

30 Marzo 2021

Mobilityamoci: dalla visione alle proposte

ORGANIZZARE LA MOBILITÀ SCOLASTICA: dal mobility management scolastico agli strumenti gestionali

Spazio Pubblico e Camminabilità | Strumenti di indagine per una corretta comprensione dei fenomeni

Systematica Srl
Transport Planning
and
Mobility Engineering

Milan
Beirut
Mumbai
New York

Via Lovanio, 8
20121
Milan
Italy

T +39 02 62 31 19 1
F + 39 02 62 31 19 50
E milano@systematica.net
www.systematica.net

- 1. Systematica and Transform Transport**
- 2. Child-friendly cities**
- 3. Milano | Sidewalks Map and Priority of Intervention**
- 4. Milano | Accessibility to urban parks and public realm**
- 5. Milano | 15-minute city**
- 6. Bologna | Biennale dello spazio pubblico**

□ Systematica

transform
transport

Established in 1989

Transport Planning and Mobility Engineering

Offices in Milan, New York, Beirut and Mumbai



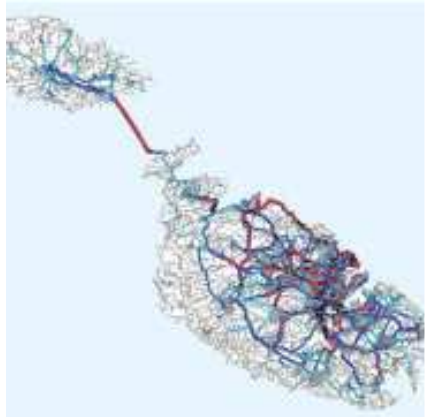
□ Systematica

Established in 1989, Systematica is a transport planning and mobility engineering consultancy with its main office in Milan (Italy) and subsidiary offices in Beirut (Lebanon), Mumbai (India) and New York (USA).

Systematica operates at multiple scales and provides a wide array of integrated consultancy services in the sectors of transport and urban planning, including national, urban and development- scale transport planning, strategic advisory and due diligence for infrastructure investments, traffic analysis and management, mobility engineering in complex buildings and events venues with a special focus on pedestrian flows, parking design, vertical transportation, and application of advanced info-mobility systems and technologies.

Systematica is committed to its company statement and mission to deliver highly ethical and professional response, through Research and Development, for seeking new approaches and solutions for the ever-changing issue of mobility and transport planning, put social inclusion on top priority, and search for sound engineering solutions to support sustainable growth.

- National and Regional Transport Planning
- Urban Mobility Planning
- Feasibility Study of Transport Infrastructure
- Development Transportation Planning
- Traffic Impact Study
- Parking Traffic Engineering and Design
- Pedestrian Flows Analysis
- Vertical Transportation Appraisal
- Strategic Traffic and Revenue Advisory and Due Diligence
- Wayfinding Planning and Spatial Analysis
- Crowd Management and Mobility Planning of Mayor Events
- Sustainable Mobility Advisory



National



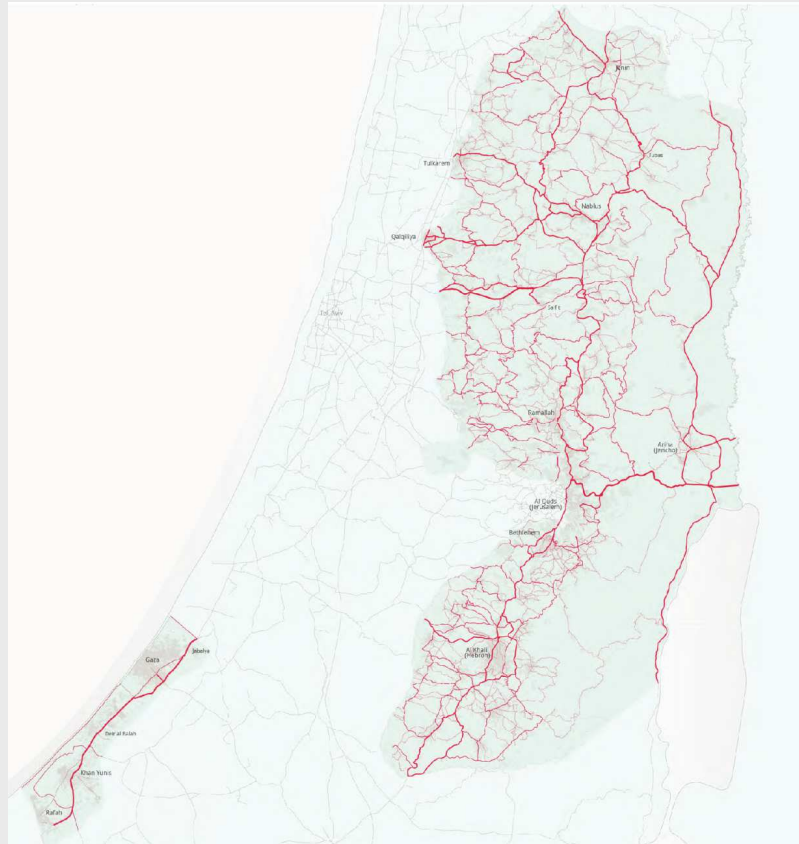
Urban



Large Developments



Complex Building



West Bank and Gaza Transportation Master Plan
Location: Palestinian Territories
Client: European Investment Bank
Year | 2013 – 2016



Le Grand Paris
Location: Paris, France
Client: Presidency of the Republic of France
Year: 2008 – 2009



Expo 2015
Milan, Italy
Client: Expo 2015 S.p.A.
Year: 2009 - 2014



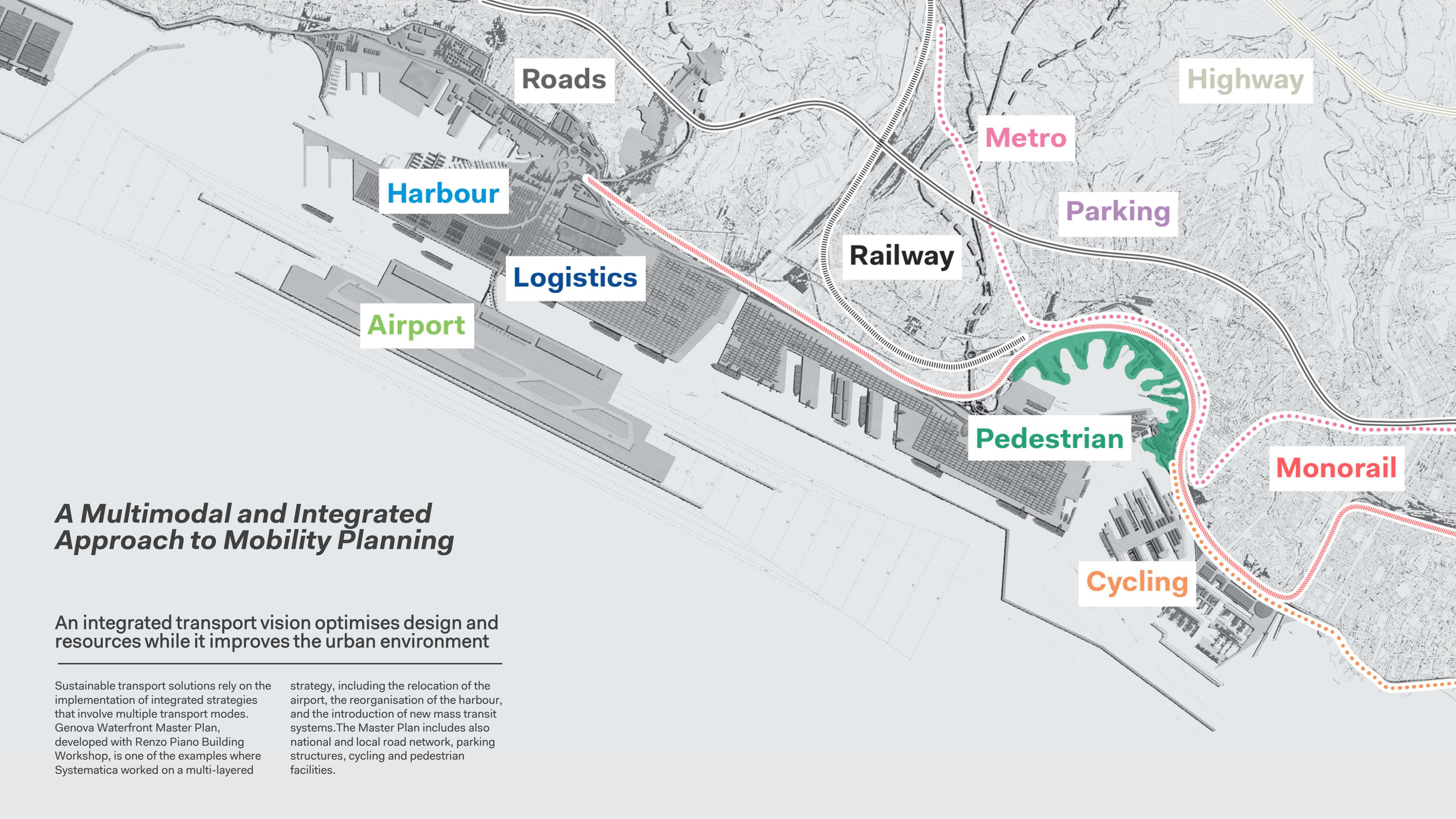
KL 118 Tower
Kuala Lumpur, Malaysia
Client: PNB Merdeka Venture Bhd
Year: 2012

Transport Systems Interconnected at Multiple Scales

Mobility patterns involve different scales, tightly interlinked and requiring an approach that goes beyond projects boundaries

There are no predefined scales of intervention and analytical limits: access to any given building is influenced by interconnected dynamics at the city scale, while inversely provisioned national infrastructure affect circulation at the local scale, parking configuration generates

impacts on the external road network within the surrounding districts, and so on. Systematica is extensively operating at all scales, from National Transport Master Plan to infrastructure at city scale, large developments and complex buildings.



A Multimodal and Integrated Approach to Mobility Planning

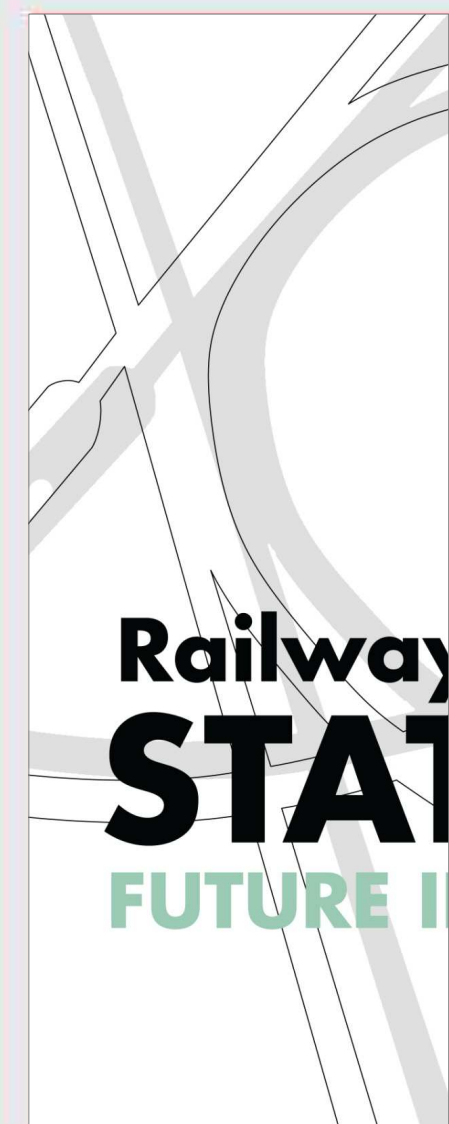
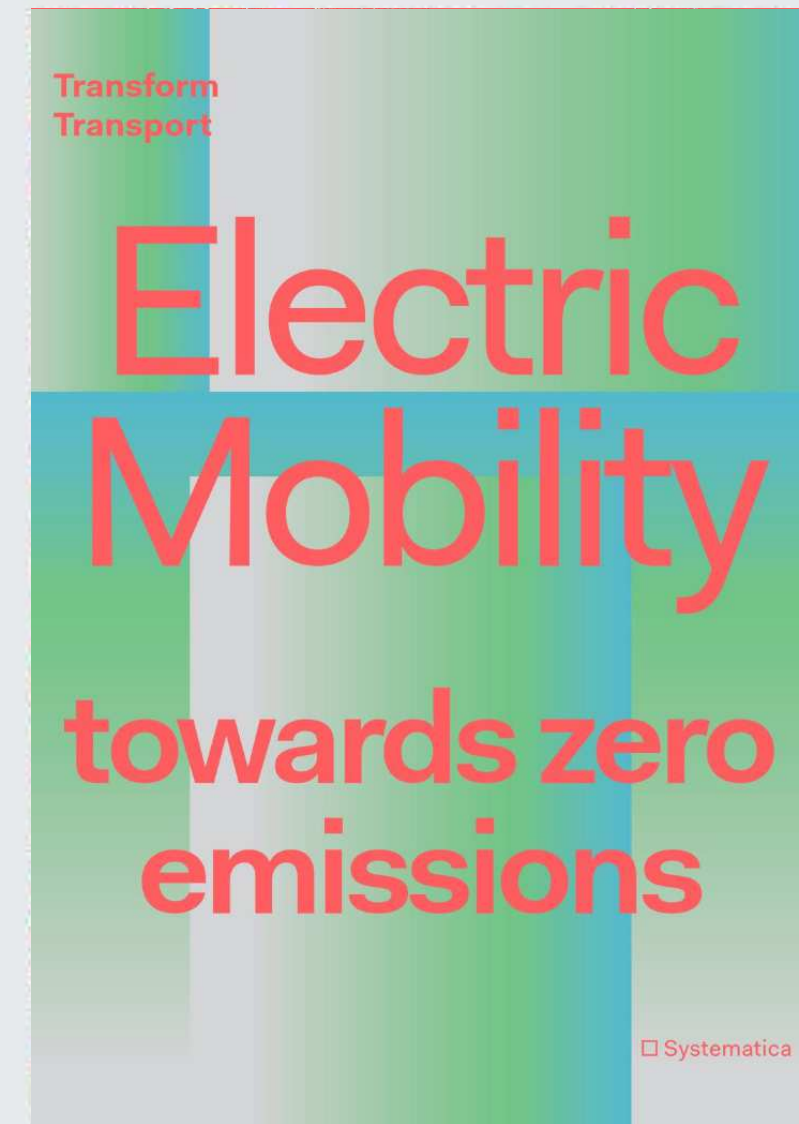
An integrated transport vision optimises design and resources while it improves the urban environment

