Case Study Report

Exposing unbalanced service distribution in urban areas

The case of Milan

Lamia ABDELFATTAH, Systematica s.r.l., Italy
Filippo BAZZONI, Systematica s.r.l., Italy
Rawad CHOUBASSI, Systematica s.r.l., Italy
Andrea GORRINI, Systematica s.r.l., Italy
Dante PRESICCE, Systematica s.r.l., Italy
Marianna ZURETTI, Systematica s.r.l., Italy

Abstract

From Melbourne to Paris, the 'complete neighbourhood' or '15-minute city' model is adopted as a framework for recovery from the ongoing COVID-19 pandemic situation. Various versions of hyper-proximity models have been argued by urban planners over history envisioning self-sufficient neighbourhoods with high accessibility to services on foot. City lockdowns worldwide have provided a lens for understanding the spatial inequality of accessibility. In Milan, one of the first epicentres of the pandemic in the West, such inequalities have great implications on users' everyday life in and out of lockdown. A Systematica-led effort was carried out imagining a sufficient level of accessibility to a set of daily, non-work services within the 15-minute framework as a benchmark to evaluate neighbourhoods across the city. Using isochronal mapping, the study revealed that 54% of the city (where 27% of the population resides) does not meet the 15-minute standard neither by walking nor cycling and highlighted that the likelihood of neighbourhoods to exceed the standard increases radially from the centre of the city to peripheral areas. Quick and cost-effective solutions are recommended to meet adequate accessibility levels in these low-functioning areas, taking high-functioning areas as a frame of reference for density, diversity and proximity of services.

Keywords

Service accessibility, micro-neighbourhoods, Hyper-proximity, Active transport, GIS mapping, COVID-19

1. Hyper-proximity models: resetting the rhythm of urban life

1.1. The shift towards micro

Almost 70 years after Jane Jacobs' arguments for smaller, mixed-use, connected neighbourhoods were published (Jacobs, 1961), the world is beginning to fully grasp the importance of neighbourhood-scale urban planning and actively supported service accessibility. Beyond transit-oriented development, city administrations around the world are now looking to even smaller scales of assessment for accessibility, asking the simple question: can it be walked or cycled? If not already prompted by global sustainability agendas, such as the United Nations' Sustainable Development Goals (UNDP, 2015), the mobility standstill brought about by the coronavirus pandemic in early 2020 has provided a real-life simulation of

what it would mean to live entirely within a few short blocks from home. Emphasis on the sustainability of the micro-neighbourhood grew as slogans such as the '15-minute city' and 'walkable neighbourhoods' gained the attention of mainstream media (Willsher, 2020; O'Sullivan, 2020; Whittle, 2020).

The 15-minute City idea has recently been spotlighted by Mayor of Paris, Anne Hidalgo's re-election campaign, promoting the plan as a way to create 'self-sufficient communities' whose needs for amenities could essentially be met within a 15-minute walk or bicycle ride (ibid.). Carlos Moreno, mastermind behind the concept adopted by Hidalgo, stated the need to 'reinvent the idea of urban proximity' and make sure that the basic social functions are easily fulfilled without the need to rely on public transport or endure (the stresses) of longer commutes (Willsher, 2020).

Despite current focus on Paris, the proposed concept is not new. In Portland, Oregon in the United States and in Melbourne, Australia, local urban planning units have similar plans under the label 'the 20-minute neighbourhood' – the first under the umbrella of the Portland Plan of 2012 and the follow-up 2015 Climate Action Plan (City of Portland et al., 2012; City of Portland and Multnomah County, 2015), and the second as part of the Plan Melbourne 2017-2050 scheme, in efforts to offer 'more inclusive, vibrant and healthy neighbourhoods' (Victoria State Government, 2020). As per the latest available progress report, the Portland Plan has already managed to increase the number of citizens living in 'complete neighbourhoods' from 63% in 2010 to 65% in 2016 (City of Portland, 2017). Such plans are also in keeping with Speck's (2013) General Theory of Walkability, which states that the level of pedestrian friendliness of urban areas is directly related to their level of usefulness and attractiveness, pinned down in metrics of land-use mix, street connectivity and commercial density as well as poly-centricity to ensure service coverage within short walkable distances (150 meters) and distinctiveness of urban character.

