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Journal of
Land Use, Mobility and Environment

This Special Issue contains a collection of sixteen extended papers from the XXV Living and Walking in Cities International Conference. It is a bi-annual occurrence aiming to gather researchers, experts, administrators, and practitioners and offer a platform for discussion about mobility and quality life in urban areas-related topics, specifically on vulnerable road users. The aim is to exchange ideas, theories, methodologies, experiences, and techniques about policy issues, best practices, and research findings.

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Special Issue 1.2022

**New scenarios for safe mobility
in urban areas**

TeMA

Journal of
Land Use, Mobility and Environment

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NEW SCENARIOS FOR SAFE MOBILITY IN URBAN AREAS

Published by

Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"

TeMA is realized by CAB - Center for Libraries at "Federico II" University of Naples using Open Journal System

Editor-in-chief: Rocco Papa
print ISSN 1970-9889 | online ISSN 1970-9870
Licence: Cancelleria del Tribunale di Napoli, n° 6 of 29/01/2008

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The cover image was retrieved from: <https://www.progettaferrara.eu/it/b/2284/slides>.

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print ISSN 1970-9889, e-ISSN 1970-9870

DOI: 10.6092/1970-9870/8653

Selection and double blind review under responsibility of “Living and Walking in Cities 2021” Conference Committee.

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www.tema.unina.it

The 15-minute city as a hybrid model for Milan

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Abstract

With a special focus on Milan, we explore the interpretation of the 15-minute city as a hybrid model, where soft mobility is integrated in a holistic urbanism approach. Contemporary urban challenges, synthesized in the 15-minute city model, look for a sustainable “proximity mix”: mix of uses (overcoming rigid zoning and building codes), mix of inhabitants and users, mix of time schedules and multi-purpose open space. The proposed hybrid approach considers the living-working urban experience as a whole: it proposes to consider, as a starting point for measuring the timeframe of 15 minutes, not only homes but workplaces as well. It welcomes innovative working facilities among those to be considered as essential services reachable within the 15-minute walking timeframe and it integrates open spaces within urban infrastructures by mixing the neighborhood “eco-system” –both of environment and mobility– and designing them around the central role of walking.

Keywords

15-minute city; Walkability; Hybrid mix.

How to cite item in APA format

Abdelfattah, L., Deponte, D. & Fossa, G. (2021). The 15-minute city as a hybrid model for Milan. *Tema. Journal of Land Use, Mobility and Environment*, 71-86. <http://dx.doi.org/10.6092/1970-9870/8653>

1. Introduction: proximity mix for resiliency

The pandemic, climate change, social inclusion, digital accessibility and circular economy are urban contemporary challenges which are deeply intertwined. Recent crises and emergencies, overlapped at the global scale, stressed the uncertainty of the current transition momentum, open to unpredictable scenarios. The related fluidity of the city's future pushes planners towards creative and critical thinking, combining data-driven awareness with new imaginaries and tactical urbanism with long term strategies. Beyond the re-prioritization of UN goals under the pandemic pressure with new balances among health, society and environment, *conditio sine qua non* to find an exit-strategy for sustainable development is the resiliency of the settlement system. This concept offers a powerful and sensitive interpretation of the globally emerging 15-minute city model as a "proximity mix" which makes treasure and promotes the variety of physical and human resources, urban typologies and functional patterns as strategic factors of city regeneration, both referring to existing textures as well as to redevelopment areas.

1.1 The hybrid neighbourhood for the post-Covid city

The 15-minute city became popular in 2020 when Paris' mayor launched the plan "Paris Ville du quart d'heure" during the peak of the Covid emergency. This political agenda is supported by the theoretical discussion of Moreno (2020, 2021) which defines the model around the accessibility to the urban life experience (essential facilities and services) in a timeframe of a quarter of an hour from home, by walking or cycling. Forward-looking global cities such as Ottawa, Melbourne, Seattle, Portland promoted 15/20-minute neighborhood plans even before¹, calling for a "transition" to be accompanied by an incremental, participatory process. The pandemic accelerated and internationally spread this 15-minute trend which is actually rooted in the neighborhood organic planning principles of the 1960s² (Busi, 2021) and is now reinterpreted in its regeneration potential: the ecological perspective is combined with digital and energy innovative programs in the framework of a green and circular economy, making treasure of the experience of urban regeneration masterplans of the last decade. The urban design frontier is forced by global drivers to embrace resiliency in relation to environmental risks as well as socio-economic challenges: climate change (flooding, heat island), energy saving, social inclusion are leading the urban form issue. The approach falls in line with real estate strategies for place making, which aim to create new sustainable, mix-used, urban districts that are pedestrian-oriented and carbon free.

The lockdown experience allowed to integrate these already existing trends towards the rediscovery of the urban hybrid proximity, the fine-grain mixed-use texture composed of hybrid uses, convenience stores, new office layouts with shared workstations, coworking and co-living spaces, innovative timetable alternating plans and shared but individual eco-mobility options. The availability of private/collective outdoor living spaces fully revealed its preciousness; open spaces of public use became the vital place to continue enjoying a social life during the pandemic. The lockdown also revealed that remote working as well as the flexibility of both working and living spaces are essential conditions to fully accomplish this innovative model. The digital transition has been accelerated as a tool for managing the emergency and, at the same time, following a long-term strategy. Extending digital accessibility at a professional level³ and allowing working remotely from marginal contexts concerns not only mountain regions but also peripheral neighborhoods, which thanks to smart/remote working have been experimenting an intense daily life beyond commuting to the city core. Under this perspective, the

¹ Ottawa Official Plan (2019), Plan Melbourne 2017-2050, Portland Climate Action Plan (2018), Plan Seattle 2035 (2020).

² See the "Living and Walking in Cities" International Conferences, conceived by the planning research group of Brescia University (under the guidance of Prof. R. Busi and Prof. M.Tira), which have been promoting, for more than 25 years, the walkability of urban milieux, constantly updating the model in continuity with the organic proximity approach.

³ Next generation digital access: very high-capacity network Fibre To The Home FTTH.

pandemic opened a historic window of opportunities for a settlement rebalance, not only at the regional scale but also at the city level.

