

Designing Good Life for All. Explorations on a Fragile Neighbourhood in Trieste

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Abstract

Across Europe, interrelated crises – economic, environmental, social, and demographic – are increasingly undermining quality of life in urban contexts, with direct implications for the affordability of everyday living, and the resilience of the public welfare system. This paper investigates the evolving dynamics of multifactorial poverty, vulnerability and fragility within cities. Urban space is conceptualised as a 'capacitating' infrastructure – one that enables individuals, regardless of their socio-economic condition, to pursue flourishing lives. From this standpoint, urban design must transcend the conventional binary of domestic versus public space and instead embrace a networked approach that integrates housing, welfare services, and collective spaces into more accessible, personalised, and innovative support systems. These theoretical reflections are applied to an 'inner periphery' of Trieste – a medium-sized Italian city facing population ageing and decline, economic hardship, gentrification, and increasing strain on welfare provision. The research focuses on the urban district named *Barriera Vecchia* and its transformation into a *supportive and de-fragilising* neighbourhood. The methodology employed comprises: (i) stakeholder engagement through the organisation of discussion events and participatory placemaking initiatives; (ii) data analysis on housing conditions and the socio-demographic profiles of residents; (iii) spatial mapping of resources and criticalities – including the distribution of facilities and open spaces, and their inclusiveness and usability in relation to mobility, accessibility, and environmental quality; and (iv) the development of a local masterplan aimed at strengthening the connections between collective assets and service networks for vulnerable populations.

Keywords: Housing affordability; Fragility; Trieste.

1. Introduction

Today, in Europe, multiple ongoing crises – economic, environmental, social, and demographic – are significantly impacting the quality of life in urban areas. These crises have direct consequences on both *life affordability* – understood as the cost not only of housing but of living conditions as a whole – and the resilience of welfare systems, which are expected to support individuals in achieving and sustaining adequate living standards. In fact, the goals of sustainability, inclusivity, and accessibility 'for all' have become key themes in many urban regeneration projects and urban design guidelines (among the others: Gehl, 2010; UN-Habitat, 2018; Sim, 2019), with the aim of fostering human-scale environments that are responsive to the needs of persons of all ages and diverse social, economic, gender, and cultural backgrounds. However, the translation of these goals into concrete local actions often suffers from vagueness and generality, or, in the worst cases, from a lack of careful selection of the specific places and processes on which to intervene. In the absence of spatially guided and well-inte-

grated management of the various urban policies that these actions – often designed according to a top-down approach – are expected to coordinate and synthesise, there is a recurring risk of generating depoliticised decision-making processes and producing *negative externalities*. Chief among these is the displacement of residents in favor of real estate-led valorisation processes (Swyngedouw, 2007; Checker, 2011; Bunce, 2017; Anguelovski et al., 2018). These considerations highlight the urgent need for a project-based reflection on the spatial conditions of well-being and well-living, their multiple dimensions, and the policies, actions, and actors involved in ensuring their just implementation ‘in place’.

This paper stems from the activities developed within the project *iNEST – Interconnected Nord-Est Innovation Ecosystem – Spoke 4* (2022–2025), co-financed by Italy's EU-funded National Recovery and Resilience Plan (PNRR). The Research Topic, coordinated by the University of Trieste and entitled *Solutions to Improve the Well-being and Quality of Life of Fragile Groups*, focuses on the multifactorial distress affecting urban populations in many European cities, including small and medium-sized ones. The occasion for a deeper and place-based reflection is provided by ‘research by urban design’, conducted with the students of the fourth year of the full cycle degree in Architecture of the University of Trieste (academic year 2024–25) in an ‘inner periphery’ of Trieste, a medium-sized city in the Northern part of Italy. Specifically, the second paragraph of the paper critically examines the different terms – poverty, vulnerability, and fragility – that are commonly used today to describe the conditions affecting large parts of urban populations. Their meanings, along with their theoretical and operational implications, are considered from the perspective of urban regeneration, with particular attention to the relationship between individual living spaces and collective spaces at the neighborhood scale. The underlying hypothesis is that the *city can act as a capacitating and de-fragilising spatial and social infrastructure*. The third paragraph describes a number of quantitative and qualitative surveys, data and indicators helping investigate the various spatial conditions of fragility and de-fragilisation, including housing and living affordability, access to school facilities and food, climate and environmental comfort, and inclusive accessibility and usability of spaces and services. These tools are described through practical examples of their application in mapping, policy design, and urban regeneration processes. The fourth paragraph examines the design work conducted in Trieste's *Barriera Vecchia* neighbourhood. It discusses the involvement of local stakeholders and the use of spatialised data and information to identify and represent various forms of fragility, along with the ways they manifest in specific locations within the urban context. The paragraph also outlines the steps taken towards the development of a masterplan aimed at transforming *Barriera Vecchia* into a *supportive and de-fragilising* neighbourhood. This is conceived as a design exploration and strategic framework intended to revitalise public spaces, collective facilities, and services, with particular attention to the needs of vulnerable populations. Finally, the conclusions outline key theoretical and practical insights for a de-fragilising approach to urban design and policy-making.

2. Poverty, Vulnerability, and Fragility in Urban Contexts

What follows is a brief exploration of the concepts of poverty, vulnerability, and fragility, with a focus on how their meanings have evolved toward the recognition of complex and stronger synergies between the conditions of individuals and households and their living environments. While these terms and their related analyses still primarily belong to the socio-economic fields of research and practice, the aim here is to emphasise, on the one hand, their connection with the *physical organisation of urban contexts*, and on the other, their *multifactoriality*, that is the interplay of factors impacting on individuals' everyday lives. This perspective helps highlight the multiple – social, economic, and spatial – dimensions of urban distress, as well as the need for inclusive and resilient planning beyond mere physical renewal and valorisation of specific urban areas.

2.1 Terms in Evolution: from Measurement to Meaning

Poverty is generally understood as a *condition of deprivation* – specifically, the lack of material resources necessary to meet basic needs. This condition undermines the ability and opportunities of individuals and households to build and sustain their quality of life and well-being over time. From an economic perspective, three notions of poverty are widely recognised in institutional statistics and data sources: ‘absolute poverty’, ‘relative poverty’,

and 'subjective poverty' (ISTAT, 2024; Saraceno, 2023, 2025; EUROSTAT, 2025a)¹. While the first two imply statistical measurement and appraisal, the third involves a strong personal component, as the identification of a minimum threshold required for a decent life is obtained through interviews and questionnaires addressed to target groups. However, defining poverty solely in economic terms is reductive (Sen, 1976; Bourguignon and Chakravarty, 2003; Aaberge and Brandolini, 2015). Poverty has long been recognised as a multifaceted phenomenon, typically rooted in multiple causes and affecting not only an individual's economic condition but also various interrelated *dimensions of quality of life* – including immaterial, relational, and contextual assets. As a result, its social outcomes may vary significantly depending on the specific location and spatial context (Desmond, 2023; Gallo and Bonacini, 2023; Caritas Italiana, 2024).

From this perspective, a number of agencies and research institutions have challenged the conventional concept of poverty by incorporating dimensions related to various aspects of everyday quality of life. For example, the *Global Multidimensional Poverty Index (MPI)*, developed by the Oxford Poverty & Human Development Initiative (OPHI), is a widely used measurement of acute multidimensional poverty. Its datasets – spanning from 2011 to 2023 – cover more than 100 countries worldwide, allowing for comparisons over time. The MPI combines traditional poverty metrics with indicators of deprivation organised into three dimensions: i) Health (nutrition, child mortality); ii) Education (years of schooling, school attendance); iii) Living Standards (cooking fuel, sanitation, drinking water, electricity, housing, and assets such as a car, bicycle, phone, television, or computer) (UNDP and OPHI, 2024; Lemmi, 2025). All these elements are, to varying degrees, directly linked to spatial planning and welfare policies. Closely related and complementary to this tool is the *Human Development Index (HDI)*, developed by the United Nations since 1990 to evaluate key parameters that contribute to human well-being. The focus shifts from a 'lack-based' lens to the analysis of the assets and opportunities that enhance material well-being. Like the MPI, the HDI also incorporates three main dimensions: i) A Long and Healthy Life (measured by life expectancy); ii) Knowledge (measured by years of schooling); iii) A Decent Standard of Living (measured with reference to inequalities in income distribution) (Fig. 1). HDI indicators not only reflect the availability, quality, and accessibility of the physical components of collective facilities, but also emphasise that people and their capabilities – not economic growth alone – should be the ultimate criteria for assessing a country's development (UNDP, 2025).

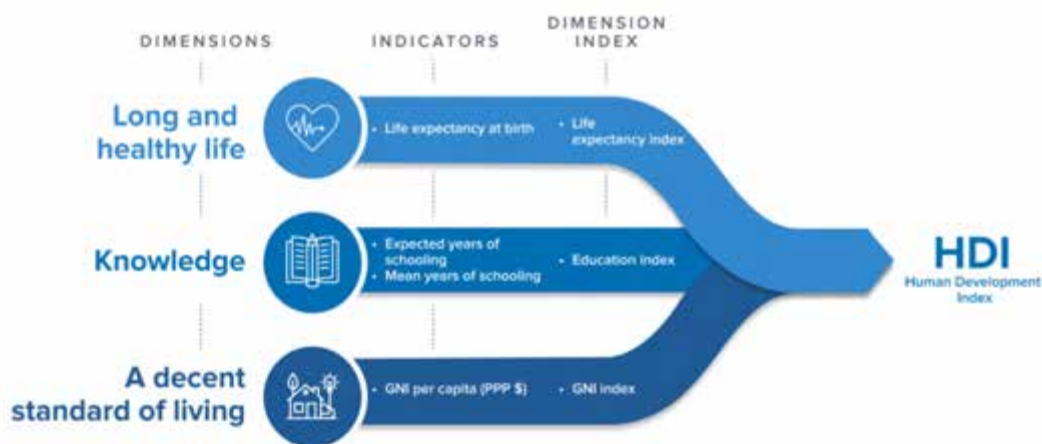


Fig. 1. Human Development Index dimensions and indicators (Source: UNDP, 2025).

¹ 'Absolute poverty' is defined as the inability to meet one or more basic needs for a period sufficiently long to threaten or seriously compromise survival. It is measured with reference to the economic capacity to cover the cost of a standard basket of essential goods and services (such as housing, food, healthcare, clothing, etc.). A person or household is conventionally considered 'relatively poor' if their available income (or consumption) falls below half – or, in some cases, 60 percent – of these average (or median) per capita values in a given reference area. Finally, the starting point of the assessment of 'subjective poverty' is individuals' perception – what circumstances they consider indicative of a state of poverty, whether related to income levels, lack of certain goods or opportunities, both material and relational.

HDI is largely based on the widely debated *Human Development Approach* (HDA) (Nussbaum, 2011), first conceptualised in economics by Nobel laureate Amartya Sen, and later applied across diverse research fields. According to HDA, also known as the *Capability Approach*, “well-being” is framed in terms of “functionings” (Sen, 1985) – that is, whether a person is able to ‘be’ (e.g., well-nourished, sheltered, healthy) and ‘do’ desirable things (e.g., work, receive an education, participate in community life). An individual’s “quality of life” is thus defined through their freedom of choice and personal responsibility (Nussbaum and Sen, 1993). In this sense, “capability” refers to the real opportunities that individuals have to accomplish what they value; it denotes the various combinations of functionings (beings and doings) that a person can achieve, reflecting their freedom to lead one type of life or another (Sen, 1989; 1992). Conversely, “poverty” is understood as a deprivation of capabilities – “the failure of the ability to achieve precisely those things that are ultimately important” (Drèze and Sen, 1989, p. 45) – often resulting in social discrimination and marginalisation. A meaningful response to poverty and its multiple dimensions therefore involves expanding the *choices and capabilities* that individuals can access and put into practice to lead lives they have reason to value. Within this perspective, the economic component is only one dimension of a broader equation balancing failures and opportunities where spatial conditions that can enable or hinder individuals’ capabilities should be evaluated, particularly in relation to access to housing, education, social and healthcare services.