1.2. The COVID imperative

The current emergency health crisis has further accentuated the role of micro-neighbourhoods in addressing basic mobility needs both in and out of lockdown. In its 2020 Adaptation Strategy plan, which was sketched out in the onset of the COVID-19 crisis, the City of Milan makes an explicit reference to the 15-minute City concept, highlighting the importance of 'rediscovering neighbourhood dimensions' and ensuring the right of residents to access *almost all services* on foot within that timeframe (Comune di Milano, 2020).

At the wider scale, the concept was also recently picked up by the C40 Mayors' Agenda for a Green and Just Recovery (C40 Cities, 2020). On July 25th, 2020, the C40 Global Mayors COVID-19 Recovery Task Force, which is chaired by Mayor of Milan Giuseppe Sala, released the ambitious plan aiming to forge the path for an equitable and sustainable recovery from the pandemic, highlighting the otherwise inequitable impact of COVID-19 on the elderly as well as black and ethnic minority groups (ibid.). One of the cornerstones of its Action Plan is to adopt the '15-minute city' model by promoting an urban regulatory environment open to inclusive zoning, mixed-use development and flexible building/space use (ibid.). Part of the plan's vision is that:

> *All residents will live in '15-minute cities', where shops, workspaces and essential services are easily reached within a short cycle or walk, surrounded by plenty of green spaces where they can relax, exercise and play.*

2. Approach and methodology

2.1. Guiding approach and methodology

In light of these developments and the ongoing emergency situation, Systematica launched its own mapping initiative to study Milan's micro-neighbourhood network and offer a basis for understanding the

city's prospects for a 15-minute model. The initiative is intended as a contribution to wider city plan endorsed by the Milan Municipality and the C40 Global Mayors Agenda.

