anthropization processes.

During the last two decades, Italian urban migration has slowed down while the depopulation of inner areas has not. According to the 2013 ISTAT Census, 5,836 out of 8,100 minor municipalities have a population of less than 5,000. Among them, 3,651 are less than 2,000; 1,971 less than 1,000, and 845 less than 500. Overall, 10,190,451 inhabitants live in small towns. This means that 17% of the population is sparse in roughly 54% of the entire territory of Italy (Palazzo, 2017). About a quarter of the Italian population lives in the major and minor historical centers in a portion of the territory that exceeds 60% of the total and which is organized in over 4,000 municipalities (Barca, Casavola, & Lucatelli, 2014).

Demographic decline threatens the internal or peripheral areas of Spain too, according to the National Institute of Statistics (INE). Of the minor towns in Spain, 4,955 out of 8,125 have less than 1,000 inhabitants. This is mainly due to a lack of generational shift, low birth rate, and job shortage. The Spanish Federation of Municipalities and Provinces (FEMP) demands the application of “urgent State policies”. The autonomous communities (Galicia, Asturias, Castilla y León, Castilla-La Mancha, Aragón, and Extremadura) are the most affected by this phenomenon. In 2013, they organized the Forum of Regions with Demographic Challenges and were later joined by the communities of Cantabria and La Rioja (Franco, 2017). These figures, in the absence of systematic surveys on the minor urban heritage scattered throughout these countries, show a correspondence between “minor centers” and “minor historical centers” because of the lower degree of dynamism that has characterized the smaller settlements.

Other important criticalities observed in the smaller centers of the internal areas are the population aging, the loss of identity values, the lack of social inclusion for migrants, and the replacement of inhabitants. Nowadays, these are endemic and chronic phenomena (Fig. 1).
The international normative framework
Conserving historical urban environments while enhancing sustainable development is currently one of the most urgent and challenging political and urban planning issues. There are various well-known European and global initiatives linked to the SET Plan, such as the New Urban Agenda adopted by the General Assembly of the United Nations in 2016 and the Covenant of Majors. Difficult conditions of public finances and climate change hinder these initiatives at every level of innovation with a special focus on technology, finance for new interventions, local resources, long-term savings, and private capital. Therefore, the goal is to achieve models based on networking and partnerships for funding tangible and intangible infrastructures, social assets, and common goods through a more extensive use of institutional savings (pension funds, insurance, sovereign wealth funds, regional and national development, and multilateral banks). These partnerships are increasingly raising the attention of the EU. The creation of new financial circuits that invest savings into infrastructures and regional assets has been on the agenda of international policymakers for quite some time.

The EU has adopted a Multiannual Financial Framework (MFF) for the 2014–2020 period to detect clear targets, such as raising employment and valorizing the built environment. It further supports low-carbon technologies as drivers for sustainable development. The targets are established as follows:

• Employment: at least 75% of the population between 25–64 years old to be employed;
• Research and development (R&D): 3% of the EU’s GDP to be invested in R&D;
• Climate change and energy: greenhouse gas emissions 20% lower than 1990 levels, 20% of energy coming from renewable sources, 20% increase in energy efficiency;
• Education: school dropouts below 10%, at least 40% of the population ages 30–34 having completed higher education;
• Poverty and social exclusion: reduction of at least 20 million people in, or at risk of, poverty or social exclusion (EUROSTAT, 2017).

The Europe 2020 strategy is a model framework for activities in the EU on national and regional levels. The funding channels are called European Structural and Investment Funds. They are managed...
by the EU countries themselves through partnership agreements. In Italy, they are received by the regions and divided into: the European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD), the European Fund for Regional Development (ERDF), and the Operative Programme for Regional Development (POR), co-financed by the ESF, which both pursue the goal of inclusive, sustainable, and smart growth within a strengthened social dimension.

**The national normative framework**

The research follows the perspective of the Strategic Intervention Option “Internal Areas”, in line with the Partnership Agreement for the new Programming of the Community Funds 2014–2020, which has been followed by governmental initiatives such as the “National Strategy for Inner Areas” of the Territorial Cohesion Agency. This is a strategic financing plan on the regional level that, in the framework of the National Reformation Plan (*Piano Nazionale di Riforma*, PNR), is aimed at combating the demographic reduction and relaunching the development and services of these areas through ordinary funds of the Stability Law and through the Community funds available for all the regions of the country over the 7-year period of 2014–2020. The plan has been published by the Senate of the Republic of Italy: 17th Legislature – Research Service, Dossier No. 240, 10 Vol. II (12/15/2017, 2:57 p.m.).

The strategy aims to join the services of municipalities in the territory through the Union of Municipalities tool and “experiment” interventions of regeneration that comply with the communities. If effective, those interventions will be permanent. Then, coordinated intervention programs must be provided to ensure the protection of landscape and architectural beauty. These are among the goals that, in the long run, the present research will hopefully achieve. The design and validation of the Historical Small Smart City Protocol can be part of this framework and contribute to creating a new strategy to be spread throughout every region and macro-region of the country. While enhancing the recovery of small historical centers, the protocol can create new jobs, achieve social inclusion, and reduce the cost of land abandonment. Such a scenario is relevant especially because urban planning instruments and conservation laws have often proven to be at odds with environmental protection, sustainable development, and urban regeneration. The fact that the Protocol is also based on participative processes should further highlight its crucial priority to decrease territorial vulnerability (Pica, 2018).

The Union of Municipalities is an institutional form of association between town governments, as specified by the Constitutional Court ruling No. 50/2015. It is ruled by the Legislative Decree No. 267, August 18, 2000, which implements the No. 265 law from August 3, 1999, especially Article 32. It consists of two or more municipalities for the joint operation of functions or services within the municipal jurisdiction. The union has statutory autonomy within the principles established by the Constitution and by the community, State, and regional norms.

The present research takes into account the various “government memories” that compose the planning and legislation experiences of Italy. This, in order to understand the current situation and analyze how an integrated new strategy can find a useful and effective inclusion in compliance with the current planning tools and regulatory constraints (Ministerial Decree No. 1444/1968 on Planning and Urban Design Standards; Law No. 457/1978 on the Decennial Plan for Residential Buildings and Recovery Plans; Consolidated Text of the Laws: Presidential Decree No. 380/2001, and subsequently upgraded versions; Decree *Scia2*: Legislative Decree No. 222/2016; and the Code of Cultural Heritage: Legislative Decree No. 42/2004).

On this basis, a new viewpoint should broaden the Italian concept of “A” zone (i.e. the protected historical center, disconnected from the rest of the city in progressive transformation) to the entire
consolidated city, strictly in contact with its naturalistic environment and its inhabitants (Ruocco, 2015). Moreover, according to the new regional laws, municipalities are now encouraged to individualize areas of urban regeneration through the Urban Regeneration Programmes (PRU) for promoting widespread interventions that involve new private investments (Reg. Law No. 7/2017 of Lazio; Reg. Law No. 6/2009; Reg. Law No. 24/2017 of Emilia Romagna, and Reg. Law No. 12/2008 of Umbria).

This transition to urban renewal in Italy has the merit of streamlining administrative practices with the transformation of strict prescriptions of municipal planning tools. This trend follows and improves the Italian tradition of complex programs but with high risk, putting the interests of the community in the background while favoring private investors. In Europe and in Italy, the term urban regeneration is associated with integrated actions aimed at addressing the vicious circle between physical degradation and social exclusion, which are at the basis of worsening inequalities in the contemporary city. Nevertheless, the concept of urban regeneration implicit in the regional laws, including one of the most advanced such as that of Emilia Romagna, seems to ignore such a fact.

It is therefore essential to speak up about the management of common goods and the assessment of the social and environmental impacts of operations over the largest urban ecosystem. The construction of the protocol of integrated interventions for the recovery and the smart and sustainable development of small historical cities are going to follow a specific and strategic methodological approach that starts from these premises of ensuring a balance between social, economic, physical, and environmental elements.

**PROTOCOL CONTENT AND ACTIONS**

Based on the considerations introduced in the previous section and in relation to the real global sustainability of the first urban regeneration operations that are underway, it is beneficial to make further clarifications. Such clarifications are necessary to define the content and actions of the protocol.

The protocol includes the conceptual framework of the urban regeneration not seen as a sum of sporadic interventions but as a coordinated path based on economic and social feasibility with a view towards environmental sustainability. The revival of local economies and the building sector should go hand in hand with the historical centers’ recovery and modulated protection. It is fundamental to integrate the public and the private initiatives. New technologies can play a key role at this point. They improve the communication network and the effectiveness of interventions, moreover for energy saving.

At the bottom of this urban regeneration concept lies a fundamental principle, sharing globally the objectives that guarantee a valid usability of public spaces and sustainable transformations. Moreover, to be effective, urban regeneration must produce an attractive image of the city or of the small municipality and its territory.

The Protocol Certification System can certainly support the creation of an integrated strategy that allows for assessing the social, environmental, and global impacts of the operations. It offers strategic lines in form of tables with intervention fields and sub-indices. These indicate the precise actions to be undertaken. An incremental score will be given to each action according to the level of quality, complexity, and cost of its performance. The protocol is “smart” because it contains a guideline document that indicates the procedures for carrying out the planned interventions. A third category of content can be found in a database using GIS (Geographic Information System) software, which
will support the publication of open source data for the creation of an online observatory of the historical center of Sutri (Viterbo). This is to stimulate participation and the raising of citizens’ awareness about the themes of urban regeneration. This database will also serve to define quantitative and qualitative indicators for the evaluation of possible and foreseeable scenarios based on the various proposed interventions.

The bonus allocation criterion is based on an accomplishment for at least one of the subsections of each intervention area. The score augments according to the complexity of the operations. The realization of further interventions envisaged in the action categories will allow for higher qualifications that will also guarantee better rankings for the Regional Funding Bids if the protocol is adopted by national policies.

The protocol’s strategic framework
As mentioned, the Historical Small Smart City concept is at the base of the protocol’s strategy. Of note is the history of the Italian architecture and environmental research that has led to such an outline. In the 60s, the architect Saverio Muratori formulated the importance of investigating how a historical place could be renewed without being betrayed. According to Muratori, a place has resilient structures, lines of force, which must and can be maintained or regenerated through a dynamic process (Berruti, 2013, p. 32). Therefore, one must think about an eco-friendly and resilient habitat with its bioclimatic potential and structural resilience that is stratified and consolidated over time (Appendino, 2016; Salat, 2011).

The protocol’s procedures also aim at valorizing the Cultural Historic Environment (Osservatorio Nazionale per la Qualità del Paesaggio, 2018). This is a conceptual framework that includes the Historical Small Smart City within a network of its territory. This perspective assumes the quality of the landscape as the foundation of the strategic scenario for the development of Italy. This great opportunity stands out in the contemporary, globalized world. Institutions and politics should provide this to their citizens for answering the demand of life quality and environments capable of contributing to individual and collective well-being.

The construction process of the Protocol Strategic Framework is being carried out on the basis of a SWOT analysis, integrating different aspects of the actual conditions of Sutri and other Italian and European minor centers. The strategy is oriented at the enhancement of opportunities and lines of force, taking in account critical aspects and threats (Fig. 2).

The strategic framework is technically grounded on a long-term and elastic strategic management plan. As for the Lazio region, it foresees that the Recovery Plans could be flanked by operational tools like the protocol and other instruments included in its guidelines that optimize interventions on both the executive and economic level. The project management approach of this framework prioritizes the interventions. The priority goes from the most immediate and easy actions to the most difficult, following the analysis of the operative, economic, and highly critical issues. This order starts with setting up synchronous actions in the short term, then develops action plans in the mid to long term.

With regard to funding and economic feasibility of the integrated interventions, the framework includes several compound reward measures, such as the reduction of building permit fees; the increase in volumetry outside the historical center’s perimeter; simplified paperwork for change of intended use; tax reduction, and better loan conditions. It is important that the long-term aid is granted in a context of sustainable development so that partners and institutions do not invest money only for it to be exhausted. Each institution should participate in the wider system of control and scrutiny with their own budgets.
Figure 2. SWOT matrix with the current, principal characteristics of minor historical centers in the internal areas of Italy.

This strategy encourages the Union of Municipalities, which is the institutional form that allows municipalities to enter into preferential rankings for access to EU and national funding. Thus, the union has a leverage effect. This is why actions undertaken within a union are awarded more bonuses. Among them: Sustainable Mobility Plans (PUMS); Urban Regeneration Programmes (PRU), and Action Plans for Sustainable Energy (PAES). A municipality alone is less effective, and its actions can perform only basic scores. The best rankings can be achieved only within a union. This is because the most rewarded interventions and planning actions can be sustainable and feasible through this tool.

The protocol’s integrated interventions
The safeguard of collective interests and mitigation of negative market effects have to be taken into consideration. There are risks of demolition and replacement of valuable buildings, and of gentrification of historical centers. Hence, the necessity that the various initiatives are part of an overall strategy. They must improve the physical urban environment (i.e., building fabric inside and outside the historical center) and affect all the areas of action that we have defined for the Historical Small Smart City: mobility, economy, environment, heritage, living, and governance (Fig. 3).

Concerning the “Mobility” activities area, each municipality can operate without adhering to a Union on the graduation of interventions on the use of public space in the short, medium, and long run (maximum 5 years). This kind of action consists of the installation of restricted traffic areas with temporarily allowed access for residents only, no parking in public spaces, and special parking permits for disabled people. No parking measure can be put into force gradually, according to the realization of new parking in the belt areas outside of the city walls or the historic center’s perimeter. At the same time, without any Union, the municipality can secure pedestrian routes and open connection spaces. More complex projects must be realized within a network of municipalities. These are the smart and sustainable mobility interventions such as bike sharing; new electric minibuses to connect with major railway stations; improvement of routes and timetables for intermodal transport; new interchange nodes, and traffic monitoring.
Figure 3. The six action areas of the Historical Small Smart Cities Protocol with interventions.

Regarding the “Economy” activity area, incentives introduced by the regional laws for urban regeneration are maintained while local public-private partnerships are encouraged. The abandonment of buildings in small municipalities is addressed through loans for temporary uses and the reconversion of brownfield sites, as well as other tools. The reduction of energy consumption is a crucial part of this category of actions, moreover for the economic return and the monetary recovery of the cost of the operations. Smart tourism is included, ranging from regulation and containment of widespread hotels to the application of regulations on commercial activities in the historical center. The promotion of new tourist routes, incentives for tour operators, and support for e-tourism are also provided.

The “Environment” activity area focuses on the maintenance and restoration of biodiversity; conservation of wetlands and bodies of water; enhancement of rural uses (especially of peri-urban farmlands); prevention of areas subject to flooding; and protection and securing of steep slopes. All these are basic activities that can be realized outside of the Union of Municipalities. The actions connected to the employment of smart facilities, such as smart grids and monitoring of incinerators, are more complex and require the union participation.

The “Heritage” activity area envisages measures and objectives to protect the inhabitants of areas where regeneration programs are enforced. It avoids their removal, supports social housing and social mixité, and determines criteria for the insertion of variations in the base areas of available housing with tax credits and other economic incentives that involve owners or small private investors. In addition, housing conditions are expected to be improved through the “modulation of protection”. This involves a series of operations applied to residential built heritage (minor construction with testimonial value) where specific guidelines support virtuous and rigorous interventions, especially in the case of restoration and conservative rehabilitation or building renovation. These interventions are based on precise GIS analysis of the building fabric, which guarantees the development of an interoperable, shareable, and quickly updatable database, as well as the optimization of the management and control of the procedures. All the interventions are targeted at the safeguard of the original types and elements, most of the time eliminating the recently added or deteriorated elements.
The “modulation of the protection” is a procedure already included in the technical standards for implementation (NTA) of the Recovery Plan for the historical center of Formello (Cerasoli, 2010). The novelty here is in its use for a pilot project centered on a minor historical center of a peripheral area and not of a metropolitan belt. Further, it works with a GIS database and is linked to energy retrofit and domotics.