The term *vulnerability* also refers to a person-centred approach – the condition of ‘being vulnerable’ – emphasising the *exposure* of individuals or communities to risks such as displacement, environmental hazards, or socio-economic shocks, combined with a limited capacity to cope with or recover from them often due to pre-existing personal conditions such as gender, age, health status, or disabilities (Martinuzzi and Lahoud, 2020). The underlying assumption is that managing vulnerability-related risks is a critical concern for urban governance and a range of public policies and interventions, including spatial planning and design. Over time, this concept has been applied to various fields – from socio-economic studies to political science (e.g., ‘social’ and ‘institutional’ vulnerability) – but has more recently been used to highlight the impacts on populations and their overall living conditions of natural disasters, public health crises, and climate change (Biswas and Nautiyal, 2023). Today, vulnerability is increasingly recognised as a *constitutive concept of contemporary societies and cities* (Beck, 1992; Jabareen, 2015), fostering a deeper understanding of risk itself, its spatial and multidimensional implications and consequences, its potential to exacerbate existing inequalities in specific places, and the ways in which urban contexts and their inhabitants can adapt to uncertainty and threat. If vulnerability is defined as a reduced capacity of a person or group to anticipate, withstand, and recover from the impacts of natural or human-made hazards, then this capacity is also closely linked to the availability and accessibility of urban infrastructures and services. As a consequence, and from a spatial perspective, vulnerability can also be framed as a matter of location and disadvantaging configuration of an urban context – such as limited disposal of housing, facilities, and services; poor environmental comfort; gender segregation; or barriers to an inclusive use of urban resources. This conceptualisation is directly linked to the notion of spatial inequality and, by contrast, to the development of more just cities and planning strategies (Fainstein, 2010).

Finally, *fragility* refers to a *precarious and uncertain condition* – whether affecting individuals and households, communities, physical spaces, or institutional systems – that is *susceptible to breaking under external pressures*. Such susceptibility derives from the intersection of intrinsic characteristics with social, demographic, economic, political, and policy-related factors (EURISPES, 2018). It can ultimately manifest in, for example: loneliness and unstable family conditions; ageing and health problems; insecure and low-paid employment; unaffordable housing and living costs; as well as ineffective sectoral organisation of public institutions also linked to shortages of funding and personnel. Reaching a peak during and immediately after the Covid-19 pandemic, the use of the term fragility has increased in the academic discourse, including spatial planning and urban design. In this context, it specifically refers to the condition of an entity (e.g., a territory, a city, a society, a person or a group, a set of public and private institutions and actors) that may collapse even under minimal stress or retreat in the face of ordinary and minor challenges, due to the rigidity and inflexibility of its conditions, the lack of external support, as well as insufficient infrastructures and networks that might otherwise help develop new capacities, equilibrium, and resilience (Blečić and Cecchin, 2016; Sendra and Sennet, 2020; Pasqui and Curci, 2021; Curci and

Chiffi, 2024). “Interestingly enough, something fragile is not necessarily vulnerable if it is protected from certain external events or agents able to potentially trigger or accelerate its breaking process” (Chiffi and Curci, 2019, p. 56). Here again, space plays a dual role: both as a driver of fragility and as a device that can help mitigate it. From this duality stems the concept of “antifragility” and its use to highlight the possibility of gaining positive outcomes after a shock in an uncertain situation (Taleb, 2012; Aven, 2015). Since not all uncertainties can be prevented, the idea behind antifragility is not just to survive trauma, or simply improve the performance of a given system in response to a shock, but to reinvent and evolve the system as a whole.

2.2. Space as a Capacitating and De-Fragilising Infrastructure

When defining “a new urban question” at the beginning of the 2010s, Bernardo Secchi identified three fundamental aspects of the issue: mobility as the right to accessibility, the consequences of climate change, and social inequalities and exclusion (Secchi, 2010). In line with the theoretical framework of the “right to the city” – from Lefebvre (1968) to Castells (1972) and Harvey (2013) – the city is portrayed as a space where people come together, but also one where they are divided and marginalised due to disparities in work opportunities, access to goods and services, cultural and religious backgrounds, and conflicts among diverse social groups. Even when considering only the modern history of city-making and urban governance, spatial and planning tools have had direct and often disastrous consequences on mechanisms of confinement and segregation between “rich” and “poor” populations, typically favouring the former and displacing the latter. Again, the term “poor” refers not only to those with limited financial means, but also to individuals who cannot enjoy essential facilities (such as health-care and education) due to locational barriers or uneven service distribution; who face limited access to social support; and who are stigmatised because of the bad living conditions or negative reputation of their residential areas. Therefore, spatial policies bear significant responsibility in addressing inequality and rebalancing urban territories from both social and economic perspectives (Secchi, 2013).

Starting from these considerations, the hypothesis here is that spatialising poverty and vulnerability in the urban context can enable a reinterpretation of the relationship between fragility and space – one in which urban environments are conceived as *capacitating infrastructures*, where all individuals, regardless of their material, social, or physical conditions, can live a good life and achieve personal fulfilment. Accordingly, urban design is called to move beyond the dichotomy between ‘individual space’ (within the home) and ‘collective or common space’ (understood as the sum of open areas and public facilities), toward a *networked and integrated conception of indoor and outdoor living environments*. In this conception, the arrangement and design of urban spaces are oriented towards enhancing the effectiveness and personalisation of a plurality of welfare provisions – ranging from housing and traditionally defined collective facilities, to other types of equipment and services, such as those dedicated to food production and distribution, or to the creation of climate-resilient environments. This also includes their interrelationships and conditions of both physical and organisational accessibility. Furthermore, this perspective – drawing on the Capability Approach – invites rethinking urban space and welfare by recognising *individuals as active agents* of change, rather than passive recipients of predefined benefits (Sen, 1999). This implies building a collaborative framework in which institutional, social, and personal capitals are jointly mobilised. Accordingly, public welfare is called to expand and integrate its spheres of action, joining forces with other stakeholders and the inhabitants, and transforming facilities from isolated delivery points of standardised services into proactive devices. These spaces should interact with a diverse range of other collective places, enabling healthy and care-full practices to be tailored to individuals’ needs, bodies, and lifestyles, also through social interaction, mutual support, and the shared performance of outdoor activities (Marchigiani, 2022a).

In essence, rather than conceptualising antifragility as a form of preparedness to confront unexpected crises and potentially benefit from them, the focus is here on the *de-fragilisation of individuals’ and households’ conditions of vulnerability*. These conditions often stem from various forms of deprivation and are closely intertwined with the spatial settings of living environments. The process of de-fragilisation is pursued by intervening in space from a *person-centered perspective*, through the development of new social and spatial infrastructures. The underlying assumption is that an integrated organisation and configuration of urban space and essential services can help prevent fragility from becoming a manifest, disruptive, and persistent condition. This design operation

should begin with the collection and critical interpretation of both quantitative and qualitative information about the population living in a specific urban context, gathered through indirect and direct observation, listening, and participatory processes. The aim is to identify the “dispositions” (or predispositions) individuals possess to either cope with or succumb to the emergence of critical conditions (Choi, 2008). However, this commitment is far from straightforward. While it promotes the recognition and enablement of individual capabilities, social activation, and collaboration between institutions and residents, it also requires careful attention to avoid the pitfalls of a *new humanistic functionalism* (Bianchetti, 2016). Indeed, when based on a superficial collection of data and indicators, there is a risk of inadvertently reinforcing forms of spatial or social determinism. This, in turn, may lead to the reimposition of rigid standards and urban design metrics, reducing people – and their everyday, embodied experience of living spaces – to mere statistical and functional units (Bianchetti, 2023).

3. Mapping Plural Fragilities as a Tool to Address Urban Policy Design

Within the framework of the iNEST research, mapping is a key tool. Its role is complex and multifaceted: i) to spatialise the overlap between quantitative data and experiential knowledge; ii) to investigate the relationships between places and people, identifying the concrete spatial dimensions of various forms of poverty, vulnerability, and fragility; and iii) to select locations where different types of fragility converge, which therefore require special attention to improve living conditions in specific urban areas.

Spatial analysis and visualisation of multiple deprivations are receiving increasing attention worldwide. This growing interest reflects the need to better understand and make unequal living conditions visible, as well as the processes that produce them. Such analyses can support public institutions in resource allocation, land management, and policy design (Martínez et al., 2016). In Italy, two particularly noteworthy examples are the *Mapping Inequality* research platform (Vinci et al., 2025) and *MappaRoma* (Lelo et al., 2019, 2021; MapparomaLab, 2025). The former offers a georeferenced “Atlas of Urban Inequalities”, exploring this issue in several large Southern European cities – specifically Palermo and Naples – using small-scale indicators from various domains, including income distribution, housing conditions, access to fundamental services and facilities, and exposure to environmental risks. The latter is an in-depth analytical project focused on the Rome metropolitan area. Drawing on datasets at both municipal and sub-municipal levels, *MappaRoma* brings together a wide range of data to highlight the spatial distribution of social, demographic, economic, planning, and political differences. Both initiatives are of considerable interest for their capacity to construct a spatialised knowledge base that underpins innovative methods and tools aimed at mitigating the spatial inequalities produced by urban policies and at informing future urban transformations. This holistic approach proves particularly effective at the scale of the entire city or metropolitan area, as it facilitates the comparison and superimposition of multiple layers of information, enabling a deeper understanding of the diverse, and at times contradictory, forms that urban inequalities assume across time and space.

The following paragraphs explore in greater depth how various concepts and dimensions related to poverty, vulnerability, and fragility can be interpreted in spatial terms, and in relation to more specific spatial features. The focus is primarily on a selection of European and Italian experiences, ranging from observatories and atlases to analytical and interpretative efforts aimed at supporting urban policies and regeneration projects. Their relevance to iNEST research lies in the attempt to spatialise and interrelate different types of data and information, with a view to their potential application at the scale of *urban sectors and neighbourhoods*.

3.1. Housing Location Affordability

In contexts marked by multiple crises and overlapping factors that undermine the quality of life in urban areas, the fulfilment of the right to adequate housing (Kenna, 2012; The Shift, 2025) should be regarded as a cornerstone of welfare policies, future EU priorities, and planned investments (Vlad, 2024). Across Europe, *housing poverty* manifests itself in a wide spectrum of situations, ranging from extreme forms of exclusion and deprivation to more widespread conditions of housing insecurity. These are often driven by an insufficient supply of public rental housing – both social and ‘very social’ – as well as by rising rents in the private market (Tosi, 2017; Bricocoli

et al., 2021; Fondation Abbé Pierre and FEANTSA, 2024; Marchigiani and Novak, 2024). Moreover, *affordable housing* is not only a fundamental welfare provision that helps prevent the risk of homelessness, but also, as described by Habitat for Humanity, “a ladder out of poverty for families” (2021, p. 5). Ensuring stable residency is, in fact, a basic prerequisite for the enjoyment of a broader range of civil rights, public services, and social support – including political representation, employment, healthcare, and education.

