Towards Neighbourhoods as Minimum Units of Resilience?

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Grazia Brunetta
Patrizia Lombardi
Angioletta Voghera *Editors*

Post Un-Lock

From Territorial Vulnerabilities to Local Resilience

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Preface

This book is the first result of the "Post Un-Lock" research project, funded by the Interuniversity Department of Regional and Urban Studies and Planning (DIST) of the Politecnico di Torino, a three-year work involving the collaboration of a large number of researchers belonging not only to different departments and institutions but also to diverse disciplinary areas.

The research involves teams from the Department of Environmental, Land, and Infrastructure Engineering (DIATI) of the Politecnico di Torino (such as environmental and geomatics engineers), the Department of Mathematical Sciences "Giuseppe Luigi Lagrange" (experts in mathematical statistics), and the Department of Medical Sciences of the Università di Torino (researchers in the field of medical statistics and epidemiology), committed to reflecting on the territorialization of the pandemic and the effects of pollution on health in cities.

The Post Un-Lock research took shape in the last months of 2020, triggered by the scientific impulse of the international goals of sustainability and resilience in the perspective of the post-carbon city and the overcoming of environmental, economic, social and health crises. Scholars have collaborated and tested on case studies methodologies, approaches, and tools capable of re-imagining cities and regions to overcome vulnerabilities and to innovate the socio-ecological system on the basis of the ideal-typical model of Local Resilience Unit.

With this in mind, we would like to thank, in addition to the authors of the chapters and their collaborators: the partners of the research such as the Interdepartmental Centre Responsible Risk Resilience Centre (R3C), the SDG11LAB, the S3+Lab (Urban Sustainability and Security Laboratory for Social Challenges), the CED PPN (European Documentation Center on Natural Park Planning), the Living Lab and the PIC4SER of Politecnico di Torino. We would also like to thank the external supporting institutions such as IUGA of Grenoble, University of South Denmark, CMCC (Euro-Mediterranean Center on Climate Change), and the administrations involved in the case studies, whose suggestions provided crucial support for the outcomes of this publication. Other institutions and people we would like to thank are: Nicola Tollin, Professor with special responsibilities in Urban Resilience, UNESCO Chair at University of Southern Denmark (SDU), ITI,

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Chapter 6
Towards Neighbourhoods as Minimum Units of Resilience?

Elena Pede, Mattia Scalas, and Luca Staricco

Abstract COVID-19 restrictions have changed the perception of space: travel limitations and diffusion of remote activities have narrowed the spaces of everyday life, leading to a rediscovery of proximity. We are both witnessing a re-appropriation of the domestic environment and re-discovering the neighbourhood and those small portions of the city often neglected. This rediscovery is evident in the use of nearby public spaces and in transport, with the decongestion of many urban areas following the reduction of commuting. Even if this is a contingent situation, it is reasonable to think that part of these changes will persist at the end of the emergency. For these reasons, there is a need to focus on neighbourhoods' quality, spatial organization and adaptive capacity towards both emergencies such as the pandemic and the great urban challenges towards resilience and sustainability. Essentially, sub-local scale must be rethought to meet not only the ordinary needs of its inhabitants but also health or other issues. In this sense, the potential of spatial units based in the concepts of proximity and walkability is explored, giving an interpretation that starting from the 15-min city and the superilla models explore the perspective of "minimum units of resilience" for facing pandemics.

Keyword COVID-19 · Resilience · Sustainability · Neighbourhood planning · 15-min city · Superilla

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6.1 Neighbourhoods and Pandemic

Urban areas have always been exposed to pandemics because of high density, mass interactions, connections and concentration of activities. Since ancient time, the emergence of a pandemic has posed the attention to cities as hotspots for the spread of diseases. Each pandemic has seen the re-thinking of urban form, sanitation systems, street design and housing regulations together with rules, ordinances and restriction to reduce the threat of contagion.

During the Industrial Revolution, as a result of the disease outbreaks linked to water and unhealthy air, there was an overwhelming demand for the improvement of urban environments to reduce the threat of disease. Consequently, public health interventions expanded to encompass issues like housing, sewerage, clean water provision and nutrition. In the same way, many cities have imposed restrictions, mask wearing and disinfection of shared spaces due to the Spanish flu.