The pandemic has put in crisis the consolidated planning priority against climate change, *id est* land saving, due to the fact that it results, as consequence, in volume concentration. Densification around stations, suggested by the Transit Oriented Development approach (Calthorpe, 1993; Cervero, 2004) in combination with land saving now constitutes a health risk because of people crowding. But the transit network will continue to provide the backbone at the inter-neighborhood scale, connecting it to the city/region (Scholl et al., 2018). Optimizing uses and services around less dense transit nodes suggests the hybrid evolution of the neighborhood core inside a vision of a multiscale network of 15-minute urban districts, an innovative multi-center territory (Tira, 2020). The planning question raised by the lockdown crisis about whether or not we should reconsider a light-city settlement paradigm leads us towards hybrid solutions where urban density could find balance with individual soft mobility, innovative timetables programs and the upgrading of public transport capacity.

In synthesis, all the three disciplines and scales of architecture, urban design and planning are called to evolve towards a resilient hybrid design, mixing flexible and interchangeable uses, in space and time. The infrastructure platform will support "plug-in" uses, integrating them in flexible open space patterns and building functional layouts. The post-pandemic scenario indeed seems to suggest this hybrid interpretation of the emerging 15-minute city model: first, because this paradigm is based on a proximity mix of facilities and services for living and working, defining a hybrid proximity habitat which we realized is so precious for public health; and second, because the urban system needs to be resilient and able to quickly react to unforeseen changes and challenges, a condition which is better provided by a range of resources as diverse as possible. The hybrid concept involves all various components of the urban experience, both in space and time. It is a mixed-use, 24/7 and multiscale vision of the living/working neighborhood. The multitask reinterpretation of open spaces, integrating sustainable mobility, social life and climate change measures, is strategic for the hybrid regeneration of the urban fabric (Freudenberg et al., 2021). This 15-minute hybrid proximity model is a general concept which requires to be deployed in a site-specific, community-specific way. This model's sensitivity to local conditions unfolds its potential to be adapted to various cities and neighborhood communities, which is testified by universal success.

1.2 Calling for a hybrid approach on issues around the 15-minute model

Despite its widespread political consensus, there is still a wide range of vagueness and ambiguity in the 15-minute model, both at the conceptual and implementation levels, which could be better addressed if approached with the proposed hybrid perspective. In this paper, both interpretation and design criteria are discussed on the basis of the case of Milan and synthesized in the following issues.

A net-zero open neighborhood: the proposed hybrid 15-minute model does not aim to promote gated communities. Even if it will seek self-sufficiency for energy and recycling as much as possible, starting from water and waste and local food production through community gardening initiatives for providing 0-km food, it will not be an inward-looking community. On the contrary, it will be permeable to pedestrian and green connections, by ensuring synergy and complementary functional relations with the surrounding urban context in order to reinforce the inner mix potential (people, economy, ecosystem) in a wider market and society as well as environment; it welcomes users and tourists and is socially inclusive as evidenced by the Reinventing Cities initiative, which is focused on the regeneration of relatively narrow but strategically located railway yards and other dismissed or leftover areas which offer great potential for integrating different urban textures⁴.

4 So far, Milano has joined two Reinventing Cities editions: 2019 and 2020.

A glocal hybrid: the proposed hybrid concept for the 15-minute model does not eliminate the commuting phenomenon. Transit stations should be required as one of the components of essential neighborhood services in order to guarantee the desired quality of life: a bus stop is not enough. For example, in a city of the scale of Milan, almost the whole city could be reached in 20 minutes by subway and half an hour by bike, and the metropolitan area in 30-45 minutes by subway or train. Commuting will not therefore be cancelled but made more flexible in space and time, especially with the introduction of co-working spaces as another component among the essential services. Coworking spaces are becoming hubs of urban regeneration in the 15-minute neighborhood perspective. The hybrid 15-minute model is "glocal": this neighborhood is indeed connected by mobility and digital infrastructures at all scales; it is "glocal" also because it implements the neighborhood hybrid structure in a site-specific way, combining place identity and access to the global world.

Home & work: the proposed 15-minute concept creates a living and working ecosystem. The hybrid neighborhood community is made by both inhabitants and users; in particular, some workers commute into and out of the neighborhood, some work from home and others work in their neighborhood co-working spaces. In coherence with this approach, co-working facilities should be included among the essential services of the neighborhood, and not just recognized as spaces of public interest, as already done by the Milano City Plan, together with innovative urban manufacturing.

In this perspective it is interesting to note that Milan's Urban Economy Department just instituted a "Register of Hybrid Spaces" (September 2021) in order to promote them for their role in placemaking and promoting social cohesion. This approach suggests to consider as a starting point for measuring the timeframe of 15 minutes not only homes but also workplaces (whichever type of dynamics it reflects: smart working at home, coworking neighborhood hub, new offices and urban manufacturing workplaces or traditional office spaces). The separation between home and work could become more blurred, thus offering great potential for urban regeneration and resiliency.

Walking versus cycling versus the car: 15 minutes of walking is different from 15-minutes of cycling (it is 1.5 km vs 6 km - 4 times more): it is implicit to consider a neighborhood as walkable in 15 minutes. The 15-minute timeframe by bicycle suggests the desired relation between different neighborhoods. The walkability of the neighborhood should be integrated in a multi-scale framework with other soft/sustainable mobility modes in addition to transit modes and in coherence with the hybrid core of the softer TOD.

Tactical urbanism, recently adopted by the City of Milan through the Adaptation Strategy Plan (Comune di Milano, 2020) and the "Piazze Aperte" (Open Piazzas) initiative, providing pop-up cycling lanes and social spaces on roads and squares, could only be an effective but temporary solution. The vision reclaims the whole road space for hybrid public uses, privileging walkability and social life and taking away street parking in order to improve the urban landscape experience. On-street parking for a few users indeed occupies a significant portion of precious public open space (about half of the ordinary road section); across consolidated urban textures, most of the parking lots are occupied by cars of neighborhood residents, stationary for the most of the time and acting as triggers for the urban heat island effect while also acting as hazards for flooding risks. Recent researches (Balletto, 2021) reclaim the urban public spaces occupied by street parking on the basis of interdisciplinary arguments, including Real Estate (highest value locations coincide with lowest street parking availability). Space occupied by parked cars is precious space especially in Milan, which lacks enough space for sidewalks (Deponete, Fossa & Gorrini, 2020). Central underground parking facilities, such as the one below S. Ambrogio square, should serve not to attract further city-users by car, but to host resident cars, clearing the streets.