However, the very concept of *housing affordability* is increasingly being called into question, as its definition is recognised as multifaceted and not easily measurable through simple parameters (Peverini, 2023). The traditional threshold – set at 30% of the ratio between housing costs (whether rent or mortgage) and total household income – rises to 40% when all housing-related expenses are taken into account. To more thoroughly investigate households’ ability to access adequate housing in suitable locations and at acceptable costs, a variety of measurements and indicators have been developed, as evidenced by international statistical platforms and observatories (EUROSTAT, 2025b; OECD, 2025). These tools help construct a picture of the varying degrees of *housing poverty and vulnerability*, though some limitations persist in terms of data collection and interpretation (OECD, 2021). Considering the general conditions of both the supply and demand sides, quantitative methods for measuring housing affordability rely primarily on indicators related to real-estate values, rental costs, housing maintenance expenses, and households’ disposable income. Other indicators – such as the overcrowding rate, measures of housing quality, and subjective perceptions of affordability – can offer a more nuanced picture of housing’s impact on residents and their increasing *social fragilities*, including the negative effects of limited space and overcrowding on health and well-being. However, such indicators rely on data that are more complex to collect, often requiring qualitative methods like interviews and questionnaires (Heylen, 2023). In fact, the quality and adequacy of housing in relation to the needs and resources of households vary significantly according to cultural differences, age, and family composition (which are becoming increasingly unstable due to demographic shifts and rising divorce rates), job and income security (highlighted by the growing number of ‘working poor’), and the burden of inflation reducing the purchasing power of households’ wages (Marchigiani and Novak, 2024). Moreover, when housing affordability is understood as a component of the overall cost of living within a given urban context, it encompasses not only rent or property prices but also broader living expenses. To effectively inform supportive housing policies, affordability must therefore be assessed in relation to the availability, accessibility, and public character of a wider range of services. This highlights its strongly *site-specific nature* and the need for a closer, more integrated investigation of local spatial, social, and economic conditions.

From this perspective, recent experiences highlight innovative approaches focused on *location affordability*, understood as encompassing the spatial dimensions and conditions of affordability, and highlighting a strong link between housing, urban planning, and urban welfare policies – for example, those related to transport planning, land use, and the broader supply of affordable rental housing. However, the call for a more comprehensive analysis – as evidenced by theoretical models and frameworks developed globally – has so far resulted in only a limited number of practical initiatives (Mullinere and Maliene, 2012; Peverini, 2023; HUD, 2025). Among them there is OCA – *Osservatorio Casa Abbordabile* (Observatory for Affordable Housing), an initiative jointly promoted in Milan by the Politecnico di Milano and third-sector organisations. OCA draws attention to housing affordability as the relationship among individual or household income, the cost of accessing housing (whether for rent or purchase), and a wider set of conditions related to spatial location. The mapping and analysis of various public datasets (ISTAT, MEF, and OMI)² highlight how inequalities in access to different types of housing supply (including social and regulated rental housing, tourist accommodation, and short-term rentals) by a growing variety of social demand (from long-term residents to students and workers) are closely connected to commuting patterns and costs, measured in terms of both transport expenses and travel time. These investigations are carried out not

2 ISTAT is the Italian National Institute of Statistics; it collects and analyses data on various topics, including the socio-economic conditions of the population and the housing stock (<https://www.istat.it>). MEF is the Italian Ministry of Economy and Finance, which provides data on the incomes declared by individuals (<https://www.mef.gov.it>). Finally, OMI, the Italian Real Estate Market Observatory, collects and disseminates real estate quotations for defined homogeneous territorial areas within each municipality, indicating a minimum/maximum range of market and rental values per square metre, based on property type and condition (<https://www.agenziaentrate.gov.it/portale/schede/fabbricatiterreni/omi>).

only within the administrative boundary of the municipality of Milan but also in its wider regional context, where housing values have skyrocketed and people with average or low incomes can no longer access the inner-city housing market, while the supply of council housing remains stagnant (DASTU et al., 2025; Bricocoli et al. 2025). Given that housing policy is currently limited to the municipal scale, this insight is crucial for reorienting interventions at a broader territorial level, thus opening up new perspectives for future decision-making.

What can be learned from ongoing reflections and experiences is that a more complex and integrated framework of housing affordability indicators and indexes – along with related data sources and operational procedures for analysing, cross-referencing, and interpreting them – are necessary to support the implementation of multilevel urban policies and spatial regeneration strategies at the regional, urban and local scales. The pandemic and, more recently, the decline in living standards and broader processes of social fragilisation, have shown that the private space of the home (when available!) is not, in itself, sufficient to ensure a decent life. In fact, housing vulnerability goes beyond the mere availability of affordable housing. It requires a closer examination of living patterns and household compositions, which are becoming increasingly less standardised, as well as of individuals' levels of autonomy, including considerations related to social, health, and age conditions. These factors demand careful assessment of the spatial qualities of housing with respect to the size and configuration of households, as research activities within the *UAH! Unconventional and Affordable Housing project* (2023–25) are attempting to demonstrate (Aa.Vv., 2025)³. UAH! operates at the intersection of urban and architectural design of individual and shared spaces within the home, collective spaces and equipment at the neighborhood scale, public housing policies, and informal practices carried out by residents in collaboration with a variety of institutional, community and third-sector actors.

3.2. Schools and Urban Learning Contexts

Within the framework of essential services aimed at reducing vulnerability and fragility through the creation of spatial and social infrastructures complementing the home environment, access to schools and education represents a fundamental condition for enhancing individual capabilities and acquiring the knowledge and skills necessary for autonomous living. In contrast, *educational poverty* refers to the lack of opportunities for children and adolescents to learn, grow, face life's challenges, and develop their talents and aspirations (Save the Children, 2014). Driven not only by insufficient provision (in terms of quantity and distribution) of facilities, educational poverty is also linked to cultural disparities among household groups, the duration and quality of education, and spatial accessibility to schools. In this regard – in Italy as well as all over Europe – early school leaving and competence levels measured by standardised tests serve as key indicators (European Commission, 2024). From this perspective, educational poverty is also recognised as a root cause of unemployment and social exclusion (European Commission, 2015).

In relation to these issues, in 2014 Save the Children Italia developed an *Index of Educational Poverty* (IPE). In 2019, the IPE was applied to monitor the Italian context, highlighting relationship with social inequalities and their spatial distribution across the country. The indicators used refer not only to the availability of educational spaces in a given area, but also to directly associated facilities (e.g., school canteens, libraries, gyms, courtyards) and the frequency with which they are used by children (Save the Children, 2014; Openpolis and Con i Bambini Impresa Sociale, 2019). In addition, the IPE considers the range of activities children engage in outside of school, either during or after school hours – such as visiting museums and exhibitions, going to the cinema, to sports facilities and libraries. This assessment not only examines the availability of basic school services – highlighting which areas within a city or region lack adequate provision – but *also establishes a strong connection between the school system and other urban facilities*, evaluating their attractiveness and suitability for children and young people. From this perspective, what matters is how schools are used and how they support access to other urban services, as well as how they serve the community and how open they are to different user groups at various times of the day, week, and year (Gammino, 2024). Here, again, spatial organisation and setting of these facilities at territorial,

³ UAH! is co-financed by Italy's EU-funded National Plan for Recovery and Resilience (PNRR). The partners are DASTU of the Politecnico di Milano (leader partner, coord. Gennaro Postiglione), Università di Trieste (coord. Elena Marchigiani), and Università e Politecnico di Bari (coord. Daniele Petrosino).

urban and local scales constitute pivotal issues.

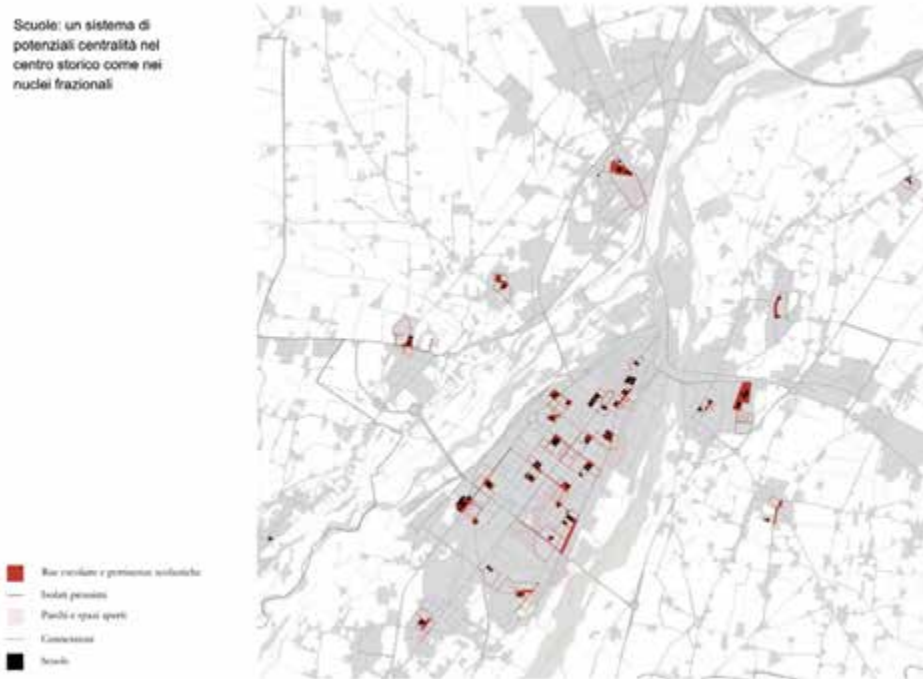


Fig. 2. Schools: a system of potential hubs in the historical centre and in the external neighbourhoods. Urban and territorial strategic regeneration strategy for Sustainable Cuneo city
(Source: Renzoni and Vassallo, 2021b).

The importance of planning and design of educational spaces in reducing urban and social fragilities is not a new concept. In Western contexts, schools have long been recognised as focal points within neighbourhoods or urban areas, and as tools for equitably equipping different parts of the city while fostering cohesive local communities. More recently, their relevance has been revitalised worldwide within the '15-minute City and Neighbourhoods' concept (Moreno, 2024). In parallel, school facilities have been examined from a spatial perspective as catalytic elements within the network of urban welfare spaces. In a growing number of European experiences, the role of *learning contexts* is not limited to school buildings alone, but extends as well to streets and public spaces understood as part of a collective educational infrastructure fostering independence (among the others: Ward, 1973; Ceppi and Zini, 1998; Kyttä, 2004; Munarin et al., 2011; Marchigiani, 2022b; Renzoni and Savoldi, 2022).

From this perspective, among the most advanced experiences aimed at supporting urban policies and design strategies, there are those recently developed by research groups at the Politecnico di Milano and Politecnico di Torino. These studies focus on various Italian metropolitan and medium-sized cities in the Lombardia and Piemonte regions, investigating the connections between educational facilities, urban accessibility systems, and other urban services (Renzoni et al., 2021a; Pileri et al., 2022; Renzoni and Savoldi, 2023; Savoldi and Baldissera, 2025). Specifically, within the studies for the strategic plan of Cuneo, four guiding principles are recognised. They focus on: open and public spaces; cultural heritage; social and healthcare services (crucial in the context of an increasingly ageing population); and school facilities, in relation to their surrounding spaces. As part of the master-plan for the regeneration of the urban fabric, the school hubs connect their associated facilities and courtyards to streets and spaces nearby, structuring a potential network of 'school roads' that is porous, liveable, and safe for people of all ages (Renzoni et al., 2021b) (Fig. 2).