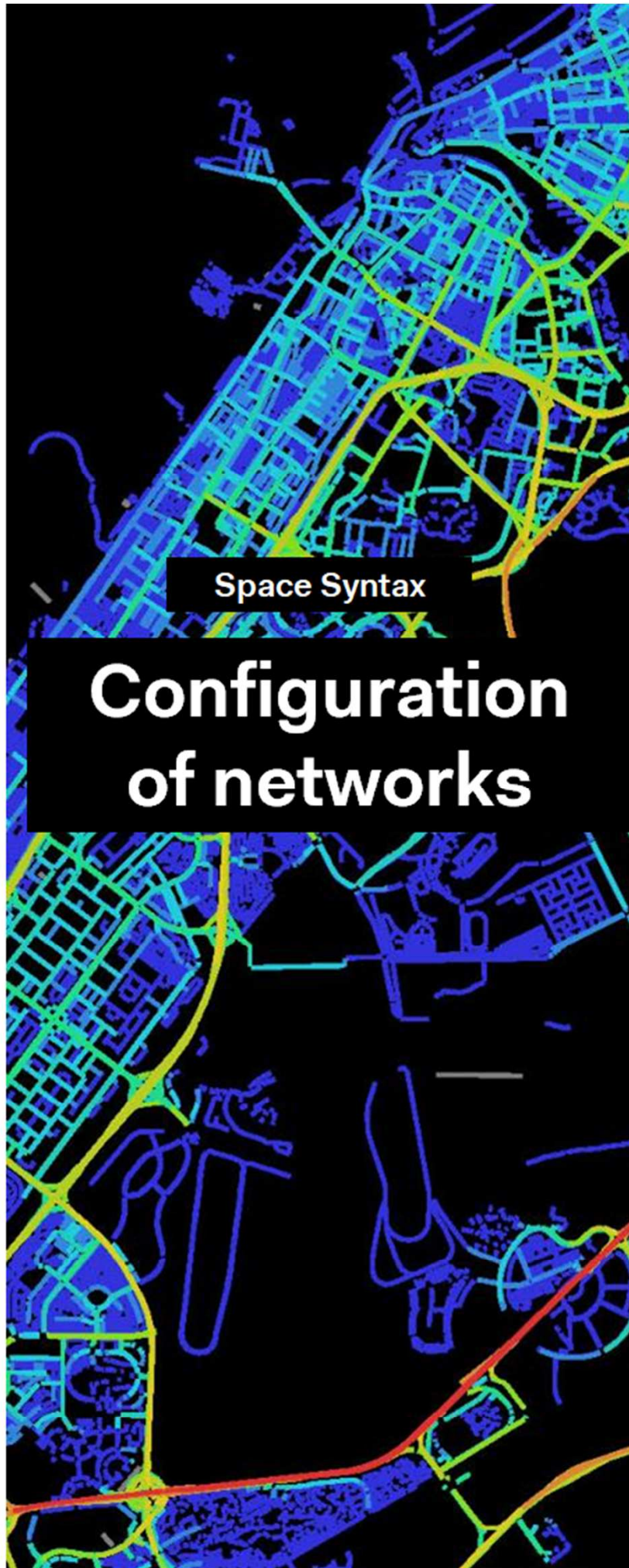
Sustainable transport solutions rely on the implementation of integrated strategies that involve multiple transport modes. Genova Waterfront Master Plan, developed with Renzo Piano Building Workshop, is one of the examples where Systematica worked on a multi-layered

strategy, including the relocation of the airport, the reorganisation of the harbour, and the introduction of new mass transit systems. The Master Plan includes also national and local road network, parking structures, cycling and pedestrian facilities.

transform transport

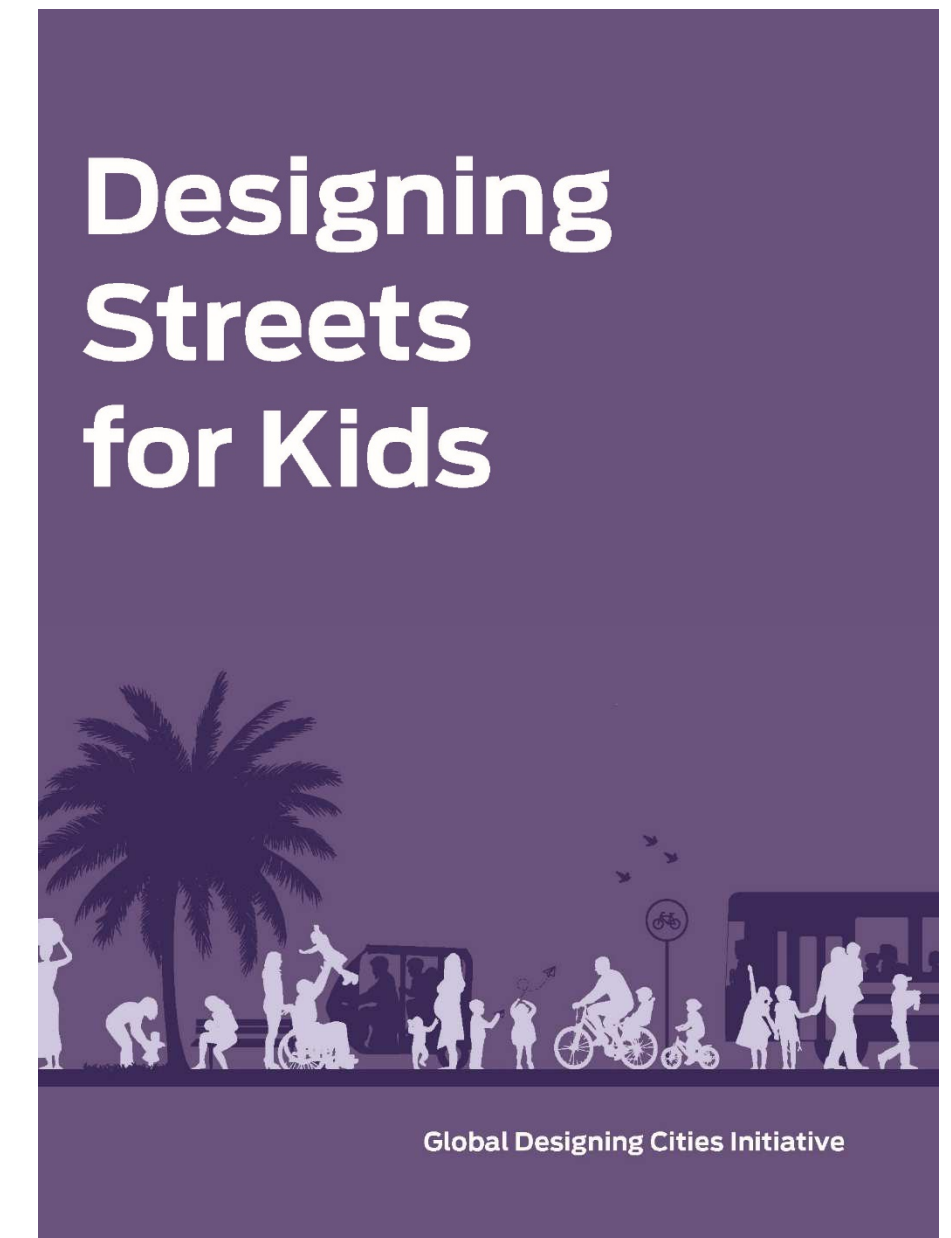
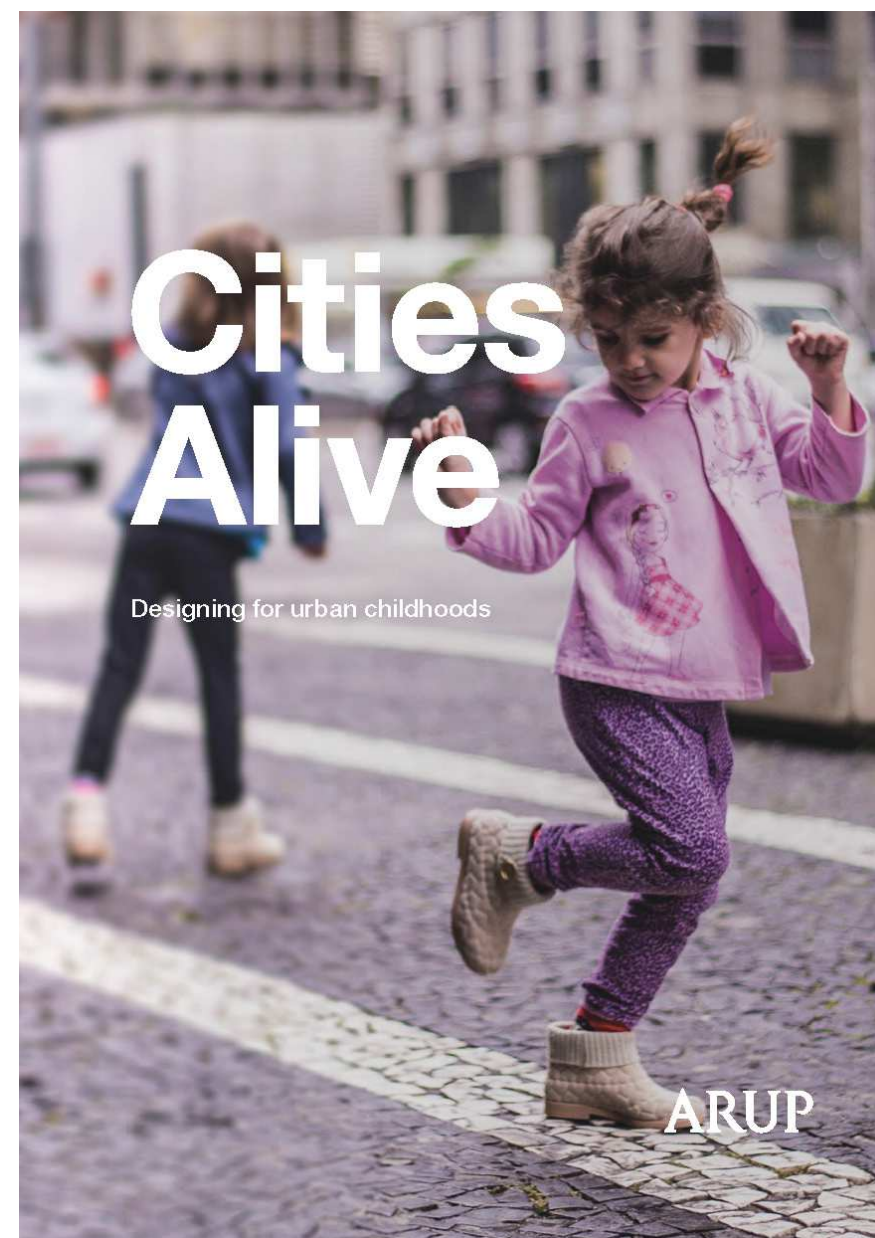
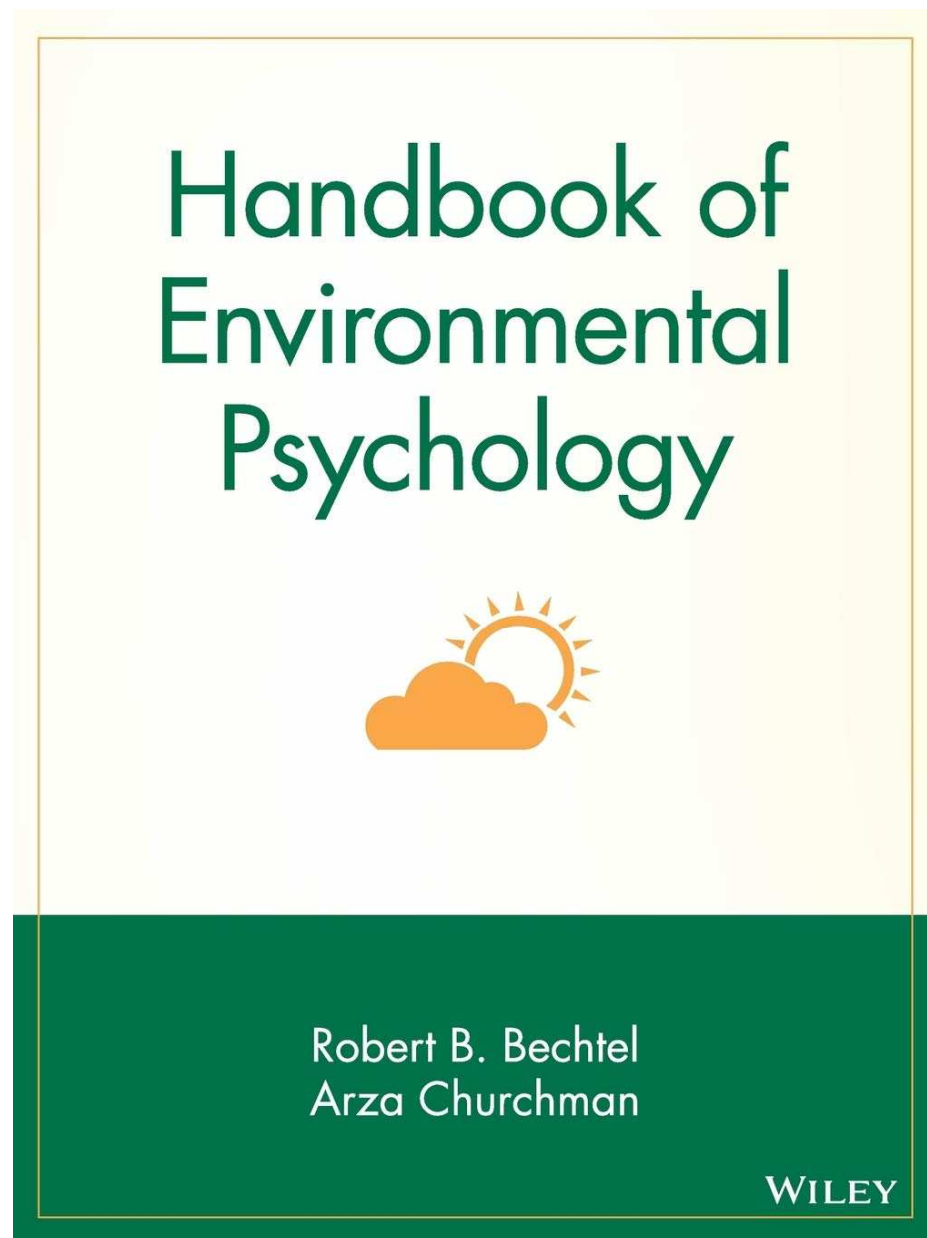
Systematica's Research Unit