The types of intervention range from restoration and conservative rehabilitation to building repositioning. They follow a cataloging work and in-depth analysis of the characters and types of existing built heritage, which allow for the classification of building categories. Each category will correspond to a type of intervention, passing from the most restrictive and protective, such as for monuments, to the most transformative. The “Living” and “Governance” areas envisage professional training and promotion of employment through services and infrastructures. They follow the guidelines attached to the protocol in the form of a dossier for urban participation. Bottom-up participation is not an exercise of democracy for obtaining consensus, but rather an essential factor for guaranteeing the effectiveness of regeneration programs. This adds to the correct use of public resources for solving needs without wasting money or incurring undesired interventions.

The protocol guidelines document can be downloaded for free from the project web page via the ESRI Open Source platform. Based on the ArcGIS Online service, the protocol is provided by the LabGIS at Roma Tre University in support of our research group.

IMPLEMENTING PROTOCOL ARRANGEMENTS

The sustainable development conceptual model of the Historical Small Smart Cities Protocol is network oriented. It favors the Union of Municipalities and promotes inclusive planning tools, such as the General Urban Plan (PUG) in Emilia Romagna or the collective Recovery Plans used by the Union of Municipalities of the Romagna Forlivese (SUSREG, 2015).

The protocol would reconnect the broken relations between small historical cities and their territory. New development strategies centered on the networks of municipalities (following a multi-polar system) and the complex identity of the historical places would follow. Moreover, the protocol would include the use of new digital communication technologies; the possibility of interchanging data and activating streamline and business communications, and the capability to use local renewable sources. These factors could make life in smaller historical centers affordable for a greater number of people.

The importance of protecting the cultural heritage within its specific landscape needs to be recalled. Nonetheless, this should not be in conflict with the possibility of reflecting on culture from a “smart” perspective, in order to individualize milestones and opportunities for relaunching and sustainably regenerating places (Cerasoli & Biere Arenas, 2016, p. 297). Thus, this research focuses on the network between smaller centers as a preliminary platform for structuring an internal area and, subsequently, the need to “activate” the individual nodes of the network.

In the internal areas, the nodes of the network are primarily the historical centers of minor municipalities long-marked by abandonment, socio-economic crisis, and structural decay. At the same time, the consolidated policies have shown their limits in dealing with the historical center as separate from the rest of the municipal territory, usually classified as an “A” area and to be referred to in the Recovery Plan.
On the national level, the dynamics of transformation in the mid to long term confirms a geography modulated on different forms of center-periphery relationships. These are made more complex by anthropological and socio-economic factors, yet are still marked by the unification of services even on the primary level. A supra-municipal scale exists de facto due to the drastic downsizing of welfare. Such processes will be accentuated in the future. Corrections that can be activated nationally on the policy level are thus required (Palazzo, 2017).

A recent survey by the Ministry of Economic Development focused on these subjects. It integrated the condition of “proximity” in terms of travel times between each municipality and the nearest major centers with a pre-established level of health, education, and infrastructure (Ministry of Economic Development, 2013). The document classifies “Service offering centers” (sometimes called “poles”) as those municipalities or aggregations of municipalities that can provide all the secondary school services, hospitals with emergency rooms, and railway stations. This thematic reading, in association with the demographic trends that have affected minor municipalities over a period of forty years, allows for identifying the importance and value of autonomous trajectories of territorial development in synergy with policy and instrumentation at the regional level: sector planning, extensive area planning, and special planning (Palazzo, 2017).

The possibility of relaunching the minor centers as “poles” can realistically be enforced according to specific situations. For example, possibilities would be different in proximity to major cities or when promoting inter-municipal federations as cooperation (like the Union of Municipalities) for one possible integration of the urban type: municipalities do not own the full range of services but each develops a particular “utility” and all are mutually accessible. Within this framework, the requalification and recovery of disused buildings and abandoned areas can contribute to the activation of new poles of socio-economic aggregation (through reconversion of abandoned or free assets). These factors could implement the local market supply chains.

The GIS system supports the optimization of both the protocol’s content and actions, as well as its implementing arrangements. Hopefully, it is going to be a Decision Support System (DSS), a tool that can enhance and guide the decision-making processes. The databank is going to allow the calculation of specific indicators for the evaluation of future scenarios. The general indicators chosen could make this system implementable and extendable to the national and European territory. This tool could be useful for the management and monitoring processes of small historical centers and their surrounding territory. The main indicators of the system are being drafted by taking into account the recent reports and studies by the Italian Superior Institute for Environmental Protection and Research (ISPRA) and its partners. These works aim at providing national indicators of vulnerability within the MASTER ADAPT project (Giordano, 2017). These indicators are linked to the recent GIS system realized by the Region of Lazio and others to describe the rural Italian mountain areas within the Geographic System of the Mountains of Lazio (SGML) project (Regione Lazio, 2009).

Other indicators related to the built heritage and the morphologic characteristics of minor historical centers are also being set up in order to define indices of transformability, urban quality, and solar energy productivity (Iannilli & Petroselli, 2016). The main problems for the protocol’s application could be related to the governance system of the municipalities whose 5-year mandate is too short compared to multi-year planning. Moreover, many municipalities do not know yet the potential for application of the new regional law directives for urban regeneration.

On the operational level, it could be necessary to enroll local non-municipal institutions into partnerships and agreements with local and voluntary associations (such as the local action groups, GAL) or the involvement of local authorities such as the regional and national parks managed by
administrative bodies such as Pro-Loco, Mountain Communities, and Provinces. On an economic level, it may be useful to create shared local investment funds to be controlled by other local authorities and maintained over the years. For this reason, it is important to activate long-term partnerships with individual entrepreneurs, business networks, local farmers, manufacturers, and consortia.

CONCLUSION

The framework of integrated interventions supported by the Historical Small Smart Cities Protocol can be applied as a support tool for territorial governance, municipalities, and local authorities in an incremental, multi-scalar, and multidisciplinary perspective. Overall, it is possible to foresee that the main chronic, critical issues (weak economies, demographic aging, loss of identity values, and lack of social inclusion for migrants) would be mitigated through the measures introduced by the Protocol, such as the integration of different kinds of broad actions. This would strengthen the short supply chain and the local production with the result of making migrants’ employment and training flourish. The activation of municipal agreements supporting telework, the improvement of basic assistance services, and the creation of participatory design processes with the strengthening of cultural events all run in the same direction. More specifically, these measures aim at enhancing the residential attractiveness of the smallest historical centers of the inner areas by improving the quality of life they have to offer.

REFERENCES


Ioannilli, M., & Petroselli, A. R. (2016). L’analisi morfotipologica dello spazio urbano a
supporto della formulazione di politiche diffuse di riqualificazione [The morphotypological analysis of urban space to support spreading requalification policies]. In Reuso 2016: Contributi per la documentazione, conservazione e recupero del patrimonio architettonico e per la tutela paesaggistica [Contributions for the documentation, conservation, and recovery of architectonic stock and for safeguarding the landscape] (pp. 1246–1255). Florence: Edifir.


LID systems as significant tools in urban regeneration strategies

Patrizia Piro\textsuperscript{1}, Vito Cataldo Talarico\textsuperscript{1}, Aldo Pedro Ferrante\textsuperscript{1}, Ferdinando Frega\textsuperscript{1}, Giovanna Grossi\textsuperscript{2}, & Stefania Anna Palermo\textsuperscript{1}

\textsuperscript{1} University of Calabria, Department of Civil Engineering, Rende (CS), Italy
\textsuperscript{2} University of Brescia, DICATAM, Brescia, Italy

ABSTRACT

Low Impact Development systems represent an ecological alternative for mitigating the effects of urbanization and climate change on the environment, such as urban flooding risk, water pollution, urban heat islands, etc. These systems include significant tools in urban planning and retrofitting strategies; among others: green roofs, permeable pavements, and stormwater filters.

While presenting the innovative LID systems developed at the University of Calabria, this study aims at demonstrating its hydrological efficiency through a modelling application carried out by the use of PCSWMM. A sub-catchment of the urban area of Rossano, Italy, flooded on August 12, 2015 was considered for the implementation of permeable pavements on every impervious surface (roads, parking lots, etc.). The results show that permeable pavements produce a 75\% drop in surface runoff throughout the sub-catchments, and a 46.5\% total flow volume decrease.

Keywords: Low Impact Development systems; sustainable development; urban flooding mitigation; permeable pavements; urban catchment scale; stormwater management.
INTRODUCTION

The increase of uncontrolled urban population has generated urban areas almost completely covered by impervious surfaces. This has led to several environmental issues, such as impoverishment of ecosystems, flooding risk, water quality deterioration, air pollution, urban heat island effect, and other socio-environmental problems (Shuster, Bonta, Thurston, Warememeunde, & Smith, 2005; Gunn, Martin, Engel, & Ahiaablame, 2012; Babaei, Ghazavi, & Erfanian, 2018, Zhou, Wu, Woodfin, Zhu, & Chen, 2018).

The rise of surface sealing is due to the wrong development of built-up areas, roads, and parking lots. This turned into a constant loss of natural areas, and brought a significant alteration of the natural hydrologic cycle (Antrop, 2004; Jacobs 2011; Garofalo, Palermo, Principato, Theodosiou, & Piro, 2016). This phenomenon is reflected in the rise of runoff rates and volumes, reduction of the natural infiltration rate and groundwater recharge, as well as in the decrease of interception and evapotranspiration processes (Tang, Engel, Pijanowski, & Lim, 2005; Ahiaablame, Engel, & Chaubey, 2018). The most negative effect of this environmental alteration is the phenomenon of urban flash flooding, responsible for severe socio-economic and environmental disruption.

In addition to the loss of soil permeability, climate change adds its relevant influence on the hydrological characteristics of rainfall, which are much more intense than in the past. Stormwater peaks and runoff volume, in fact, exceed the capacity of the existing drainage infrastructures (Shafique, Kim, & Kyung-Ho, 2018) and put a strain on sewer systems.

The combining effect of the climate change and growth of megacities calls for the relevancy of urban stormwater management (Larsen, Hoffmann, Lüthi, Truffer, & Maurer, 2016; Eaton, 2018). According to Shishegar, Duchesne, & Pelletier (2018), the expression “stormwater management” refers to all the strategies that aim at controlling the surface runoff, reducing water pollution, and restoring the integrity of the ecosystem.

Regeneration policies based on Sustainable Development (SD) seem more viable and suitable than replacing the existing drainage system (Zhou, 2014). These include strategies for controlling stormwater by reusing neglected public and residential spaces. More in detail, these sustainable approaches include techniques known as LID (Low Impact Development), BMPs (Best Management Practices), GI (Green Infrastructure), WSUD (Water Sensitive Urban Design), and SUDS (Sustainable Urban Drainage Systems) (Fletcher et al., 2015).

Several studies about the hydraulic, energetic, environmental and social benefits of LID have been carried out (Ahiaablame, Engel, & Chaubey, 2018; Qin, Li, & Fu, 2013; Eaton 2018; Chang, Lu, Chui, & Hartshorn, 2018). LID practices, reintroducing vegetation in the cities, produce decentralized micro-scale systems, which provide many ecological benefits and make cities more livable and sustainable (Spatari, Yu, & Montaldo, 2011; Zischg et al., 2017; Maiolo, Carini, Capano, & Piro, 2017).

For example, green roofs exhibit a significant capability to reduce water runoff volume as well to delay peak flow rate, with great improvement of urban rainwater management (Stovin, Vesuviano, & Kasmin, 2012; Wong & Jim, 2014). Furthermore, green roofs enhance water quality by retaining pollutants (Berndtsson, Emilsson, Bengtsson, 2006; Vijayaraghavan, Joshi, & Balasubramanian, 2012), and produce thermal benefits by mitigating cold and heat at the
building scale, as well as reducing the urban heat island effect (Kolokotsa, Santamouris, & Zerefos, 2013; Bevilacqua, Mazzeo, Bruno, & Arcuri, 2017). They also mitigate air pollution in urban environments (Rowe, 2011), safeguard the biodiversity of plants and animals (Brenneisen, 2006), reduce noise pollution (Van Renterghem & Botteldooren, 2011), and add aesthetic value to the cities (Jungels, Rakow, Allred, & Skelly, 2013). All of this increases the quality of life of the inhabitants.

Permeable pavements systems are generally used to retain runoff, allow groundwater recharge, and reduce water pollution. Several laboratory and full-scale studies widely proved the effectiveness of these systems in enhancing water quality and reducing the risk of floods (Scholz & Grabowiecki, 2007; Fassman & Blackbourn, 2010; Turco, Kodešová, Brunetti, Nikodem, Fé, & Piro, 2017; Hu, Zhang, Siu, Li, Tanaka, Yang, & Xu 2018; Shafique, Kim, & Kyung-Ho, 2018).

The beneficial effects of these strategies are mobilizing public awareness. Many developers and policy makers are showing a growing interest on the use of pervious pavements and other LID strategies for building sustainable cities (Ahiaiblame, Engel, & Chaubey, 2018).

We therefore can consider LID systems such as green roofs, bio-filtration systems, permeable pavements, green walls, rain gardens, and so on, important tools in urban planning and retrofitting strategies.

The main objective of this study is to present the benefits of implementing LID systems in urban regeneration processes. First, we will illustrate the innovative LIDs systems, which have been developed by the University of Calabria. Second, we will analyze the hydraulic efficiency of permeable pavements in terms of rainfall and runoff mitigation by focusing on the urban area of the town of Rossano, which was hit by a flood on August 12, 2015.

EXPERIMENTAL LID SITES AT THE UNIVERSITY OF CALABRIA

Urban Hydraulic Park

The Urban Hydraulic Park is a demonstration site, located at the University of Calabria (39°18’ N, 16°15’ E), south Italy, in the Vermicelli catchment (27.80ha). Climate conditions are typically Mediterranean, characterized by hot-dry summers and cool-wet winters.

The Park includes different LID systems: a green roof with a rainwater harvesting system, a permeable pavement, a stormwater filter, which will be described in detail below, and a traditional sedimentation tank connected to a treatment unit.

The Park is also equipped with a complex monitoring and acquisition system, which steadily collect climatic, hydrological, hydraulic, and thermo-physical data in real time during each experimental session.

Green roof and rainwater harvesting system

The experimental green roof was built on the fifth-floor terrace of the Department of Mechanical, Energy, and Management Engineering (DIMEG). The existing area of this roof was parceled into four sections (Fig. 1, left) for the measurement of outflow rates. These are
hydraulically independent and differentiated according to stratigraphy, composition elements, and the presence, or absence, of vegetation.

The same native Mediterranean vegetation (*Carpobrotus edulis*, *Dianthus gratianopolitanus*, and *Cerastium tomentosum*) covers two sections, but the drainage layer is different. Another section hosts colonized plants. The third section, finally, represents the typical impervious roof, as a reference for the hydraulic and energetic analysis. In general, each extensive green roof installed on the site consists, from top to bottom, of a soil substrate with a maximum depth of 8cm, a permeable geotextile, a drainage and storage layer, an anti-root layer, and a waterproof membrane.

![Figure 1. The four sections of the experimental site and the rainwater harvesting system installed at the University of Calabria (photos by the Urban Hydraulics and Hydrology Laboratory).](image)

The water supply is guaranteed by reusing the green roof’s outflow which is collected in a storage tank (1.5 m³) placed at the base of the building (Fig. 1, right), and distributed through a drip irrigation system during drought periods.