3.3. Food Atlases

Another domain of welfare aimed at supporting socio-economically fragile individuals is access to healthy, affordable food, as well as the infrastructures related to its production and distribution. The lack of such conditions is referred to as *food poverty* – a complex phenomenon that has been exacerbated and diversified by recent crises, even in advanced capitalist countries. In contexts such as Italy, the problem lies less in the availability of food than in the access to a healthy and adequate diet. This reflects the paradox of *scarcity in abundance*, defined as “the impossibility for parts of the population to access adequate nutritive resources despite their (over)abundance in the context where they live” (Maino et al., 2016, p. 26; translated by the authors). Food poverty is also defined as “one of the most severe and comprehensive forms of material deprivation, leading to the inability to obtain or consume food of adequate quality or quantity in socially acceptable ways” (Toldo et al., 2023, p. 141). These definitions capture the phenomenon’s multidimensional nature: material deprivation, social exclusion from food-related practices, and psycho-emotional effects such as stigma and shame from relying on public aid.

However, the difficulty of situating food poverty within a unified critical framework makes it equally challenging to measure and assess its multidimensional nature. Available data are often fragmented and focus almost exclusively on economic dimensions, failing to fully capture the phenomenon – particularly from a spatial perspective. This gap has contributed to framing food poverty merely as a condition of need, thereby obscuring the issue of access to food as a fundamental right. In Italy, a significant attempt to address these limitations has been undertaken by ActionAid. In its most recent report, three tools are used to investigate food poverty: the Material and/or Social Food Deprivation Index (DAMS); the risk of food poverty; and relative food poverty (Ciancimino and Sensi, 2024). The report highlights how food poverty is shaped by multiple factors – including education, housing conditions, and access to the labour market – as well as by demographic characteristics, and the resources available in local contexts. It also raises critical questions about the adequacy of a response system based solely on material aid, particularly in cases not linked to extreme deprivation. Finally, the report underscores the urgency of developing local monitoring systems that consider not only food affordability, but also diet quality, food literacy and well-being, and the role of social participation in food practices.

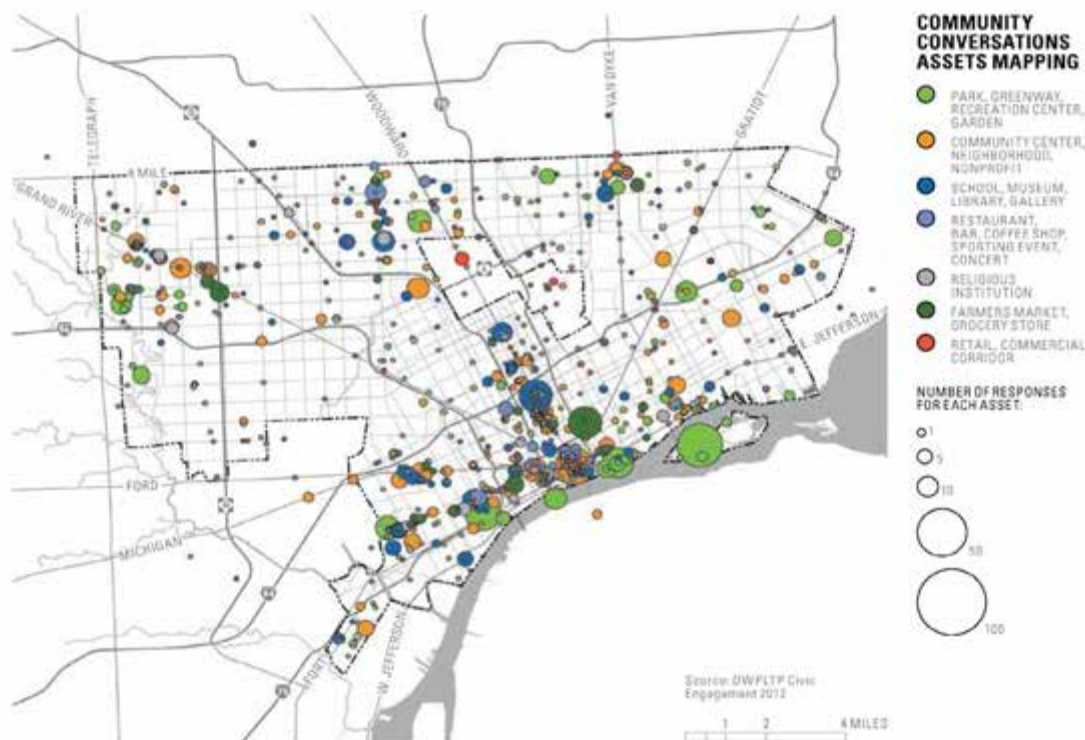


Fig 3. Food and social facilities: supports for transforming neighbourhoods
(Source: Detroit Future City, 2012).

In this framework, the concepts of *food empowerment and food environment* play a major role. The latter – understood as the set of conditions that enable or constrain food choices – specifically highlights the importance of urban space. This approach was already evident in the Strategic Framework Plan for Detroit, developed to address urban shrinkage and severe social and economic crises (Detroit Future City, 2012). Within this plan, urban agriculture and the reclamation of vacant lots are recognised as key interventions; furthermore, this tool envisions a multi-scalar network of food-related spaces and landscapes – from home gardens to farms linked to employment districts and food processing industries – as a cornerstone of a more resilient and equitable urban structure (Fig. 3). In fact, mapping food retail and distribution alone is insufficient to fully define a local food environment. A comprehensive understanding also requires the integration of spatial accessibility (e.g., the territorial distribution of food-related services – from supermarkets to open-air markets) with indicators such as food affordability, local food production, and the presence of solidarity networks. Within the *Atlante del cibo* (Food Atlas) of Rome metropolitan territory (Marino et al., 2022), this spatial approach makes it possible to identify ‘food blackout areas’, characterised by a systemic disruption in food access. In these areas, the intersection of multiple forms of fragility – economic, productive, spatial, and social – leads to a complete breakdown of local food systems, leaving communities without adequate support (Bernaschi et al., 2023).

3.4. Climate-proof cities and neighbourhoods

Especially in densely built urban contexts, *climate vulnerability and fragility* are today key issues that must be urgently addressed. This is particularly relevant for urban planning and design interventions in consolidated and highly ‘mineral’ urban districts, where natural elements are scarce. Southern Europe is mostly affected by three climate-related phenomena: heatwaves, or prolonged periods of above-average temperatures; heavy rainfall leading to flash flooding; and droughts, which contribute to wildfires and put pressure on water supplies (European Environment Agency, 2024). The effects of heatwaves and heavy precipitation are amplified where soil sealing is widespread and there is a lack of natural elements and vegetation. These hazards have a significant impact on the *comfort and health of urban dwellers*. In particular, prolonged heat stress, associated with rising temperatures and exacerbated by the urban heat island effect, can severely affect individuals already suffering from health problems, older adults, and children. Furthermore, these risks are heightened in situations of housing overcrowding and poor-quality dwellings. It is therefore not surprising that, within the broader context of the ecological and climate crises, the interrelation between environmental well-being and individual health is increasingly recognised as a matter of spatial justice and welfare. This recognition calls for an integrated policy framework situated at the intersection of spatial and environmental planning and social welfare – commonly referred to as ‘ecosocial policies’ (Carrosio and De Vidovich, 2023).

From a spatial planning and design perspective, enhancing green provision – encompassing tree cover and permeable green surfaces – emerges as a strategic intervention. In this regard, the implementation of Nature-Based Solutions (NBS) provides a practical and integrative approach to improving the functionality of green and open space networks, as well as mobility infrastructures within urban neighbourhoods, thereby linking urban regeneration with climate adaptation goals (Farlè, 2020). However, precisely because such interventions can significantly enhance quality of life in urban areas, ‘urban greening’ initiatives may also contribute to rising property values, reduced affordability of housing and public services, and the onset of gentrification processes that disproportionately affect socioeconomically vulnerable populations (Checker, 2011; Anguelovski et al., 2018). As such, these initiatives must be critically and contextually assessed to mitigate potential adverse social impacts.

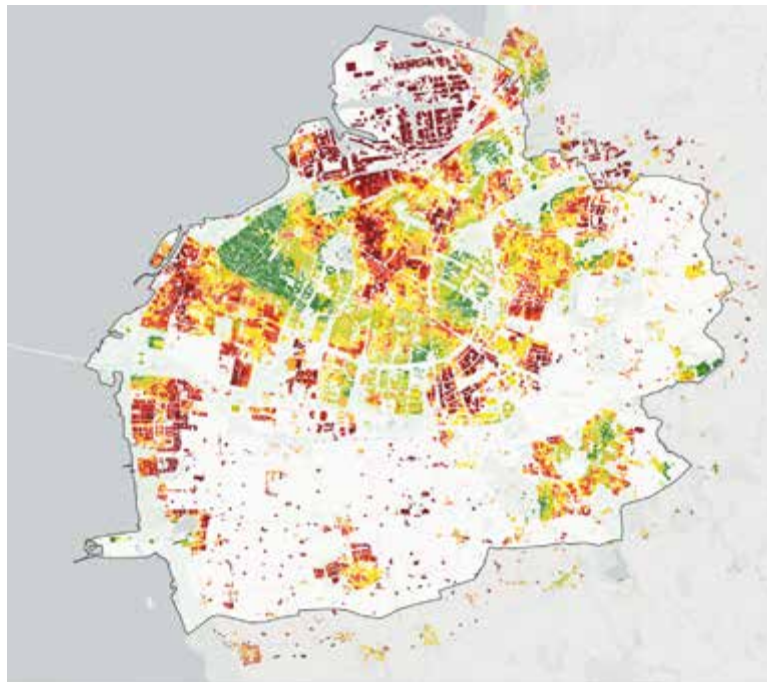


Fig. 4. 3+30+300 rule scores for buildings in Malmö, Sweden. Green and yellow indicate buildings and areas that meet or exceed the criteria, while orange and red highlight those with insufficient scores (Source: Konijnendijk et al., 2025).

Among NBS, depaving and the 3-30-300 rule have recently gained prominence in academic debate and design practice. While the former is a method aimed at improving soil permeability, the latter functions both as an index for assessing the quality of green spaces and as a strategic framework for territorial and urban planning (UN-ECE, 2021). Introduced in 2021, the 3-30-300 rule promotes healthier urban environments through a principle of redistribution: “ensuring that every resident can see at least three mature trees from their home, lives in a neighbourhood with 30% tree canopy cover, and has access to green space within 300 metres” (Konijnendijk, 2021). The Yggdrasil project, developed as part of the Nordic Council of Ministers’ Vision 2030 initiative, represents one of the first attempts to extend the 3-30-300 concept at an interregional level across the Nordic countries (Denmark, Norway, Sweden, Finland, and Iceland). This experience demonstrates how data from various international databases can be harmonised – for example, using the World Cover map by the European Space Agency to analyse tree canopy cover, and OpenStreetMap to assess mobility and accessibility in relation to the availability of green infrastructure in urban contexts (Konijnendijk et al., 2025) (Fig. 4). Notably, the study also highlights access to green spaces and trees in connection with dimensions of socioeconomic vulnerability, visualising potential disparities between areas with differing income levels, employment rates, and proportions of migrant populations.