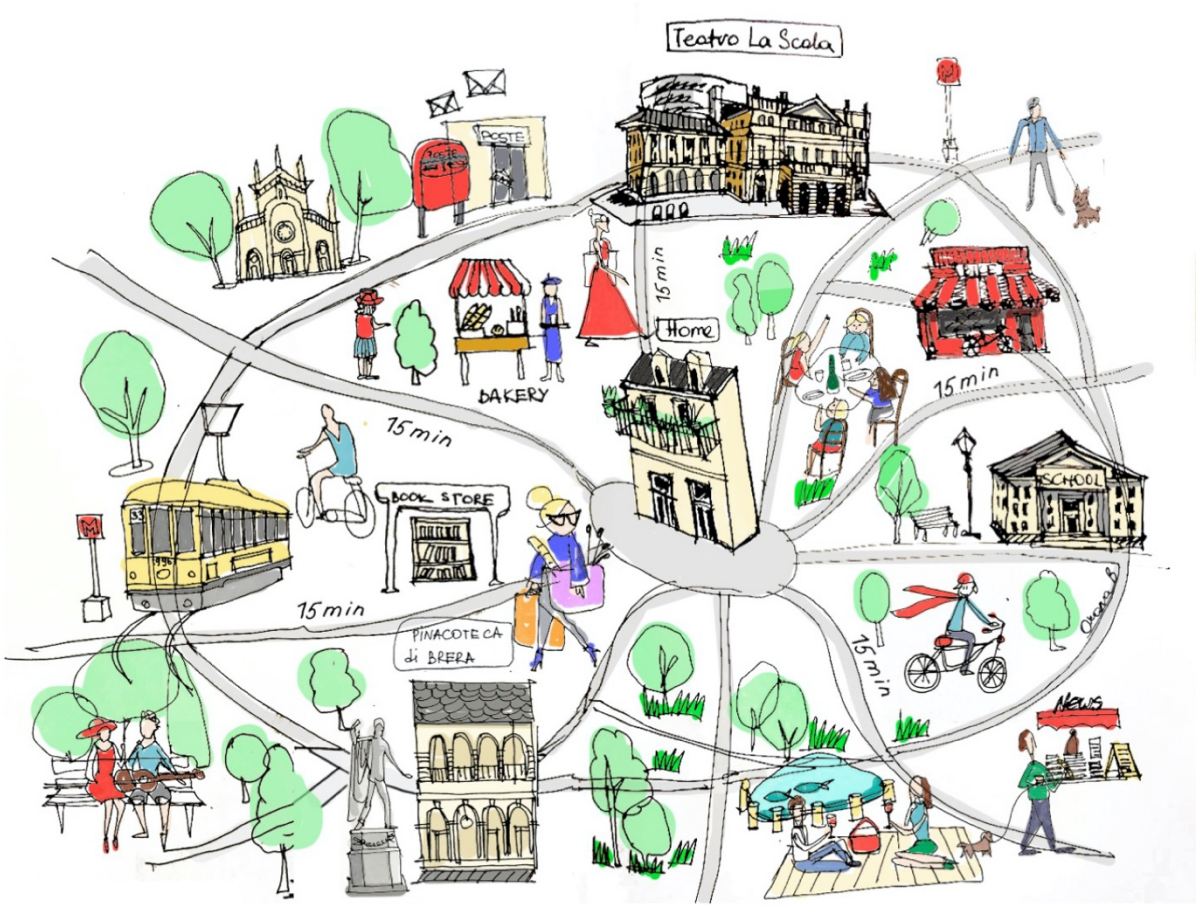

Figure 1. 15-minute City concept as conceived by the authors. Source: Authors.

The mapping exercise was carried out via isochronal analysis based on the Voronoi tessellation method, generated according to the distribution of a variety of services across Milan. As per the Voronoi method, each point of origin (neighbourhood centre, in this case) is matched to a corresponding *region* (micro-neighbourhood) consisting of all points of services closest to that particular point with the minimum achievement of one service point for each specified service type.

The result of the analysis is a patchwork of micro-neighbourhoods, organized by their service proximity level and categorized as 15-minute walking, 15-minute cycling and above-15-minute micro-centres, based on the maximum distance to travel to any single service point. Each neighbourhood typology is then further analysed to convey typical weak areas by functional category and population distribution among the different typologies. A preliminary scope of priority action areas is then proposed in accordance with these initial findings.

As it stands, this study is a work-in-progress development. It is a first step towards formulating an understanding of Milan's performance as a 15-minute city and developing criteria for strengthening these prospects. Future directions for analysis are presented in Section 4.1.

2.2. Defining the functional structure of the micro-neighbourhood

What constitutes a 'good neighbourhood' has been the subject of debate in modern urban theory for decades. The New Urbanism movement in particular has long occupied itself with normative ideas of the ideal size of a neighbourhood and the types of services ascribed therein. For Clarence A. Perry, the founder of the neighbourhood unit theory in 1929, a neighbourhood had a very rigid functional structure and could not extend beyond a quarter mile radius, established as the limit which children could walk to school (American Society of Planning Officials, 1961; Park and Rogers, 2015). These stipulations among many others have routinely changed over time (see Figure 2 for one such elaboration). Time limits – as opposed to distance limits – take over in contemporary Complete Neighbourhood models. The types of services that are considered essential to deliver within these complete neighbourhoods vary from one application to another.

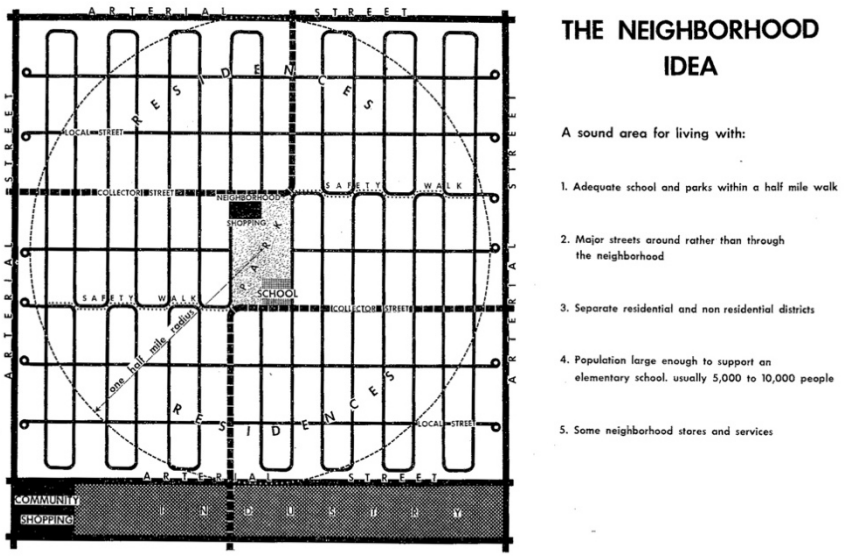

Figure 2. An elaboration of Perry's Neighbourhood Unit. Source: American Planning Association.