More details about the designed features of each sector, the scientific implications, laboratory and modelling applications can be found in (Carbone, Garofalo, Nigro, & Piro, 2014; Carbone Principato, Nigro, & Piro, 2014; Carbone, Principato, Garofalo, & Piro, 2016; Garofalo, Palermo, Principato, Theodosiou, & Piro, 2016; Brunetti, Šimůnek, & Piro, 2016a).

**Permeable pavement**

The experimental permeable pavement was built in a parking lot of the University of Calabria, which presents a total capacity of 90 parking spaces and an area of 2700 m². More in detail, the permeable pavement installed (Fig. 2) has an area of 154 m², an average slope of 2%, and a total depth of the profile of 0.98 m.

Each component of the permeable pavement was chosen to minimize any environmental impact, limit costs, and maximize the efficiency of hydrological retention and treatment of pollutants carried by the runoff.

A surface layer in highly-permeable porous concrete blocks rests on a multi-layered bed, which was constructed according to the suggestions of the Interlocking Concrete Pavement Institute (ICPI). This recommends a specific ASTM stone gradation. A geotextile is placed between the superior and inferior layer of the bed, while an impermeable membrane sits at the very bottom to avoid water percolation. Finally, while a protection layer of coarse sand is placed between the sub-base layer and the impervious membrane. For the quantity and quality measurements, the baseflow is collected in a horizontal drain and discharged into a manhole placed at the base.
Figure 2. The Permeable Pavement installed at the University of Calabria (photos by the Urban Hydraulics and Hydrology Laboratory).

More detail about the physical features of each layer, the scientific implications, laboratory and modelling applications can be found in (Palla, Gnecco, Carbone, Garofalo, Lanza, & Piro, 2015; Brunetti, Šimůnek, & Piro, 2016b).

Stormwater filter
A stormwater filter was installed downstream the permeable pavement and connected to an impervious parking lot (220 m²), which collects the runoff discharges into the filter through a channel.

This LID system (Fig. 3), with a surface area of 125 m², an average slope of 2%, and a total profile depth of 0.75 m, is covered by a soil substrate vegetated with Mediterranean species. To avoid the migration of fine particles into the bottom layer, a geotextile is placed between the soil substrate and the filter layer. The filter layer is composed of highly permeable gravel-like material. Finally, an impervious membrane at the bottom prevents water percolation.

Figure 3. Stormwater Filter installed at the University of Calabria (photos by the Urban Hydraulics and Hydrology Laboratory).

More detail about the physical features of each layer, the scientific implications, laboratory and modelling applications can be found in (Brunetti, Šimůnek, Turco, & Piro 2017).
MATERIALS AND METHODS

Site description
The urban area of Rossano, with its 36,623 inhabitants, faces the Ionian Coast of Calabria and is part of the newly established municipality of Corigliano-Rossano.

A sub-catchment with a surface of 35.90 ha, located on the left side of the Citrea Creek (Fig. 4), was selected for the hydrological modeling of two different scenarios, that will be discussed below. The flood of Rossano occurred in 2015 makes this sub-catchment significant.

![Figure 4. Sub-catchment area on the left side of the Citrea Creek](Image by the Authors after Google Map).

Data analysis
The sub-catchment parameters (land use, slope, area, etc.) were identified according to the literature, digital (GIS) and Regional thematic maps analysis, and site inspection. The urban drainage system was defined based on the maps provided by the technical office of the Municipality. These data were analyzed, evaluated jointly, and then integrated for implementing the model. Based on these evaluations, 11 sub-catchments were identified (Fig. 5).

![Figure 5. The sub-catchment on the left side of the Citrea Creek with the identification of 11 sub-catchments (green lines) and the main drainage network (blue lines) (Image by the Authors).]
For each sub-catchment, an analysis on the land use was carried out. This analysis highlighted three different land use type: (1) green area, (2) area occupied by roads and impermeable surfaces, (3) area occupied by buildings (Table 1).

This land use classification allowed for evaluating the Curve Number value for each sub-catchment by using the SCS-CN (Soil Conservation Service Method – Curve Number) (Cronshey, 1986). The CN estimation was referred to an average soil moisture condition at the beginning of any precipitation (CN II) and a type of soil B.

<table>
<thead>
<tr>
<th>Sub-catchments</th>
<th>Green Area (%)</th>
<th>Roads and Impervious Surfaces (%)</th>
<th>Buildings (%)</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40.00</td>
<td>53.20</td>
<td>6.80</td>
<td>83</td>
</tr>
<tr>
<td>2</td>
<td>11.90</td>
<td>61.80</td>
<td>26.30</td>
<td>94</td>
</tr>
<tr>
<td>3</td>
<td>14.70</td>
<td>66.70</td>
<td>18.70</td>
<td>93</td>
</tr>
<tr>
<td>4</td>
<td>5.70</td>
<td>72.70</td>
<td>21.60</td>
<td>96</td>
</tr>
<tr>
<td>5</td>
<td>19.00</td>
<td>58.40</td>
<td>22.60</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>5.20</td>
<td>67.70</td>
<td>27.10</td>
<td>96</td>
</tr>
<tr>
<td>7</td>
<td>3.40</td>
<td>67.50</td>
<td>29.10</td>
<td>97</td>
</tr>
<tr>
<td>8</td>
<td>8.80</td>
<td>68.60</td>
<td>22.60</td>
<td>95</td>
</tr>
<tr>
<td>9</td>
<td>9.90</td>
<td>60.90</td>
<td>29.20</td>
<td>94</td>
</tr>
<tr>
<td>10</td>
<td>22.70</td>
<td>58.50</td>
<td>18.80</td>
<td>90</td>
</tr>
<tr>
<td>11</td>
<td>1.30</td>
<td>69.40</td>
<td>29.30</td>
<td>98</td>
</tr>
</tbody>
</table>

Table 1. Percentage of green area, roads/impervious surfaces, and buildings with corresponding CN values of every sub-catchment.

The analysis referred to the pluviometric data extracted from the 2015 Event Report by the Regional Basin Authority (Regione Calabria, 2015). The total amount of precipitation on August 12 was over 230mm within 24 hours, while 155mm fell in just 6 hours. This specific rainfall was one of the most relevant climate event of the past years in Italy, and damaged significantly the territory.

Simulation scenarios
To evaluate the effectiveness of permeable pavements implementation at urban catchment scale, two simulation scenarios were considered and compared. The first one, hereafter named scenario 0, is the current configuration of the sub-catchment previously described. The second one, hereafter named scenario PP, hypothesizes the implementation of permeable pavements, integrated with the existing drainage system, in all the areas occupied by roads and others impervious surface. The permeable pavement of the model has the same physical features of that one installed on the Urban Hydraulic Park.

Model development
Based on data previously analyzed, a hydrodynamic model was developed, by using the rainfall and runoff simulation model PCSWMM (CHI PCSWMM), with the EPA-SWMM version 5.1.012 (Rossman, 2015).

To obtain a detailed model, the study area of 35.90ha was split in 36 sub-catchments, defined according to slopes and land use. The drainage system implemented in the model consists of 114 junctions and 114 conduits with cross section and diameters ranging from 400 to 800mm.
The SCS Curve Number (CN) method was considered for the infiltration method, and the flow routing computations was based on the Dynamic Wave Equations.

The final model configuration is shown in Fig. 6, where the degree of imperviousness is also reported.

![Figure 6. PCSWMM model configuration of the sub-catchment on the left side of Citrea Creek, with the distribution of imperviousness (Image by the Authors).](image)

While scenario 0 considers only the traditional drainage system, scenario PP takes in account the implementation of permeable pavements.

First, the specific permeable pavement was defined according to several parameters (berm height, vegetation volume, surface roughness, surface slope, pavement’s thickness, void ratio, and so on) in order to apply the LID system on PCSWMM. Some of these parameters were based on the real stratigraphy of the experimental permeable pavement. They were selected according to previous research and laboratory tests. Others parameters were identified in function of the ranges recommended by the SWMM Manual (Rossman & Huber, 2016).

Second, the geospatial distribution of permeable pavements on the area was set. For each sub-catchment, we have considered the implementation of different permeable pavements, with an area of 100 m² each, in order to cover all the land actually occupied by roads and impervious surface, as reported in Table 1.

**RESULTS AND DISCUSSION**

The results obtained in both the scenarios are shown in Table 2. They express the runoff coefficient of the sub-catchment and the total flow volume measured at the outfall node, i.e. the spot where the sewer outflow joins the water course. The cumulative volume at the outfall node for both scenarios is reported in Fig. 7.
By observing these findings, it clearly emerges that replacing roads and impervious surfaces with permeable pavements the hydrological effectiveness is optimal. A 75% reduction of surface runoff in all the area is recorded, along with a 46.5% reduction of the total flow volume.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total Surface Runoff (mm)</th>
<th>Runoff Coefficient (%)</th>
<th>Total Flow Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 0</td>
<td>233.14</td>
<td>97.96</td>
<td>35628</td>
</tr>
<tr>
<td>Scenario PP</td>
<td>58.98</td>
<td>24.78</td>
<td>19052</td>
</tr>
</tbody>
</table>

Table 2. Summary results for both scenarios

![Figure 7](Image by the Authors)

**Figure 7.** Cumulative Volume for Scenario 0 and Scenario PP (Image by the Authors).

Fig. 8 and Table 3 show the modelled results in terms of flooding nodes for Scenario 0. By analysing these findings it emerges that, the extreme rainfall event considered makes 10 nodes of the actual drainage system unable to support the incoming outflow; thus overflow happens.

![Figure 8](Image by the Authors)

**Figure 8.** Flow Depth in all Nodes in which occur flooding for Scenario 0 (Image by the Authors).
<table>
<thead>
<tr>
<th>NODES</th>
<th>Hours Flooded</th>
<th>Max Rate (L/s)</th>
<th>Total Flood Volume (10^6 L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>4.25</td>
<td>290.73</td>
<td>1.736</td>
</tr>
<tr>
<td>S2</td>
<td>6.94</td>
<td>707.49</td>
<td>8.865</td>
</tr>
<tr>
<td>S4</td>
<td>6.08</td>
<td>2167.85</td>
<td>25.281</td>
</tr>
<tr>
<td>S6</td>
<td>3.89</td>
<td>1745.32</td>
<td>12.865</td>
</tr>
<tr>
<td>S7</td>
<td>1.82</td>
<td>333.5</td>
<td>0.994</td>
</tr>
<tr>
<td>S8</td>
<td>0.47</td>
<td>84.73</td>
<td>0.08</td>
</tr>
<tr>
<td>S9</td>
<td>1.87</td>
<td>329.97</td>
<td>0.92</td>
</tr>
<tr>
<td>S10</td>
<td>0.17</td>
<td>22.42</td>
<td>0.008</td>
</tr>
<tr>
<td>S18</td>
<td>0.91</td>
<td>295.97</td>
<td>0.39</td>
</tr>
<tr>
<td>S35</td>
<td>0.25</td>
<td>27.17</td>
<td>0.018</td>
</tr>
</tbody>
</table>

Table 3. Flooding refers to all water that overflows nodes for Scenario 0 (Image by the Authors).

Making easy to compare the results from the two scenarios, Fig. 9 shows the flow intensity for the same 10 nodes where flooding occurred in scenario 0. By analyzing Fig. 9, it is possible to observe how the implementation of permeable pavements has led to a significant reduction of flow depth in all nodes. In this case, in fact, only nodes S1, S2, and S4 (Fig. 9 and Table 4) are affected by overflow.

<table>
<thead>
<tr>
<th>NODES</th>
<th>Hours Flooded</th>
<th>Max Rate (L/s)</th>
<th>Total Flood Volume (10^6 L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>0.12</td>
<td>4.26</td>
<td>0.001</td>
</tr>
<tr>
<td>S2</td>
<td>2.18</td>
<td>288.11</td>
<td>1.529</td>
</tr>
<tr>
<td>S4</td>
<td>1.65</td>
<td>517.52</td>
<td>1.217</td>
</tr>
</tbody>
</table>

Table 4. Flooding refers to all water that overflows node for Scenario PP

CONCLUSION

This study reveals a significant hydrological efficiency of permeable pavements distributed at catchment scale, also in case of extreme rainfall events. These results confirm that the LID systems can be considered as significant tools in the field of urban regeneration and in the development of sustainable cities.
ACKNOWLEDGEMENTS

The last author would like to thank CHI for allowing the use of PCSWMM to the University Grant Program.

This work includes data from a previous work carried out by the Urban Hydraulic and Hydrology Laboratory (L.I.U) of the University of Calabria after the request by the municipality of Rossano.

The study takes also into account the LID systems installed at the Urban Hydraulic Park at the University of Calabria, funded by the Italian National Operative Project (PON) – Research and Competitiveness for the regional convergence 2007/2013, I Axis “Support to structural changes” operative objective 4.1.1.1. “Scientific-technological generators of transformation processes of the productive system and creation of new sectors” Action II: “Interventions to support industrial research”.

The work is also co-funded by URBAID Project, Assisted and integrated urban regeneration, Health & Wealth 2015 call, University of Brescia.

REFERENCES


If Civic Architecture was Language, then it would be a Common Good

Sergio Los
IUAV University of Venice, Italy

ABSTRACT

Architecture is a civic language and a cognitive tool. As such, it can only exist within a community, which architecture strongly contributes to build. The correlation between the destruction of the common good and the reduction of architecture to aesthetics is here presented. The case is made for the possible role that bioclimatic and local architecture can play in recovering a civic architecture as common good. A way out of the industrial and financial consumption of our common planet is envisioned through a change of perspective on urban design, seen as a communitarian, civic, and self-controlling language that generates the world.

Keywords: civic architecture, bioclimatic architecture, common good
1. SYMBOLIC COMMUNICATION IS A PARADIGM OF THE COMMON GOOD

My title shows that I took this conference’s theme seriously. I have therefore worked on the problem of the “common good”, which I regard as a very interesting and urgent subject. It is my belief that if “civic architecture” (we are going to see what such an expression means) was a language, then it would be a common good.

Since I began working with architecture, I have felt its potential in dealing with the great issues of the world of life. My feeling was that the current aestheticization had blocked the theoretical evolution of architecture, which therefore started oscillating between computation and taste. The Enlightenment tended to place it among the techno-sciences, and this seemed the only possible alternative. The internalism recognizable within this trend made me understand its absurdity and the mercantile reason of its globalization. Meeting with artists, in particular Carlo Scarpa in architecture, allowed me to focus on thinking by images, which was—as an extension of geometry—a very common characteristic of the figurative culture before Reformation. Modern aestheticization is, on the contrary, consistent with the current iconoclasticism, and it shifts the description of the surrounding environment into the aim of disciplinary techno-sciences. Setting the image free from the reductive role of suggestion and entertainment is the recurring motif of most of my research.

Many authors have spoken about the problem of common good lately, for example Salvatore Settis (2014) and Ugo Mattei (2011). Even a Commission for the Common Good has been established, and its chairperson was Professor Stefano Rodotâ, who, unfortunately, recently passed away (Mattei, Reviglio, & Rodotà, 2010). I would like to refer to the thought of Settis, first published in a booklet about the landscape as a common good, which refers to Article 9 of our Constitution (Settis, 2013) and then to his Academy of Mendrisio lectures on Architecture and democracy, published by Einaudi last year (Settis, 2017). Settis deals with the problem of protecting landscapes and cities. He does so by highlighting, among several issues, the fragmentation of disciplines that are supposed to focus on landscape.