At a neighbourhood scale, the City of Paris has implemented various NBS strategies within the framework of the *OASIS Schoolyard Programme*. In response to increasingly severe heatwaves in the urban environment, the project transforms schoolyards within disadvantaged neighbourhoods from hard-surfaced, enclosed spaces into green, open areas. Funded by the EU Urban Innovative Actions (UIA) programme, this pilot initiative involving a number of schools was carried out as part of the *Paris Resilience Strategy* addressing climate adaptation at multiple levels across the metropolitan area (Sitzoglou, 2020; Resilient Cities Network, 2025). A key concept behind this project is that green schoolyards are designed not only as a response to escalating climate threats, but also as a tool to foster inclusivity within local communities. The schoolyards remain open after school hours, serving as neighbourhood pocket parks for the most vulnerable residents.

3.5. Inclusive Spatial Accessibility

Spatial accessibility is here understood as the set of spatial conditions that enhance individuals' ability to move independently on a daily basis from their homes to workplaces, public spaces, and essential facilities. This fundamental quality of urban environments enables people – regardless of their age, gender, health, income, or social status – to lead autonomous and healthy lives, actively participate in society, and shape their own conditions of well-being and social interaction. However, the physical layout of cities often hinders access to essential services (such as education and healthcare), due to their dispersed location, the absence of pedestrian infrastructure or public transport links, and the presence of architectural and urban barriers (Marchigiani, 2023). Moreover, conditions of so-called accessibility poverty exacerbate social and economic inequalities, resulting in territorial segregation and the marginalisation of both people and places. In this regard, spatial accessibility – being a “capital” that can help or prevent a full performance of a person's capabilities (physical and social, economic and cultural) (Kaufmann, 2011; Marchigiani, 2022a) – becomes a matter of urban justice and a key component of urban equity and inclusiveness.

Addressing these challenges requires a shift in perspective beyond the spatial distribution of services and facilities. Accessibility encompasses not only the availability and geographical placement of these assets, but also their functional quality, user-friendliness, and systemic connectivity. Additionally, the health implications of active mobility should not be overlooked, as they play a pivotal role in individual and public health outcomes. Environmental sustainability is likewise a key consideration, since the implementation of integrated and low-impact mobility systems contributes significantly to reducing the environmental footprint associated with conventional, car-dependent transport modes. From this perspective, services and facilities must not only be accessible, but also reachable and effectively interconnected via safe, comfortable, and adequate routes. The concept of *proximity* thus assumes a central role (Gall, 2024), yet it needs a robust design framework capable of guiding interventions within a comprehensive vision for urban planning and regeneration (Marchigiani and Bonfantini, 2022). Beyond physical distance, several additional factors must be considered, including average travel time (whether on foot, by bicycle, or via public transport), the availability and quality of transit options, the presence of physical and perceptual obstacles, safety conditions, and the degree of alignment with users' needs. Specifically, the provision of barrier-free, walkable environments is highly important for individuals with different types of fragility. In fact, understanding the impacts of accessibility poverty requires particular attention to the groups most affected. Vulnerable populations – such as children and, more notably, persons with motor, sensory, or cognitive disabilities, whether permanent or temporary – are disproportionately impacted (World Health Organization, 2001). For these individuals, accessibility is a determining factor for social participation itself. Moreover, the likelihood of experiencing disability increases with age, making this a critical consideration in the light of current demographic trends within Europe (Eurostat, 2024).

Therefore, by adopting a Universal Design (UD) approach (Müller, 2023), urban space should be organised and reconfigured through the lens of bodily diversity and inclusivity (Bianchetti, 2020). Furthermore, limitations in accessibility should be regarded as design opportunities to reconsider the relationships between mobility, local economies, social practices, and the spatial distribution of essential services. Enhanced access to key facilities supports the development of *person-centred and place-based welfare systems*; thus, inclusive accessibility emerges as a strategic instrument for addressing complex territorial and social vulnerabilities. Orienting urban planning and regeneration around accessibility entails the involvement of multiple stakeholders and requires strong public leadership and coordination, whereas spatial connections between public facilities should serve as the *backbone of an urban infrastructure* capable of generating positive impacts across multiple scales and fields of action (Marchigiani and Basso, 2021). The liveability of streets – aimed at promoting safe and slow mobility – is a central concern. This calls for the implementation of a range of interventions, including pedestrian zones, 30 km/h speed limits, and the redesign of pavements and crossings, to help reduce conflicts between travel modes and improve accessibility for individuals with mobility impairments.

Several recent initiatives embody these principles. Notably, *FVG Accessibile* – a project developed by the Italian Friuli Venezia Giulia region in collaboration with the Universities of Trieste and Udine, and the Regional Informa-

tion Centre on Architectural Barriers and Accessibility – has established an ICT-based mapping system focused on the spatial and functional components of the urban environment, with accessibility assessed through Universal Design (UD) lens (Regione Autonoma Friuli Venezia Giulia, 2025). This initiative aims to integrate representations of facilities and public buildings, streets and connecting spaces, alongside the identification of various types of indoor and outdoor obstacles and barriers, in order to detect critical issues and support integrated planning processes. In this context, accessibility emerges as a cross-cutting concept that links spatial comfort, social welfare, and the effective usability of urban spaces and services (Marchigiani et al., 2022). Among the various approaches used to assess accessibility to essential facilities through active mobility, the *Inclusive Accessibility by Proximity Index* (IAPI) emerges as another valuable and context-sensitive tool for informing urban planning strategies aimed at promoting more inclusive and sustainable urban environments. This was demonstrated through its application at the neighbourhood scale in the city of Bologna. The IAPI is based on a comprehensive set of data sources and indicators relating to: the technical performance of pathways; traffic safety and road impacts; the safety and social appeal of public spaces; the design and diversity of public spaces and the built environment; and the accessibility of public and collective services, assessed using isochrone-based methods. The result is a synthetic representation of accessibility levels to essential services at the local scale, enabling the identification of potential issues related to both service provision gaps and the perceived quality of cycling and pedestrian routes, open and built spaces (Lanza et al., 2023).

The relevance of this integrated approach is clearly demonstrated in the *Site-Specific Assessment Guidelines* (UN-Habitat, 2020), where “suitability maps” are employed to visualise urban accessibility and usability within a neighbourhood, in order to support the development of inclusive and sustainable mobility ‘for all’ (Fig. 5).

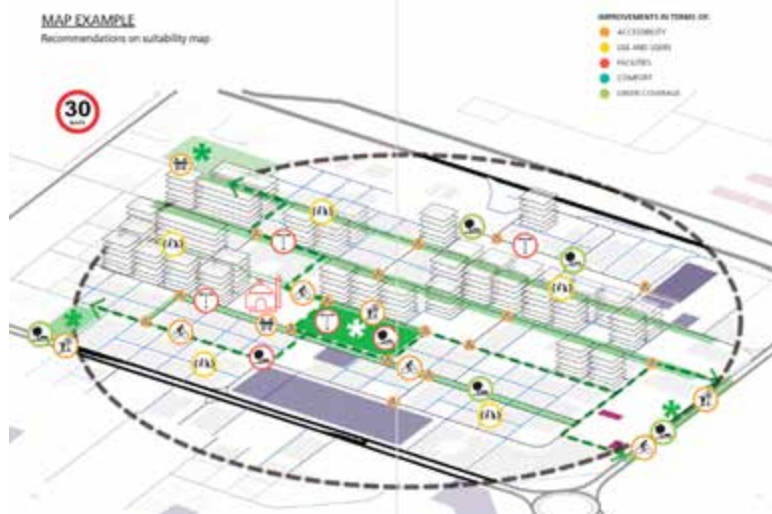


Fig. 5. The network of services and facilities at the neighbourhood scale (Source: UN-Habitat, 2020).

4. Design Explorations in Trieste: Toward a Supportive and De-Fragilising Neighbourhood

The opportunity to test the concepts and methodologies outlined thus far was provided by *research by urban design* conducted in the district of Trieste called *Barriera Vecchia*, within the activities of an Urban Planning Atelier at the University of Trieste. Owing to time constraints and the design-oriented nature of this experience, the development of complex indicators was not entirely feasible. The investigation therefore focused on the material quality of urban spaces. This shift, however, enabled emphasis on a layer of analysis that is often still superficially addressed in the aforementioned studies.

Specifically, the work pursued two main objectives. The first was to experiment with approaches for analysing

the quality of everyday life in an urban district that is characterised by the coexistence of multiple forms of fragility. This was achieved by systematising methods and tools that are rarely integrated into mainstream urban design practices. The second objective was to develop a design masterplan to transform this urban sector of Trieste into a *supportive and de-fragilising neighbourhood*. The aim was to enhance existing spatial and social assets, amenities and resources – improving the environmental performance of collective spaces, and proposing the implementation of new services to support overall upgrading of living quality and affordability. This was addressed through listening to and collaboration with public authorities, and third-sector organisations. The work employed both qualitative and quantitative data and information, with the purpose of rethinking the forms and methods of spatial regeneration. Overall, the intention was to foster social and institutional innovation capable of preventing and mitigating the emergence and escalation of conditions of vulnerability.

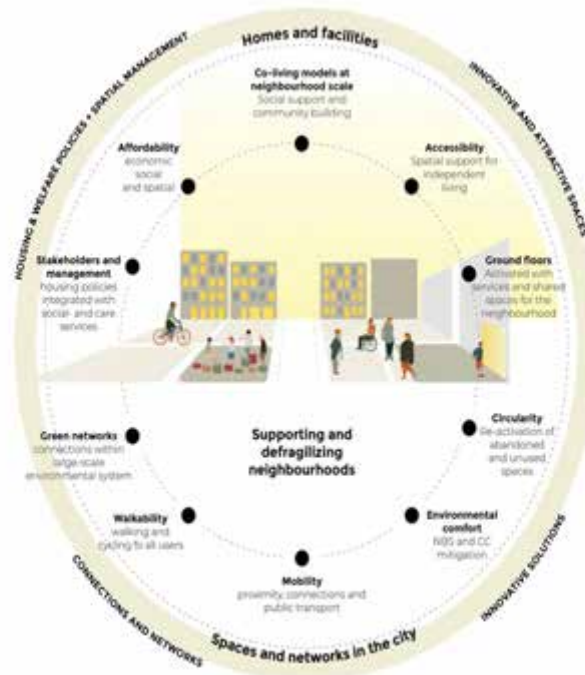


Fig. 6. Supporting and de-fragilising neighbourhoods: domains and actions
(Author: Teresa Frausin).

More broadly, by integrating multiple domains of quality assessment – including uses and users, amenities, comfort and safety, the green environment, and accessibility – the organisation of the city into supportive and de-fragilising neighbourhoods provides a spatial framework for the integration of housing and facilities (Fig. 6). This approach focuses on lived spaces beyond individual dwellings, specifically on public and collective spaces conceived as enabling infrastructures capable of hosting collaborative practices and supporting place- and people-sensitive spatial and policy design. However, before outlining the overall process, it is necessary to clarify its context and the rationale underpinning its design outcomes.

4.1. Working in the Inner Periphery of a Medium-sized city

Trieste is located on Italy's north-eastern border and currently has a population of approximately 200,000 inhabitants. It is a *medium-sized city*, occupying a spatial and functional position distinct from both large metropolitan areas and suburban, inner, or marginalised territories. These characteristics, along with their specific contextual conditions, have made medium-sized cities – and the so-called *intermediate urban areas* – a focus of recent Italian research, as well as of experimentation with more context-sensitive planning and design approaches and tools (see, among others, Lanzani and Curci, 2018; Gabellini et al., 2023; Renzoni et al., 2023; Caramaschi et al., 2024; Lanzani, 2024a).