As a general rule, services included within the 15/20-minute principle are decided on a basis of necessity (essential services), frequency of use (daily services), or a combination of the two. These timeframes are based on research showing that 20 minutes (roughly 800 meters) is the maximum time people are willing to walk to meet daily needs (Gunn et al., 2017). Each plan functions differently but all usually have a combination of the same broad categories. Portland's 20-minute neighbourhood index is on the conservative side, focusing on access to healthy food, parks and greenspace and local businesses; while Melbourne and Paris' schemes encompass wider arrays of daily needs (City of Portland, 2012; Victoria State Government, 2020; Paris En Commun, 2020). Paris, whose ambitious plan pivots on aims to reduce daily stress and improve quality-of-life standards goes a step further to include cultural and sports venues within 15-minute reach (Paris En Commun, 2020; Willsher, 2020). In the absence of a predefined framework in Milan, this exercise draws from parallel global applications to set the main study parameters. It considers a variety of daily (essential and non-essential), non-work services organized under the following broad categories: nutrition, education, recreation, health, public transport and civic services, as seen in the diagram below (Figure 3).

Figure 3. Functional components of the micro-neighbourhood. Source: Authors.

3. Main findings and analysis

3.1. The mapped reality

Below is the mapped result of the isochronal analysis, color-coded to reveal the different proximity levels of each micro-neighbourhood. In the first order, the map reveals that more than half the city by surface area (54%) is characterized by low levels of local accessibility. The morphology of the map further reveals a clear transitionary trend from central to peripheral neighbourhoods: micro-centres that function on a 15-minute walking basis are clustered in Milan's inner-city districts, surrounded by micro-centres where daily, non-work services can be reached within 15 minutes of cycling, and finally encircled by areas where neither condition is guaranteed. There is a clear tendency of the most hyper-connected neighbourhoods towards the central-east, incidentally coinciding with the agglomeration of high-density, mixed-use districts. A number of these districts stand out; these include Porta Garibaldi-Porta Nuova, Porta Venezia and Brera. Neighbourhoods in this category offer a model for local living from which various lessons could be derived. An initial analysis of each category by functional distribution follows in Section 3.2.