2. Child-Friendly Cities

Child-friendly cities
Città a misura di bambino



R. B. Bechtel, & A. Churchman (Eds.) Handbook of Environmental Psychology. New York: John Wiley & Sons

ARUP Cities Alive: Designing for Urban Childhoods. London 2017

Greater London Authority Making London Child-friendly: Designing Places And Streets For Children And Young People, London 2020

NACTO, GCDI, Designing Streets for Kids Island press 2020

THEORETICAL INSIGHT

PROCESSING

METHODOLOGY

GUIDELINES

Child-friendly cities
Città a misura di bambino

Humans strive for cognitive integration and consistency, anxiety reduction, and self-esteem maintenance, and they use places to achieve these goals.

“Place preferences during childhood and adolescence are assumed to provide support for the developing self-identity, the need for security, social attachments to caregivers and to the peer group, and the practice of social roles.”

“Attachments are formed to places that fulfill people’s emotional needs and enable them to develop and maintain their identities”

References:

Korpela, K. (2002). Children’s environment. In R. B. Bechtel, & A. Churchman (Eds.) *Handbook of Environmental Psychology*. New York: John Wiley & Sons, 363-373.

Child-friendly cities

NATURAL SPACES

&

NEAR-HOME ENVIRONMENTS



➔ **Imagination + Emotional release + Attentional capacity**

➔ **Children's perceptions of risk and safety**

Child-friendly cities

Città a misura di bambino

Benefits of child-friendly cities



Health and wellbeing

- Physical activity
- Mental wellbeing
- Accessible activities
- Intergenerational activities



Safety

- Road safety
- Safe and active streets
- Perceived safety
- Addressing social fears



Nature and sustainability

- Connection to nature
- Wilder natural spaces
- Risk and adventure
- Wellbeing and sanctuary



Local economy

- Retention of families
- Vibrant destinations
- Attractive developments
- Space saving



Stronger communities

- Generating community
- Time spent together
- Social interaction
- Inclusivity and accessibility



Resilience

- Resilient citizens
- Climate resilience
- Response to threats
- Multifunctionality

Successful case studies for child-friendly urban plans & projects

80-9%

From 1971 to 1990, the number of UK children walking to school unsupervised decreased from 80% to 9%.⁴⁷

No.1

cause of death

In 2015, road traffic injury was the leading cause of death among 10-19yr olds globally.⁷⁶

30-50%

child fatalities

arising from natural events due to greater vulnerability.¹¹¹



Barcelona Superblocks
400x400m no-traffic blocks turning internal streets into "citizen spaces" focused on active mobility



Sydney's Darling Quarter
innovative 4,000m² playground at centre of neighbourhood



Freiburg Green City
Integrated mobility strategy reducing car use and enhancing user safety



Bicentennial Children's Park, Santiago, Chile
Children's park at threshold of rich and poor areas as a cohesive community enabler



Natuurspeeltuin de Speeldernis in Rotterdam
Natural and unstructured play opportunities in the city



NYC school playgrounds
Transforming schoolyards into green infrastructure-activated play spaces for the community and stormwater absorbents.

References:

ARUP Cities Alive: Designing for Urban Childhoods. London 2017

The Trust for Public Land (2020). SCHOOL'S OUT In a time of compounding crises, America's schoolyards are packed with potential. San Francisco: TPL.

Child-friendly cities

Città a misura di bambino

Built environment professionals

- engage communities to develop more creative and informed ideas,
- support community action and intervention in problem areas
- raise aspirations and demand for child-friendly cities.

City Leader and policy makers

- engage the community in constructive debates about children's wellbeing and freedoms in the city, building a shared vision and harnessing the potential of community action
- monitor and report problem areas.

Developer & Investors

- explore co-creation opportunities to tap into and build local knowledge,
- mobilise social capita
- create a sense of identity and ownership
- ease management and maintenance.



Tirana's Child Policy Director



New York City Children's Cabinet



Ghent European youth capital 2024 (shortlisted)

Child-friendly cities

Città a misura di bambino

Potential Indicators for child-friendly cities

	Economic Possible priorities	 Retention of families Placemaking Equity and reduced deprivation	Suggested indicators	<ul style="list-style-type: none"> - City migration by age band - Net migration of children and families - Presence of children in the public realm - Land and property values - Availability and accessibility of activities and services - (Child) health inequalities - Deprivation indicators - Intergenerational activities
	Social Possible priorities	 Preventive healthcare Safety and reduced crime Road safety and active travel	Suggested indicators	<ul style="list-style-type: none"> - Levels of reported anti-social behaviour - Reported crime - Road traffic accidents - (Child) pedestrian casualties - Active travel mode levels - Children's use of public transport - Physical activity levels - Prevalence of health conditions - Levels of environmental pollution
	Environmental Possible priorities	 Ecosystem services Climate and disaster resilience Liveability	Suggested indicators	<ul style="list-style-type: none"> - Congestion - Levels of footfall - Use of space - Air quality - Flood soakaways - Area available for disaster relief - Value of green infrastructure - Mental health - Commute times
	Political Possible priorities	 Active citizenship Sustainable behaviours Building consensus	Suggested indicators	<ul style="list-style-type: none"> - Number of community groups and initiatives - Votes and referendum results - Leadership popularity polls - Child engagement in decision making - Co-created spaces - Cross-party-political sign up - Number of volunteers - Funding across city functions and agencies - Dwell times and spend

880 cities



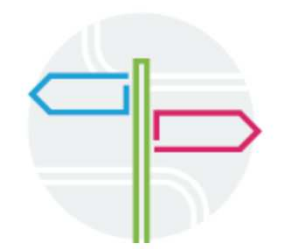
Unconventional Engagement



Idea Labs



Open Streets Planning



Special Projects

The 8 80 Cities initiative analyses city safety, necessary mobility and public space improvements by asking whether a senior and a child can walk to the park together.



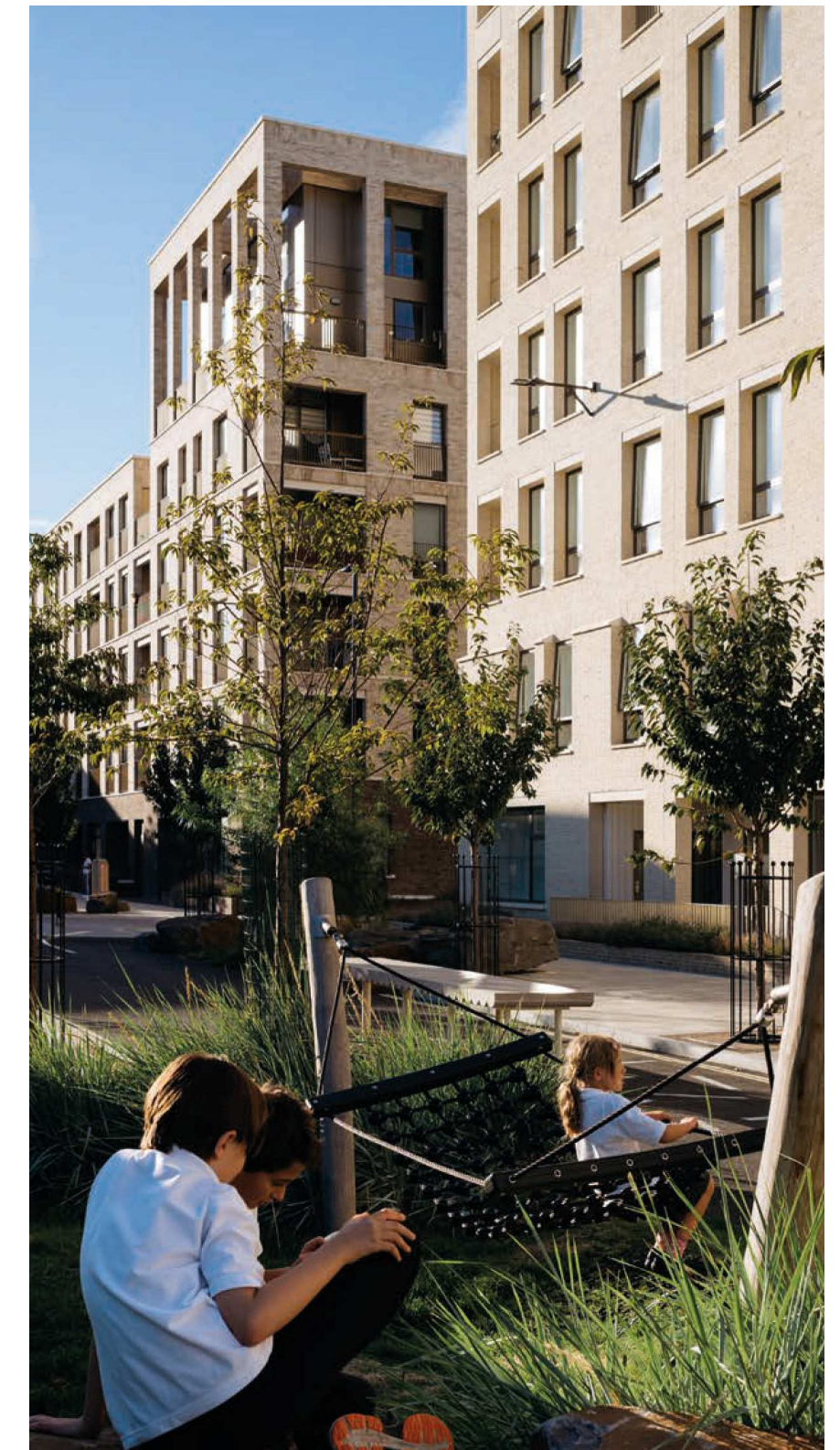
OSLO

Creative use of technology can improve understanding of children's concerns and perspectives. In Oslo, the Traffic Agent app gamifies the collection of real-time road safety data, helping improve the city's walking infrastructure and provide reassurance to children and families on their walk to school.¹³⁵ The City of Oslo invested €347,000 in the development of the child-friendly app, which casts its primary school age users in the role of secret agents, encouraging them to report on concerns like heavy traffic, a difficult pedestrian crossing or problems seeing road signs.