1.3 The central role of walking

The 15-minute city concept contests car dependency and long public transport commuting patterns by reprioritizing active mobility as the main mode of transport, whether on foot or by non-motorized personal

mobility devices such as the bicycles and micro-mobility solutions. However, the path to achieve the 15-minute city is intricately tied to the potential to deliver safe and comfortable walking environments. In other words, the concept is deeply intertwined with the paradigm of walkability. Walkability is the core of the 15-minute neighborhood and the foundation of its safety; it has to be prioritized over bikability (Busi, 2021). Speck's (2013) General Theory of Walkability focuses on the importance of making cities appealing to pedestrians and the most effective ways to achieve that. This involves an intricate dynamic of infrastructure development, enhancing network connectivity, high land-use mix, vitality and distinction of urban character. Overall, walkability assessment criteria range from usefulness and safety to comfort and attractiveness.

Road safety is a particularly pressing topic in today's hyper-mobile urban reality. Pedestrians are considered 'vulnerable road users'; a category which consists of pedestrians, cyclists, and motorcyclists. According to the World Health Organization (2021), vulnerable road users make up more than half of all road traffic deaths globally. In the EU, pedestrians alone are estimated to make up 20% of all road fatalities, well above other vulnerable road users such as cyclists (9%) and motorcyclists (15%) according to the European Commission (2020). Data from the Italian context presents similar statistics: 17% of road fatalities in 2019 were pedestrians (ITF & OECD, 2020), down by 12.7% from 2018 (ACI & ISTAT, 2020). The improvement of road safety, and in particular with reference to vulnerable road users, is highlighted by the UN resolution A/RES/74/299 on Improving Global Road Safety adopted in August 2020 (UN General Assembly, 2021). In addition to road safety, the advantages of higher walkability have been linked to improvements in environmental sustainability, economic development, public health and community resilience.

In Milan, a global study on sidewalk conditions across the city was carried out by Systematica as a first attempt to evaluate the level of safety and comfort of the city's walking infrastructure. The output of this study is an interactive open-access sidewalk map documenting sidewalk width across the city (Systematica, 2021). The analysis revealed that 45% of the city's sidewalks by length are less than 2.4 meters in width - the recommended minimum for sufficient two-person movement, according to guidelines by the Global Designing Cities Initiative & NACTO (2016).

1.4 A living-working population-based approach

The proposed methodology to assess the urban accessibility to essential services, in the perspective of a 15-minute city, follows a hybrid approach based on living-working population. It is organized on 3 levels of analysis: (i) mapping resident population and the density of workers/employees at their place of work (workplace density) in Milan to offer a first reading of the mobility character of its various districts (i.e. which areas generate more trips and which areas attract more users on a daily basis); (ii) mapping basic daily services to understand which areas are better served in terms of static proximity of daily services (density and variety), and (iii) a compound walkability analysis using the patented Walk Score metric to offer a more holistic reading of walkability including the factor of travel time to give a dynamic understanding of walkable areas within the 15-minute timeframe. Factors considered include the proximity of services, population density and road network characteristics, such as block length and intersections density.

The first layer of analysis (i) aims to evaluate the density of the resident population and workplace population across Milan in relation to the pedestrian accessibility levels ensured by the morphology of the urban fabric. The main result is therefore mapped as a "cumulative" value in the sense that it represents not only the resident or workplace population present in each cell, but also includes those who are able to reach this cell in a given timeframe (i.e. 5, 10 and 15 minutes). As a result, this first level of analysis provides a clear idea of the characteristic tendencies of different zones across the city and, as a result, the predominant pattern of pedestrian mobility generated.

In (ii), the service proximity analysis is a pure compresence analysis based on distance buffers, showing areas where residents can reach on foot at least 7 out of 9 predefined macro-categories of services identified as

crucial services supporting daily life activities of residents and contributing to a balanced lifestyle. These 9 service categories are: food/grocery stores, commercial stores (including clothes shops, electronics shops, etc.), cultural venues, educational facilities, parks and green spaces, restaurants, health facilities, sports facilities and other (post offices, banks, etc.). The choice of the macro-categories based on a reinterpretation of the Parisian approach as defined in the 'Ville du quart d'heure' plan, which looks at services related to a number of key life activities (Paris en Commun, 2020). Here, the list follows a spatial structure (categorized by land-use functions as opposed to activities), and it is adapted to the open data provided for Milan. Each of these macro-groups was further detailed into a list of services based on corresponding fields in the open-source datasets. A GIS-based analysis of the static compresence of these services was then performed based on a pure isometric analysis with respect to 3 walking buffers: 300, 600 and 900 meters, which roughly correspond to 5, 10 and 15 minutes of walking.

The Walk Score mapping (iii) is a more holistic and comprehensive metric as it includes the variable of travel time to measure the actual accessibility levels through isochronal analysis. It is based on the analysis of accessibility to each macro-category in 15 minutes calculated on a graph with the cost of the links based on travel time and inversely proportional to the slope of the road. The results of the 9 pedestrian accessibility analyses were then reported as indicators of accessibility to each macro-category on a grid of 150 meters. These separate values were added up to obtain the final value of the Walk Score.

Data used in all studies are gathered from the open portal of the Municipality of Milan and other open-source datasets. For the analysis in (i), the spatial unit is the institutional census sections defined by the Italian statistical office (ISTAT). For the analyses of (ii) and (iii), the spatial unit used is the NIL (Local Identity Nuclei as institutionally defined by the Milano City Plan for spatial planning of public interest facilities) modelled in a spatial grid of 150 m space unit.