Despite the progress during the past century, the pandemic caused by COVID-19 still caught cities unprepared. Although technological innovations and new urban form paradigms, the pandemic has transformed almost every aspect of contemporary urban living.

During the past two years, short-term interventions have been implemented around the world. Work and lessons from home were boosted thanks to online resources, and many countries have implemented restrictions on mobility in order to prevent the spread of Coronavirus disease-19, disrupting daily mobility. Once again, the consequences of pandemic and the need to coexist with the emergency have made clear that a paradigm shift is required.

Part of the debate has focused on the performance of cities in relation to contagion levels and mortality rates, but there has also been significant discussion around the role that the urban form and function, spatial patterns and access to urban services may play in living this new normality (UN-Habitat 2021). If in the early months of the pandemic the challenge was indeed to flatten the contagion curve at the cost of putting the world on an unprecedented pause; in the second wave of the virus—also because of pressing socio-economic issues—governments and cities needed to preserve quality of life despite the uncertainty.

In a context where social distancing was suddenly essential, issues like proximity, local neighbourhood, public space, accessibility to essential urban services and different transport modes have captured the attention of many politicians and have prompted cities to work on it.

Travel within cities has been strongly limited with lockdowns and restrictions of out-of-home activities. At the same time, people also applied self-restrictions avoiding public transport in favour of private mobility (car and active travel modes such as walking and cycling) due to their perception of risk of virus transmission on the different modes (Hanzl 2020). Cities witnessed the huge increase of cycling and pedestrian mobility demand and have re-designed their streets to accommodate bikers and pedestrians needs (Moreno et al. 2021).

Similarly, the long-term consequences of restrictions on the use of public space, and the access to urban services has also transformed our relationship with open spaces and proximity. Green spaces were considered to be increasingly important as well as public squares and streets; they provided space for physical, social and cultural activities with a lower risk of infection. For the same reasons, private or communal outdoor spaces have experienced a renaissance in the quality of life perception in the cities. It is not by chance that disparities in housing conditions and accessibility to facilities and green areas have magnified the inequalities between the residents of different urban neighbourhoods.

The role of public open spaces was crucial also for physical and mental health and for face-to-face interactions. While in business districts cafes, restaurants, shops and cultural spaces have been strongly hit by work-from-home habits, in residential neighbourhoods these activities—especially those with outdoor areas—have contributed to reactivate local community and social interaction (Mouratidis 2021). Dwellers needed to find social, economic and cultural activities in their immediate localities in order to reduce travel, and this was an opportunity to rediscover neighbourhoods' shops. The neighbourhood unit and the social ties within it have strongly been reshaped, and it is supposed that many of these changes will have long-term consequences in urban form and planning.

While the pandemic has transformed almost every aspect of urban living, new narratives about urban form, access to services and amenities have emerged. Planning models like *superilles* or *15-min city* that were mainly born in the frame of sustainability goals offer attractive perspective for building safer, more resilient, sustainable and inclusive cities. Their organization of street networks as well as the distribution of services and amenities emphases the concepts of accessibility and proximity that are well suited to the challenges posed by COVID-19 pandemic. The convergence of different aims suggests long-term implications for urban resilience. Through this approach, the chapter explores the potential of spatial units based on walkability as the minimum system capable of reacting to crises effects of different nature. The *superilla* and the 15-min city models are introduced (as re-interpretations of the XXth century's neighbourhood unit) and analysed just in their perspective role of minimum units of resilience for facing pandemic crises.

6.2 The Ideal Type of the Neighbourhood Unit

The neighbourhood unit has been acknowledged as one of the main landmarks in the last century urban planning (Patricios 2002). It can be briefly described as a spatial model which aims to be self-sufficient in terms of basic service provision and to ensure safe accessibility to these services by walking and cycling (Rohe 2009).

Even if the expression was first coined by William Drummond in 1916, the neighbourhood unit is usually traced back to the contribution of Clarence Perry to the first *Regional plan of New York and its environs* in 1929 and to Clarence Stein and Henry Wright's project of Radburn, the "town for the motor age", in the same year

(Brody 2016). They both implement a traffic separation principle: T-intersections and cul-de-sac are adopted in the inner streets of the unit to discourage car-through traffic (which is diverted to the thoroughfares deliming the unit) and to allow only access traffic; separated footpaths are provided to move safely inside the unit and to access the basic services (*in primis* the primary school, but also the library, the church, the playground, etc.) (Grammenos et al. 2008). These services are primarily located in a barycentric position in the unit, with the exception of shops, which are concentrated in a boundary corner so to be accessible also to the other surrounding units.