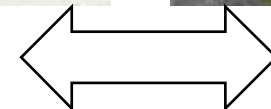
Child-friendly cities

Città a misura di bambino

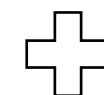
A rights-based approach



Independent mobility



Play and playfulness



Engagement

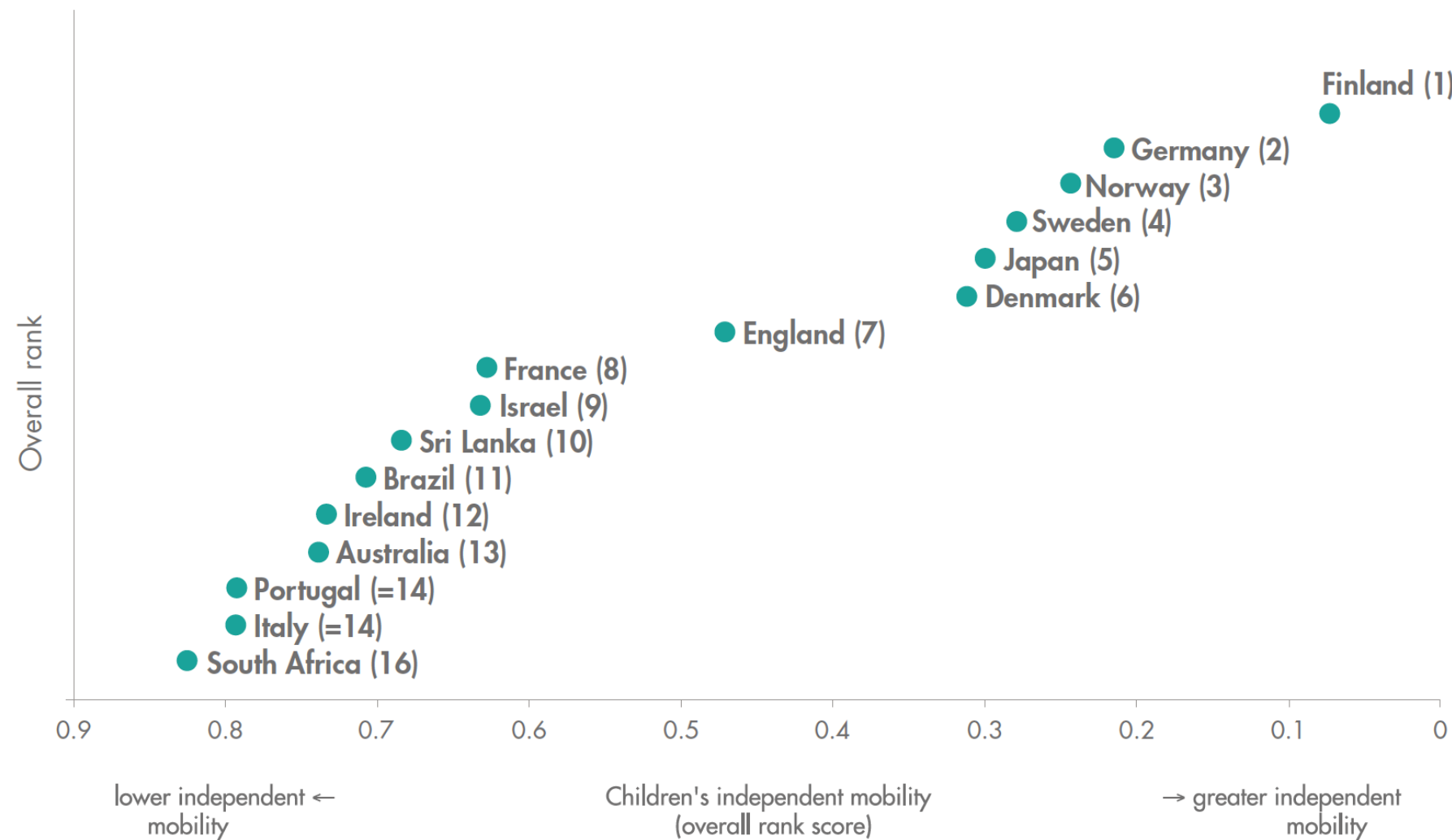


the built environment becomes simultaneously safer, full of affordances and navigable for children and young people of all ages and abilities.

Child-friendly cities

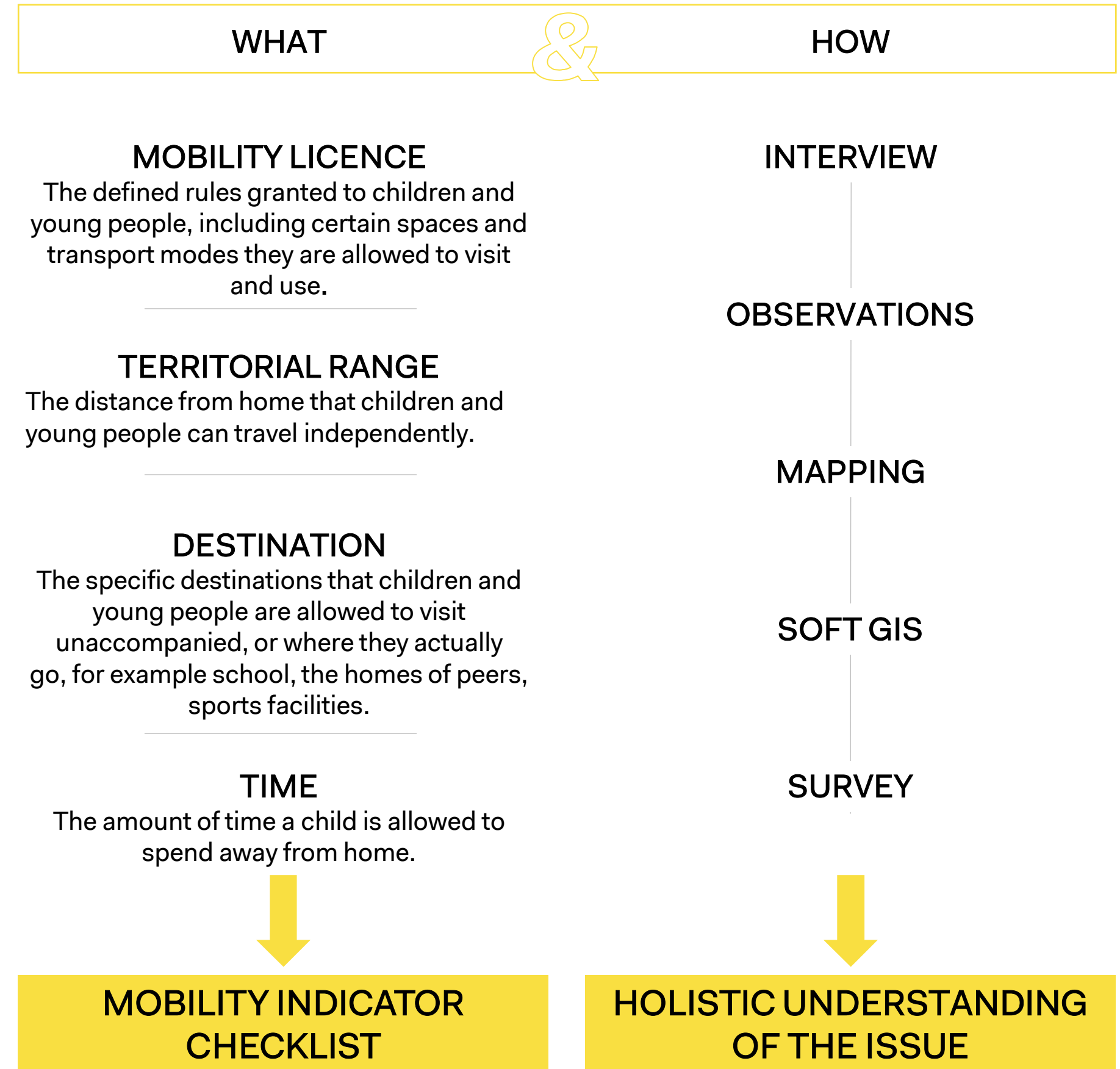
Città a misura di bambino

Assessing independent mobility International comparison



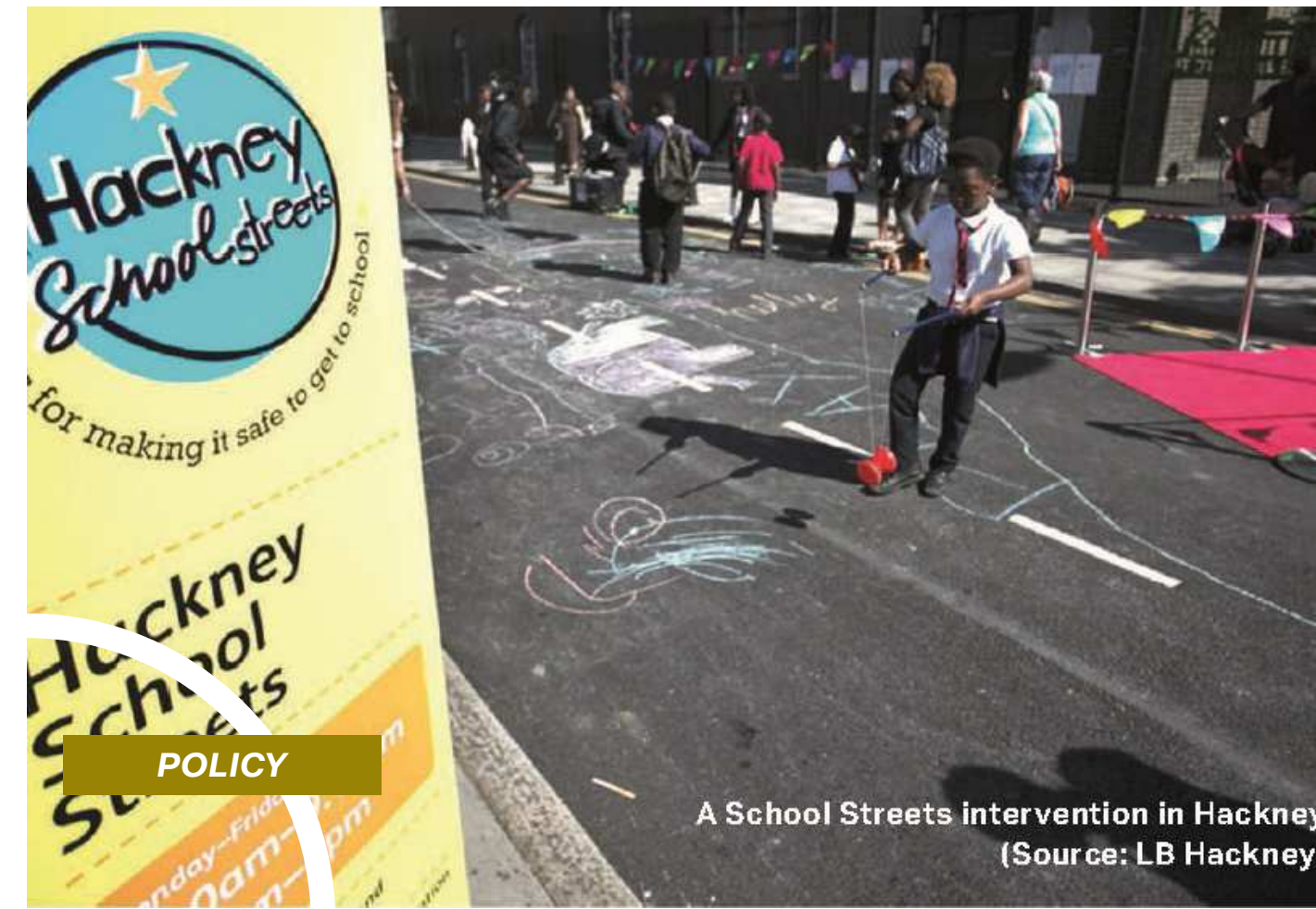
Shaw et al, 'Children's Independent Mobility'

References:
Greater London Authority (2020) Making London Child-friendly: Designing Places And Streets For Children And Young People. London 2020



Design and Typology Approach

New developments, renewal projects and public realm improvements should encourage and facilitate the independent mobility of children and young people. Wider connectivity should be provided for to access nearby streets, cycle lanes, bus stops and train stations. If this is not possible, nearby child-friendly routes should be identified and efforts made to ensure access between the development and the route.

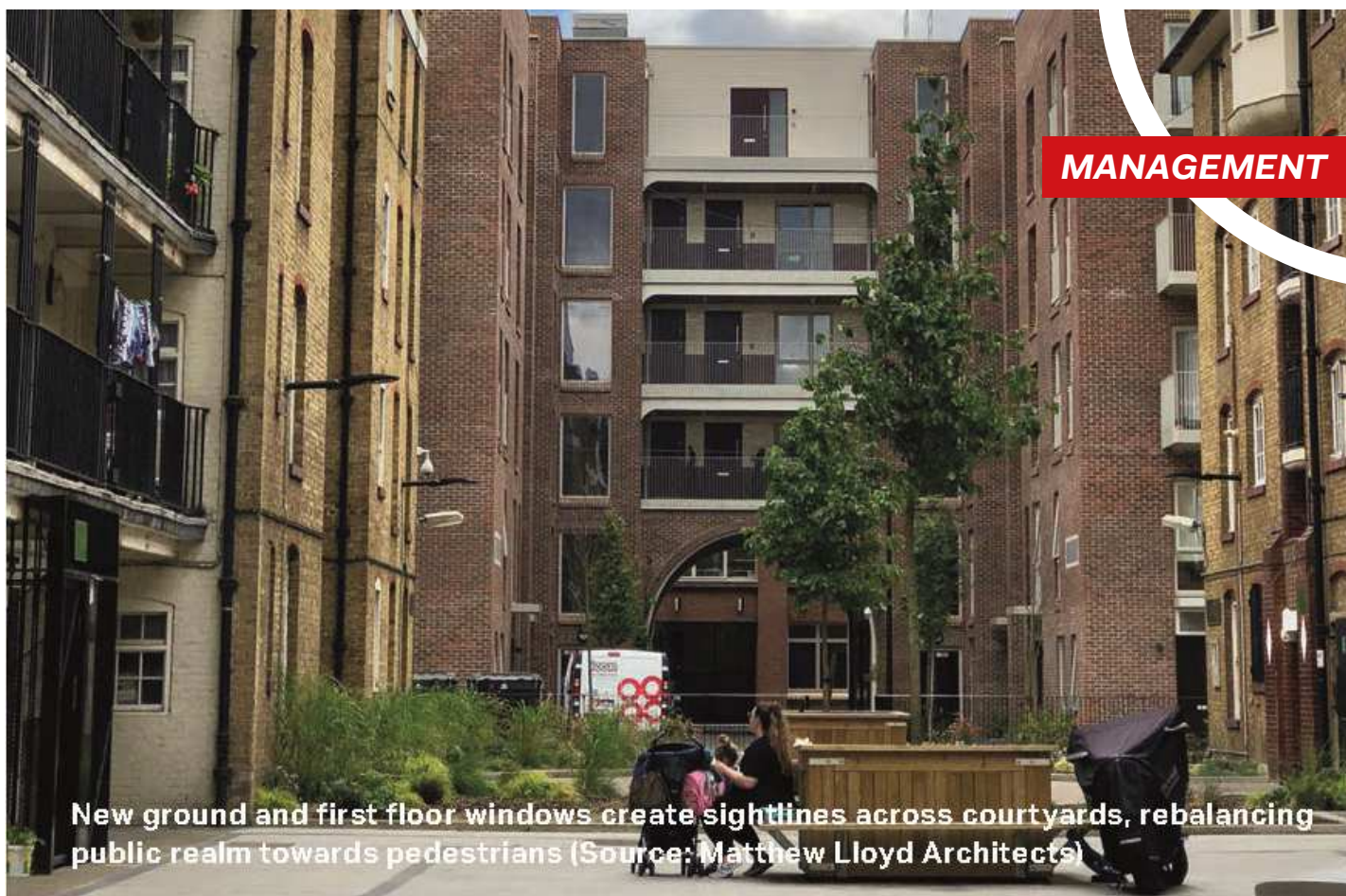


Policy Approach

An inter-departmental agenda of child-friendliness, particularly with the objective of facilitating independent mobility for children and young people, should be pursued at the borough level and embedded across multiple departments and strategies. The development of policy affecting children and young people should seek to engage with their views as part of the commissioning process.