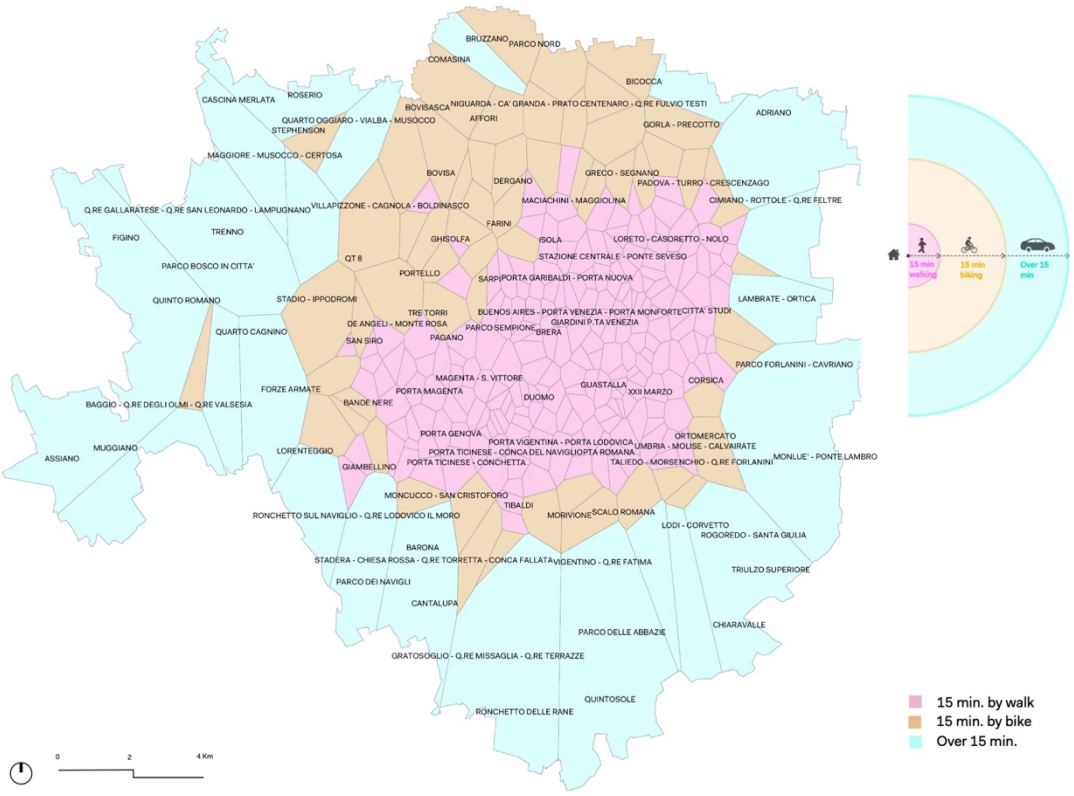

Figure 4. Milan map of micro-centres. Source: Authors.

3.2. Analysis of the mapping results

A reading of the results looking at population distribution as opposed to surface area coverage renders a more optimistic view. Whereas 54% of Milan's area is composed of over-15-minute micro-centres, only 27% of the city population resides in these zones. In contrast, the largest segment of the population (43%) live in 15-minute walking micro-centres. The bar chart comparison in Figure 5Figure 5 conveys, in part, the inverse correlation between the area coverage of the neighbourhood categories and the population distribution, suggesting that high proximity is a function of high residential densities.

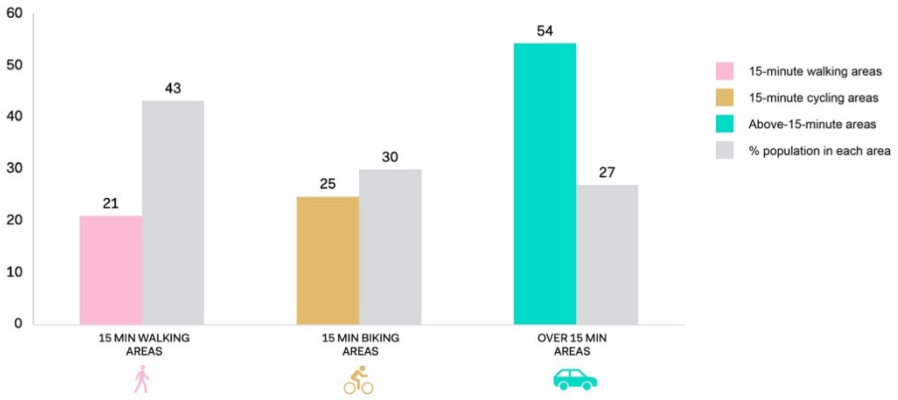

Figure 5. Comparison between area coverage and population distribution of micro-centre categories in Milan. Source: Authors.

Breaking down each proximity-level category into its functional composition gives a general overview of the functional mix within accessible range in each type of neighbourhood (Figure 6). The analysis reveals some similarities and differences between districts analysed in each category. A striking similarity between all three categories is that the Nutrition group consistently makes up 40-45% of the service offering in all types of neighbourhoods across the spectrum. In contrast, the Recreation category is split. Shops dominate the service offering with approximately 50% in 15-minute walking areas, dropping to about a third (33%) in the least serviced areas. In contrast, the average number of large parks in direct proximity increases in the lowest-access neighbourhoods, reflecting – in part— the land use structure of low-density peripheral areas in which they are located. An independent study conducted by Systematica to quantify public space access across Milan showed that the largest parks are mostly clustered along the outermost ring of the city (Transform Transport, 2020).