Clearly inspired by the wards of Howard's Garden city, the neighbourhood unit has been "a persistent idea" in twentieth-century urban planning (Birch 1980), not only in America. Although not free of criticism [relating to social and functional segregation, as well as physical determinism; (Mehaffy et al. 2015)], this idea has been repeatedly proposed in different contexts and times, from second Post-war Abercrombie's Greater London Plan and British New Towns to Buchanan's Environmental areas, until recent proposals by the Congress for the New Urbanism, European eco-district experimentations and superblocks in the Middle East and China.

6.3 The Spanish *Superilla*

While most of the implementations of the neighbourhood unit model were related to new urban developments, in the last twenty years a new reinterpretation of the neighbourhood unit—the so-called superilla (or supermanzana, in Catalan)—was proposed in the Spanish context to be applied to well-established built areas. The superilla concept has been elaborated by Salvador Rueda, director of the Agencia de Ecologia Urbana de Barcelona (Urban Ecology Agency of Barcelona—UEAB), in the framework of his "Ecological urbanism" approach (Rueda 2014). It is an ideal 400 $\times$ 400 m "urban cell" which is conceived as a basic unit for reorganizing the existing city and increasing its sustainability by applying the traffic separation principle. Streets are hierarchized into two levels. Those inside the superilla are supposed to support only car traffic whose origins or destinations are inside the superilla itself; cut-through traffic is discouraged in these streets by maximum speed of 10 km/h, frequent changes of direction, traffic calming, etc. Instead, those streets that border the superilla are designed as thoroughfares to host cut-through traffic, public transport (buses, taxis, tramways, etc.) and bike lanes. By spreading this model on the whole city, a two-level new urban morphology is established: a main street network, which is made up of thoroughfares that cross every 400 m; and the meshes of this network, which are the superilles, whose inner streets are intended mainly for walking and for multiple local uses and functions.

The superilla model has been tested in a number of Spanish cities (such as Victoria-Gasteiz, Ferrol, Madrid and Valencia), but Barcelona is the one that has most experienced it. At the city scale, the *Pla de Mobilitat Urbana 2013–2018* identified the main network of thoroughfares, whose speed limit was set to 50 km/h; the meshes of

this network were classified as superilles (mostly corresponding to a 400 × 400 m square made up of 3 × 3 blocks), whose inner streets had a 10 km/h speed limit. The *Pla* proposed the reorganization of the bus system, creating a "Nova Xarxa de Bus", made up of 28 bus lines riding along the thoroughfares, without crossing the superilles. In addition, over 200 km of new bicycle lanes were planned on the main network in order to guarantee a high-speed cycling mobility. At the neighbourhood level, the *Omplim de vidas els carres* programme adopted by the city administration in 2016 identified one pilot superilla in each of the ten city's districts to be realized. As some analyses of these pilot projects highlighted, this spatial model seems to be more easily accepted when applied to urban areas featuring a clear and physically evident hierarchy between main and secondary streets (such as Gracia and Ciutat Vella in Barcelona), than to homogeneous street networks such as the Cerdà grid (Scudellari et al. 2020; Zografos et al. 2020).

In the very last years, Barcelona's administration had changed its approach: instead of proceeding by areas, incrementally implementing the new superilles one after the other, the strategy was focused on creating a network of "green streets and squares" across the whole city, by enabling some streets to be freed of road traffic and to give priority to pedestrians. This approach is being tested on the whole district of the Eixample, where 21 streets (for a total length of 33 km) and 21 squares at the intersection of these streets (for a total surface area of 3.9 ha) should be re-designed so to allow cars to circulate at a maximum speed of 10 km/h and ensure priority for pedestrians and cyclists. The aim is to provide the Eixample with 33.4 ha of new pedestrian areas and 6.6 ha of urban green areas; in this way, each resident in the district will have a square or green street within 200 m of his homes (Staricco and Brovarone 2022).