2. Preliminary tests on the city of Milan

This section focuses on the practical case study applied to the city of Milan, which is developed as an attempt to study the potential of Milan to become a 15-minute city with sufficiently walkable neighborhoods and investigate the relationship between neighborhood walkability and population distribution as a way to gauge distributional inequalities between levels of walkability across the city. By mapping and interpreting the above-mentioned analyses, the following series of maps demonstrate a thought experiment to conceptualize the chrono-centered mobility concept. The maps offer an alternative approach to chrono-centric mapping based on population density as opposed to service density, highlighting distributional differences at different time

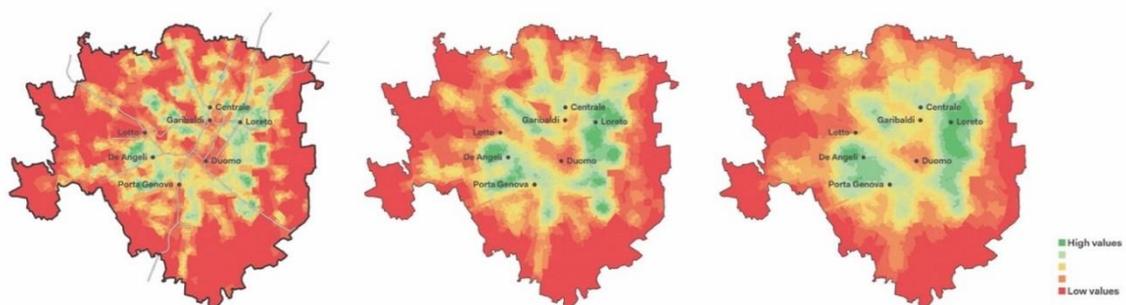


Fig.1 Pedestrian access of the Milanese population to different census sections of the city in 5/10/15 minutes

scales and, as a result, the specific main urban character of each district. This conceptual analysis demonstrates how isochrones change shape and intensity depending on the given timeframe. It is evident how micro-clusters of local centralities emerge from the 5-minute map, and the distinguished shape of Milan's

second ring-road where the highest concentration of the resident population is located, emerges at the 15-minute scale.

A similar interpretation can be drawn from the distribution of the workplace population. The maps show a more balanced allocation in the 5-minute accessibility analysis, with a gradual solidifying of the central districts as the main cluster as the radius increases. The main centers at 15 minutes are the Duomo district followed by secondary concentrations in the north-east districts of Loreto, Centrale and Porta Garibaldi (fig. 2). Areas left out of both clustering scenarios (resident population and workplace population) are peripheral neighborhoods or agricultural non-built areas, such as those occupying the southern portion of the municipality.

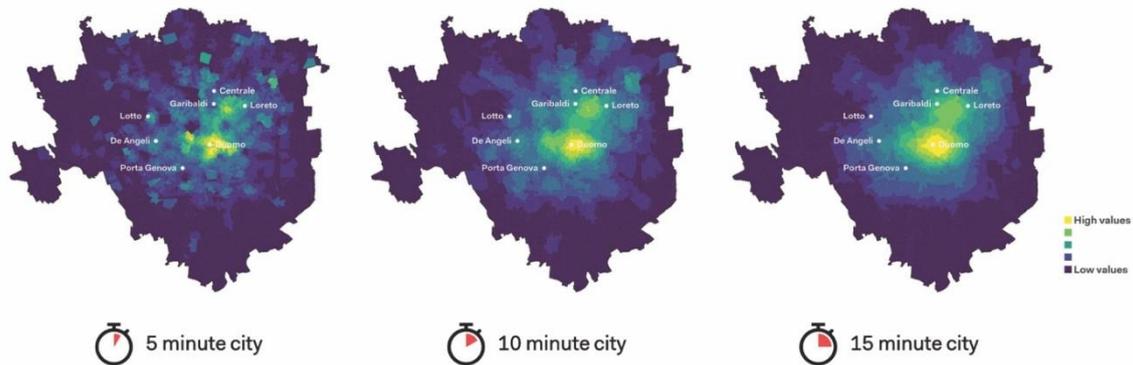


Fig.2 Pedestrian access of the working population to different census sections of the city in 5/10/15 minutes

Analysing the location of services with an analogous pedestrian & NIL accessibility principle allows a cross-sectional reading of the city that includes both a population-based view and a service-oriented view can yield additional insights into the efficacy of the urban structure in meeting population demands. The proposed service-comprensence accessibility analysis highlights the need for service diversity in a walkable distance by measuring the number of different categories accessible in a 5, 10 or 15-minute range. This offers a first diagnostic reading of the city and the services available, serving as a preliminary evaluation of service accessibility and density. It is possible to appreciate that despite the high number of people within 15 minutes reach of the districts of De Angeli, Lotto and Porta Genova, some pockets lack the accessibility to at least 7 of the core service categories. Central areas of Milan predominantly outnumber peripheral areas in terms of density and variety of essential services offering. Further segmentation shows that most of these well-performing areas actually function as 5-minute and 10-minute centers; whereas the majority of the remainder of the city exceeds the 15-minute limit.

The Walk Score analysis set at a 15-minute radius confirms the static findings of the service compresence map while also highlighting additional lower scoring areas in the north of Milan that, despite adequate service density, may be less walkable due to a lack of support of the urban structure for comfortable and efficient walking trips (Fig.3).

A transversal neighborhood-based walkability analysis based on Walk Score conditions shows a striking correlation between nearness of a NIL neighborhood to the city center and high walkability levels (fig. 4). This correlation does not translate, however, to population distribution trends. As shown in the chart below, apart from a few spikes in the number of people in close reach of well-performing and walkable districts such as Duomo and Porta Garibaldi-Porta Nuova, there is no clear trend in population distribution amongst the remaining neighborhoods. In fact, many neighborhoods with high population accessibility have low walkability scores such as Gorla, Cimiano and Gallaratese. These neighborhoods have high attraction potential but low pedestrian access to services. It is in these low functioning yet populous areas that intervention is needed most in order to advance an egalitarian level of access to daily amenities on foot across the city.