Management Approach

Residential building management should ensure that children and young people are able to move between private, communal and public spaces (from the home to the street) without relying on adult presence.



Participative Approach

Children and young people should be engaged in the process of design and planning from the earliest possible stages, including pre-design consultation. Participation needs to be understood as a long-term process; ensuring post-intervention feedback and analysis means co-creation is not limited to the design of a space, but also its management and iterative changes.

Child-friendly cities

Città a misura di bambino



SAFE & HEALTHY

Safe and healthy streets include continuous and accessible pedestrian infrastructure, safe cycling and transit facilities, safe vehicular speeds, clean air, access to nature through landscape and trees, opportunities for physical activity, and adequate lighting.



INSPIRATIONAL & EDUCATIONAL

Inspiring and educational streets are beautiful; have spaces for learning, development, and play (through images, colors, textures, and games); and offer opportunities for imaginations to develop.



CONVENIENT & COMFORTABLE

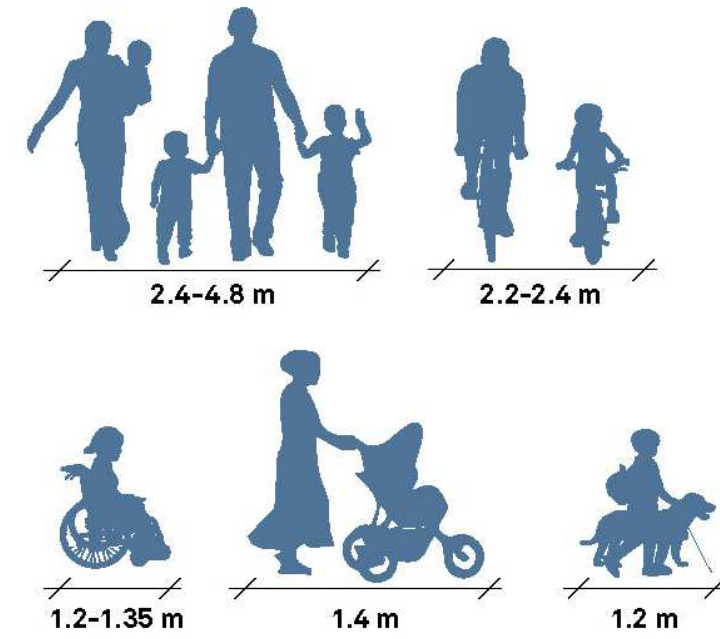
Comfortable and convenient streets include places to sit for moments of rest or interpersonal connection, reliable transit options with legible wayfinding and schedules, shade and shelter suitable for the local climate along sidewalks and at transit stops, and facilities like restrooms and drinking fountains.

Child-friendly cities

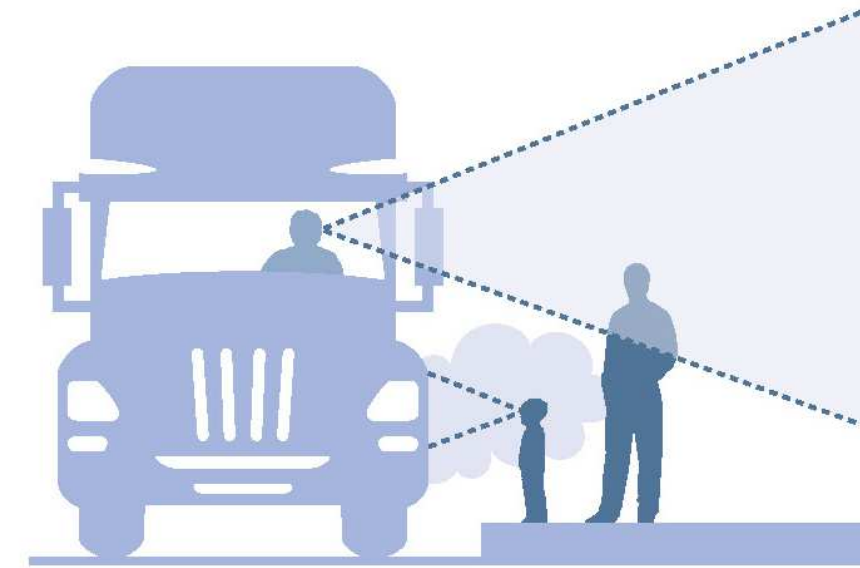
Città a misura di bambino



RELIABLE MOBILITY CHOICE



SPACE



VISIBILITY



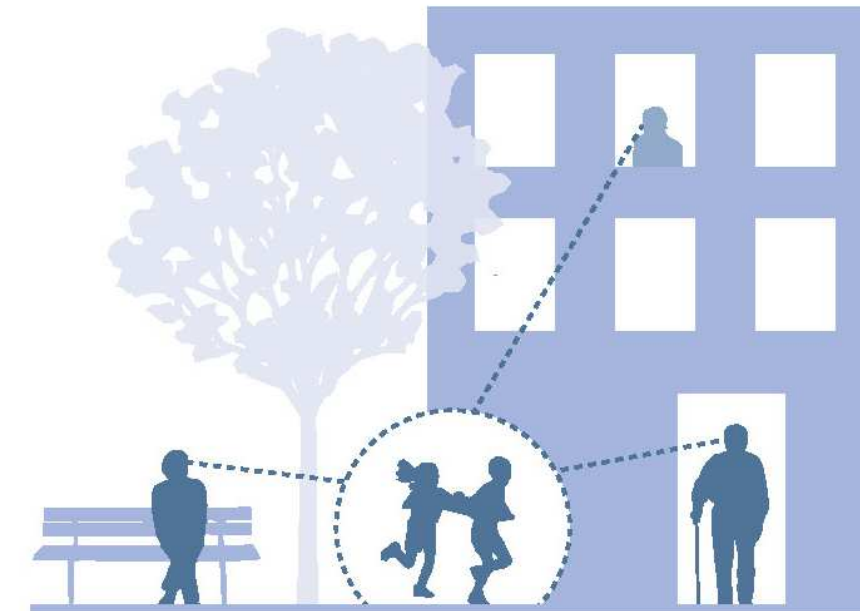
PLAY & LEARNING



PLACES TO PAUSE AND STAY



SOCIAL INTERACION



SECUTIRY

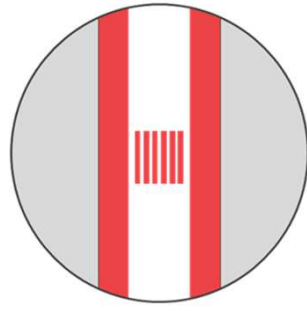


SAFE ENVIRONMENT

Child-friendly cities

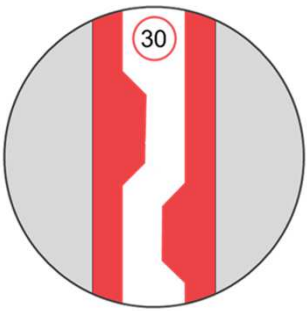
Città a misura di bambino

NEIGHBORHOOD CHILD FRIENDLY STREET



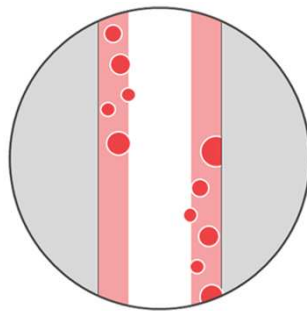
1 - UPGRADE

- Reduce crossing distance
- Widen pedestrian crossings
- Widen sidewalks
- Provide cycle facilities



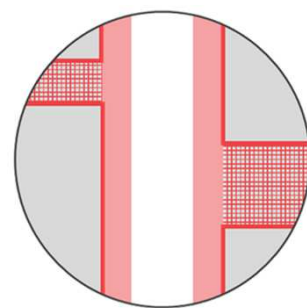
2 - PROTECT

- Reducing speed limits
- Through street design
- Narrowing lanes
- Protecting cycle tracks



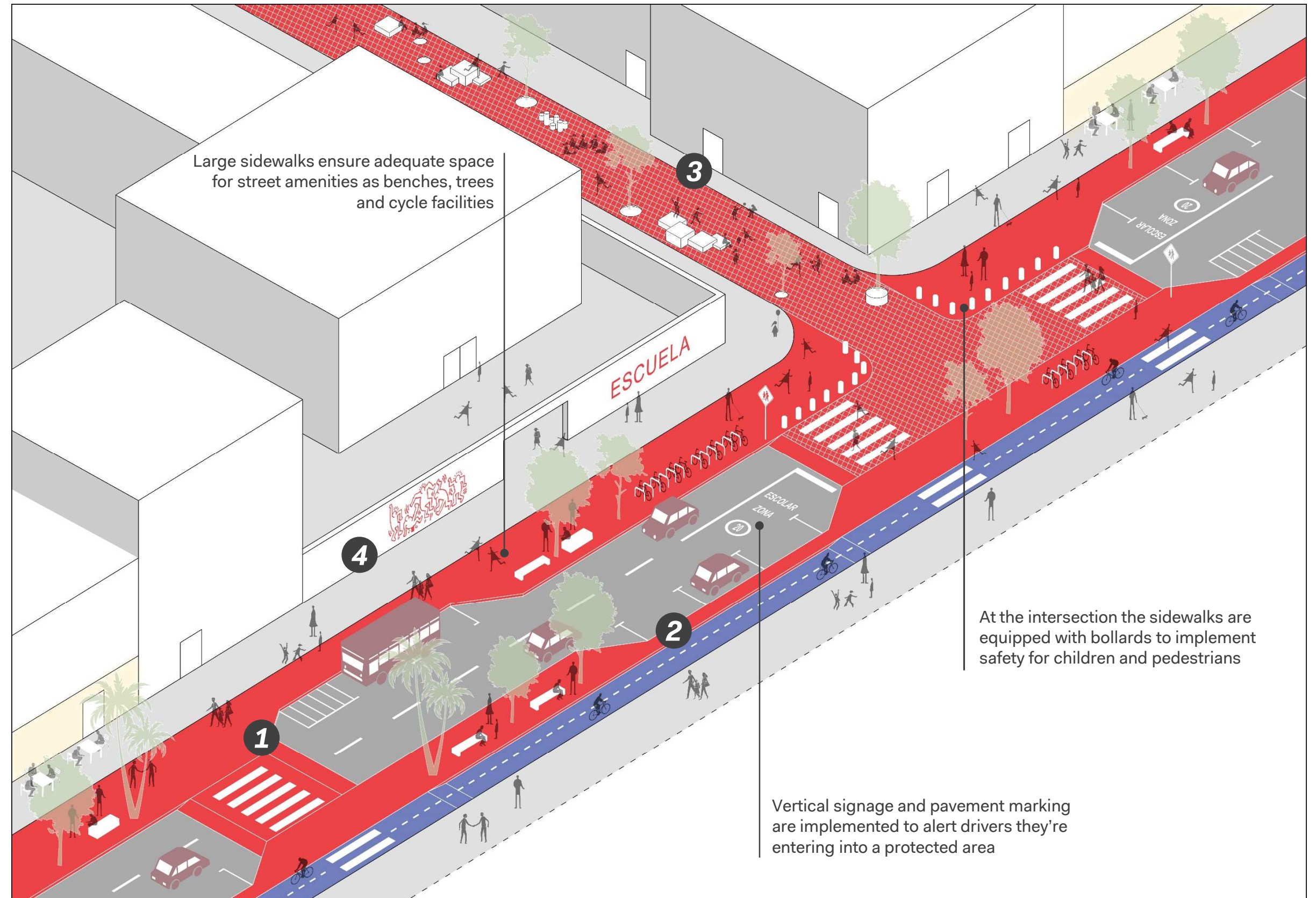
3 - ACTIVATE

- Adding play-educational grounds
- Planting trees, landscaping
- Providing "all size" spaces



4 - EXTEND

- Incorporating setback spaces
- Activating empty blocks
- Painting blank walls - murals/artworks



3. Milano | Sidewalks Map and Priority of Interventions

Mapping pedestrian infrastructure

Mappare l'infrastruttura pedonale

Pedestrian traffic is the primary and most capable "mode of transport". The study aims to highlight how the mapping of pedestrian infrastructure, here in particular of sidewalks, is fundamental and how much this is missing among the tools of administrations and planners.