6.4 The 15-Min City

The neighbourhood unit can be considered a clear reference also for the 15-min city model (especially for its 20-min neighbourhood variation in American and Australian low-density cities). This model first appears in Carlos Moreno's 2016 book "*Droit de la Cité—De la «ville-monde» à la «ville du quart d'heure»*", attracting attention and critics of scholars, policy makers and citizens. Sometimes defined as a *eutopia* (Pozoukidou and Chatziyiannaki 2021), the 15-min city is proposed as a model of spatial organization of cities based on pedestrian or cycle accessibility within a quarter of an hour to all the services of the daily needs of citizens. This chrono-urbanism perspective was often interpreted as a *manifesto* (Marchigiani 2021) for its clarity, simplicity and ability to hold together a multitude of different concepts and dimensions, spreading outside the scientific debate and being adopted as a city paradigm proposed by Anne Hidalgo during her 2020 campaign for the Paris local elections. The 15-min city aims to overcome a vision of the city focused on car dependence, a modernist approach—Moreno explicitly refers to Le Corbusier—which contributed to the development of the lattice structure of cities and to sprawl.

Developed as a model to reduce dependence on cars and therefore promote the reduction of emissions and sustainability, according to Moreno the 15-min city can also be seen as a paradigm for overcoming the legacy of car-dependent urban organization with its deep-rooted social and economic inequalities (Moreno et al. 2021). The attention on the 15-min city has grown further with the COVID-19 pandemic (Pinto and Akhavan 2022): the impact of restrictions and social distancing started a debate on density and the rediscovery of proximity. In this context, in 2021 Carlos Moreno revived the concept, defending the dense city and reinterpreting the 15-min approach as a planning response to the pandemic. In this sense, the pandemic proved to be a sort of case study, which highlighted the shortcomings of cities in terms of distribution and accessibility of services, but also allowed to visualize the effects that some of the most desired policies, such as traffic reduction and the increase in the use of bicycles, may have on settlements. The restrictive lockdown policies were in fact also accompanied by numerous temporary urban planning initiatives, especially related to accessibility of green areas, the establishment of new cycle lanes (Mexico City) or the closure to motor vehicles (Vienna, Boston) (Krzysztof and Drozda 2021). According to Moreno, the permanent adoption of these policies would lead to an increase in the quality of life in the cities enshrined in the reduced commuting times, proving the effectiveness of the 15-min city or similar declinations such as the 20-min neighbourhood (Gower and Grodach 2022). The most updated definition of the 15-min city model identifies six key functions to support a dignified urban life, identified in living, working, commerce, healthcare, education and entertainment, while there are four dimensions that should be incorporated in the planning it intends to pursue this paradigm: proximity, density, diversity and digitalization, the latter added in the re-elaboration of the concept in a post-pandemic key (Moreno et al. 2021).

Despite an objective difficulty in identifying an operational definition, the 15-min city has been recognized by numerous international organizations as a useful prospect for reaching SDG11 “sustainable cities and communities”, with application examples not only in Paris but also in New York, Bogotà, Melbourne and the Milan “phase-2” post-pandemic strategy. C40 actively promote the dissemination of this planning paradigm, with publications, indications and guidelines addressed to local administrators, whose electoral campaigns that often have taken up Hidalgo’s approach proposing the model as a vision for the city. At an operational level, the 15-city concept has often been interpreted in terms of walkability analysis and accessibility to services, leading to different interpretations of what these services should be. Models have been developed mainly focused on the construction of the network and the calculation of isochronous curves, for example with respect to schools within 15 min on foot from the maximum concentration of population in a neighbourhood (Caselli et al. 2022). There are also attempts to calculate overall indexes of the closeness of a territory to the model of the 15-min city, arising from interactions between private sector and academia to promote city smartness. An example is the 15-min index made available by the energy company Enel X to Italian local administrations and developed with the University of Florence (Badii et al. 2021). This tool, fully based on open data, develops 13 indicators starting from the six themes proposed by Moreno and calculates them dividing the national territory into squares each one

representing accessibility in 15 min (Nesi and Gambacorta 2021). The result is an index that evaluates the territory readiness with respect to the 15-min model, helping administrations in policy design. However, these kinds of initiatives show that the 15-min city model still lacks operational definitions and needs specific interpretations to be applied. Furthermore, the model may not be sufficient to identify planning priorities in territories that have already introduced in their regulations a distribution of minimum services, even if built based on the number of settled inhabitants.