While Trieste shares with other medium-sized cities across the country population stagnation/decrease and demographic change, some of these trends are particularly pronounced here, making the capital of the Friuli Venezia Giulia region stand out in the national context. Notably, acute patterns of population ageing combine with a significant presence of migrants and individuals with a migration background. These dynamics contribute to a growing segment of the population experiencing social and economic hardship, placing considerable strain on local welfare services. At the same time, the effects of 'touristification' – including rising real estate values – are undermining housing affordability. This is further exacerbated by strong housing demand from temporary populations, particularly a large number of university students and researchers (Marchigiani, Novak, 2024).



Fig. 7. The neighbourhood of Barriera Vecchia within the city of Trieste
(Source: Google Earth, edited by the authors).

Within the city, the research focused on a semi-central area (Barriera Vecchia), extending east of the historic centre and constituting its contiguous expansion dating from the late 19th and early 20th centuries (Fig. 7). Data collected by the municipal administration as part of the newly established RUPA – *Osservatorio Rigenerazione Urbana e Politiche Abitative* (Observatory for Urban Regeneration and Housing Policies) (Comune di Trieste, 2025) indicate that this area is characterised by a very high concentration of foreign residents, a significant presence of working-age individuals comparable to that of elderly persons, and a predominance of single-person households. The area's attractiveness is strong among young persons, who frequently choose this neighbourhood as their place of residence. This preference is linked to the fact that, despite its close proximity to the city centre, property values in Barriera Vecchia remain moderate to below average in terms of residential sale and rental prices, and are lower than those recorded in adjacent districts. However, this occurs within a broader context of significantly low household incomes compared to other parts of the city.

Owing to these dynamics, Barriera Vecchia can be defined as a specific articulation of the concept of *inner periphery*. While this concept is predominantly applied to suburban and rural contexts within the scope of European territorial cohesion policies (Ietri and Pagetti, 2019; Oppido et al., 2023; Galderisi and Limongi, 2024), it nevertheless provides a valuable interpretative framework for understanding disparities that also emerge in the most densely urbanised areas. The marginality of Barriera Vecchia does not stem from a condition of remoteness from more central and economically dynamic districts, to which it is in fact close and well connected by local public transport, nor – as will be shown in the following paragraphs – from a lack of facilities and services, which it actually has in abundance. What contributes to defining its marginality are: a high use value connected to a significant presence of individuals and groups in vulnerable or fragile conditions – related to age, health, social isolation, the burden of caregiving responsibilities, and low income; the lack and poor maintenance of pedestrian

areas, which compromises the creation of social spaces and inclusive accessibility; and widespread conditions of physical decay or underuse of individual residential buildings, often linked to poor energy performance and a spatial layout of housing units that does not reflect the actual composition and size of households.

4.2. Masterplanning as a Framework for Multiple Fields of Public Action

Over time, public intervention in *Barriera Vecchia* has consisted of a few fragmented initiatives focused on the refurbishment of individual spaces, while the low market value of private properties has made substantial renovation efforts economically unfeasible. Today, designing and managing renewal and retrofitting processes in urban areas where precarious conditions and multiple forms of fragility – affecting both the spatial environment and its inhabitants – are concentrated, demands more careful consideration of the appropriate scales, locations, and approaches to regeneration.

From this perspective, a preliminary and significant issue addressed by the research concerned the development of an approach for constructing a tool capable of ‘translating’ a regenerative design vision. This refers not merely to a device aimed at defining the location and spatial extent of individual interventions, the types of assets specifically involved, or their predominant uses. Rather, the work carried out with students was directed towards the definition of a *comprehensive masterplan*, complemented by design explorations focused on strategic themes and spatial systems of sites. This approach reflects a practice now adopted not only in academic settings but also within more institutional domains of urban and spatial planning. An example is the concept of “local strategies” included in the Town Plan approved in Bologna in 2021. These are described as “figurative guidelines for steering actions in the territory that aim to connect, relate, and create synergies between parts of the city, places of public life, and sites of memory and sedimented identity. [...] They indicate requirements and performances to be ensured in the transformation of urban spaces, without prefiguring their final form” (Comune di Bologna, 2021; translated by the authors).

A deeper reflection is nevertheless required on the meaning ascribed here to the term ‘masterplan’. Specifically, it is understood as a tool for defining and guiding regeneration processes that are sensitive to both place and people, particularly within already-inhabited urban contexts equipped with infrastructure but marked by severe and interrelated forms of precarity. The aim of such processes should be not only to counteract fragility, but also to empower individuals and strengthen their relational and spatial capabilities. A central element in the development of the masterplan is the existing infrastructure of public spaces – that is, the set of social, health, and educational facilities; places dedicated to the distribution and shared consumption of healthy food; existing open and green spaces, their connections and conditions of environmental and climatic comfort. An equally strategic move consists in uncovering and integrating other ‘opportunity spaces’, actions, and actors, in response to social needs that have not yet been adequately addressed by public policies.

Moreover, in developing the masterplan, the approach should not be confined to data collection and ‘external’ analyses, nor to the identification of a few prominent sites for selective action. Likewise, processes of listening, collaboration, and participation should not be relegated to a merely instrumental role aimed at mitigating conflicts arising from top-down strategies. Rather, the masterplan is conceived here as a process of immersion in place, involving interaction with local stakeholders and residents, and aimed at identifying the multiple domains of integrated public action – also extending beyond the scope of urban planning and design – upon which future spatial transformations and welfare policies may be grounded.

4.3. The Tale of a Process Toward a Place- and People-Sensitive Regeneration

The masterplanning process comprised several key steps, which are briefly outlined in the following paragraphs, with a focus on their principal findings and conceptual frames. The initial stage involved engaging with and listening to local stakeholders; it provided valuable insights and concrete indications. Building on this, both quantitative analyses and qualitative investigations were carried out, drawing on the systematisation and interpretation of available data, site surveys, and technical readings of spaces and their uses. This process led, on the one hand, to the development of an information base essential for the spatial representation of various dimensions

of fragility – referring to social and education facilities, as well as to food provision, climate and environmental comfort, mobility, and accessibility – and, on the other, to the identification of critical issues and opportunities that informed the masterplan’s strategic orientation.

4.3.1. Listening: In-depth Engagement with Place and Stakeholders

The listening phase involved a diverse range of stakeholders operating at both urban and neighbourhood scales. These included public institutions – such as the Agency for Public Housing (ATER), the Public Health Authority, and the Social and Urban Planning Departments of the Municipality of Trieste – with a central role played by the Public Company for Personal Services (ITIS), a social and healthcare hub deeply embedded in the local care infrastructure. Third-sector organisations were also engaged, particularly those specialised in support policies for individuals facing multiple vulnerabilities (e.g., Caritas Trieste, Lybra social cooperative, and San Martino al Campo). Additional participants included bank and social foundations, trade associations, labour unions, students, and local residents.

Specifically, at the urban scale, the process was carried out by the University research group through the organisation of two round tables on housing conditions in Trieste, direct dialogue with key actors, and in-depth interviews with various subjects. These activities addressed key challenges, in particular the role of public residential assets as catalysts for urban regeneration, the provision of adequate affordable rental housing, and the development of integrated service systems. In parallel, at the neighbourhood scale, a more in-depth listening process and a placemaking event involving residents – conducted in collaboration with other ongoing projects related to the healthcare system – enabled the identification and *mapping of local needs and challenges*.

Within these activities, particular attention was paid to factors influencing well-being, such as healthy lifestyles, economic security to meet basic needs, and the ability to move freely in order to access public spaces and amenities. Additionally, a strong desire emerged for a sense of identity and belonging, intergenerational social interaction, and access to education that promotes autonomy. Several critical issues were also identified, including spatial barriers to mobility, poor safety conditions in open spaces, and social isolation. Finally, this collaborative process facilitated the shared mapping of collective neighbourhood spaces with high potential for community use, alongside existing cultural, sports, healthcare, and community facilities that can be networked, reactivated, or – when privately owned – opened up to the neighbourhood through shared use. Overall, this phase laid the foundation for the development of genuinely place-based urban analyses and design approaches, aimed at more accurately responding to the actual needs of the community.

4.3.2. Data Analysis: Housing Spaces and Dwellers

As part of the masterplanning process, a further step involved a more precise delimitation of the field of technical analysis and intervention, based on the spatial configuration of the Barriera Vecchia neighbourhood and its actual patterns of use. This stage revealed a mismatch between, on the one hand, the boundaries of administrative and statistical areas – used to collect data on housing characteristics, sociodemographic profiles, household income, and property values – and, on the other, the complex topography of Trieste, where steep gradients often make places that are close in planimetric terms effectively distant and inaccessible (Fig. 8). This process underscored the inherent difficulty of translating city-level statistical data into more accurate, localised applications.

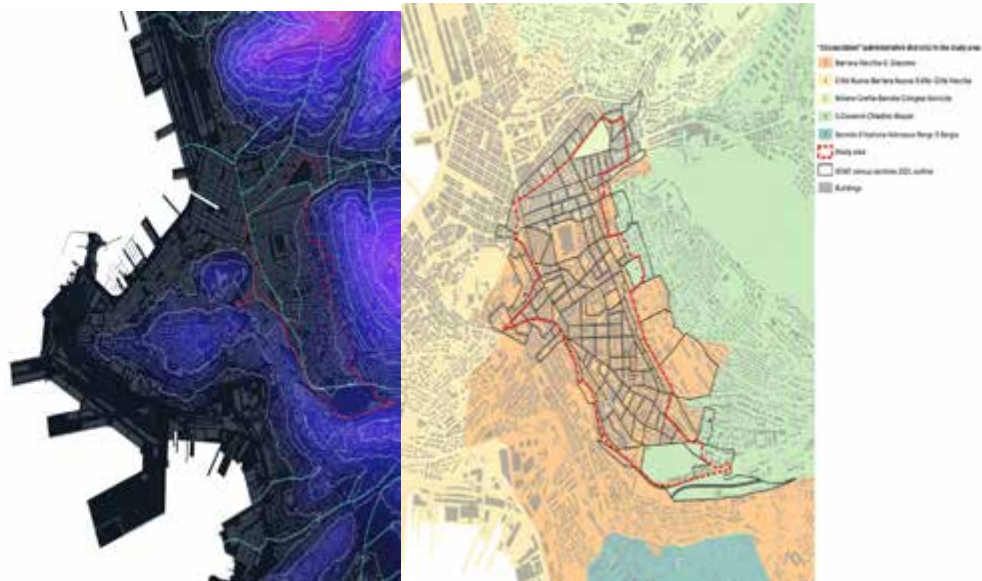


Fig. 8. Barriera Vecchia neighbourhood (in red). On the left, the city topography; on the right, the boundaries of administrative districts

(Source: Urban Planning Atelier, the University of Trieste, 2024-25).

Specifically, the processing of municipal registry data (Anagrafe comunale), based on administrative divisions, proved insufficient to capture socioeconomic phenomena at the neighbourhood scale (Comune di Trieste, 2025). Similarly, data on property values (from the Real Estate Market Observatory – OMI 2024) and income levels (Personal Income Tax, IRPEF – MEF 2023, based on areas defined by postal codes) remain tied to relatively large zones, which do not correspond to the spatial articulation of the territory. As such, they can be used to indicate median values and general trends, but not for detailed spatial analyses. It was therefore decided to rely on the spatialisation of data provided by ISTAT (Italian National Institute of Statistics), as their level of detail – structured at the scale of census tracts – allows for closer observation of local dynamics. Due to the high settlement density in the central area of the Municipality of Trieste – and Barriera Vecchia in particular – census tracts often correspond to individual urban blocks⁴. ISTAT data enable a specific focus on the age structure of the population, household composition, presence of foreign residents, as well as the distribution of dwellings and number of rooms per unit. Overall, despite numerous limitations, their GIS-based mapping and comparison – when possible – with other available datasets prove highly effective in visualising key issues and facilitating cross-analysis between different topics.