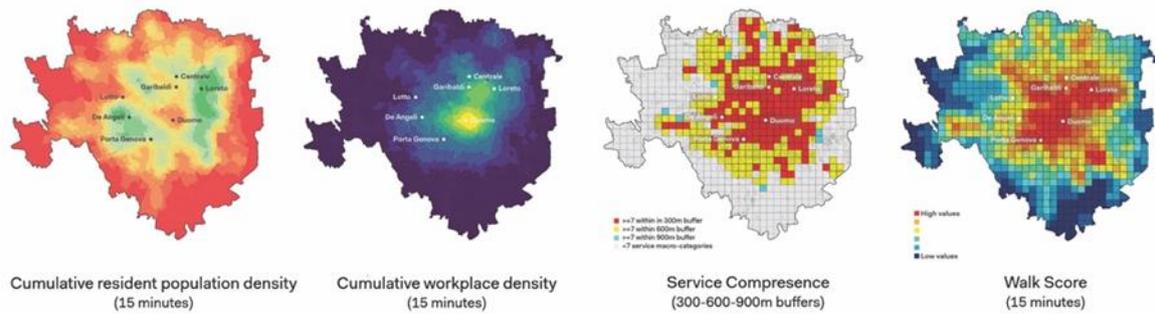


Fig.3 Different analytical components of the 15-minute city model

Following the conceptual approach discussed in Section 1, the results are based on walkability both from homes and workplaces, id est residents and users, in coherence with the suggested vision. The maps show that the Walk Score is the best (and the 15' goal is achieved) where we have mixed-use urban textures, as it becomes evident when we overlap these maps with the NIL description provided by the city plan.

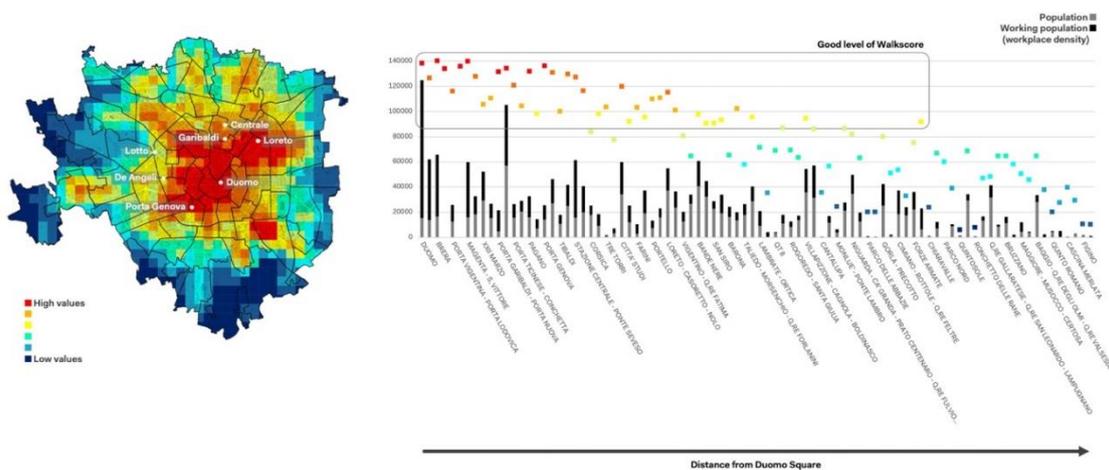


Fig.4 Walk Score and 15-minute population accessibility by NIL neighborhoods

3. The contribution of regenerative masterplans to a hybrid 15-minute Milan

Regenerative masterplans are experimenting this hybrid model designing new 15-minute mixed-use neighborhoods. Below are some examples from the Milanese context of completed and ongoing efforts that fall in line with the goals of the hybrid model proposed herein and which therefore present positive use cases for models of urban development that could support the aims of walkability and urban connectivity. The first use case, the Milan railway regeneration project, offers an example of a hybrid approach implemented in a strategic vision with urban-level implications. The other two examples are selected from the Reinventing Cities initiative that instead focus on local design interventions with localized effects on walkability and public realm enhancement.

3.1 The Milan railway yard regeneration

In the Agreement signed in 2017 between the City and the Italian Railway Network Company (Rete Ferroviaria Italiana) regarding the seven dismissed railway yards in Milan, a vocational hybrid mix (a percentage of non-residential uses) was negotiated together with green public spaces, highlighting the contribution of a hybrid approach to placemaking. With a site-specific approach, hybrid uses are promoted in a perspective of general interest. Their percentages range from 13-14% for the Rogoredo, Greco and Lambrate yards, to 30-32% for

the Porta Romana and Farini yards, to the highest share of 70% prescribed for the Porta Genova yard as a legacy of its historic industrial-artisan urban context.

In the Greco yard, the winning project called "The Graft"⁵, which is currently under construction, conceives the neighborhood as a "human adaptive zone", with new working and living lifestyles supported by shared services at the masterplan scale, an innovation hub and a community center. Walkability is protagonist to the point that car parking spaces are not provided; neither public spaces nor private spaces for the adjacent social housing dedicated to students.



Fig.5 Greco yard regeneration project: walkability of the public realm

In the Porta Romana yard, the project "Parco Romana"⁶ proposes a new model of integration, supporting urban biodiversity.

The development brings together residents, 2026 Olympics athletes and visitors in a resilient community with its own identity, promoting health and well-being.

Housing and offices live in symbiosis with outdoor activities and the integrated car free landscape. The mix of public spaces and pedestrian paths hosts essential services and proximity trade making the whole neighborhood livable and vibrant.

The new park at its heart brings back to nature the former infrastructure site, eliminating any architectural barrier to create a continuous shared public asset; thereby enhancing the masterplan with potential urban agriculture solutions.

A Milanese highline is proposed above the strip of active tracks, allowing residents and visitors to cross the entire length of the site at the same level of the two the existing bridges at both edges.

⁵ "L'innesto", Greco Yard, Barreca & La Varra arch., Redo Sgr developer, Milano Reinventing Cities 2019.

⁶ "Parco Romana", OUTCOMIST design team: Diller Scofidio + Renfro, PLP Architecture, Carlo Ratti Associati, with Gross. Max., Nigel Dunnett Studio, Arup, Portland Design, Systematica, Studio Zoppini, Aecom, Land, Artelia, developer Coima SGR, Covivio and Prada Holding S.p.A. Winner project of the design/developer competition process.