2. KNOWLEDGE THROUGH LANGUAGE OR THROUGH DISCIPLINE

When meant to protect the landscape and urban heritage, any discipline-mediated knowledge turns into ministries and specialized disciplinary institutions. These pursue their tasks through different and more or less complementary theories and practices. Settis notices that the landscape is the shared subject of at least four different institutions. These stem from different, unrelated, and uncoordinated disciplines. He is right. The matter turns to be dissociative because it follows an analytical attitude. Such an attitude ends performing a vivisection of the landscape. The focus on separate organs, treating them as components of a machine, eludes the integral character of the landscape. In brief, such an approach is reductionist. It pretends that disassembling and reassembling the elements of such a “machine” would not change anything. That is wrong. Non-modern architecture could hardly perform a function by replacing some parts with others. Likewise, one could hardly succeed in transmitting the same content of a text if some propositions were changed. A steel structure concealed within an age-weakened column could translate the column’s performance to prevent a collapse. Yet such a column would be unable to communicate any meaning of robustness to the community. A foreign (or international) community, which is unable to interpret that meaning of robustness, could either reject the column or appreciate it from an aesthetic point of view.

A command is less ambiguous and easier to translate than a poetic verse when it is about making
someone perform an action. A military program, which “shoves” people in order to make them obey, is designed for launching commands. It is a kind of functional machine and it transmits forces and performances. On the contrary, people who aim at negotiating better, common rules through conversation would rather make an effort to reach clarity of communication in order to avoid harmful misunderstandings. Conversing people would rather share an interest and engage in establishing a discourse ethics.

This does not happen when ethics is competitive, such as in modernity, where exchanges turn into challenges and conflicts for the strongest or the smartest to prevail. Such a culture cannot but disrupt any negotiation, because it sees exchange as an impermanent compromise aimed at tricking every challenge. A community committed to bringing harmony to prevail under the wings of justice must avoid the pitfall of competitiveness, which, by reducing the chances of communication, makes awareness and responsibility increasingly rare and difficult. Only a total disarmament of “competitors” allows for the development of communicative, symbolic languages and systems.

By reducing the energy crisis to a mere matter of saving on consumption, one could legitimate a solar-powered electric chair—an “environmentally friendly electric chair”. Solar culture is not a matter of technology. Rather, it is a social and moral innovation.

Figure 1. Bioclimatic architecture is about desire, not technological innovation (Image by the Author).

3. SETTLED CULTURES AND UNMOVABLE PRODUCTS VS NOMADIC CULTURES AND MOVABLE PRODUCTS

Disciplinary fragmentation hampers the discussion. Discussion is instead required by the intrinsic political dimension of the cultures of landscapes and cities, rooted in their own territories. It is the city, along with its landscape, which carries out the actions able to motivate relevant discussions. Its components, even if the good functioning of the city also depends on them, are not enough for such a purpose. The disciplinary monologue encourages actions with a limited aim. It belittles any communicative action, where experts from the same discipline engage in controversies. The capability of disciplinary knowledge to generalize and involve an international, global, and thus unlimited aim of validity, exalts its presumed neutrality and objectivity. This makes any confrontation a hard and even pointless task.

The universal individual promoted by the Enlightenment emerges more easily in nomadic merchant companies of movable products than in permanent civic societies of immovable products. The
colonial perspective of the former will tend to make cultural differences irrelevant. Differences shrink to a matter of aesthetics. Therefore, they become a subjective, individual matter, acceptable provided they are all equally subject to the same economic calculation that appears neutral, objective, and international/universal. As a trend, nomadic culture goes on to sell patented movable products, while the settled culture goes on to teach how to make immovable products.

Just compare the British with the Roman Empire. My thesis is that the movable products of the nomadic companies are much less likely to become commons than the immovable products of settled societies. The current predominance of nomadic cultures and modern movable products gives their colonial industrial attitude a natural appeal since we look at settled cultures as unfashionable, old, and therefore condemned. The state of the planet is a responsibility of those nomadic cultures, though, and this shows that they are to be condemned. This is why I have argued here that architecture can be a common good as a language, not as a discipline. Accordingly, it shall be regional and refer to a specific symbolic community, not to an international, universal one.

Each discipline implies some subdivision in different areas of territorial relevance, which cannot overlap with those of other disciplines. These disciplines are characterized by the difficulty of choice induced by the scale of several fragmentations. Therefore, of course, it is easier to deal with events that are the same everywhere than with those that would be different elsewhere. It is thus not by chance that a complex of knowledge has emerged, defining a “situated knowledge” that is the subject of my talk. If the world were indeed external and independent (an illusion unfortunately shared by many), the problem would be much simpler. In fact, the world connects by retroactive circularities to the operators that are busy controlling its evolution, so things are much more complex. The phantom of physics is always present in every form of reductionism, even if we are aware that the landscape is not a machine.

Let us return to the focus of the conference: can architecture be or become a common good?

I believe that architecture has been a language for many centuries, and I think this should continue today—becoming a language again for those who do not believe it to already have been so.

There are other questions, though: how can we motivate a process that turns architecture into a common good? And, how does the common good relate to sustainability?

4. COMMON GOOD, SUSTAINABILITY, AND ARCHITECTURAL LANGUAGE

Indeed, the two questions relate to sustainability. Therefore, bioclimatic architecture again shows its connection to the common good. As long as we care for sustainability, we are the ones who have to deal with it. In fact, when architecture is meant as an “individual good” it makes cities and landscapes unsustainable. Widespread modern and contemporary architecture speaks for itself. It wastes non-renewable resources and destroys both the urban and the natural environments. Technological progress makes the building machinery plants so powerful and commodified that they can be identical everywhere, while consuming and polluting.

Engineering designs the efficient machines that architecture can aestheticize independent from places, as if the entire planet were an immense megalopolitan periphery where the same multi-national movable products are bought and sold. If architecture and the city were bioclimatic, then they would be regional, i.e. related to different geographies and cultures, contextual, and rooted. They would therefore be committed to represent and communicate the local cultural identities. For these civic
communities, architecture could resume its task of knowledge embedded in the local language, so that the symbolic communities can discuss and govern their destiny and project.

Why should we choose a symbolic, linguistic, and located architecture rather than the current modern architecture, composed of many international disciplines such as aesthetics, engineering, urban planning, et cetera? My answer is that disciplines make architecture more exclusive, and less participatory and shared: a matter for professional experts only; instantaneous and objectified; less contextual and holistic, and more individualistic and specialized.

Since disciplines are international, universal, and nomadic, they clearly separate the present from the past, and jeopardize the individual professional cognitive tools aimed at finalized actions. Languages are instead regional, civic, and contextual. They correlate the present and the past through semantics; target communicative actions; split into different, settled, and traditional cultural communities, and situate themselves in specific territories and geographic areas.

5. HETEROTROPHIC, NOMADIC CULTURES AND AUTOTROPHIC, SETTLED CULTURES

I would like to make a digression here, albeit concisely, to explain where this distinction between nomadic and settled cultures comes from. After a long nomadic period, humans develop different life forces in response to different places. This happens first in a locality, then by migrating to different locations on the planet. Cultural evolution brought out the first settled cultures, especially in the Mediterranean and in the area called the “fertile crescent”, which corresponds to the present-day Middle East. Topography and climate facilitate this transformation in some areas but hinder it in others, and this provokes a differentiation in the evolutionary processes of human settlements, for which some communities become permanent while others remain nomads. Cities form primarily and predominantly in cultures that are self-powered, and not in cultures that instead find forms of hetero-fed lifestyle more suitable, being so much more dedicated to the exchange than to caring for settlements and urban road networks. Even the economic theory, formed around the notion of “surplus”, is more understandable in the context of cultures of exchange and movable products, than in that of subsistence cultures and immovable products.

It is around this cultural evolution of settlement that the Greek polis also emerges from a philosophical point of view. This is extremely important, because it establishes the sense of a city in the use of language that is something very close to the concept of the commons. Romans, however, undertook the definitive step. The difference between polis and civitas is substantial, besides being relevant for what I am trying to communicate. However, both the polis and the civitas belong to the settled cultures of immovable products.

6. MORAL AND SETTLED (UNMOVABLE) INNOVATIONS VS TECHNOLOGICAL AND NOMADIC (MOVABLE) INNOVATIONS

The polites, i.e. the citizens of the polis, recognize themselves as united with other polites by sharing the same origin from a common race, i.e. for coming from something common. The Roman cives, instead, do not focus on the common origin but on the common destiny—the shared construction of a common project, a common destination. To me, this consideration also seems very current, and I believe that the reading of the Roman city and the aforementioned distinction between the building object and the civic architecture also comes from this difference between the cives and the polites.
This led the Roman citizens to join the other cives in the construction of the city. The Latin word cives translates into the Italian concittadini (fellow citizens), rather than just cittadini (citizens), indicating a relational character. The existence of two fundamental instruments within the discourse of a city’s construction, the rhetoric and the law, is no coincidence.

Rem Koolhaas too refers to this subject in an unpublished work, written as part of his research on cities at Harvard. Of this research, he has published two books: one dedicated to the great Chinese leap (Chung, Inaba, Koolhaas, & Leong, 2001) and the other to commercial architecture (Chung, Inaba, Koolhaas, & Leong, 2002).

7. RHETORIC AND LAW AS MAGISTERIA OF MORAL AND SOCIAL INNOVATIONS

Rhetoric and law are two great tools that mainly concern the Roman Republic form and its political evolution. It is necessary to clarify that rhetoric is not what most people mean today. Instead, it was the art of thinking and discussing together. In fact, rhetoric makes no sense for the individual, and it is precisely when the individuals triumph that we lose the use of rhetoric. One of the greatest adversaries of rhetoric was Descartes, as seen in his monologue on being. Rhetoric, opposite of any monologue, is instead the art of dialogue and productive discussion. In this sense, Cicero is very clear.

The other tool is the art of law, which consists of the ability to transcribe agreements reached by negotiating and discussing, in order to preserve the friendship indispensable for the construction of a city. Rhetoric and law are moral and social innovations that allow for a systematic transition from shoves to discussions. People shared them through language. Therefore, transitions did not occur through disciplinary or technological innovations but through a complexity of highly effective discursive practices, as well as through linguistic institutional innovations and their continuous maintenance.

Christianity, which St. Paul brought to Rome, fits very well into this culture. St. Paul was a Roman citizen, he had not arrived to Rome by chance but in a very conscious way, in the sense that Roman rhetoric turns naturally into Christian evangelization. This, above all, is based on relationships with others. It is not a doctrine of personal meditation like the Cartesian monologue: it has a fundamentally relational, civic character.

8. INTEGRATION OF CLASSICAL RHETORIC WITH THE ICONIC MORAL PROJECT OF CHRISTIAN CULTURE

The second step is key, because Christianity had remained iconoclastic until the 9th century A.D., i.e. for nine centuries. It nevertheless turned into the culture that contributed the most to the diffusion of figurative culture. With the Council of Nicaea, dating back to 870 A.D., the iconoclastic ban drops and, especially in Italy, figurative culture has an extraordinary expansion that stands out today. A radically new culture, based on strengthening the emulation of the person’s moral behavior and his way of life, has been born. I could mention mirror neurons, but my externalist vision does not require it. I say instead that even internalists must admit the existence of these external connections that motivate behavior. Despite all that has continued to be taken away and disseminated around the planet, Italy keeps being the repository of an extraordinarily relevant and widespread heritage of this figurative culture. It is evident that surpassing iconoclasm led Italy to own a complex language based on the steady use of a composite symbolic system, weaving words and images. Such a use of images drove Italy to an extraordinary level in architecture and in mastering the art of cities and landscapes.
Parma is a good example, yet any historic Italian city may witness this thesis exemplarily. In fact, such a complex language that weaves words and images leads to the construction of the “medieval commune” (not only in Italy) during the 10th and 11th centuries. Anyone interested in urban planning knows it as the most relevant example of citizen participation in governing a city.

9. DELIBERATIVE DEMOCRACY AND THE CITY OF MEDIEVAL COMMUNES

Siena’s Council of Nine, which I will discuss later, is an extraordinary example of “deliberative democracy”. Ambrogio Lorenzetti painted the “common good and individual good” frescoes in Siena. These frescoes initially depicted the difference between the “common good” and the “individual good”, even though these subjects were renamed “the good government and the bad government” from 1700 on. The paintings are a kind of essay on urban planning that shows the differences between the good and the bad government of a city. The exceptional value of this permanent representation of a moral project put on the walls of City Hall is evident. This way, everyone can understand it together with the statutes, which are written in a common language, not in Latin. Think of our almost illegible urban regulations that can barely be interpreted without an expert interpreter! Modern societies require the obligatory guidance of professional experts, so much so that if we trespass the law, we need to refer to a lawyer. This implies that we do not understand legal norms enough to defend ourselves. To be defended, we need an expert who explains in a language that we would not understand our conditions, motivations, reasons, et cetera to the judges. This is absurd, and yet it applies to all our actions.

The Republic of Siena had a deliberative democracy that was certainly empowered by this composite symbolic system. Such a system integrated words and images, constituting a binding condition for the realization of the Republic. The moral project is embodied in the reciprocal behavioral imitation, which is thus a sort of existing moral language, as evidenced in Dante’s Divine Comedy, where it seems clear to me that “divine” means “moral”: a moral comedy.

10. CIVIC ARCHITECTURE WEB AND MONOLITHIC ARCHITECTURAL OBJECTS

I find relevance in the contrast that Colin Rowe and Fred Koetter put forth in the famous book *Collage City* (1979), between the architectural object of the Acropolis and the architectural grid of the Forum—where, by precisely arguing the need to be contextual—they stand for the road network and forum architecture, i.e. the typical architecture of Italy. While we face the object-centered design of
a temple, we instead belong to the relational architecture of the forum, that is, we are inside its internal space. Luckily, since Roman times, our great civic tradition (which unfortunately is underappreciated and underdefended) has always bound our life to the road network, which is what I call “civic architecture”, as opposed to the extremely widespread and preponderant system of monolithic buildings. This latter is typical of modern architecture.

9. BRITISH AND ITALIAN INDUSTRIALIZATION

Modernity begins and many things change after the age of the medieval commune. Modernity returns to iconoclasticism. If anything, people now refer to the numbers but not longer the images. Images turn into a matter of mere aesthetics, like in advertising or decoration, and this is a relevant milestone for architecture. Even the modern, abstract attitude to starting everything from scratch stems from our mechanized and mechanistic culture, which in fact exhibits a focus on particularly weird mechanical objects when interpreting the city. A simple visit to any modern suburbia abundantly shows that the medieval ability to make a city is incomparable to that of our actual culture.

Italy’s first industrialization, taking place in Veneto, was much more involved in social than in technological innovation and facilitated the discussion of civic communities, which were involved in governing their relatively small and self-subsistent cities. Trying to fit the benefits of industrialization into their scale was a matter of increasing the economic independence of cities. For the commons’ sake, we shall emulate the first steps of the Italian industrial culture. See for example what happened in Schio and Valdagno in the early 19th century, where medium-sized cities near the mountains feature a fundamentally civic character. Such interventions were based on solar energy, bringing sea water to the mountains and allowing it to flow downstream to form rivers and creeks that generate mechanical energy through simple wooden mills. Here, industry produces a civic culture. It takes on economic responsibilities; and these responsibilities are not enclosed within the factory but rooted in the city. It even revitalizes agriculture. See Biella, Ivrea, and many other Italian cities. Eighty percent of Italy’s mechanical energy was hydroelectric during the early years of the 20th century. What a pity that such a process of industrialization shifted from its civic kick-off! It moved, instead, toward logics aimed at translating a country of many cities into a mesh of megalopolises and international suburbs, similar to each other and stemming from an industrial background that is the same everywhere.