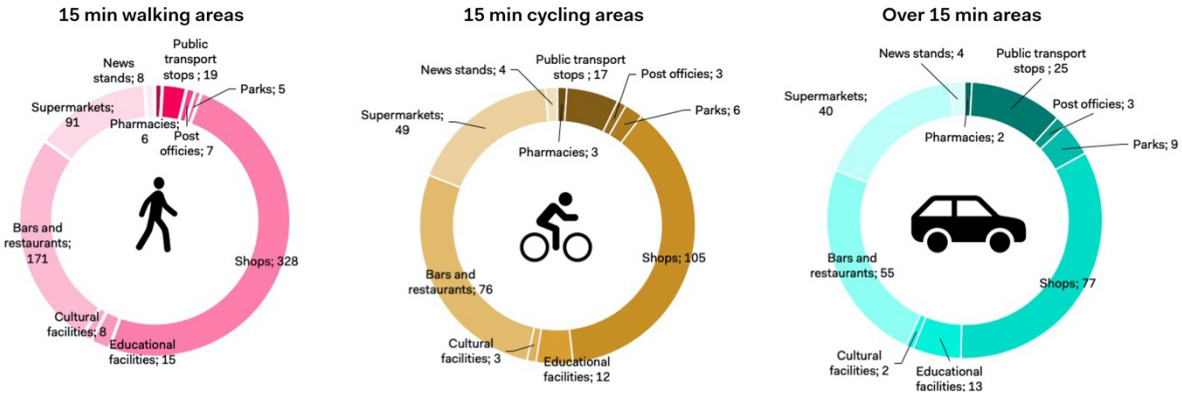

Figure 6. Functional composition of micro-centres by proximity level. Source: Authors.

3.3. Intervention strategies

Based on the initial findings of this study, a number of intervention strategies were identified to help bring all neighbourhoods across Milan to their highest accessibility potential. For those areas already identified as having a high level of foot accessibility to daily services, it might suffice to focus on upgrading works for pedestrian and cycling infrastructure to ensure safe and comfortable travel. For areas with low accessibility levels, more substantial interventions are needed to densify and diversify local service offering.

There are many practical ways to achieve effective results both in short- and long-term scenarios. Depending on the type of building, adaptive reuse of existing derelict or underused spaces can be a cost-effective way to address service shortages across the city. According to a recent mapping survey by the Municipality of Milan, more than 80% of a total of 170 identified abandoned private buildings in the city are located in peripheral areas (Comune di Milano, 2019). Temporary use of public open space is another possible scenario. Given the relative abundance of parks and public spaces in above-15-minute micro-centres, on-site cultural event organization is a quick and simple way to boost cultural amenities in underserved areas.

In areas where potential for both strategies is low, pop-up infrastructure offers a quick and easy way to extend services to underserved areas while circumventing bureaucratic processes of land/space acquisition. Kiosks and in-situ caravan-based services, ranging from medical to recreational, could be employed in targeted locations where occupying vacant space is not an option. Such initiatives should, however, be coupled with long-term planning efforts to maintain the capacity of localized living beyond the pandemic crisis. In all scenarios, service provision is only one side of the two-pronged approach needed to achieve the 15-minute city. Enhancing foot and cycling networks that connect these services is just as important.

4. Future steps and broader impact

4.1. Future steps

Further analysis looking into various independent variables would support the effort to articulate a cohesive service compensation strategy. These variables include both functional and demographic categories. For example, one of the critical aspects highlighted by the C40 Mayors' Agenda for a Green and Just Recovery is the need to prioritize vulnerable populations in the crisis, particularly elderly populations. According to a recent policy brief released by the United Nations Economic Commission for Europe, the elderly are 5 times more vulnerable to COVID-19 (UNECE, 2020). In that sense, a detailed analysis of access levels by functional category and demographic breakdown would further supplement a priority action plan tailored to the amenity needs of each neighbourhood and accounting for its demographic constituency.

Another goal for future development is to build a city index for successful proximity models by extending the methodology to 10 or 15 other cities in a structured comparative analysis and study how various physical urban characteristics contribute to better service proximity and containment at the neighbourhood level.

4.2. Broader impact of the project

The project goals are in congruence with ongoing local plans for the City of Milan. Both the Territorial Government Plan (PGT) 2030 and the recent Milan 2020 Adaptation Strategy highlight the importance of pedestrian-enabling interventions to improve connectivity and accessibility (Comune di Milano et al.,

2019; Comune di Milano, 2020). The C40 Mayors' Agenda for a Green and Just Recovery reinforces these aims further by grounding them within the framework of the 15-minute city paradigm as a natural response to the ongoing pandemic. As stated by the UNDP (2020), the COVID-19 pandemic response must essentially be rooted in environmental strategies as a prevention measure against future outbreaks.

Ultimately, this study offers a spatial reading of Milan's capacity to deliver self-sufficient micro-living-centres, as well as a basic frame of reference for potential intervention scenarios. Putting the 15-minute city model into practice, however, will require a cohesive, integrated effort by municipal authorities not only to ensure a balanced and diversified service offering in all areas across the city, but to guarantee the adequacy of the soft mobility infrastructure networks needed to connect them.

5. References

American Society of Planning Officials (1961). Neighborhood Boundaries. Information Report No. 141. Available at: https://www.planning.org/pas/reports/report141.htm.