6.5 Are Minimum Units of Resilience a Worthwhile Target?

The COVID-19 pandemic has highlighted the important role of urban liveability at the neighbourhood scale during a health emergency. On the one side, in the last months, medium and long distance trips have become more difficult, due to a couple of reasons: public transport services have been reduced or suspended in most cities, as overcrowded buses, trams, tube, etc., were pointed out as a high infection risk factor (Das et al. 2021); stringent health protocols, social distancing, lockdowns and movement restrictions have been adopted to face the pandemic. That made evident the necessity of a minimum set of proximity-based services that should be accessible by walking or cycling in the short distance (Marin-Cots and Palomares-Pastor 2020). On the other side, public spaces (such as green areas, playgrounds, courtyards, etc.) turned out to be essential to perform outdoors some activities that could no longer be carried out indoors in schools, gyms and so on.

In other words, a neighbourhood offering: (1) a fundamental set of basic services, (2) a network of foot- and cycle-paths to easily and safely reach those services by walking and cycling and (3) public spaces for meeting and performing social activities outdoors seems to ensure a certain level of resilience, at least for facing pandemic risks. Therefore, does it make sense to conceive and design neighbourhoods as "minimum units of resilience", at least in relation to pandemic risks? And can the city be planned as a "mosaic" of these resilience units?

The neighbourhood units launched about a century ago by Perry, Stein and Wright in the USA largely fulfilled the three above-mentioned requirements. Therefore, it is probably no coincidence that the superilles and the 15-min city, two spatial models clearly inspired by the neighbourhood units, have gathered great momentum and have been embraced in a growing number of scholars and city mayors' agendas during the pandemic. At the same time, both these models have a number of critical issues that question their actual resilience.

As regards the superilles, they are focused on reducing the street section devoted to car circulation and parking in order to free up public space for walking and cycling, and for performing outdoor activities. Little or no attention is paid to offering a set of basic services inside the superilla, also because its average dimension is too limited for ensuring the minimum number of customers and users that is necessary for the efficiency of a primary school, a library, etc. Only in the recent evolution of this model, focused on creating a network of "green streets and squares" in the

Eixample district, there is a proximity target: each resident in the district should have a square or green street within 200 m of his home. Moreover, as one of the first implemented superilla (the one in Poblenou) has shown, this model can generate a number of conflicts and discriminations, between residents inside the superilla and residents in surrounding neighbourhoods; residents and activities inside a superilla and those located at its verges; residents and visitors of the superilla; car drivers and non-motorized citizens; pedestrians and cyclists.

Also the 15-min city, and particularly its 20-min neighbourhood variation adopted in low-density cities, cannot be considered strictly resilient. Paradoxically, till now this concept has often been at risk of being reduced to a mere political slogan (Andres Duany 2021). In many cases, it was translated in a query for traditional issues such as density, diversity and mix of land uses, walkability, etc.; instead, poor attention was paid to the effective accessibility by proximity of the services in the neighbourhood or the city: which services should be accessible within 15 min? Which is the indivisibility threshold (i.e. the minimum number of users) for these services? Why was the temporal threshold set precisely at 15 min? These and many other issues, essential for operationalizing the 15-min city concept, often remain unanswered in practices.

Beyond these specific weaknesses of the two models analysed in this paper, further fundamental problems related to the neighbourhood unit approach can re-emerge when implementing resilience at the neighbourhood scale. These problems mainly concern the relation between the unit and the rest of the city. On the one side, neighbourhood (or resilience) units are at risk of creating social and spatial segregation and gentrification (Mehaffy et al. 2015). On the other side, diverting the cut-through traffic to the borders of these unit can determine what Jacob (1961) over 50 years ago termed “the curse of border vacuums”.

In conclusion, all these critical issues should warn against adopting the neighbourhood—through an excessively simplifying approach—as the right spatial scale to implement minimum resilience units. At least in densely populated cities such as the European one, it is not obvious that resilience could be pursued more effectively at this level and not at the whole urban scale, particularly if multiple risks—and not only health ones—are taken into account.

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