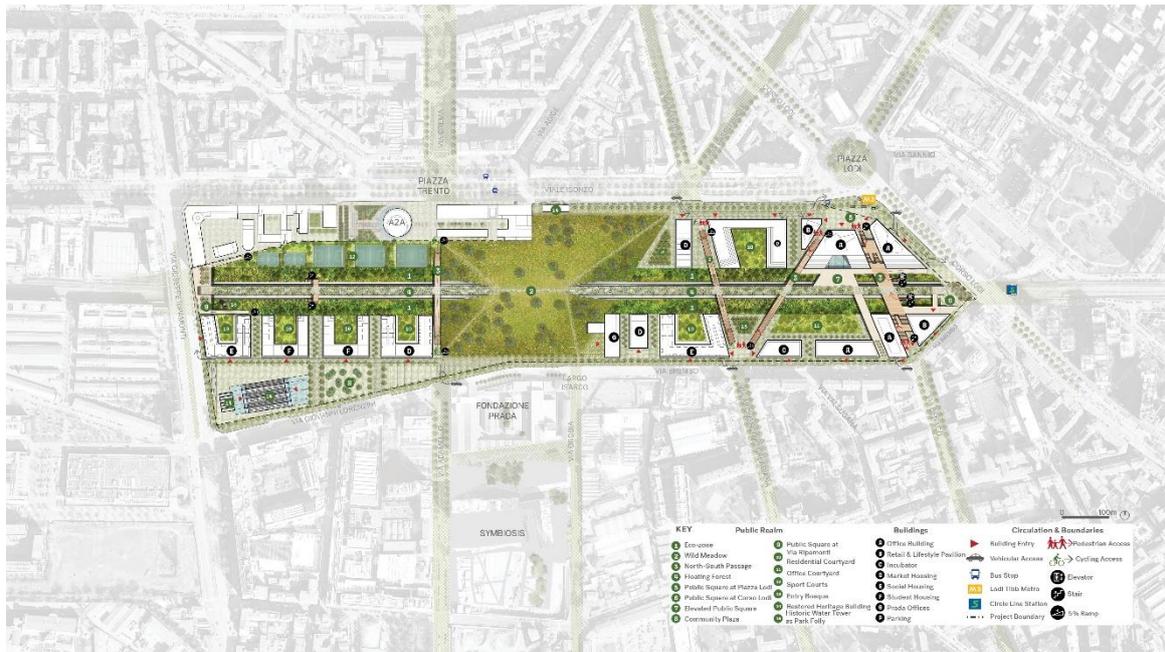


Fig.6 The Porta Romana railway yard winning project: the protagonism of the ground level experience

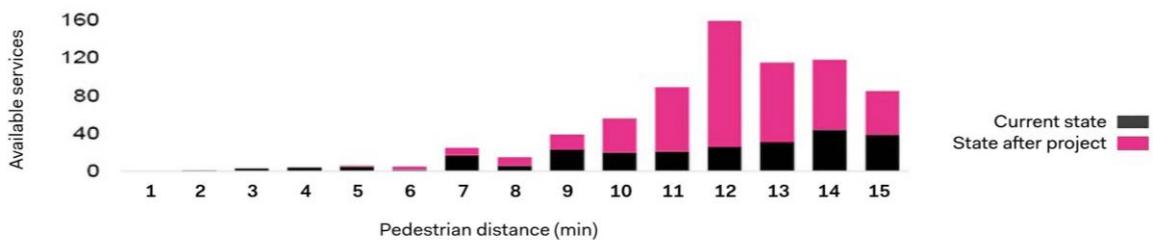
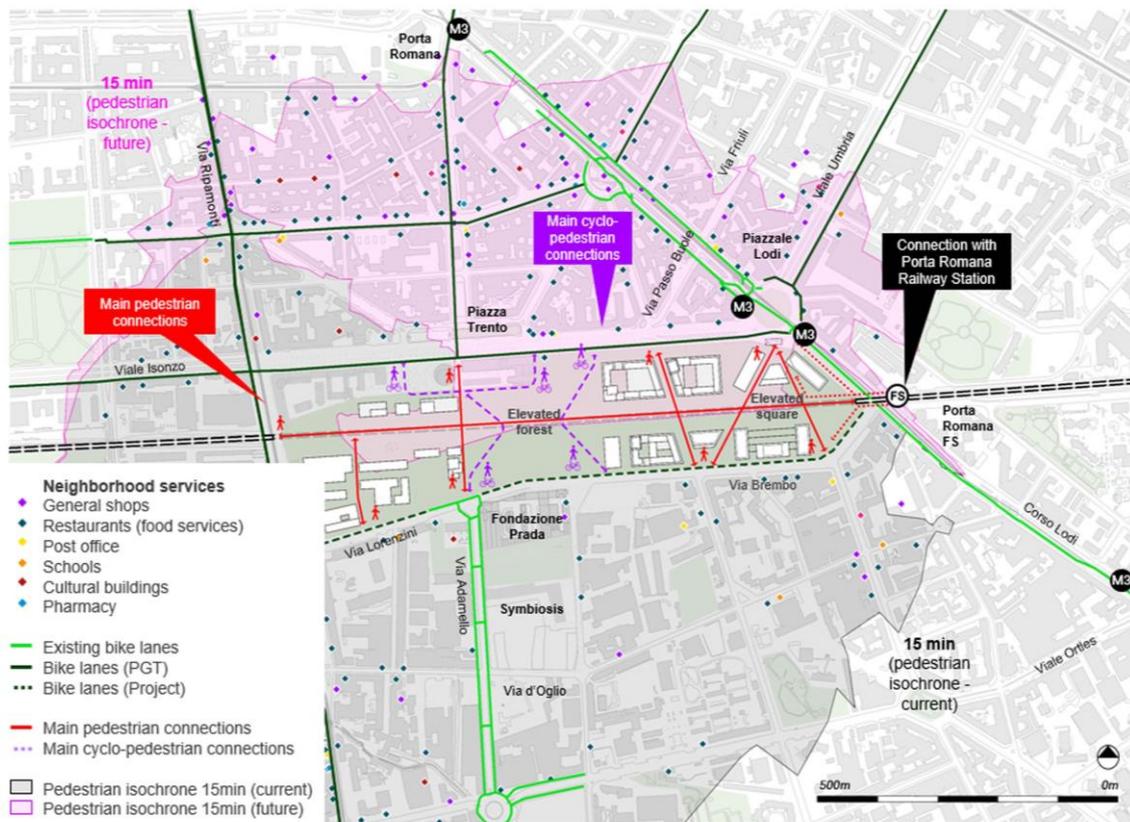