We have a huge amount of information on our cities with regards to vehicular traffic: road hierarchy, number of lanes, vehicles per hour, level of congestion, etc... and no information on the true users of cities - pedestrians - and on the most important infrastructure - the sidewalks. This tool would exponentially increase the ability to analyze and plan pedestrian spaces, serving fundamentally the need for rapid adaptation, which we are working towards and in line with the principles of sustainable mobility that many cities are promoting.

The width of a sidewalk contributes to the level of comfort in using that infrastructure. Sidewalks that are too narrow can create zones of conflict where pedestrians encroach on road space, leading to dangerous situations. Comfortable sidewalks instead support and encourage pedestrian traffic by increasing the attractiveness of the street and bringing widespread advantages.

Sidewalks provide a primary mode of travel that supports nearly all other travel options, leisure, recreation and community activities.

Il traffico pedonale è il principale e più capace «modo di trasporto». Lo studio vuole mettere in risalto quanto la mappatura dell'infrastruttura pedonale, qui in particolare dei marciapiedi, sia fondamentale e quanto questa stessa manchi tra gli strumenti delle amministrazioni e dei pianificatori.

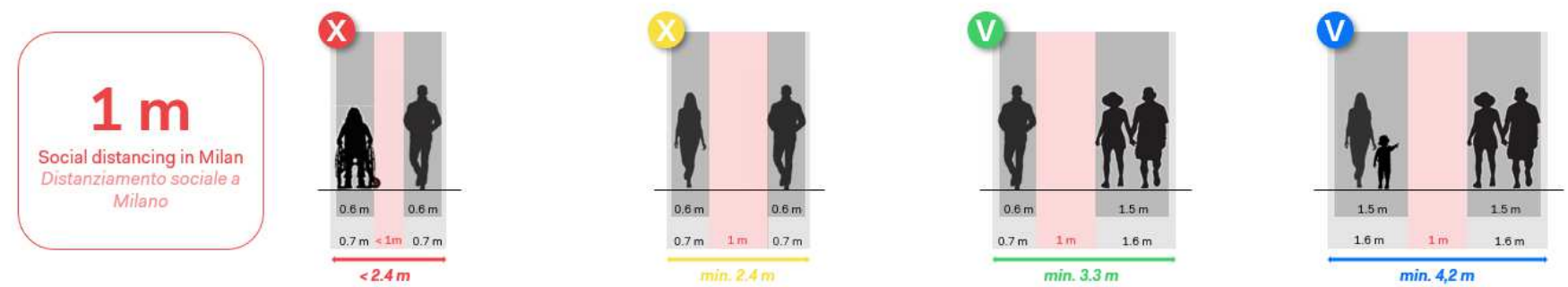
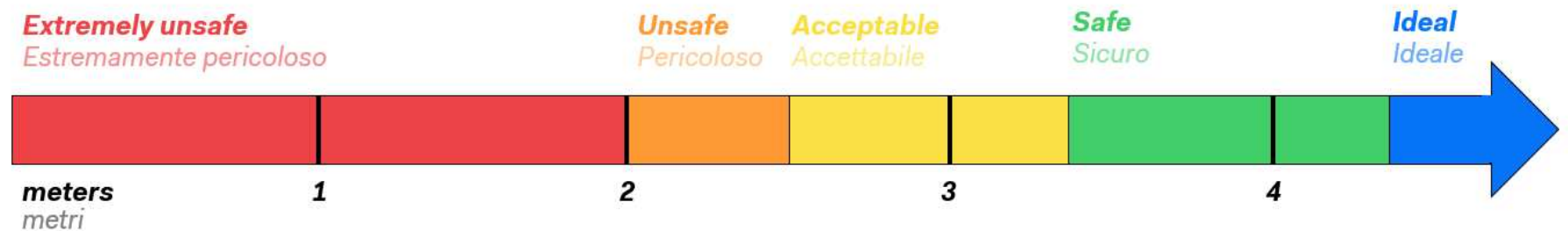
Abbiamo un'enorme quantità di informazioni sulle nostre città per quello che riguarda il traffico veicolare: gerarchia stradale, numero di corsie, veicoli all'ora, livello di congestione, ... e nessuna informazione sui veri fruitori e animatori delle città - i pedoni - e sull'infrastruttura più importante - i marciapiedi. Tale strumento incrementerebbe esponenzialmente la capacità di analisi e di pianificazione degli spazi pedonali, risultando fondamentale nell'ottica di richiesta di rapido adattamento a cui stiamo andando incontro e in linea con i principi di mobilità sostenibile che molte città stanno promuovendo.

La larghezza di un marciapiede contribuisce al livello di comfort nell'utilizzo di quella infrastruttura. Marciapiedi troppo stretti possono creare zone pericolose dove i pedoni invadono la carreggiata creando zone di conflitto. Marciapiedi comodi invece supportano e incentivano il traffico pedonale aumentando l'attrattività della strada e portando vantaggi diffusi.

I marciapiedi supportano il principale modo di trasporto: il traffico pedonale. Questa modalità è alla base di quasi tutte le altre opzioni di viaggio, il tempo libero, le attività ricreative e della comunità.



Source: Nacto



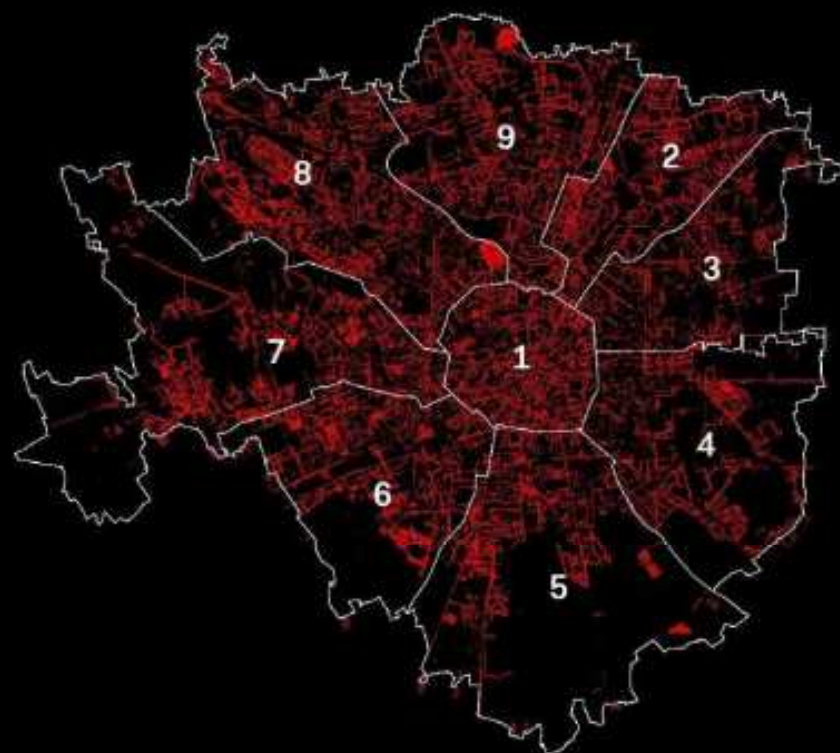


www.milansidewalks.com

Sidewalks in Milan

Marciapiedi a Milano

Unsafe sidewalk
Marciapiede non sicuro
 < 2,4 m



45%
1.374 km

- ➔ ZONA 1 - 44%
- ➔ ZONA 2 - 52%
- ➔ ZONA 3 - 32%
- ➔ ZONA 4 - 40%
- ➔ ZONA 5 - 47%
- ➔ ZONA 7 - 45%
- ➔ ZONA 7 - 46%
- ➔ ZONA 8 - 46%
- ➔ ZONA 9 - 49%

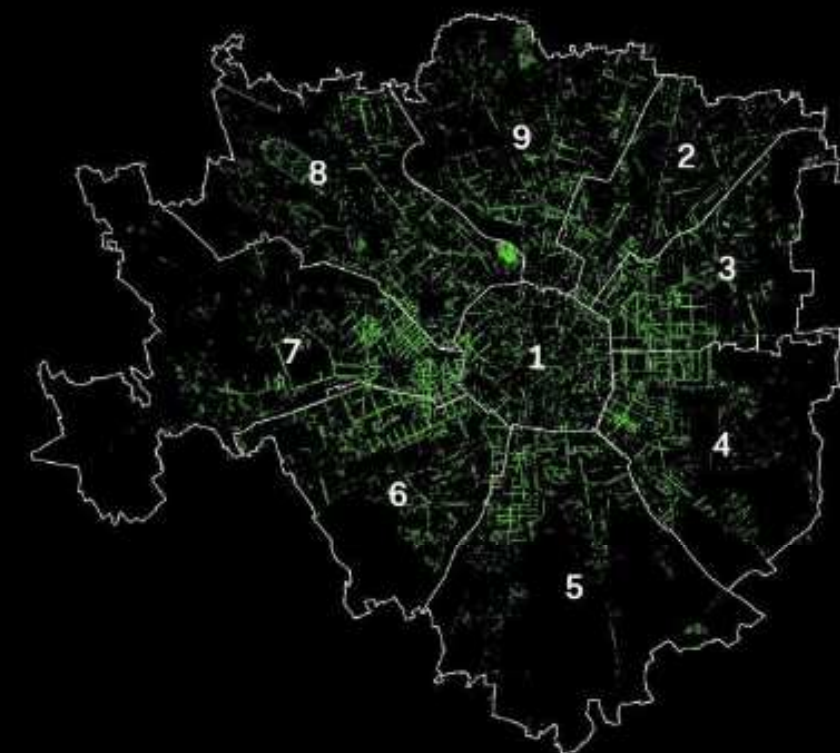
Acceptable sidewalks
Marciapiede accettabile
 >= 2,4 and < 3,3 m



24%
730 km

- ➔ ZONA 1 - 22%
- ➔ ZONA 2 - 25%
- ➔ ZONA 3 - 27%
- ➔ ZONA 4 - 26%
- ➔ ZONA 5 - 24%
- ➔ ZONA 7 - 22%
- ➔ ZONA 7 - 22%
- ➔ ZONA 8 - 22%
- ➔ ZONA 9 - 26%

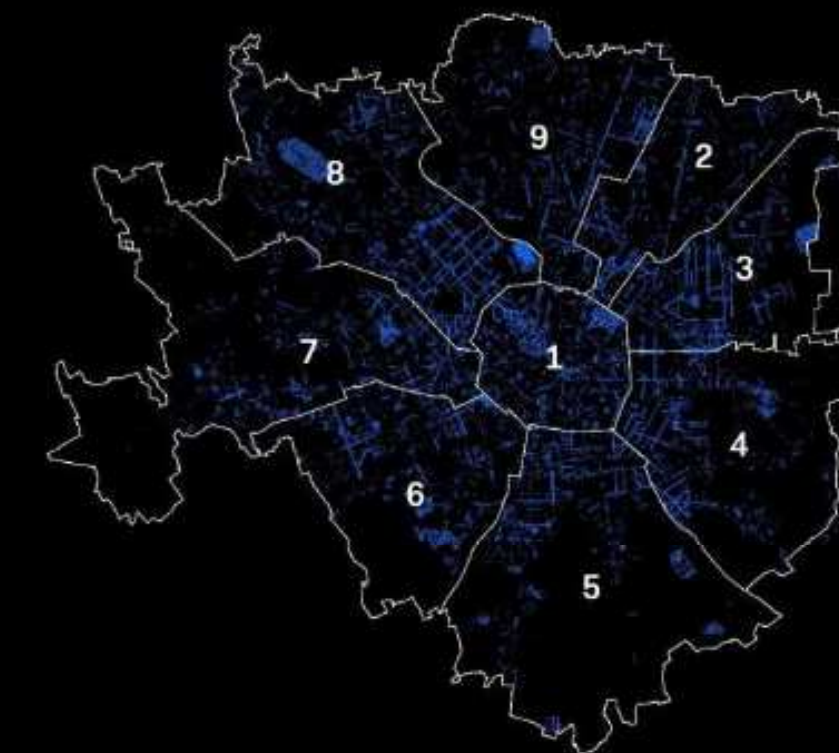
Safe sidewalk
Marciapiede sicuro
 >= 3,3 and < 4,2 m



14%
429 km

- ➔ ZONA 1 - 12%
- ➔ ZONA 2 - 11%
- ➔ ZONA 3 - 20%
- ➔ ZONA 4 - 17%
- ➔ ZONA 5 - 13%
- ➔ ZONA 7 - 17%
- ➔ ZONA 7 - 18%
- ➔ ZONA 8 - 11%
- ➔ ZONA 9 - 11%

Ideal sidewalk
Marciapiede ideale
 >= 4,2 m



17%
520 km

- ➔ ZONA 1 - 21%
- ➔ ZONA 2 - 12%
- ➔ ZONA 3 - 21%
- ➔ ZONA 4 - 17%
- ➔ ZONA 5 - 17%
- ➔ ZONA 7 - 16%
- ➔ ZONA 7 - 14%
- ➔ ZONA 8 - 21%
- ➔ ZONA 9 - 13%

Objectives

Obiettivi

This article is based on the results of the study "Milan sidewalks" (available at the link: www.milansidewalks.com), in which the width of all the sidewalks of Milan have been mapped and narrow sidewalks were classified as inadequate to guarantee the correct social distancing measures necessary in this emergency situation to contain the COVID-19 virus.