C40 Cities (2020). *C40 Mayors' Agenda for a Green and Just Recovery*. [online] Available at: https://c40.my.salesforce.com/sfc/p/#36000001Enhz/a/1Q000000kVoY/kuR1PLHMGR2K9eEbo8aivV.xPegZVTqwt.EjX.4a.hk.

City of Portland (2017). The Portland Plan: Progress Report. [online] Available at: https://www.portlandonline.com/portlandplan/index.cfm?c=45722&a=632343.

City of Portland *et al.* (2012). 20-Minute Neighborhoods. [online] Portland Plan. Available at: https://www.portlandonline.com/portlandplan/index.cfm?a=288098&c=52256 [Accessed 25 Sep. 2020].

City of Portland and Multnomah County (2015). Climate Action Plan: local strategies to address climate change. Portland: City of Portland.

Comune di Milano (2020). *Milano 2020 Strategia di adattamento*. Milan: Comune di Milano. Available at: https://www.comune.milano.it/documents/20126/95930101/Milano+2020.++Strategia+di+adattamento.pdf/c96c1297-f8ad-5482-859c-90de1d2b76cb?t=1587723749501

Comune di Milano (2019). *MILANO - EDIFICI E AREE IN DEGRADO*. Geoportal of Milan. Available at: https://geoportale.comune.milano.it/sit/map-services/

Comune di Milano *et al.* (2019). *Milano 2030 Visione, Costruzione, Strategie, Spazi*. Piano di Governo del Territorio (PGT). [online] Milan: Comune di Milano. Available at: https://www.comune.milano.it/documents/20126/2053134/01DP_Relazione_Generale.pdf/baba55b0-c49a-ce8a-d9d2-68380cce21d2?t=1554722056097.

Gunn, L. D. *et al.* (2017) 'Identifying destination distances that support walking trips in local neighborhoods', *Journal of Transport & Health*, 5, p133-141.

Jacobs, J. (1961). *The Death and Life of Great American Cities*. 1st ed. New York: Random House.

O'Sullivan, F. (2020). Paris Mayor: It's Time for a "15-Minute City." Bloomberg CityLab. [online] 18 Feb. Available at: https://www.bloomberg.com/news/articles/2020-02-18/paris-mayor-pledges-a-greener-15-minute-city [Accessed 25 Sep. 2020].

Paris En Commun (2020). Ville du 1/4h. [online] Le Programme d'Anne Hidalgo. Available at: https://annehidalgo2020.com/le-programme/.

Park, Y. and Rogers, G.O. (2015). 'Neighborhood Planning Theory, Guidelines, and Research', *Journal of Planning Literature*, 30(1), pp.18–36.

Speck, J. (2013) *Walkable City: How Downtown Can Save America, One Step at a Time*. New York City: Macmillan.

Transform Transport (2020). Access to green areas and public realm: the case of Milan. Transform Transport. [online] Available at: https://research.systematica.net/research/access-to-green-areas-and-public-realm-the-case-of-milan/.

UNDP (2015). Sustainable Development Goals. [online] Available at: https://www.undp.org/content/undp/en/home/sustainable-development-goals.html.

UNDP (2020). COVID-19 and the SDGs. [online] Available at: https://www.undp.org/content/undp/en/home/sustainable-development-goals.html.

UNECE (2020). *Policy Brief: The impact of the COVID-19 pandemic on older persons*. Geneva: United Nations Economic Commission for Europe. Available at: https://www.un.org/sites/un2.un.org/files/un_policy_brief_on_covid-19_and_older_persons_1_may_2020.pdf.

Victoria State Government (2020). 20-Minute Neighbourhoods. [online] Plan Melbourne 2017 – 2050. Available at: https://www.planning.vic.gov.au/policy-and-strategy/planning-for-melbourne/plan-melbourne/20-minute-neighbourhoods.

Whittle, N. (2020). Welcome to the 15-minute city. Financial Times. [online] 17 Jul. Available at: https://www.ft.com/content/c1a53744-90d5-4560-9e3f-17ce06aba69a.

Willsher, K. (2020). Paris mayor unveils '15-minute city' plan in re-election campaign. The Guardian [online] 7 Feb. Available at: https://www.theguardian.com/world/2020/feb/07/paris-mayor-unveils-15-minute-city-plan-in-re-election-campaign.