Let us highlight some differences between the Venetian and British ways to industrialization. The Veneto Region featured a feedback system, which came from the Roman, then Christian idea that the city is in pursuit of a moral project. A deep tradition embodies such a project into the common language of images and words. Based on local, renewable resources and solidarity among civic communities, industry could thrive in support of workers and the environment, and enhance the deliberative character of the civic communities. The civic culture of the medieval communes tamed itself as it did with the surrounding fauna and flora and improved its own language through continuous communication. Its economy was compatible with the environment because it was directly proportional to its natural development.

On the contrary, the industrial culture of the reformed Northern Europe emerged from the enclosure and the privatization of the common land, without any discussion or collaboration with the people who used to enjoy the commons. This occurred through an “institutional machine” that connects three tele-actors, i.e. three individual actors distanced from each other:

1. the national state, fed by enclosing entrepreneurs’ taxes in order to legitimize and enforce the private, individual enclosed properties (management of public goods and services);
2. the entrepreneurial individuals who manage enclosed properties as their productive private assets and explore new potential markets;

3. the mass of working individuals who lose their commons by expropriation and are obliged to work for surviving in the enclosed private properties.

Such a mechanism produces a form of internal colonization. It requires the existence of national states equipped with tax-maintained armies. Armies defend public and private assets from the external and internal violators of the law. Law experts write Law. It is sure that those who are obliged to respect the law do not know it. In fact, when they break the law, they need a lawyer or law expert to protect them. Citizens do not first discuss Law as in the Roman republic, because people do not share anymore the art of negotiation (rhetoric), nor the art of recording such a negotiation (law). Modern law speaks a language that is foreign to people, and they cannot understand it. The law states that everyone is a potential entrepreneur and that market-ruled, monetary-economic competition can turn everyone into winners, i.e. private entrepreneurs who enclose private properties.

People from civic communities communicate through a behavioral language, whose semantics is governed by a common morality. People have belonged to such a morality since they were born and learn it together with the other languages. After the Reformation, those who used to share such communitarian and wise languages morph into universal individuals. Individuals spend their lives under nations governed by disciplinary and professional laws. They must compete with other individuals who are as well armed with techno-scientific disciplines in order to conquer goods and services. Meant for commodification, these goods and services are shared and regulated by monetary exchanges.

12. THREE ARCHITECTURES OF THE CITY: COMMON, PUBLIC AND PRIVATE

To revive the deliberative democracy of the medieval civic republics, we need a theory of the city to make their digital project explicit. By digital project, I mean a genotype that is recognizable in its architectural analogical phenotype. So, to be clear, in my courses I used to distinguish three main elements of a city as a symbolic system, i.e. as language or languages.

1. The first element is a network of “common spaces”, the so-called public spaces. I must stress the difference between public and common space and highlight the difference of their legal status.

2. The second element includes public spaces, public properties, libraries, schools, parks, hospitals, et cetera.

3. The third concerns private spaces, as well as urban and rural private properties.

A town councilor could sell a public property if the majority of the council voted for it. It could even succeed, to the extreme, in making the council vote for cashing in on the sale of public monuments. In fact, city councils have not yet distinguished between public and common good in Italy. This means that the public space includes the common one, where accessibility is never limited by constraints or closures. All city buildings face the common space, which thus have a character of intangibility or at least a hope of intangibility to be respected.

These three elements also support different architectural methods. I call public space what Leon Krier draws as “res publica” and spaces deprived of civitas what Krier draws as “res privata”, i.e. the economic space. A similar distinction occurs in Aldo Rossi’s The Architecture of the City (1986) where urban facts stand out as “primary elements” (res publica) and “residential area” (res privata).
Nevertheless, these are always building objects separated by open urban spaces. What is missing is the urban space, as Rowe and Koetter also say in *Collage City* (1979), which I call “civic architecture”. The reticular nature of this common space is a topological characterization that configures it as a highly connected space, and it is very important. One can produce many kind of grids. I show some of them here for you to understand what architecture can do with this type of civic space.

![Figure 3](image1.png)

**Figure 3.** Three types of spacetime: common, public, and private and how international modern architecture refers to them (Image by the Author after Leon Krier).

![Figure 4](image2.png)

**Figure 4.** Typological grammar of civic architecture: common, public, and private spaces (Image by the Author).

13. **MANUFACTURING OF MOVABLE AND IMMOVABLE PRODUCTS**

It is useful to refer to another subject, i.e. the evolution that also affects the urban culture with respect to urban problems. A long-lasting belief, shared for example by Le Corbusier, states that modernity needs to respect some monuments not as actuality but as historically valuable, while all the remaining parts of the city must somehow be updated. Le Corbusier thought that we should continually change our “machines à habiter” as we do with our cars. Later, in Italy and abroad, we began to understand that the historical center should not be managed like the rest of the territory. We made plans for the historical center, transforming it into a kind of reservoir of monuments or a museum of historical architecture under the protection of restrictive rules. Yet beyond such an historical reservoir, the modernization of the city could run wild.
During the 1996 UIA conference in Barcelona, I showed a triple map where the territory unfolds according to an organic, evolutionary, and non-chronological concept of time. The first drawing illustrates the heroic phase of modernity, envisioning the preservation of every single monumental building. Progress is going to change everything for the better, except some monuments preserved through an archaeological approach. The second drawing exposes the insanity of such a claim. One cannot preserve any monument without its context, streets, building fabric, walls, et cetera. The third drawing shows a further step. Communication lines, railway equipment, ports and airports, industrial plants related to such infrastructure shielded from trees, and control systems aimed at avoiding their pollution—everything joins an infrastructure grid.

![Figure 5. The evolutionary project for a sustainable city (Image by the Author).](image)

Apart from these indispensable infrastructures, the entire territory is a landscape that preserves its traditional order, alternating small urban centers and farming areas. This provides coherence to different bioclimatic architecture regional typologies and protects from forms of modern internationalism. The Ispra redevelopment competition project is an example of such a re-territorializing process. Landscape is not stuck in the past. Rather, it is an ever-renovating language. During use, it takes words and figures from the past as we do with the language of Dante and St. Francis. Even though those languages were formed during the 12th and 13th centuries, they still exist in our everyday conversations. Such a language is coherent with our culture, and it allows us to express concepts that we could not utter through a foreign language. This is also true with architecture. An architectural literature fitting both cities and countryside should be able to provide types of compositional elements and find ways to use them. This is our language in architecture. There is no reason to eliminate such a language, as it happened in so many suburbs on the basis of a matter of taste and for the sake of “being modern”. We accepted to throw away glorious architectural traditions. We have taken modernization as a dogma, yet ultimately it is rather a colonization. In fact, modernity has turned into triggering the liquid society described by Bauman (2000) rather than a form of progress of the actual civic city. By the way, it would be more appropriate to call such a society “nomadic” rather than “liquid”, and so highlighting the cultural and territorial origins of this rampant modernity.

Due to its specific culture, Italy should instead preserve its urban building tradition. We used to build better cities than those of the current nomadic merchant companies. The state of the planet on the other hand—I am talking to persons who deal with sustainability—shows that the culture of modern architecture, which many consider appropriate, unavoidable, and mandatory, is not at all compatible with the planet. We could also put down an infrastructure blueprint as long as infrastructure does not harm the landscape. Plants and infrastructure shall fit the system. This way, they would enjoy a faster and more functional circulation.
14. MORAL AND TECHNOLOGICAL EVOLUTION

Figure 6 shows that, nowadays, we measure our evolution based much more on the machines we use than on what we ourselves do to improve our behavior. The result is the oddity of troglodytes with nuclear weapons. When humankind waged war by throwing stones, fighters were more intelligent than the pebbles they threw. Those who launch the atomic bomb are much less intelligent than the bomb. Even some techno-scientists discussed this problem. Until a certain time, we had a development, a progress both in technology and in morality. As a scholarly subject matter, morality was discussed in books and taught in schools and churches. This subject has literally disappeared during the last three or four centuries. In his relevant book, *After Virtue*, Alasdair MacIntyre analyzes the condition of institutions dealing with moral issues, and compares it to the situation of institutions dealing with technological issues. Research and technological innovations have rapidly progressed, while moral and social knowledge is still, if not even, regressed. A lot of work for innovating technology corresponds to very little work spent on social innovation (despite EU funds). It would therefore be worth it to study such a subject matter—who would dare claim that we do not need moral and social innovation?—and establish appropriate institutions or modify those we have fortunately inherited. What we see on TV is troublesome and makes it clear that, even in the eventuality that the invention of terrible bombs were a real need, it were better if it followed the development of moral and social institutions that educate people to manage a Kalashnikov or an atomic bomb wisely.

![Figure 6](image_url)

Figure 6. Moral and technological evolution (Image by the Author).

Instead, the inverse occurred. We did not respect the law of necessary multiplicity. Therefore, the system does not have sufficient complexity, multiplicity, nor the ability to face the complexity and multiplicity of the state of affairs. The United States alone is responsible for 35% of the world’s weapons trade (Tian, Fleurant, Kuimova, Wezeman, & Wezeman, 2018). The spread of weapons is just as devastating as chemical, thermal, or radioactive pollution. How can we even call a country that sells weapons “civilized”?

15. LIFE EXPECTANCY AND ECOLOGICAL FOOTPRINT

Look at this MIT Press advertisement promoting “Science for the common good” (Fig. 7). So far, science has done almost nothing for the “common good”. Its progress is for experts only, and its few benefits are freakishly expensive. Science has really taken few steps toward building peace. There are no signs nor institutions dedicated to building peace. Except for Pope Francis, who occasionally, for our good fortune makes his sermons, no other institution deals with peace nor the design of settlements meant to improve the propensity for peace. Cities that do not need to import more than
25% of what they consume would be much more self-sufficient and resilient. Thus, they could resist against the blackmail of acquiring very expensive goods and supplies, and experience a much less tense condition. This is especially true for countries where intense migrations occur. It is more beneficial to teach migrants to build self-sufficient ecovillages rather than turn them into dependent consumers, as the industrial countries are actually trying to do.

Advanced countries should survive by consuming very little, especially the soil of others. They should have a low ecological footprint and a high life expectancy. Now, let us make a comparison between Italy and the ideal of current civilization, i.e., the United States. If the U.S. lifestyle goes global, we would need the planet’s resources tenfold. This means that even now, the United States lives in a luxurious waste of goods, most possibly because they dominate territories that support such a way of living. At any rate, the United States ranks 45th in terms of life expectancy (World Population Review, 2018).

Figure. 7. Comparing the U.S. and Italy on life expectancy and ecological footprint (Image by the Author).

Nothing personal against the United States, where I have many friends, but these are facts. On the other hand, neither Italy is enough for itself. Its lifestyle, once globalized, would require two and a half times the planet’s resources. This is four times less than the United States, though, and somehow we can better it. Italy, however, ranks 3rd in life expectancy (World Population Review, 2018). This means that the less Italy relies on mechanistic ideals the better it functions. In order to be sustainable and resilient, Italy ought to look at its cities, craft, and typical form of economy. In my opinion, this is a relevant subject, and it implies other arguments. For example, what Italy should require of the European Union, at least. I am certainly in favor of European enlargement, provided such an expansion, based on industrial culture, does not take away qualities and characteristics that grant our life quality. Features of industrialism, in fact, are quite alarming for the life of the planet.

16. SOME DAMAGE THE PLANET WHILE OTHERS PAY FOR THE DAMAGED PLANET

The following image (Fig. 8) shows how the richest countries warming the planet suffer its consequences much less than others. This is also a way of invading. Yet during the crisis provoked by the richest countries, an Anglophone journalist called Portugal, Italy, Greece, and Spain “PIGS”. Now, just look at the 2008 crisis. We know who caused it. It was not Italy, yet it costed us monstrous damages. The crisis has been worse than an epidemic and brought death, factory closures, and emigration.

Those contributing the least to the greenhouse effect will suffer the greatest from climate change.
Such a paradoxical statement shows the irrationality of the market in distributing the damages produced by global warming. This refutes the claim that the market is a just ruler. The market covers up responsibility for the greenhouse effect, so that damage can continue without anyone being held accountable nor obliged to stop or compensate for the bad deed. This shows how the market is useful to some and harmful to others. Further, by hiding responsibility, the market breaks the feedback that could create future actions based on past consequences. This is why the inhabitants of global warming-affected areas are forced to flee, cross the Mediterranean, and arrive to Italy or Greece. The main perpetrators refuse to stop damaging and do not want to compensate these people. They do not even want to welcome them when they migrate. Market supporters force all of us to inhabit a planet that they damaged and made less habitable. At the same time, they demand to keep damaging it. The major cause of this dramatic loss of freedom stems from the market imposing an interpretation of land as a fictitious commodity. The market disrupts human life, causes widespread injustice and inequality, and provokes phenomena, such as migration. Similarly, the migrant labor force is considered a fictitious commodity. Migration damages the labor market of the countries where they arrive, as greater workforce availability affects the local cost of labor. These further, unfairly distributed damages also depend on those who warm the planet.

The market gives events a character of randomness and triggers a harassing competition that makes every future uncertain. This assimilates life to gambling rather than a project, and gambling pushes human beings to fatalism, thus worsening already problematic situations. The transformation of urban people into masses who believe to be individuals, results in an increasing sense of disorientation and dependency.

17. THE EXPLOSION OF CIVIC ARCHITECTURE

The cover of Colin Rowe and Fred Koetter’s Collage City (1979) highlights the radical diversity of the old neighborhood’s civic architecture versus the modern part of the city (Fig. 9). The ancient part has a “public sphere” as figurative architecture before iconoclasm. It is a well-articulated and visible civic architecture. The modern part, instead, follows the iconoclasticism. Its “public sphere” is verbal, i.e. it exist as “opinions” expressed daily in newspapers. However, industrial urbanization makes cities explode. It disassociates and disperses civic communities, fading their territorial boundaries and producing suburbs with buildings that differ from each other by type and style. The reciprocity that
made every building belong to the city and contributed to its form disappears. It is the end of a system composed of subsystems (rooms of a building) and supersystems (streets and squares).

People used to come to the world with roles that they played within institutions useful to their lifestyle. Scenes of buildings, furniture, clothes, and products helped them play roles that complemented the roles of others in the comedies they all passed through. Cities gave meaning and feeling to the beliefs that oriented the behavior of these multi-person communities. Such a complexity of languages made cities able to communicate. It embodied knowledge, and knowledge played in different comedies, which customs or moral projects made consistent and meaningful. The plan of a city and the coherence of its civic architecture grid that connected all citizens was a common, coherent, shared language that everyone “spoke” in order to communicate and share a way of life.

Figure 9. The cover of Colin Rowe and Fred Koetter’s Collage City (1979) confronts the compact ancient city and the sprawled modern city.

The cities of modernity, on the contrary, exploded and disassociated. The main interactions occur now at a national level while local nodes become marginal. The image on the right of fig. 10 shows a comparison between a nearby communicating city and a tele-transmitting city. Three parameters show the difference: the distance from the road axis, the length of the block’s ground connection, and the height of the buildings that face the civic architecture. Less distance from the axis, greater length of ground connection, and lower façade height facilitate interpersonal and communicative relationships, as well as safety through social control.

The modern individual enters alone into a disciplinary world. Such a world is by definition unique, objective, pre-existing, independent, and external to him. The individual looks at the world by mirroring it in his internal mind. If he is wealthy enough, he can buy some partial knowledge about the world, yet never a holistic knowledge. He will thus be able to make a living out of such a reductionist and commodified knowledge by transmitting monetized professional advice and helping his clients survive in a forest of unfathomable laws. In some of those disciplines, he can even excel and contribute to their renewal.