As a preliminary step, the study identified that sidewalks that do not correspond to correct social distancing requirements are approximately 1,400 km in length (45% of all sidewalks in Milan), which are too many to be able to intervene in a timely manner.

This article proposes a useful methodology for identifying the most at-risk areas of the city, where interventions to adapt the pedestrian infrastructure must become a priority.

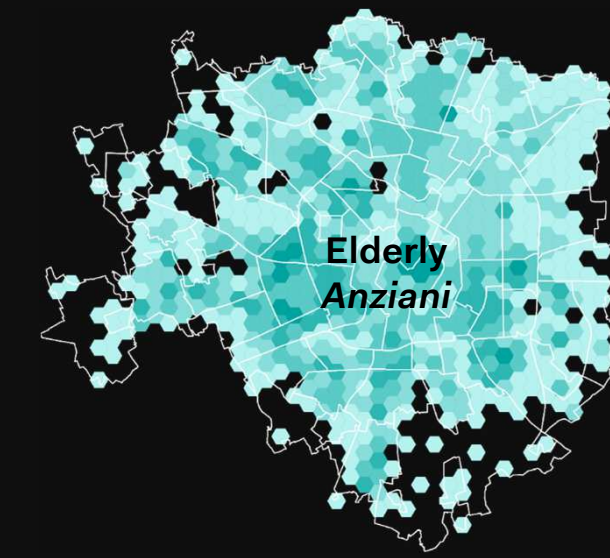
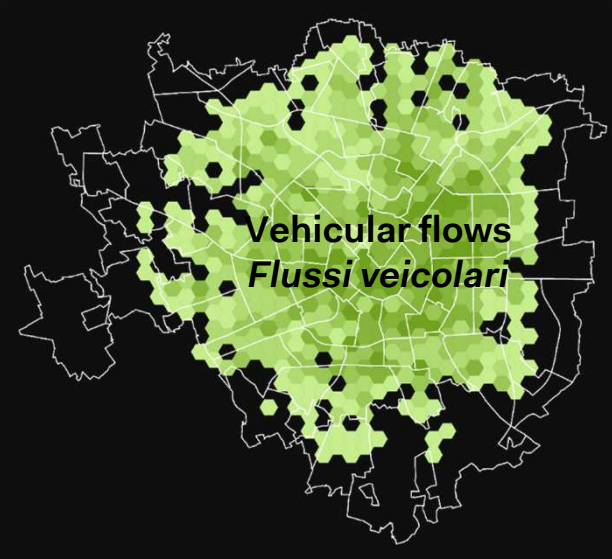
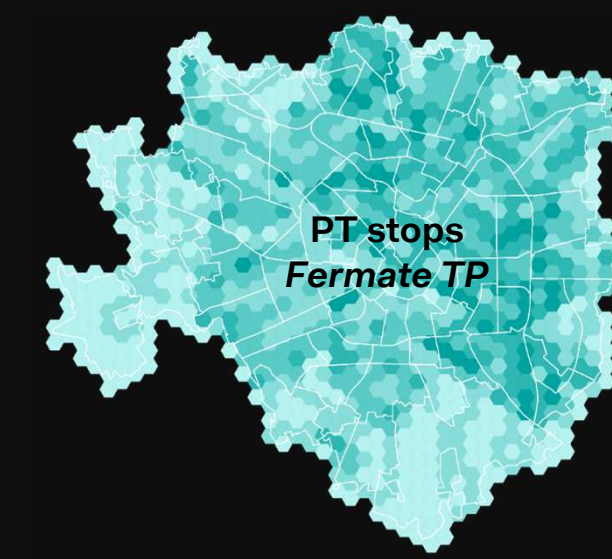
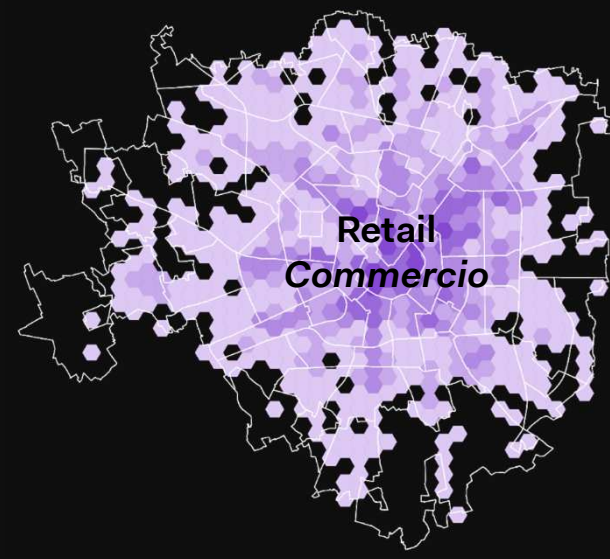
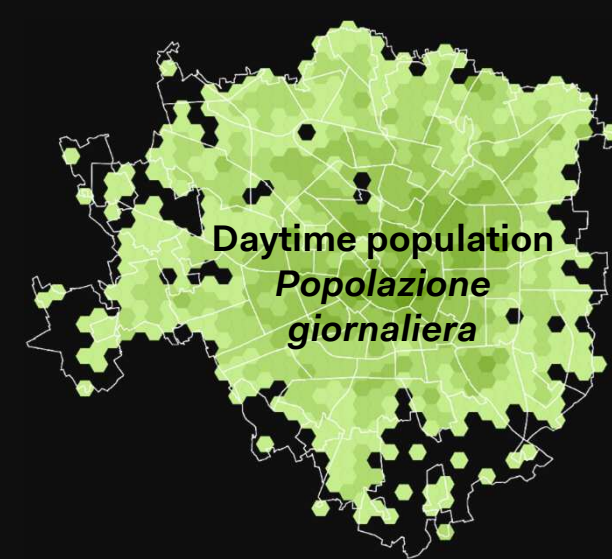
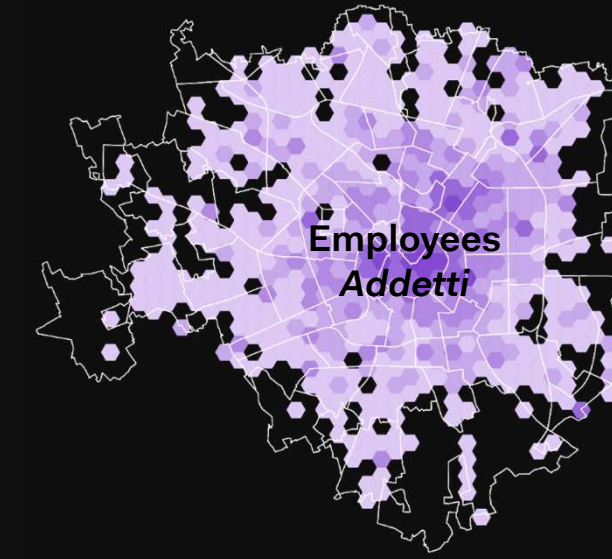
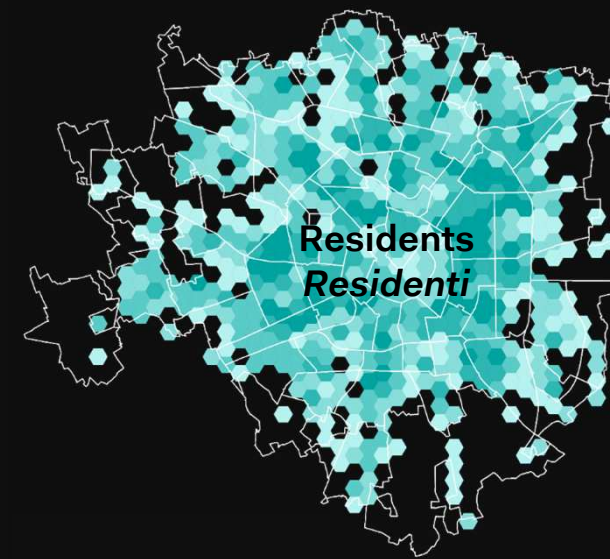
The factors considered to determine the risk level of a specific area are undoubtedly multi-faceted. The methodology proposed in this study is intentionally simplified in order to more clearly identify the groups of users to whom we ought to focus our attention in a pandemic phase. More complex factors can undoubtedly be part of further developments of the methodology and are worth more in-depth studies.

Questo articolo si basa sui risultati dello studio «Milan Sidewalks Map» (disponibile al link: www.milansidewalks.com), in cui è stata mappata la larghezza di tutti i marciapiedi milanesi ed identificati quelli non idonei, perché troppo stretti, a garantire adeguato distanziamento sociale necessario a contenere l'emergenza dovuta al virus COVID-19.

In via preliminare, lo studio ha identificato che i marciapiedi che non garantiscono il corretto distanziamento sociale sono circa 1.400 Km (45% della lunghezza totale di tutti i marciapiedi di Milano), troppi per poter intervenire in maniera tempestiva.

Questo articolo propone una metodologia utile ad identificare le zone più a rischio della città, in cui gli interventi di adeguamento dell'infrastruttura pedonale sono prioritari.

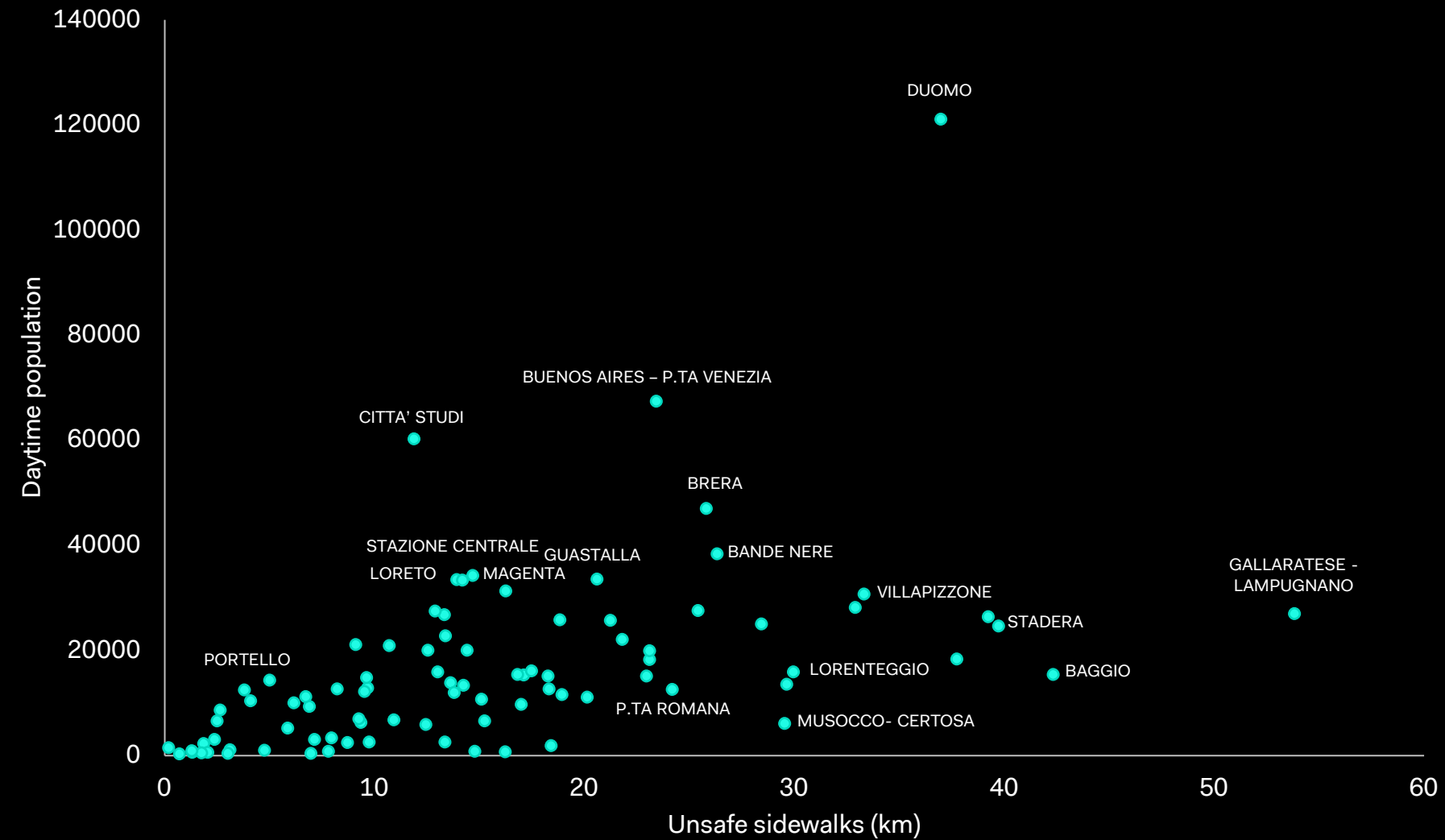
Gli elementi che contribuiscono al determinare il livello di rischio di una determinata zona sono evidentemente molteplici. La metodologia proposta in questo studio è volutamente semplificata, al fine di identificare con maggior chiarezza i gruppi di utenti a cui rivolgiamo la nostra attenzione in una fase pandemica. Ulteriori elementi di complessità possono senza dubbio entrare a far parte della metodologia a vale di più approfonditi studi.