The analyses conducted in this way show that the Barriera Vecchia accounts for 11.2% of the Municipality of Trieste's population (22,192 residents) compressed in just over 1% of the city's total surface area, with a residential density amounting to 214.7 inhabitants per hectare – approximately ten times higher than the municipal figure. The average age of the population is 46 years, compared to 49.5 at the city scale, and the 25-64 age group accounts for 65.7% of the area's residents, as opposed to 52.6% in the wider municipality. However, this should not overshadow the significant presence of older residents: more than a quarter of the population is over 65 years old. This pattern is consistent with the demographic structure of Trieste, where over-65s represent 28% of the total population. The analysis of household composition shows that Barriera Vecchia is predominantly characterised by single-person households or those with two members, accounting respectively for 55.0% and 23.4% of the total. There is also a significantly higher proportion of foreign residents (21.5%) than in the rest of the city

⁴ In fact, ISTAT data are not without their challenges. On the one hand, reconstructing time series – for example, between the last two available censuses (2011 and 2021) – is difficult due to changes in boundary definitions. On the other hand, working with spatial units that do not correspond to sub-municipal administrative boundaries requires substantial data processing efforts.

(11.2%), with a major concentration in the 30–54 age group (10.0%).

Taken together, the analyses developed from ISTAT and MEF data outline a territorial context characterised by a generally younger population and smaller household units than in nearby districts and the city, set within a high-density urban environment marked by conditions of social and economic fragility. Building on the spatial representation of this quantitative information, a map was produced to highlight the tension between the characteristics of the 'containers' (the dwellings and their dimensional configurations) and the 'contents' (namely the people who inhabit them). This map illustrates the subdivision of the Barriera Vecchia neighbourhood into distinct 'Areas' (Fig. 9). The northernmost part of the district (Areas 1, 2) is mainly characterised by the presence of single-person households and large-sized dwellings, which are, however, mostly vacant or occupied by non-residents. This suggests a prevalence of short-term rental arrangements, likely for students or tourist accommodation. The central portion of the neighbourhood (Areas 3, 4, and 5) presents a significant concentration of foreign residents, working-age individuals (25–64 years), elderly people, and relatively large families living in dwellings of varying sizes, though predominantly small. Lastly, in the southern portion (Areas 6, 7), larger households generally prevail, with a significant proportion of foreign residents and co-residents living in small dwellings.

The marked internal differentiation of Barriera Vecchia offers valuable insights for identifying design issues and potential sites of intervention – ranging from domestic environments to public spaces and support services for the most vulnerable groups. For instance, the presence of very large families living in small apartments, or multiple single-person households aged 20–35 sharing the same dwelling, underscores the importance of relational spaces outside the home and the need to strengthen links with socio and educational facilities. Similarly, the concentration of elderly residents living in large dwellings shows a potential for new living arrangements – such as intergenerational co-housing – and for home-based support models that extend beyond the dwelling to encompass a broader network of external services.

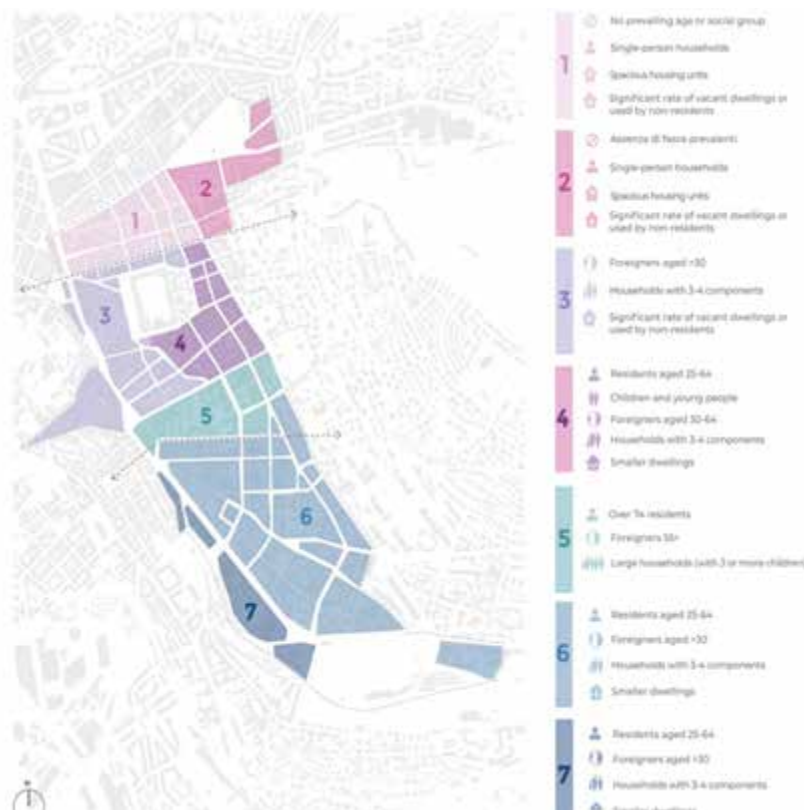


Fig. 9. Containers and contents. Map of the sociodemographic and housing conditions analysis (Source: Urban Planning Atelier, the University of Trieste, 2024-25).

4.3.3. Fieldwork and Site Analysis: Supportive Spaces

In parallel with desk-based work, on-site observations and surveys were conducted. The focus was on the distribution and physical setting of amenities, different forms of mobility – particularly pedestrian – public open spaces, green areas, council housing estates, and buildings providing various types of assisted living for the most vulnerable populations managed by public institutions and third-sector actors. The neighbourhood was investigated at various times of the day, throughout the week, and across different seasons, in order to capture uses, everyday practices, and both critical and potential spaces. This close-up perspective enabled a field-based validation of the data and brought them into dialogue with the material reality of the space.

The site reveals itself as rich in various types and spatial patterns of facilities and services. These elements are understood as supportive spaces – resources that constitute a significant asset not only for the neighbourhood itself, but also for adjacent areas of the city. Across the district, these spaces are concentrated in three main clusters, with educational, social and health facilities serving as key reference points. Each cluster is surrounded by a range of additional amenities and is enlivened by residents' everyday practices. Specifically, in the northern sector, two school hubs are located next to pedestrian areas. In the central sector, a cluster combines social and health services with a diverse set of educational buildings. Finally, in the southern portion, a network of schools and valuable community spaces – including parish sports facilities and a municipal recreational centre offering after-school and summer programmes for children and young people – is situated between two main groups of council housing (Fig. 10).

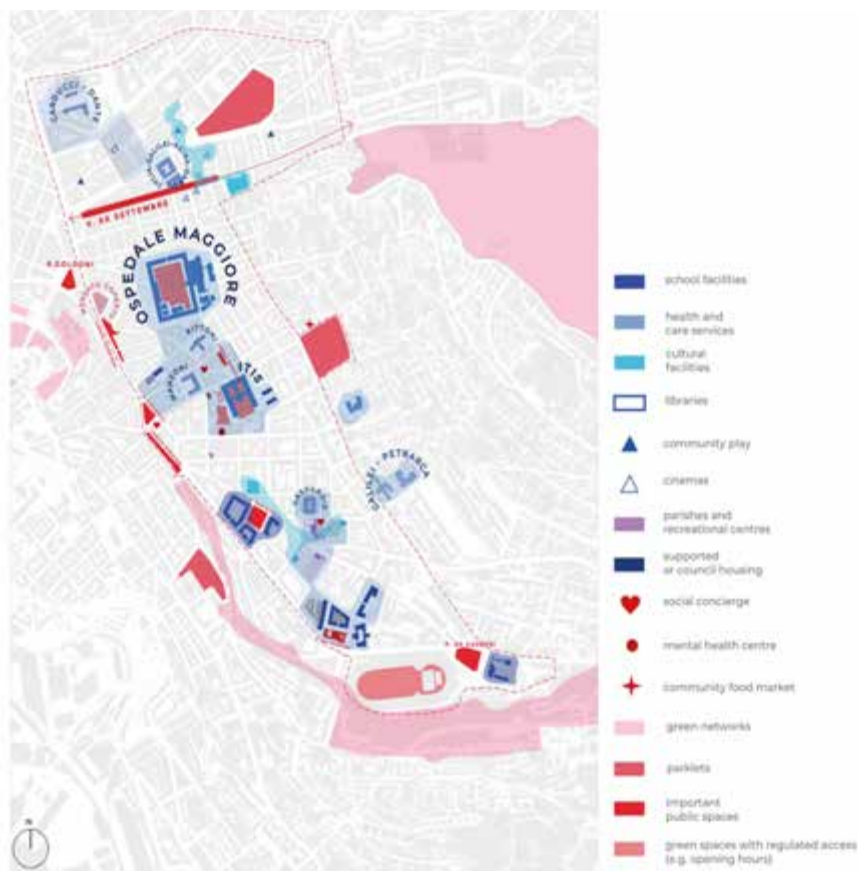


Fig. 10: Supportive spaces. Clusters of facilities and services
(Source: Urban Planning Atelier, the University of Trieste, 2024-25).

However, these well-equipped clusters do not function as integrated systems but rather resemble a *loose constellation of separate buildings and spaces*. Weak and fragmented mobility and environmental networks – comprising scattered tree-lined paths and the peripheral location of major green areas often with restricted access – limit the movement between facilities. In many cases, particularly near heavily trafficked roads or poorly designed spaces, the road infrastructure itself constitutes a physical and perceptual barrier. In parallel, the neighbourhood as a whole is characterised by a lack of squares and meaningful public open spaces, which are largely confined to a few spots along the main road running along the western edge of the site. These areas primarily function as public transport hubs or informal market spaces during limited hours of the day. Indeed, despite the richness of available facilities and services, this part of the city suffers from a pronounced lack of accessible, high-quality public space (Fig. 11). Dominated by car traffic and extensively paved and sealed, the neighbourhood is poor in terms of permeability, environmental comfort, and microclimatic resilience. Consequently, it faces significant limitations both in accessibility and in its capacity to adapt to climate-related challenges, particularly regarding the impacts on the most vulnerable population groups – such as the elderly and children.