In Italy, only 25% of people hold a degree versus a European average of 40%. Such a “shame” stems from a non-modern social character, which Italy should, in my opinion, preserve. The great social capital of Italian communities and the complexity of their languages preserve a highly distributed and non-fragmented knowledge. This also distinguishes our centuries-long ability in activities originating from an iconic language. Modern disciplines, which tend to be iconoclastic, have erased such a
language elsewhere. The individual is a “single-person community”. He is destined to receive “rational” orders by experts in charge of the vicissitudes that life reserves him. The individual is meant to struggle in order to tackle with the randomness of events and other individuals who in turn, continually, challenge him in this conflict of obligation. As a potential “king” or “emperor”, he will always live as a miserable individual, a one-person community. He will be far from the regal roles that only very few, predestined people can in fact achieve in market societies. Nevertheless, the exclusive, supernatural prerogatives of the few will be emphasized to him daily as lottery winnings—a lottery in which, usually losing, he is freely forced to participate. Deprived of any comedy, he is free to play only monologues. If a partner shows up, he cannot help but play the role of supporting actor, making both of them sad.

All of our actions are intertwined with the actions of others on the world scene. This happens through a common narration/script, which even if unrecorded (and therefore implicit), operates through our discursive practices and behavior. Even the buildings and the cities in which we live presuppose scripts that we interpret. Human behavior is always the result of two components: one carries out interventions for improving places’ habitability experienced by living, according to this implicit screenplay, while the other interprets the project or “screenplay” embodied by these interventions. The interventions grasp the recurring typological model by emulating successful experimentations. There is always a narrative behind our actions. We act as if that narrative was true and therefore shared (or shared and therefore true).

![Figure 10](image.png)

**Figure 10.** Sustainability turns a sprawled city into a modern, compact city. Right: compactness of blocks versus compactness of towers (Image by the Author).

18. **CIVIC BIOCLIMATIC ARCHITECTURE**

Architecture is a form of knowledge: architecting means thinking in terms of architecture (March, 1998). My design research has led me to imagine a bioclimatic civic architecture for a regional city as opposed to any international aesthetics. The façades of both isolated monoliths and civic architecture should follow the orientation of the sun. If they do it, the typology and urban fabric will change accordingly. Therefore, the cities will also differentiate in relation to their climatic regions as well as their cultures. This simple concept goes against the international market’s mono-dimensional standardization and its toxic stylistic and aesthetic variations.

The outcomes of the Lana project (see ch. 27) are valuable because they lead the block district and urban fabric to the solar block. We have used the solar block in many other projects. It constructs a correlation between architecture and the city. The interpersonal space’s morphic field, embedded in civic architecture, becomes then able to speak.
The façades can also become the prospects for civic architecture networks. While raising environmental quality, they offer orientation with respect to cardinal points. Architecture orientates paths within the urban fabric.

![Image](image1.png)

**Figure 11.** Bioclimatic civic architecture connects city and architecture (Image by the Author).

### 19. COMMUNICATIVE AND INSTRUMENTAL CIVIC ARCHITECTURE

This means that building without changing the system and the moral beliefs of a city is useless. For example, it is useless to build Sienese palaces in Houston, which represents the archetype of the primarily instrumental city. Downtown is the reference center of Houston. There is enormous sprawl around it composed of single-family houses connected by a gigantic infrastructure network to speed up the whole system. One cannot even compare such an instrumental megalopolis, which transmits commands or suggestions, to the communicative city. The paradigm of communicative city, Siena, is a city that discusses.

![Image](image2.png)

**Figure 12.** Siena versus Houston: communicative and instrumental character of the city (Image by the Author).

The Italian and some European cities represent the best civic typological model of deliberative democracy. No other experiment in the world achieved such a level. The evolution of the civic community has reached such high levels because figurative communications nourished it. Image communication organically joined the moral project of Christianity and the evolution of classical art in Greece and Rome. The Roman Republic unfolds classical art through rhetoric. Romans had learned
to use rhetoric instead of fighting, thus making conflicts negotiable. Through the art of law, they recorded and transcribed the agreements reached through the art of rhetoric. This made it possible for cities to last for centuries. Such a tradition continues. It lasts as long as languages, which, even if suspended for some time, resume when someone reactivates them. This culture for me, and at least some Italians, is still alive in the composite language of images and words that we continue to use, even though the secularized government of Italy does not belong to this part of Italian culture.

20. GOTHIC INTERNATIONAL CIVIC ARCHITECTURE

Notice how the internationalization of architecture is a mercantile barbarization and a colonizing activity. Such an ideological internationalization aims at making believe that the same commodities fit everywhere. Nevertheless, despite being reproduced everywhere, this architecture is not actually international. Techno-sciences want to make believe that, although these systems pollute and waste energy, this architecture is suitable everywhere. Yet its substance is Gothic, belonging to North European and North American cities. Its design bears the mark of poor light and cold climate, which is where it fits. It is unsuitable where strong light and arid climates require other exteriors. Nowadays, the same glazed casings are used in Finland, Spain, and Iran. They are chosen not because they are right, but because they are both ideologically and technologically possible. Their systems pollute by consuming non-renewable resources, such as oil, and their interior quality is quite low, despite all the lies about technological progress.

Figure 13. Buildings that inhabit time, not space (Image by the Author).

Instead of pursuing a regional exterior, as architects have been done for millennia, modern designers focus on regional heating or cooling systems. Both the environment and urban comfort pay a terrible price for this. As in most cases, modern technology allows unsuitable life forms to exist by correcting major deficiencies at a very high cost. For the sake of aesthetic, overly capricious, hyper-commodified international casings, life takes on poor quality and a precarious, unsettled condition.

21. MORAL AND IMMORAL GOTHIC SKYSCRAPER

The famous Berlin competition skyscraper by Mies van der Rohe is indeed not only beautiful but also regional. It is composed of large bay windows, which, as in traditional buildings, capture the poor light offered by the northern European climate. Mies’ project is exemplary, but the same window...
system in Mecca is nonsense. A very similar 830m-high building has risen in the arid climate of Dubai, where such a casing is utterly unreasonable, even though it looks so evolved for having reached such a height.

If architecture will become again—as it long used to be, especially in Italy—an architectural language shared among urban designers, then it will improve its communicative and civic character as well as its performance. Starting from its own historical cultural tradition and climate, each region will be able to develop languages specific to their civic communities. We will communicate and think in architectural terms, and further—we will communicate in Italian architectural terms. Today, architecture is a way of marketing a production that colonizes our culture. We see a tradition-less culture colonizing a 1000-year-old tradition culture, arguing that tradition can only serve a little tourism economy. Noventa used to say: “Un imbecil trova un che lo amira anca in un, de lu, manco imbecil” (“An imbecile will always find someone more imbecile than him, who will admire him”) (Noventa, 1960, p. 92).

Thinking in Italian architectural terms means, of course, making and practicing an architecture that produces knowledge. This knowledge will be Italian in Italy, English in England, and so on, according to the language of each place. We need to stop thinking like the modern internationalism that fakes an international Gothic to promote an Anglo-Saxon-style world, pushing us to buy their multinational products. Alike, we share language and dialects and if they last, they turn into a shared memory. Let us find again the lost memory that has been a language for many centuries, especially in Italy through Vitruvius, Brunelleschi, Alberti, Palladio, et cetera. Cities have their own architectural literature, teaching us languages of use at different historical moments. Colonizers may not like it, but they never ask if their disgusting technocratic modernity disturbs the colonized.

22. ANALOGICAL CONSTRUCTIONS AND CONSCIOUS DIGITAL PROJECTS

Understanding architecture as a language, and therefore a common good, stresses the importance of drawings as its notation system (Goodman, 1976). Such an ability has been typical of architecture for centuries; however, commodification has transformed it radically. Unlike autographic arts where the composer must identify with the performer, allographic arts allow for distinguishing the composer and the performer. Allographic pieces of art can therefore be performed, re-performed, restored, and
reconstructed even if the composer is absent. They can last more than a generation, like verbal language, theater, dance and, I believe, architecture.

Moreover, using a biological paradigm, we could say that our actions, intertwined with the world in which they operate, contribute to producing the phenotype of a genotype, i.e. the analogical construction of a digital project we trust because it feels natural to us, even if sometimes we are unaware of it. We belong to that project where we play roles referring to a community survival program in which we also survive. The many construction and maintenance interventions express, in an analogical way, the content that the projects preserve digitally in form of drawings, stories, theories, photos, paintings, texts, et cetera. It is as if, through the evolution of a “niche construction”, the built landscape represents an external memory and an orienting tradition, i.e. both the analogical and digital components. For the community that inhabits those buildings and shares their memory, they become a composite language, which, by involving constructive practices intertwined with other languages, constitute the analogical and digital components of architecture made of buildings and drawings. Discursive practices move from conversations to written texts. The same occurs in architecture. The “double movement” of the “great transformation” (Polanyi, 2001) implies the coexistence of two genotypes. One corresponds to cultural communities and the other to market societies.

These are two radically different genotypes, and presuppose two different beliefs. One makes people act as if it was necessary to resist the progress of market societies and the damage of the planet as cultural communities, not as individuals (or mono-personal communities). The other, on the contrary, makes people act individually as if the technological progress pursued by market societies had to erase the traditions and the communicating cultural communities of the past in order to realize itself. The community genotype comes from settled, self-fed, and rooted cultures, aimed at perfecting a form of subsistence that refines the quality of civic life. The market society genotype comes from the nomadic cultures of exchange and hetero-feeding. Both are active, but the predominance of the second makes the manifestations of the first look unfashionable. Yet the current state of the planet shows that only the first one will let us survive, because it pursues a development that is directly proportional to the development of natural systems.

23. THE GREAT TRANSFORMATION AND DOUBLE MOVEMENT

When refuting the 19th century European liberalism (but not individualism) that followed the French Revolution, some early 20th century societies challenged the colonial market societies of the “great transformation”. They tried to replace the project, which we have called genotype, with a different project. The construction of this other project, however, produced so many errors that it became completely ineffective and even made things worse. In fact, it gave reasons to believe that an alternative project was impracticable and that the right thing to do was strengthening liberalism and individualism. The colonial market societies that some early 20th century European states wanted to break down were already industrial, and therefore, integrated into the vision, narration, or genotype of techno-science.

Unfortunately, the nations that wanted to challenge the colonial, market societies did not move toward a local and civic scale. They did not promote the settled civic communities and their desire for autonomy, deliberative democracy, and knowledge embedded in regional languages. On the contrary, these nations imitated the national and international scale of their opponents, and finally upgraded them with super-technocratic, totalitarian organisms of state capitalism. The complexity of the universal disciplinary knowledge turned Western social democracies into “representative democracies”, just like the market societies. This transformed the totalitarian countries of the 20th
century into engineered social machines—technocratic dinosaurs versus the dinosaurs of the market. On one hand, there were powerful individuals in charge of national public companies, the totalitarian states, where as on the other there were powerful individuals in charge of multinational private companies, the large international corporations. Both based their power on the Enlightenment’s enigma of the universal individual.

In the Kantian definition of Enlightenment, it seems that man leaves the state of minority when he is able to make use of his own individual intellect without guidance from another (Kant, 1784). Rather, I believe that it is precisely the lack of relations with others, mediated by language, to keep the human being in a condition of minority. I do not mean a passive relation, of course, but a relationship among peers who address and discuss common issues together. Relations with others may involve: a) other components of the symbolic community by a shared language, and b) other components in dialogue/critical discourse on comprehensible subjects, because they are included in the common language.

In adopting these considerations, we should ask ourselves whether techno-sciences could save us from the state of minority. The condemnation expressed in Dialectic of Enlightenment (Horkheimer & Adorno, 2002) is confirmed by the damaged state of the planet, which demands reflection. The discursive practices of the techno-sciences base their own justification/indisputability on the pre-existence, uniqueness, eternity, and independence of the observed world understood as res extensa, interacting with an individual mind understood as res cogitans. The eternity of the foundation seems essential for relying on such an external point of support, which should transcend any human interference.

24. CULTURAL COMMUNITIES VS. TECHNO-SCIENTIFIC METHODOLOGICAL INDIVIDUALISM

The majority of techno-scientists support methodological individualism and materialism, i.e. confirm a powerful pact that is constitutive of scientific communities. The pact is the ground for many other beliefs. Being unquestionable, the world of techno-sciences goes simply undescribed, while no alternative is accepted. Pre-existing and independent of any assumption or action that it constrains and motivates, the pact cannot be called to its responsibility with respect to the consequences it induces in the various players’ actions. It is precisely this ideological irresponsibility to make the agreement untouchable, but also totalitarian. Its spiritual/conceptual power is not distinct from the temporal power. This way, it was able to undermine other spiritual powers by replacing their worlds only to become the one effectively integrated into the various temporal powers operating on the planet, without openly supporting them.

The validity of most research carried out by techno-sciences is valid only for a world made in this way and for behaviors that act as if that constitutive agreement were unquestionable. However, I believe that this pact is responsible for the problems posed by the current state of the planet. Because of this, techno-sciences cannot represent a way out of the state of minority. The reformed, mono-iconoclastic linguistic communities, which are the individual minds, pretend to have the ability “to use their own intelligence without the guidance of another”. Yet this confuses the guide of another individual mind with the constraint/influence of a linguistic community. In fact, it only makes sense to talk about someone’s guidance within a shared linguistic community. Kantian references to the universe cannot presuppose a universal linguistic community, let alone individual. By eluding the linguistic communities, the crucial question remains eluded. Aware that there is no private language nor mono-personal, individual linguistic community, the techno-sciences imply an
individual/universal linguistic community—and this is the source of confusion. I have tried to define this individual/universal linguistic community as a transmitter to distinguish it from any communicator. Only by discussing with other people who share their linguistic community we come to know something interesting and pertinent to the common good. In short, the view of transmitting linguistic communities of individual minds impersonated by techno-scientists is very different from that of a communicating linguistic community. However, it is even more different from the view of a communicating symbolic community that integrates images and words, i.e. where the iconic composite language of Christian cultures operates. For these communities, the world we inhabit, including economics, is not limited to being the referent of verbal languages. Rather, the world itself can be an iconic language (made of architecture, civic content, figures, et cetera) and communicating linguistic communities in fact can “speak” it. This is a great difference, and I am not speaking of any futuristic utopia: these symbolic communities have been in fact operating in Italy and Europe from the 9th to the 16th centuries. In Italy, this went even further until the 19th century and still occurs seldom. If compared to the current economic conceptions and the transmitting linguistic communities’ worldview, the disappearance of symbolic communities explains much of the current, unfortunate state of cities and urban planning.

We believe that the object of our observation is a material thing external to us and subject to reification, even when observing the human mind (identified by the brain), the world of life, economic processes, and social behavior. Polanyi rightly criticizes this conception, which has become the constitutive pact of a knowledgeable community. The latter has therefore an implicit entitlement to tell us all about the world and society. This widespread bias facilitates the economic propensity to consider human labor-force as a commodity, which can be driven, changed, and thought of in abstract terms. It makes both money and the lands of the planet appear as fictitious goods. The power to buy lakes, forests, plains, mountains, et cetera, and then even buy money to multiply such power, involves a wretched re-codification of the world. The price of such fictitious commodities thus drives economic behaviors and an ethic of profit that the individuals feel free to adopt everywhere. This non-negotiable interpretation is the real cause of the current blindness on environmental damage. It does not allow seeing the responsibility of the agents fed by techno-scientific knowledge, which have also become fictitious commodities. Thus, our surrounding natural environment, the vital *umwelt* or “world of life” that is completely incompatible with the current commodifying interpretation, is reduced to a drive for “individual good”, i.e. the wealth of the very few, instead of the “common good”, which represents our survival. This wealth for the very few is automatic, provoked by the many financial vicissitudes of an economic scenario where money is a fictitious commodity.