Fig.7 15-minute walking isochrones and accessible proximity services in the new Porta Romana plan

The mobility plan developed by Systematica as mobility consultant is both multi-scalar and multimodal. In principle, the internal mobility model of the development includes pedestrian and cycling infrastructure within a multimodal provision of public and shared transport services, pivoting around the principles of slow, sustainable and innovative mobility.

The plan reinforces and encourages cycling and pedestrian connections and accessibility to collective transport systems with the aim of guaranteeing access to all services on site and enhancing connections to the rest of the city.

The mobility plan places particular focus on the 15-minute timeframe for walking accessibility as a way to re-stitch the neighborhood for residents and visitors at the local scale.

Applying a Space Syntax analysis on the redevelopment plan, the mapping analysis suggests that the new isochrone of the 15-minute walking buffer (roughly 1.5 km), a direct result of the seamless integration of the ex-railway yard space with the surrounding urban fabric, has dramatically increased the number of proximity services accessible to local residents and users via the previously lacking network of pedestrian connections between areas north and south of the rails (Fig.7). Re-stitching the mobility network also enhanced and reinforced connections at the urban scale via three main hubs: the Porta Romana FS railway station, the Lodi Tibb subway station (Line 3), the surface transportation stops for the circular bus routes 90, 91 and 92 and the tram line 24.

In that sense, the Porta Romana project demonstrates a 'glocal' approach to regeneration which mediates between the 15-minute walkability approach for neighborhood connectivity and the soft TOD approach that seamlessly connects the neighborhood to the rest of the city while relying predominantly on public, collective and sustainable modes.

3.2 Milan's Reinventing Cities Projects

In the framework of decarbonization, which is a priority well integrated in the 15-minute model, Milan's interpretation of the Reinventing Cities program defines its inclusive guidelines within a hybrid touch. The new iconic building of the "Vitae", winning project for the Via Serio Reinventing Cities competition⁷ in the Symbiosis "Smart District", features a green spiral with vineyards and vegetable gardens.



Fig.8 "Vitae" new hybrid complex, a Reinventing Cities project coming soon in Milan, which integrates the pedestrian regeneration on the attached street via Serio

7 "Vitae", Via Serio, Carlo Ratti Associati architecture, Covivio developer, Milan Reinventing Cities 2019.

The project integrates a molecular oncological laboratory with research guest house and event spaces, sustainable workplaces, km-zero food production/restaurant and shared outdoor spaces (Fig. 8). This innovative hybrid mix is supported by the pedestrianization of Via Serio in view of walkable connections to the new Porta Romana district to soon be realized for the adjacent railway yard regeneration.

Via Serio, the street that connects the "Vitae" complex, is developed in two phases: in the first phase, a limited speed area (ZONA 30) is defined by an elevation of the carriageway at the level of the sidewalks, whereas the second phase calls for full pedestrianization of the section of Via Serio overlooking the Vitae building, intended as an extension of the green square of Vitae, qualifying the entire public space associated with the new building and connecting it to the system of public spaces of the new Symbiosis development to the east.



Fig.9 "Vitae" winning proposal render by the design firm CRA - Carlo Ratti Associati



Fig.10 "Coinventing Doria", a Reinventing Cities project in Milan which regenerates a former wide parking lot

In the same perspective, the winning project for the Viale Doria competition, aimed to regenerate an existing wide surface car park occupying a complete plot close to Piazzale Loreto, eliminates this former use indefinitely, transforming it into a pedestrianized public realm overlooked by a new co-working space combined with a

youth hostel⁸. This intervention is conceived in synergy with the incremental process of renewing the Viale Doria axes as a hybrid open space, combining slow/soft mobility with social life spots/pauses and reducing street parking. The Reinventing Cities projects are changing the experience of public realm by sharing spaces with innovative co-typologies for buildings, essentially making them hybrid areas focused on the human measure.

From a mobility perspective, the Viale Doria intervention is an experiment in public space reclamation from cars. The area between Viale Brianza and via Giovanni da Palestrina currently functions as a large parking lot. In order to recover public space and reinstate human-scale interactions, 70% of space dedicated to cars is replaced: on-street parking is removed, and circulation is limited to one-way access (in the direction towards Piazzale Loreto) restricted to public transport. Car access is guaranteed for local residents only. The process of intervention will open up the street to pedestrian users offering transformable open space uses and connecting them to surrounding functions, including a variety of mixed-use services. The intervention is viewed as a pilot project, to be potentially replicated along further extensions of the street and in similar areas across the city.

3.3 Bridging the scales of neighborhood and city

The regeneration of Milan's railway ring envisages a combination of transport and ecological infrastructures, offering sustainable mobility in complementary ways: a green promenade⁹ alongside the rail "circle line". At the city scale, this circular greenway will play the role of an osmotic membrane (Fossa, 2018) in the urban texture, which opens up the railway ring barrier, allowing soft mobility to reconnect the city core with the periphery. This strategic infrastructure, composing one unique system from the different regeneration masterplans of the seven railway yards, is the key for redesigning the city following the 15-minute approach. The neighborhood scale will be intertwined with that of the whole urban settlement in the framework of a soft TOD; at the same time, the scale of the central urban parks will be connected with the one of the surrounding agricultural belt in a reinforced vision of urban biodiversity. This will drive the integration of redevelopment masterplans (new neighborhoods already under construction or transformations foreseen by the city plan) with the regeneration of existing urban textures and neighborhoods. Milan has the right scale ("human measure") for being entirely pedestrian-oriented or slow (15 or 30 km) inside the railway ring while the woven network of "green river" and "circle line" will provide the hybrid infrastructure for the desired network of 15-minute neighborhoods.