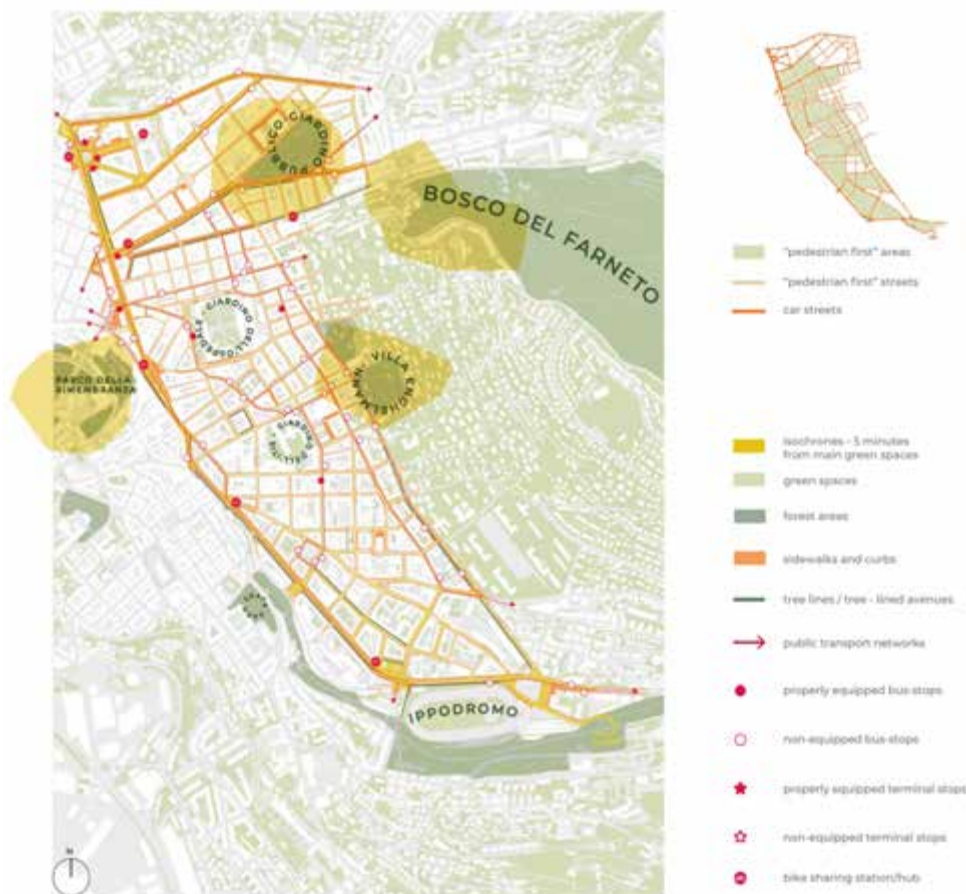


Fig. 11. Roads and green spaces. A poor supply of soft mobility and environmental networks
(Source: Urban Planning Atelier, the University of Trieste, 2024-25).

4.3.4. Masterplan: Connections and Insertions

Building upon the key information and issues previously outlined, the masterplan articulates a comprehensive vision that integrates strategic frameworks with localised actions aimed at reducing the neighbourhood's vulnerability (Fig. 12). These spatial systems and interventions are contextualised in relation to two core strategies.

The first strategy centres on *spatial connections*, aiming to transform open areas within the neighbourhood into

a system of genuinely public spaces that promote soft and sustainable mobility, foster relationships between facilities and among residents, and are reimagined as resilient infrastructures capable of mitigating flooding and urban heat island effects. The focus is on the road network and associated urban spaces, currently heavily impacted by car traffic – both from stationary (parked) and circulating vehicles.

The reorganisation of the isotropic street grid into a hierarchical system – distinguishing between major thoroughfares and finer-grained, capillary routes – enables the definition of spatial 'quadrants' (clusters of urban blocks), within which internal areas can be freed from car dominance. Drawing inspiration from Barcelona's *superilla* model (Adjuntament de Barcelona, 2025), this restructuring allows for restricted vehicular access, the creation of pedestrian-only pathways and zones, and the introduction of traffic-calming measures. These interventions are instrumental in reclaiming space for connections between housing and services. Furthermore, mobility corridors and inner courtyards are transformed into porous environments, redesigned with green and permeable elements that also enhance overall environmental comfort. In parallel, the main mobility axis – which defines the western boundary of the study area and links the railway station, historic centre, and the wider *Barriera Vecchia* neighbourhood with the more porous southern zones (including the racecourse and public housing blocks) – is redesigned. Currently a high-speed and hazardous road, it is reconfigured as a sequence of articulated spaces for both movement and social interaction. Along this axis, existing open areas are transformed into a series of distinct public squares connected to key service hubs within the study area. Meanwhile, underused or poorly conceived spaces – such as vacant lots, oversized car parks, asphalted surfaces, and outdated mobility infrastructures (e.g., a petrol station in the southernmost portion, planned for relocation) – are reorganised and repurposed.

All interventions operate at a *fine-grained, interstitial scale*: reclaiming pedestrian zones and pavements; re-designing public transport stops as elements that support active mobility and function as comfort-enhancing landmarks; and reconfiguring building courtyards – in some cases making them accessible or traversable. These spaces, currently dominated by impermeable surfaces, are reimagined as shared environments for residents, accommodating micro-facilities, areas for play and wellbeing, and green, permeable landscapes.

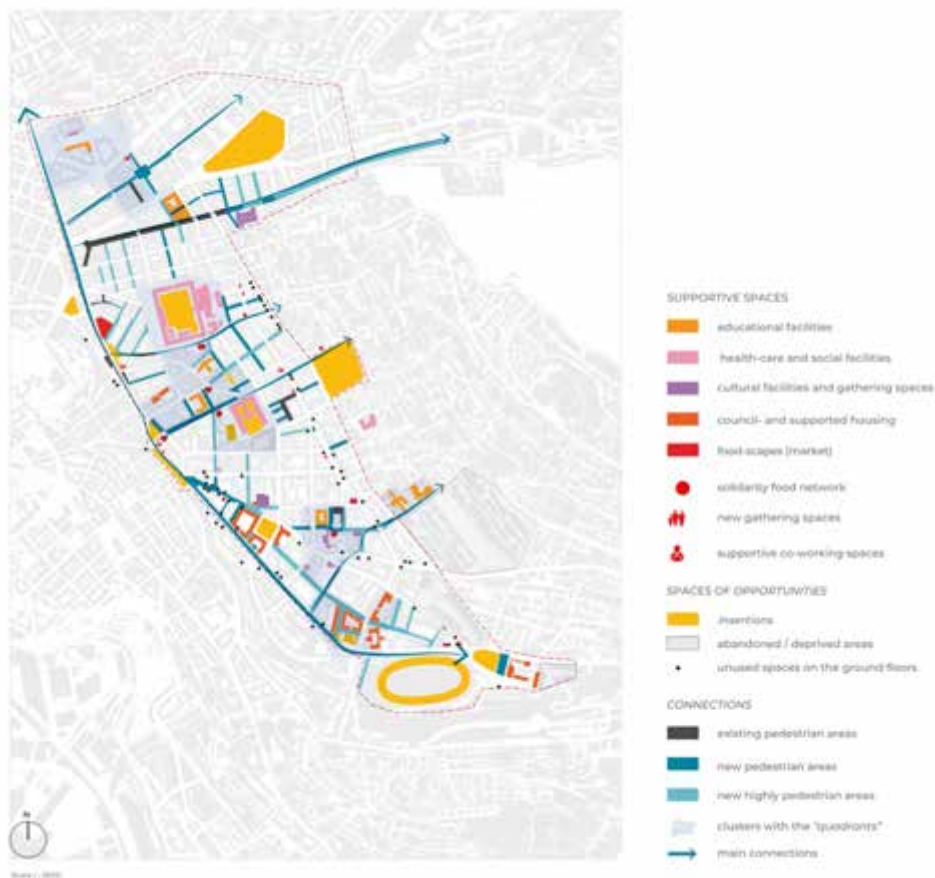


Fig. 12. Masterplan. Connections and intersections: supportive spaces and spaces of opportunities.
(Source: Urban Planning Atelier, the University of Trieste, 2024-25).

The second strategy consists of *insertions* of new uses and activities, often through the repurposing of underused or vacant spaces as catalysts for more liveable and enriched urban conditions. It primarily focuses on the reconfiguration of areas situated within or adjacent to public facilities, integrating them and enabling their systemic use through the connections provided by the broader pedestrian mobility system. This approach aims to strengthen the service network and improve its *isotropy* by activating spaces currently perceived as critical (e.g., abandoned stalls inside the food market), and by reorganising functions associated with existing facilities into a 'spatial infrastructure' accessible at different times of the day and by a diverse range of users (e.g., can- teens, libraries, gyms, sports equipment, conference rooms).

Specifically, a first type of intervention involves rethinking the spaces adjacent or within the plots of schools and healthcare centres. The redesign of thresholds, entrances, courtyards, and fences aims to better connect buildings with their surroundings, with particular attention to the needs of vulnerable users, especially older adults and children. In parallel, vacant ground-floor areas are conceived as extensions of the domestic sphere and reprogrammed with activities that support residential life (e.g., shared kitchens, self-managed nurseries and after-school services). These indoor and outdoor dimensions are brought into dialogue, fostering spatial and functional integration as well as new activities and social practices.

A second type of intervention – closely linked to the mobility reorganisation – reconfigures key open spaces as inclusive areas designed for diverse uses. One example is the new pedestrian route connecting the hospital, schools, and care facilities in the central sector of the neighbourhood. New uses include temporary markets, play areas, accessible public transport stops, and community-oriented facilities.

Finally, the project envisions new systems of open spaces and an environmental network, connecting to major green areas located on the perimeter of the neighbourhood that are currently segregated or inaccessible due to topographic constraints. Enriched by tree lines, rain gardens, and targeted depaving, these systems are imagined to host micro-functions that also encourage inclusive and intergenerational practices – for example, new sport facilities, playgrounds, and sheltered seating areas.

5. Conclusions

In inner suburbs and semi-central urban contexts, which are vulnerable both to becoming natural areas of expansion for ongoing real estate valorisation processes in the adjacent areas, and to the displacement and filtering up of resident populations, a central issue is how to *avoid regeneration that fosters gentrification*. This should be achieved primarily, if not exclusively, by promoting projects and initiatives with a strong ecological value that specifically address vulnerable groups living in these areas – in terms of housing provision, service typologies, and connections among public spaces (Lanzani, 2024b, p. 177). From this perspective, the masterplan (and the entire process oriented towards its design), developed through the research activities carried out in the Barriera Vecchia district, is conceived as a tool which aims to support “a much stronger public action”, “contrary to neo-liberal rhetoric and partly also to the more radical ideas of do-it-yourself urbanism” based on the poor resources of even those struggling to independently manage their lives (Ibid.).

Another lesson learned from the iNEST research in Trieste is that, when working in highly sensitive and fragile social and spatial contexts, there is a strong need to integrate analytical surveys, direct observation, and interaction with local institutions, stakeholders, and inhabitants who live and operate in these areas on a daily basis. While general data frameworks and observatories are useful for guiding action at the broader urban system scale, at the local level what is also needed is a closer, design-oriented perspective aimed at defining *unconventional spatial solutions* – solutions capable of responding to emerging social needs, accommodating new collective practices, and fostering a deep integration across diverse urban policy domains, from housing to the wider spectrum of welfare.

Within this process, the existing facilities and services – their further development through new insertions and additions, their connection via spaces capable of ensuring widespread and inclusive accessibility, and the creation of new synergies with interventions aimed at reducing soil sealing and re-vegetating urban surfaces – are of considerable importance. Together, these elements can shape a *framework of spatial and social infrastructures* designed to alleviate the sociodemographic and economic vulnerabilities that increasingly affect large segments of the urban population. These infrastructures – composed of public spaces and amenities – not only respond to social needs arising from the growing and multifaceted vulnerabilities of individuals and families, but also enable and foster new institutional and grassroots practices. At the same time, thinking in terms of infrastructures – understood as continuous and interconnected systems – invites a rethinking of the design process itself: its methods and aims, and particularly its role as a pivotal mechanism for the de-sectorialisation of the many and diverse public policies addressing different forms of vulnerability, ranging from urban planning to public works and mobility, and from education to social and healthcare services.

One final clarification is, however, necessary: the major omission in this narrative is housing itself. Policies aimed at affordable housing – particularly in the rental sector – capable of addressing sociodemographic and economic distress are indispensable. The approach adopted in the development of the masterplan should therefore be understood as one component within broader pathways of public policy innovation, aiming to refocus regeneration efforts on space and people, and encompassing *both the internal and external environments of the dwelling*.

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