Of course, those who believe in techno-sciences do not think that the observer reifies the environment. They think that it is inevitable for the observer to find the environment already reified, as it seems natural to consider land and labor force subject to the rules of the market. This is the magical world of a few idiots, and its conditions show that they do not know what to do with it. Everything is naturalized, including our “healthy competitive aggressiveness” facing the scarcity of the planet’s resources. Authoritative parables motivated by irrefutable experiences of the substance of the world (not of the ought of our moral behavior) dominate the discourse. Given the inevitability of these observations, even their non-questionability is inevitable. Yet behaving accordingly (is not the freedom of individuals to act according to the market indisputable?) leads to a contradiction, because those very techno-scientists realize that the damage of the planet is continuously worsening.

The conclusion of all these reflections is that we can no longer act as if the world were the one described by the techno-sciences. In fact, we cannot survive in the world that those beliefs have built.
Thus, these beliefs are unsustainable. The brother of Karl Polanyi, Michael (Polanyi, 1968), made it clear how the external, pre-existent, independent, unique, and material world does not make sense. The individual minds that observe it do not make sense. Yet if all this made sense, then individual minds would see the world that way. The point is not that the external world does not even exist. There are so many things contrary to our existence. The point is that such a world is simply not good for us. This is the fundamental question. We are not interested in the substance of that world, but in its substantial fitness for our survival. Poisonous mushrooms and shit exist, but we do not have to eat them because they do exist.

25. BUILDING THE MORAL WORLD AS A COMMON GOOD

The search for a lifestyle compatible with our survival is not a techno-scientific problem: it is a radical moral question. We are not interested in whatever can exist or not, but in what makes us feel good together.

I am not denying the existence of this damned, ever more damaged world. It unfortunately exists, but we need the freedom to refute it when it proves unable to make us survive. The world is increasingly damaged by the pursuit of a development, which is inversely proportional to the natural development of the planet. This world shows too exclusive benefits for the very few. We can no longer tolerate the exaggerated and badly wrong distribution of the costs, which we no longer intend to pay. We need social and moral innovations, not technological innovations.

The liberals knew no discussion. Within the replacing transition from languages to techno-scientific disciplines, they used a complex symbolic system, which we could call “monetary language”. Consistent with reductionism and mathematization, such an economic skill, that is the new-born cognitive economy, was branded as “free choice” by aesthetics.

The communists of real socialism knew no discussion as well. They used the scientific language of techno-sciences in a direct way, without any aesthetic mediation. In fact, there was no reason for the free choice illusion, hence embellishing goods with aesthetics and marketing, in socialist countries, since direct distribution was in charge of needs.

Both liberals and communists replace the moral system, i.e., the language of customs, with scientific disciplinary rules. These operate through laws and professional advice.

It is the absence of discursive practices, which hinders any possible democracy in both cases. Seemingly, the minimal liberal state is impartial, tolerant of every culture as long as this does not interfere with the “laws of nature”. These “laws of nature”, of course, include the laws of the market. In fact, multiculturalism seems above cultures. Techno-sciences, economics included, enjoy such a privileged position today. Hence, nobody can question them, unless he or she is a disciplinary expert.

Knowledge used to be the content of discursive practices, but now it turns into the research subject of techno-scientific disciplines that see the world as unique, independent, and pre-existent to its researchers, which are individuals external to it. Our feeling of being external to the world is actually the experience of being outside the symbolic communities, which interact with a world communicatively internal to their life. It is precisely this sense of the world’s being external to the individual mind, which produces the “freedom” to subdue the world. Such a “freedom” is actually damaging the world to destruction. Rorty’s critique of mind as a mirror of nature (Rorty, 1979) deals with the individual mind and misses the symbolic communities. Deprived of the symbolic communities that allowed them to speak and excluded from the disciplines that hold all the
knowledge, humans become masses of individuals. These are commanded by the images, which aesthetics puts to work for the (immoral) “mercantile moral project”.

Advertising deludes the people who believe in their own individuality and each in being different from the other. Yet if everybody is different, nobody can understand each other. Docile masses of individuals who crowd megalopolises receive the same messages from the media every day to consume the same multinational products. They are encouraged by the pervasive ideology of the market’s objectivity into the lifestyle of our modern Playland. They need to be different from what they were last week and from the others, who also need to change. Their lives are volatile, nomadic, liquid, and follow the rule of systematic precariousness, which prevents the formation of codes, friendships, and sharing. Modernity has invented masses of consumers. These individuals are connected at a distance, travel continuously, and simultaneously receive the same messages that influence them, so they think the same and virally mimic each other. As they do not have any opportunity to speak within differentiated communities they are not aware of this transmitted information, which they cannot control, and which operates rather as a series of commands. In a world of megacities, the secret information of the Internet operates as commands, even when featuring a pseudo-religious character, as happened recently with the wars between the West and the Islamic State. Information affects everyone by reaching randomly to even the least suspecting. TV adrenaline broadcast hugely supports such a reduction of individuals into a mass. They keep calm while absorbing information in the quietness of their home, but in reality media (first radio, then TV) have been the major instruments of every totalitarianism.

Figure 14. Two opposite projects for the city of the future.
Citizens versus the urbanized (Image by the Author).

This helps clarify that in fact there is not much difference between state and private capitalism. State capitalism aimed at communism expropriated the private, while private capitalism aimed at liberalism expropriated the state. It is clear that the individuals do not control any means of production at all in both these forms of capitalism. In fact, labor, products, and architecture become international. Therefore, these dissociated mass-individuals spend their lives in lots and apartments, commuting through misshapen suburban streets. The city is decomposed, and its morphological and organizational complexity looks like an organism that loses complexity, as when fungal structures dissociate a dying organism and produce informal complexes of unicellular fungus. The suburbs are the result of the commodification of urban structures. Destructive processes of decomposition transform their wholeness into individual cell compounds (or isolated couples).
Cities used to have differentiated cells and function as complex organisms with many organs and many cells. Modernity, though, made these cells independent so they turned into a kind of formless, sprawling structure. From the organic point of view, such a process is a progressive decomposition that keeps going on as a strongly degraded organism. Unlike food chains, which correlate organisms to ecosystems through the increase of the overall complexity, humans have introduced monetary chains, which instead reduce the overall complexity of the environments where they operate. This also causes the destruction of the surrounding living environment in which they are located, hence all the disasters of the planet. Tumor too disrupts the organism, multiplying individual cells, just as it happens in society through the massification of individuals.

26. MODERN DISRUPTION AND FREE RIDERS

This phenomenon introduces a series of communication and transmission transport systems for transforming, at the same time, people into individuals and masses. Transmission networks keep individuals connected at a distance—not enough to relate communicatively, yet enough for receiving transmissions. They are connected to centers that send information and suggestions through social networks, the Internet, and an ever-growing transmission network. Urban infrastructures produce a lifestyle where individuals are kept far away from each other so as to receive many transmissions and to be able to manage very few communications.

To understand the difference, just compare the way in which music is transmitted today, compared to the past. The music of Mozart was transmitted through the notation system of scores. Who received the score had to know how to read them, know some composition, and have the ability to play an instrument. At that point, they owned all the characteristics to become composers themselves. On the other hand the gramophone, crowded stadiums, or machines that simply transmit music that was once performed and then reproduced in millions of copies, require no knowledge from the listener, who can get dogged by tribal rituals such as mass concerts. Anthropologists used to define such phenomena as “abaissement du niveau mental” (reduction of mental level); they induced a trance and therefore unconsciousness condition (Colman, 2008). This is in fact what happens to the spectators of musical transmissions.

Ways of being together span from the most conscious and responsible to the most dazed and irresponsible, depending on the degree of dissociation of the communities. Communicating and discussing citizens who own a composite language that allows them to govern themselves, side with responsibility. See the example of the deliberative democracies of the medieval communes. Then there are the crews of functional groups of people who believe they are individuals, and behave accordingly. These individuals therefore transmit but do not communicate. I am talking of armies, industrial organizations, plants, et cetera, which are directed from outside but are efficient in carrying out tasks. Then we have clusters of users to whom goods and services are transmitted. These are non-communicating, serial passengers and include the “customers” of representative democracies that express preferences and decide, but do not discuss, exactly as modern individual consumers do. Finally, there are the enthusiastic and fanatical clients, dragged by burning collective passions up to sacrifice: drug addicts, terrorists, and suicides, which are irresponsible.

It is clear that sustainability must support the recompaction of cities after their dissociation by the modern explosion. It is also clear that the market makes this an impossible task. The experience of my first bioclimatic projects carried out in the ’70s and ’80s led me to these reflections. Since then, I have understood that active politics is the only way to help survival on a planet damaged by
mercantile dissociation, and that the reconstruction of cities is the most effective way to do so. In a way, this means pursuing a subsistence economy instead of a surplus economy, which is almost always market-based.

**Figure 15.** The city of Parma “exploded” (Source: Google Maps).

This aerial view of Parma (Fig. 15) is a direct example of the urban explosion of the city, where people as communities become dissociated and turned into massified individuals, connected through media transmissions after the explosion. Media transmit orders and suggestions because the market needs individual consumers, not organized communities. The latter, among other things, would greatly reduce consumption of products because communities tend to share, while the market aims at “personal”, individualized products.

Figure 16 shows the effect of the explosion. Let us imagine the organs inside the human body. Only when an organism features a form of boundary or closure and the possibility of coordinating its organs does it become able to feed and reproduce itself. It then becomes even capable of awareness, i.e. it can coordinate its movements and correct its behavior based on experience, and therefore can improve and produce information. Of course, we are speaking of an evolved organism with a multi-layered organization. In fact, it is made up of cells that are already living organisms, which are gathered around organs, as well as organs joined within the organism. Because of these connections, the organism is an entity and can reproduce, feed, cure, and repair itself. Cities were born in the same way. During their evolution, cities came to what modern biologists who had observed eusocial organisms call super-organisms. These are groups of insects that operate in a coordinated way without any leader. In fact, the first interpretation of the eusocial insects life assumed the existence of a queen bee or ant commander because biologists could not imagine that a flock moved in an organized way without a head. They interpreted the flock as a mass of individuals. Totalitarianism always idealizes the leader: Hitler, Stalin, Mussolini, Mao Zedong, et cetera. These are always individuals, influenced by the idea of a new state and of a community regressing from multi-persons to mono-persons.
Thus, when the community or city—let us think of Siena—owns all its internal organs and its skin, i.e. the urban walls, we have the medieval commune. This operates as a deliberative democracy because its producers are able to self-manage the city without any leader. Citizens manage to take turns in governing the city. They are united by a complex system of languages that include language and, through Christianity, images. Siena is an excellent example of this. At this point, though, the city becomes a kind of superorganism that is able to reproduce, feed, improve, and heal its wounds, that is, the city features all the characteristics of a superorganism. Siena produces extraordinary sculptures, paintings, and architecture, precisely through such an evolution.

![Figure 16. The organic character of a settled city (Image by the Author).](image-url)

The organs inside the city allowed artisans and farmers to produce the city, before and above any other production. They self-produced their own existence and were able to self-produce their own lifestyle—where the work for export, the so-called surplus, was very limited. When modernization came, these organs were blown out. Multinationals and the market scattered the city organs throughout the planet. Because of such a dispersion, these organs then lost the ability to contribute to the formation of the city. They also lost the languages that once empowered them to exchange the information needed for producing the city, and started speaking different languages that depend on multinational commodities. Totally unrelated disciplines then ruled.

In Fig. 17, I show four phases as different possibilities of the same city. Take, for example, Turin at the birth of an important industrial factory, such as FIAT. During the first phase, the artisans contributed to producing the city with all its internal goods such as furniture, clothes, food, city walls, houses, roads, and other infrastructure. Now, these people are selected and brought into the factories to produce cars, ships, planes, and different machines. This occurs in factories that grow very big and specialize because their market is international. Factories begin to relocate outside or nearby the city, which turns into a corporate center. Big industry produces only one commodity-product. Perhaps it employs the entire city, but this puts the community at high risk. See what has happened to Detroit, the great “corporate city” that shrunk.

When alternative, green, and low-energy products were imagined, they continued to be developed separately even though their market could not be international. This is the second phase. Many envisioned a green market. Yet once architecture has become international, as well as having a very
strong ideological impact, it has consumed and polluted, and it continues to do so. Therefore, the second phase that substitutes the current high-consuming devices with green devices is not a viable hypothesis. These green tools are good in themselves but do not hold up in the context of the previous energy-consuming devices: we need to reassemble other systems.

Figure 17. Symbolic languages and communities versus techno-scientific disciplines (Image by the Author).

In fact, we need to move on to the third phase, where the alternative devices, bioclimatic houses, and all other positive productive experiments must become the organs of a civic community and be used to rebuild cities—but cities capable of self-production and not meant to work for any international market.

The last image, however, shows where the old market way is heading. Transmission keeps growing along further connections that are no longer physical road but data highways. Here we are with the so-called smart city hypothesis. This backs scattering factories around the planet to produce the same products everywhere. Such a path leads to the end of life, because this system is practically eroding the very life of the globe, which is turned into a dead, physical planet according to the vision of the techno-sciences. Even when speaking of life, the techno-scientific metaphors tune with the concept of physical systems, not of living systems capable of self-regulation and feedback.

We see here two completely different ways of building the city. The traditional city built in blocks has a strong network of civic architecture and meeting spaces. It is a communicating city. The city of separate, distanced building objects instead makes people completely lose their common space, such as the civic architecture and meeting places. New cars dart through the streets where people were supposed to meet. As many experiments have shown, this drastically reduces communication among people even in historical cities. The intrusion of cars even in the historical centers cuts off many relationships and makes communication impossible.

27. ANALOG AND DIGITAL CODING

I now need to present a relevant subject matter, taking up the arguments of point 22. We should imagine societies as if they had an analogical element, which is what we see built around us, and a
less visible, digital element. Any behavior or action that we see expressed or built in the environment always corresponds somehow to a theory that is digital: a project, a kind of genotype that is expressed through phenotypes. In order to dissociate people and transform them into individuals for the market to penetrate the city, one needs to change the project of the city, i.e. its digital element. This may happen implicitly, through beliefs, new habits, and suggestions sent via the network. These inputs continue to support the market machine. It is time to make this mechanism explicit.

First, we need to unveil and change those beliefs, because it is not possible to change any buildings if we do not change their project, their genotype. Experience has taught us that the analogical elements, the buildings, no matter if they were functioning well, may change without affecting the digital element. This project, this kind of program, even if invisible, is active in people’s behavior, morals, or ethics, i.e. the ethos that means customs and ways of doing. Somehow, the market has settled within societies where Christian morality, the moral project of Christianity, once stood. This is true for the Italian and other European societies. This change does not take place on the individual level but on the cultural community level. Trained to focus only on our individual mind and convinced that cultural communities do not exist, we are unable to see and make explicit those digital projects that are operating in our behavior.

The city of Parma, which we had first visualized as “disrupted”, exposes an extraordinary, compact historical center built during many centuries. The center of Parma has a very well developed civic architecture, rich in works of art. The techno-arts that produced it represent the life and economy of the city. The modern city does not mirror anymore its historical center. It rather speaks of itself through the TV and the stories that directly influence that project/genotype, i.e. those beliefs that I have just mentioned.
1. Crosara
I designed the Crosara Nursery School in Marostica in 1972. It represents the first example of a bioclimatic school building. Inspired by a steep slope and half integrated into the ground, the building system is characterized by the presence of a green roof and a double-height greenhouse. These bioclimatic strategies can almost completely control the temperature of the school. The sun-warmed air lifts thanks to the natural convection. It warms up the interior ambient by circulating, and then reaches a bed of stones under the ground floor where it releases its residual thermal energy. Kept in motion by the same convection, the air returns to the greenhouse where the sun warms it again. This flow operates throughout the day. Simple valves interrupt this cycle during the night when, always by convection, it would reverse, thus cooling the bed of gravel that is instead meant for warming. Besides playing, children can grow plants in the greenhouse even in winter. The educational activities are carried out around the central staircase, which is a theatrical architectural space.