4. Closing discussion and observations on Milan

Redevelopment interventions on dismissed areas create hotspots for the regeneration of the wider peripheral context, triggering a diffused and incremental bottom-up process, involving the real estate market and specific public policies to sustain and address it. The 15-minute city model indeed may require more radical transformation of the existing urban texture in areas where the urban structure itself does not support permeable networks. In the meantime, tactical urbanism could offer quick and soft solutions. In this perspective, recent urbanism efforts in Milan (Milan 2020 Adaptation Strategy) focus on peripheral neighborhoods beyond the railway ring through the action of creating social spaces in strategic squares¹⁰ and

8 "Coinventing Doria", Via Doria, Co-Inventing Srl developer, design by Risari, Cidri et al., Reinventing Cities 2019.

9 The "Green River", proposed by Boeri Architecture, is a metaphor indicating a circular greenway to be realised on the safeguard strips of the railway ring. It is an application to the Milan infrastructure ring of the "Green Infrastructure" concept as defined by C. Davies (2015): "a network of multi-functional open spaces". The name "river" evokes the memory of the Milan Navigli: the two rings of canals and railways shaped the historic urban form of Milan. The "Green River" is included in the vision of the current City Plan, in synergy with the mobility infrastructure upgrading of the railway ring towards a "circle line", focused on passengers (instead of freight), connecting and supporting the planned redevelopments of the yards.

10 "Piazze Aperte" initiative, Milan, 2020.

pop-up bike lanes along the main penetration road axes¹¹ from the city gateways (transit interchange nodes) to the central pedestrian areas, while ensuring connections to new regenerated sites. A measure to be integrated in this tactical urbanism framework is an articulated promotion of micro-mobility, taking into account the various specific features of different neighborhoods. In areas that are less walkable due to large plot sizes and lower intersection densities (such as urban peripheries), innovative mobility tools may be needed to bridge the walkability gap at the neighborhood school and provide first-and-last-mile solutions in connection with public transit. One way to support the main objectives of the 15-minute city model could be to deploy e-powered micro personal mobility vehicles as a way to ensure 15-minute access without compromising sustainability or hijacking valuable public space. Sharing micro-mobility services and on-demand services can be carefully organized to satisfy different user group needs while maintaining a sustainable mobility approach and equitable transport access.

The micro-mobility sector has advanced rapidly since the adoption of electric, dockless micro-mobility vehicles (e-bikes, e-scooters and e-mopeds) began in the U.S. in 2017, quickly spreading to European territories and other parts of the world (Boglietti et al, 2021). New sharing service models merged with technological developments in battery efficiency and range have brought the growing sector into the forefront of global urban policy agendas globally with much focus on the safety of these new devices for all street users and the best ways to integrate them into the existing mobility landscape (Boglietti et al, 2021; Zagorskas & Burinskienė, 2020). Issues of safety associated with these new travel modes is one of the most studied topics in micro-mobility research (Boglietti et al., 2021).

Despite these concerns, global trends show that micro-mobility use contributes to intermodal transport and can have a significant role in reducing the first-and-last-mile gap (Heineke et al., 2019). Studies also show that micro-mobility vehicles are short-range vehicles; generally used for trips under 5 kilometers and under 20 minutes of trip time (Boglietti et al, 2021; Zagorskas & Burinskienė, 2020). Surveys from the cities of Paris and Brussels in 2019 showed that 23% and 46% of scooter trips, respectively were part of multi-modal trips, often as a substitution for walking and complimenting public transport (6t-Bureau de Recherche, 2019; SPRB - Bruxelles Mobilité, 2019).

Today, there is a great tendency for trips made using micro-mobility devices to take place near the city center (such as downtown and university zones/campuses), where land-use diversity and access to multimodal transit are higher (Boglietti et al., 2021). Extending micro-mobility services to peripheral areas with low population densities (and therefore low fleet distribution efficiency) remains a challenge for providers and the cities that regulate them. In order to best make use of the benefits that micro-mobility offers and allow the soft transition towards 15-minute neighborhoods across the city, cities must ensure a balanced distribution of shared micro-mobility devices in peripheral as well as central areas, incentivizing their use at the local scale over short-distance car trips and as last-mile solutions in multimodal trips.

Recognizing the role of the cited tactical urbanism experiments in Milan and the formal inclusion of innovative production uses among essential services of public interest (Milan's Facility Plan), as a lesson learned from the pandemic crisis, we suggest a regeneration approach of the public realm where open spaces are redesigned together with mobility spaces, giving priority to walkability in the framework of a holistic hybrid approach. Combining planning and urban design is necessary to promote hybrid mixes as hubs of the 15-minute neighborhoods and as starting points of a participatory, incremental process of a hybridization of open spaces and urban textures. In short, the 15-minute model requires mixed patterns across the board: in land use, social mix, and biodiversity.

Current planning incentives are mostly concentrated on social housing: they could be shared with innovative work and production spaces, for their placemaking and community making values and their contribution to social inclusion and to the resilience performance of the city. Resiliency demanded for city competitiveness

11 The most popular intervention concerns Corso Buenos Aires, one of the main road of Milan in the North direction.

requires cities to experiment with a new urbanism approach which will give priority to innovative, various, flexible living-working and mobility urban experiences. We do not want to measure the city success with its congestion, both of traffic and people, nor do we want, in the post-pandemic scenario, to go back to “old” peak hour trends, but rather to find a hybrid, creative, resilient way to a better quality of life, able to meet the various demands of its inhabitants and users and their various mobility needs.

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Image Sources

Fig.1: Systematica srl;

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Fig.4: Systematica srl;

Fig.5: Redo Sgr, Barreca & La Varra, Wolf visualizing architecture;

Fig.6: Fondo Porta Romana;

Fig.7: Systematica srl;

Fig.8: Covivio & Carlo Ratti Associati;

Fig.9: Covivio & Carlo Ratti Associati;

Fig.10: Co-Inventing Srl, progettisti Risari, Cidri, Pannella e Soldano, Studio Tecneas, Causone.

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