**Figure 19.** The bioclimatic nursery school in Crosara, Marostica (Image by the Author).

The outdoor play takes place on the roof instead, where the natural cycle of the grass, makes the thermal resistance of the floor variable. The school, monitored in the ’80s by the Energetica Project of the National Research Council (PFE/CNR), was selected by the European Union as one of the most interesting demonstrative projects in Europe. RAI broadcasted a TV documentary to show the benefits of this bioclimatic school in the ’70s. Numerous technical publications have reported the data collected on the school’s efficiency.

Then, the municipality that had to do the maintenance let it go. The school was considered a kind of foreign body and, instead of becoming the pride of the city, turned into a very unusual, strange structure. Although the teachers found the educational spaces interesting, they unfortunately...
stopped following the instructions given to them. They did not keep opening and closing the parts of the school that would have allowed a much greater climatic efficiency. What does this mean? I say this to show that an architecture is not only made up of walls, glass, and roofs but also of people and their behavior.

2. Lana di Merano
If we do not act simultaneously on an analogical level by building examples, and on a digital level by spreading a new way of thinking throughout the communities that adopt these projects, then even the best analogical systems will fail and be unable to become operative. The digital element operates a kind of control at the level of language and its learning. These interventions cannot operate on the scale of individuals or one-person communities. They need to affect the scale of multi-persons communities who are the subject of communication. If the architecture I am speaking about does not become language operating within a specific symbolic community, then it certainly cannot work on an international or aesthetic level. It is like throwing away a score after having played it once, with the idea that it would serve to build something only once for a unipersonal community, just an individual. In reality, the score was not meant just for building, i.e. for forming the structure, but also for its operation, for the everyday behavior, cleaning, maintenance, repairs, improvements, etc. If it works better than the previous ones and can be an evolutionary example for the community—here is its usefulness as a control at the level of the community—it also teaches others how to improve new buildings.

Another very interesting example, also publicized by the European Union, is the settlement in Lana, near Merano. This is a very original system because it introduces the criteria of bioclimatic architecture even in outdoor spaces for the first time, in particular in the small square where the houses overlook, i.e. in the civic architecture. The dominant theme is the anisotropy typical of designed space: a double asymmetry of both the elevations of the central square and of the oriented buildings. The south walls capture the solar radiation. The north ones shield wind from both the buildings and the square. Within the square, the scheme is reverted: here the shielded buildings have most pierced walls oriented toward the north and the most shielding ones toward the south.

The row of apartments facing south features two interesting views, towards both the sun and the square. The row of apartments facing north has a single view towards the sun and the square. This is
a general rule for all buildings meant to integrate solar and civic orientation. For making these buildings, we had to perform many conversations/lessons with its future inhabitants. This also involved interpreters since the inhabitants spoke almost exclusively German. For illustrating the benefits of the project, i.e. of a bioclimatic district, we had the help of a very intelligent city council member. She supported us in explaining how the regional architecture characterized, for the first time, their specific cultural identity.

Design was therefore coherent with their politics. Yet as time passed, the vulgarity of modern peripheral internationalism affected them too. Image 22 witnesses that other local people did not understand the project. Some bio-architects might think that our intervention was the last of this small settlement, which started in the traditional way with subdivisions and condominiums and finally had some signs of a different architecture. In fact, things did not go like this. We arrived first with a participated, publicized, and monitored intervention. After that, the modern barbarism that a bioclimatic architecture, a naturally aired district had temporarily interrupted, was restored.

Yet when it was inaugurated in the early ’80s, in the span of a generation nearly thirty years ago, people enjoyed it for its peculiarities. They also acknowledged the identity of a project that, once built, could also physically confirm the benefits prefigured by its design choices. The use made by the inhabitants was also consistent with what we had discussed with them for a long time, and Figure 21 shows it: the characteristics of the gardens; the outdoor eating; the double floor of the square for the sun and the shadow, and its common use. All this triggered no emulation. Our intervention was the only one in the area for a few years. You can observe the current state of the
matter around it (Fig. 22), that makes it appear like a kind of elastic pulled to do the experiment and sucked by the modern habits of condominiums and villas: a subdivision of the traditional regressive modernity.

Figure 22. Lana di Merano today: learning and inertia (Source: Google Maps).

3. Via Torino in Venice Mestre

The recomposition of peripheral areas, which constitute the systematic decomposition of historic cities, is one of the most urgent topics, especially in Italy. Having developed many projects in this sense, I would like to show you one of them quickly, because of its meaningfulness: the competition project for the Via Torino area in Venice.

Figure 23. The university settlement in Via Torino, Mestre, near Venice, 1993 (Image by the Author).

The images compare the same area, before and after the intervention. The project foresees the possibility of working through small steps to reconstruct an urban situation preserving almost all the
existing buildings, yet simultaneously rebuilding a series of blocks. By separating the pedestrian paths from the vehicular routes, the project preserves and enhances Canal Salso and Forte Marghera, together with some elements of the landscape that need to be respected because they are strongly expressive of local identity. The project applied the experience of the bioclimatic district of Lana by extending it to the multi-typological solar block.

29. PROJECTS OF AUTONOMOUS MICRO-CITIES: THE ALCATRAZ ECOVILLAGE

Here I would like to illustrate our “Solar Ecovillage Alcatraz” project for Mr. Jacopo Fo, who owns a property in Umbria of about 400ha, 40 of which are destined to accommodate these settlements.

The intention of this project is to create a community of 210–240 people who operate as a highly self-sustaining laboratory, with a part devoted to farming. Several people are interested in this experiment, and we have been involved to design this micro-city. I call it a micro-city, because it is small but also shares all the features of a city, because it can live, i.e. work to feed, reproduce, shelter, grow, learn, and improve itself.

In the ’70s, we developed a study for the International Building Exhibition (SAIE) called L’Architettura dell’Evoluzione (Architecture of Evolution), published in Bologna (Los & Pulitzer, 1977). This book collected “integrated system” examples of constructions carried out in various countries to show that a high level of self-sufficiency is possible. I had accompanied this repertoire of examples with a theorization on integrated systems, which I had developed at IUAV as part of a research for the CNR/PFE on “limited resource areas”. The theorization dealt with integrated systems concerning the formation and functioning of a micro-city or a city, certainly not the megalopolis whose production is multi-national and occurs outside the city where only services or supermarkets exist.

![Figure 24. Thematic chart of the property, landscapes, and places of the “dispersed” ecovillage](Image by the Author).

The first achievement was a correct understanding of the Umbrian climate, especially of our working area, where we turned a whole series of isolated and abandoned rural buildings into districts. The diagram on the left shows how a ring-shaped path connects them to each other and to a newly built central micro-city, with two squares connected by the presence of a public structure for cultural and administrative activities.
All medieval municipalities, which we have studied for this project, have an internal and an external square connecting to the outside. These are well-known themes that belong to the typological repertoire of Umbria and other regions.

The scheme of Fig. 25 shows the agricultural areas connected through this ring, which represent a main path to which the various districts relate. We have analyzed the components of any integrated system or micro city, which are: the transport and commercial system, the construction system, the energy system, the system of equipment, machines and furnishings, the information system, the landscape that includes agriculture and food, the materials system from water to wood, stones, and waste treatment. We completely designed the micro city by working on these eight groups of components. We dealt with the water network issue, using collected, purified and distributed rainwater. After the water supply, we have dealt with that of energy. The mechanical energy is partly produced through photovoltaic collectors and partly from the network. The thermal energy is partly generated by solar collectors. The heating energy is mainly produced by the design of the bioclimatic envelopes. We designed these by largely interpreting the Umbrian architectural "literature", i.e. Umbrian architecture. The houses were therefore almost zero-energy, meaning that during the course of the year they only need external support for peaks. We naturally did a series of calculations to check the performance of the projects in quantitative terms.

The natural slope of the land has led us to study the cities of Umbria and their architecture influenced by recurrent orographic complexity. In particular, we chose a series of sites that were like hillocks where the pre-existing districts had already been located. It was very reasonable to locate our new buildings like this. To the upper right you may appreciate a typical section based on the common space of a district oriented in an east-west direction. Adapting to the average slope, the living rooms of the houses in the valley were on the first floor, while the houses uphill had their living rooms on the ground floor. This way, one can go straight outdoor south and north from the rooms.

The slope of the land allows the back of the houses exposed to north to bathe in sun. This is a typical situation of many Umbrian cities: just look at the square of Gubbio that is arranged on the sloping ground to understand how natural the use of this architectural language is for this. We have not adopted rows of solar buildings oriented and repeated to form a series of arrays, so as not to look at the back of the next building in a city. Instead, we have positioned the houses in order to make them convivial, to make them mutually overlook a common area, naturally taking care of how the orientation requires some transformations of building types according to their position.
We have adopted two well-known bioclimatic techniques, namely that of the building embedded in the ground and that of the solar building. The embedded-in-the-ground building is perhaps a little less known strategy (we adopted it also for the Crosara school project), quite common in America. In this case, the building embedded in the ground has a constant average temperature throughout the year. This partial recess in the ground allows to reduce a lot the energy consumption and to have a very interesting environmental quality inside. The two floors are therefore also a way for us to partially use this burial of the building and use everything that faces the sun for a smart capture of solar energy.

We have followed a solar typological theme that does not only take into account the distinction between north and south. We built and monitored some experimental buildings in Caorle near Venice and in Forte dei Marmi in Tuscany, where we could see how the difference between the morning and the afternoon is extremely relevant. In fact, some bioclimatic condominiums built in other areas of Tuscany had a direct solar gain from the south but the east and west walls were symmetrical. We found that even in the early afternoon of January the windows needed to be open or sheltered with curtains to avoid overheating the rooms, wasting all the energy that could be picked up in the afternoon. We therefore oriented windows and walls of our buildings in such a way that the morning and afternoon energy capture differentiate, giving the interior spaces different destinations. In the ecovillage project, the modules are equipped with a window toward the south. The panel has an angle, so that the living room gets heated during the morning when it is much used and the sleeping rooms are instead warmed in the afternoon. Further, the inclination of the glass reflects outside of the house half of the midday irradiation. In addition, balconies can move the glass back into the shade in summer when the sun is high.

By calculating the radiation released during the morning, at noon, and in the afternoon, I can tilt the glass accordingly, thus limiting that part of the energy to accumulate heat for the day and the night.

Figure 26. The Alcatraz ecovillage: modules; two bioclimatic solutions on slopes; morphology of the landscape, and solar energy absorption (Image by the Author).
Figure 26 lists some typological repertoire modules with their different fronts. Winter and summer simulations follow below: during the summer the sun almost does not come in because, moving the windows back, we shielded the modules following the height of the summer sun. Therefore, this device lets the sun work and takes advantage of its movement. Vitruvius had already experimented with it. He suggests in his *De Architectura* treatise to regulate the depth of the portico in relation to the latitude.

![Typological repertoire modules](image)

**Figure 27.** Bioclimatic typologies in the Alcatraz project (Image by the Author).

Figure 27 is about how an ecovillage should be under several points of view. It includes an internal common square and a second external square located in front of the theater. This public building works both as a theater and exhibition/events space. The rest of the settlement is formed by artisans’ workshops, shops, and public services facing the square. Crops are located near the houses, which have direct access to the gardens. A district is in the upper part. The other aforementioned districts are located below. An avenue leads to the second district called Capuzzola. Finally, the public buildings are distributed naturally in order to respect and indeed exalt the landscape. We took care of studying the different perspective in summer and winter. The architecture carefully avoids any aesthetic drift. It emerges by recomposing the Umbrian housing uses.

### 30. COMMUNICATING REGIONAL CIVIC ARCHITECTURE IN SIENA

The city of Siena is an extraordinary example of what I said about architecture, which embodies a contemporary language worth using not for the comedies of tourists but because it is the best way to turn the city into a subject of discussion. Siena was built with a town square, a church square, and an urban fabric formed by districts that have such a specific identity that it is preserved even in the present. In fact, such identity is very active in the interpersonal relationships of the inhabitants of Siena: it has a high degree of *civicity* in the life of this city.

The famous square of Piazza del Campo is very important. The public building that faces the piazza features frescoes that are a kind of master plan, meant to distinguish the “individual good” from the “common good”. Nowadays people call it *The allegory of good and bad government*, but the frescoes are about what today we call communitarianism (the common good) and liberalism (the individual good). Before distinguishing these two cities of the good and bad government, a very complex fresco stands out on the left. It is about justice. This does not limit itself to affirming that we need to be just. It rather explains a concept of justice that was enforced by the government of the Nine in Siena. It is the proposal of a project for the community to discuss...
it. In fact, it is a kind of iconic record of previously reached agreements meant to develop these agreements further.

The proposal is also about a community project established by the community for building itself. Therefore, it is not a mere urban project of buildings and infrastructure. It also involves civic dimensions, i.e. the people organized according to their institutions. This is precisely the reason why such a design is immediately communicated and felt as a common moral project. Located in the town hall, which is a protected, public place in front of the common square, the project belongs to the entire community of Siena. The representations of the civic, common architecture meant as a common good form a shared language of the civic community of Siena. The community mirrors itself in its own city as a person that is aware of his or her way of embodying the city and the city’s customs. The awareness and responsibility of the Sienese community is central in its ability to see itself in the effects of choosing the common good or in the effects of choosing the individual good. The ethics of figurative, iconic discourse shows the action of both the comedies of common and individual good. Choice is supported by iconic and verbal discursive practices. These help in sharing choices and, at the same time, learning practices.

The two main frescoes depict the inverted Y-shaped network of civic architecture. Sena Vetus (the old Siena) is the most ancient third of the city, i.e. the settlement of Castelvecchio and Santa Maria extended along the Francigena in the third of Camollia and in the third of San Martino, constituting the current Siena. Historians call the latter, Daughter of the road. We could say that the frescoes make this common space speak, and say, “This is the common good embodied by civic architecture”.

The essence of Siena is feminine: Sena Vetus Civitas Virginis, “Ancient Siena, city of the Virgin”. The seal of the Republic of Siena shows the image of the Virgin with Child and the inscription Salvet
Virgo Senam veterem quam signat amenam, “Virgin, you who beautify ancient Siena, please protect it”. As I pointed out before, the common good is nowadays named after “the good government” while the individual good is called “the bad government”. If the civic architecture is well said (bene detta = blessed) it turns into harmony, solidarity, peace, good governance, and beauty. When badly said, it turns into discord, competition, war, misgovernment, and ugliness. How much actuality evokes these words! Landscape belongs to the city and the related civic architecture as well. This includes the part of the territory beyond the city walls where the neighborhoods are located. On Porta Camollia, the door welcoming those arriving from Florence, an inscription reads, Cor magis tibi Sena pandit, “Even more (than the door) Siena opens its own heart for you”. The city of the individual good, i.e. the modern megalopolis, is ruled by hostility, reciprocal strangeness, competition, machines and machinations, war and the roar of arms and fights (Carlotti, 2010).

Figure 29. The Palazzo Pubblico (town hall) of Siena and the frescoes of the common and individual good (Image by the Author).

Finally, I would like to show how the Italian territory seems almost handmade for sustainability. Its special form allowed for producing most of its mechanical energy from the sun. Such a form, suitable for an alternative Italy, is more genealogically close to the Sienese Republic than to modernity. Italy could also be a typological model for other European countries. After having experienced the damage of modernity, they might resume a path that has already largely demonstrated its validity. Parma was not far from the Republic of Siena. I conclude with the wish to resume together the common good, that is, civic architecture.

REFERENCES