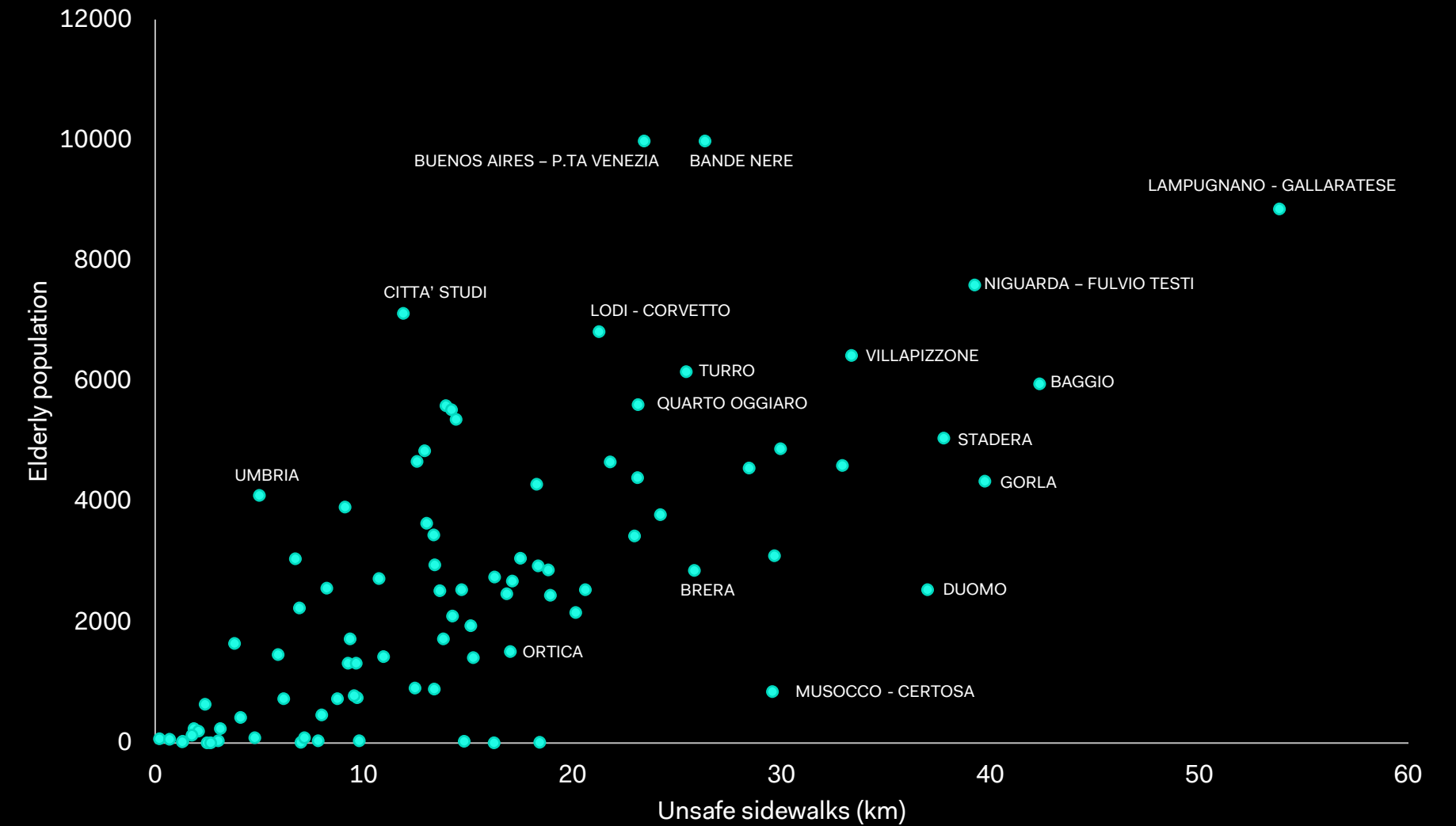
Identification of key districts

Identificazione dei quartieri chiave

Narrow sidewalks / Daytime population
 Marciapiedi non idonei/ Popolazione giornaliera



Narrow sidewalks / Elderly population
 Marciapiedi non idonei/ Popolazione anziana



Daytime population - TOP 10 NIL	Daytime	Sidewalks < 2.4m (Km)
DUOMO	121,133	36,9
BUENOS AIRES - PORTA VENEZIA - PORTA MONFORTE	67,457	23,4
CITTA' STUDI	60,253	11,8
BRERA	46,992	25,8
BANDE NERE	38,347	26,3
STAZIONE CENTRALE - PONTE SEVESO	34,240	14,6
GUASTALLA	33,594	20,6
LORETO - CASORETTO - NOLO	33,463	13,9
XXII MARZO	33,385	14,2
MAGENTA - S. VITTORE	31,312	16,2

Elderly population - TOP 10 NIL	Elderly	Sidewalks < 2.4m (Km)
BANDE NERE	9,989	26,3
BUENOS AIRES - PORTA VENEZIA - PORTA MONFORTE	9,985	23,4
Q.RE GALLARATESE - Q.RE SAN LEONARDO - LAMPUGNANO	8,860	53,8
NIGUARDA - CA' GRANDA - PRATO CENTENARO - Q.RE FULVIO TESTI	7,593	39,2
CITTA' STUDI	7,124	11,8
LODI - CORVETTO	6,820	21,2
VILLAPIZZONE - CAGNOLA - BOLDINASCO	6,431	33,3
PADOVA - TURRO - CRESCENZAGO	6,158	25,4
BAGGIO - Q.RE DEGLI OLMI - Q.RE VALSESIA	5,959	42,3
QUARTO OGGIARO - VIALBA - MUSOCCO	5,609	23,1

Priority of intervention

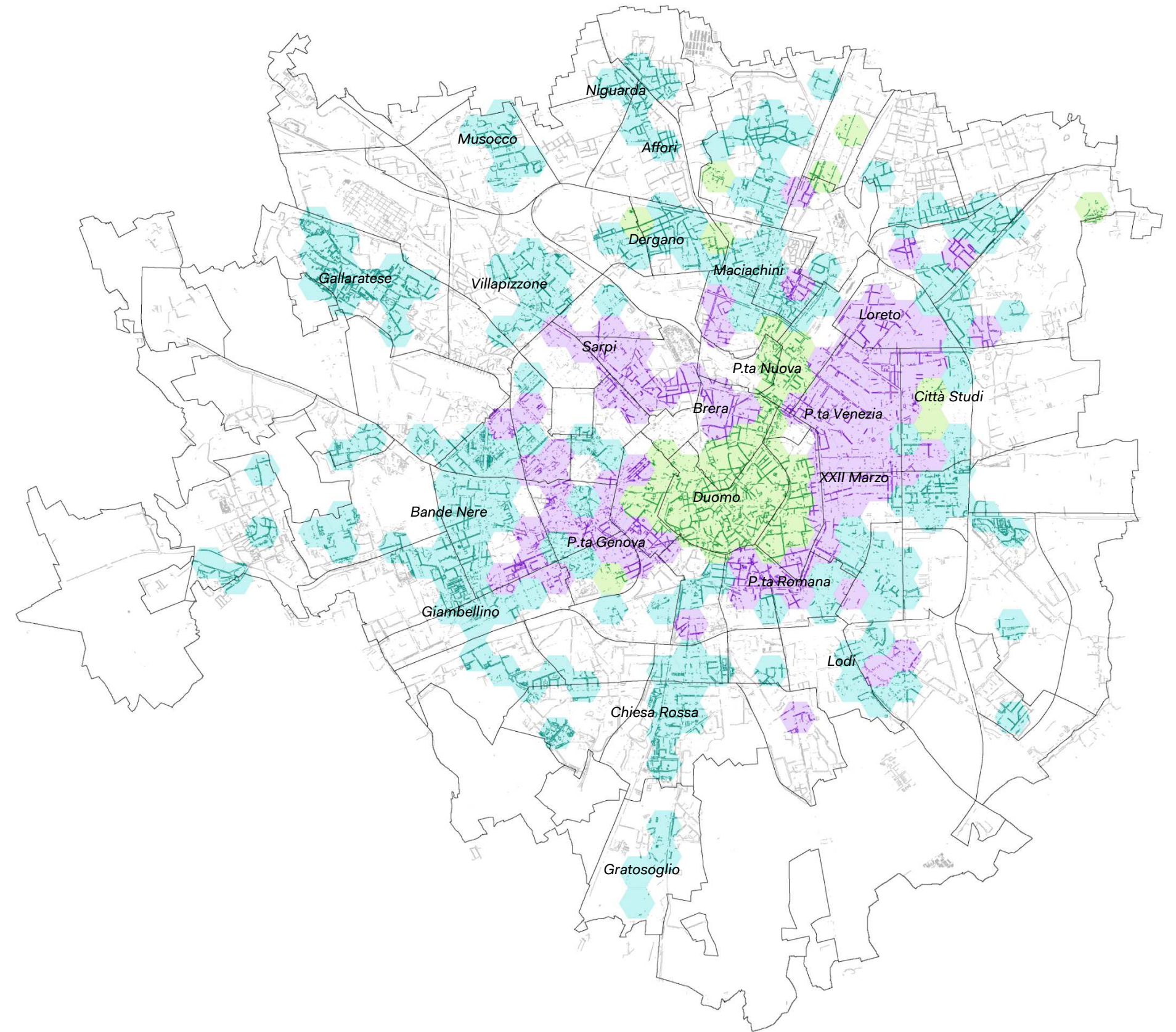
Priorità di intervento

By overlapping very dense areas (in terms of both active population and the elderly), a map of the intervention priorities was obtained for those pavements classified as unsuitable (with a width of less than 2.4 meters). Three priority levels are thereby identified:

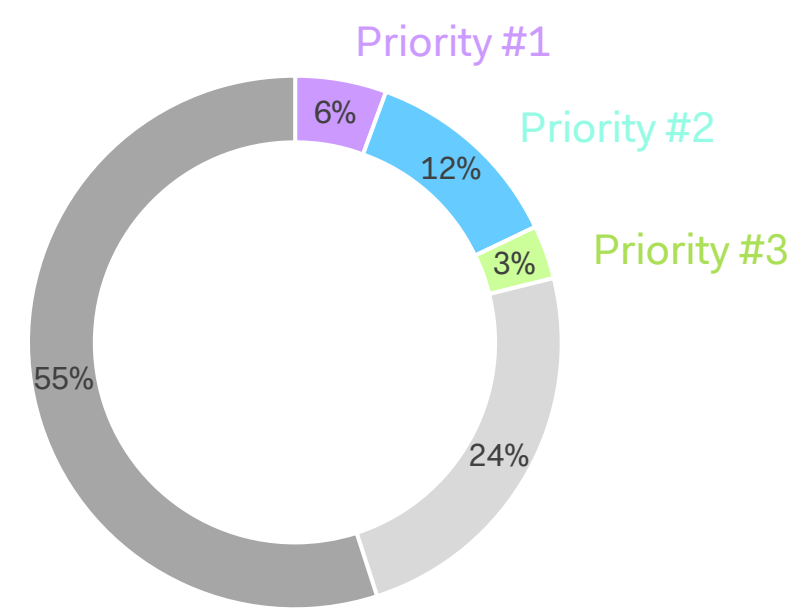
- Priority 1:** pavements located in very dense areas where there is a high number of both the elderly and daily populations. Among these areas, the districts between the first and second ring roads stand out, such as Loreto, Porta Venezia, XXII Marzo, Porta Romana, Porta Genova, Sarpi.
- Priority 2:** sidewalks in areas where there is a high density of older populations than the city average. These include some historic and mainly residential neighborhoods such as: Gallaratese, Villapizzone, Musocco, Niguarda / Affori, Maciachini, Lodi, Gratosoglio, Chiesa Rossa, Giambellino and Bande Nere.
- Priority 3:** sidewalks in areas where there is a high presence of daily populations. Among these areas, areas that are particularly active during the day stand out, such as: Duomo, Città Studi and Porta Nuova.

Tramite la sovrapposizione di zone molto dense (sia di popolazione attiva che di anziani) si è ottenuta la mappa delle priorità di intervento per quei marciapiedi classificati come non idonei (con una larghezza minore di 2,4 metri). Si identificano tre livelli di priorità:

- Priorità 1:** marciapiedi localizzati in aree molto dense in cui c'è un alto numero sia di popolazione anziana che di popolazione giornaliera. Tra queste zone emergono i quartieri tra la prima e la seconda circonvallazione come Loreto, Porta Venezia, XXII Marzo, Porta Romana, Porta Genova, Sarpi.
- Priorità 2:** marciapiedi in zone in cui c'è un'alta densità di popolazione più anziana della media. Tra questi emergono alcuni quartieri storici e quelli prevalentemente residenziali come: Gallaratese, Villapizzone, Musocco, Niguarda/Affori, Maciachini, Lodi, Gratosoglio, Chiesa Rossa, Giambellino e Bande Nere.
- Priorità 3:** marciapiedi in aree in cui c'è un'alta presenza di popolazione giornaliera. Tra queste zone spiccano le aree particolarmente attive durante il giorno come: Duomo, Città Studi e Porta Nuova.



Narrow sidewalks with Priority 1 (elderly and dense) Marciapiedi stretti con priorità 1 (zone anziane e dense)	169 km
Narrow sidewalks with Priority 2 (elderly areas) Marciapiedi stretti con priorità 2 (zone anziane)	376 km
Narrow sidewalks with Priority 3 (dense areas) Marciapiedi stretti con priorità 3 (zone dense)	100 km
Narrow sidewalks with no Priority Marciapiedi stretti - no priorità	729 km
Remaining sidewalks Marciapiedi restanti	1679 km
Total sidewalks Totale marciapiedi	3053 km



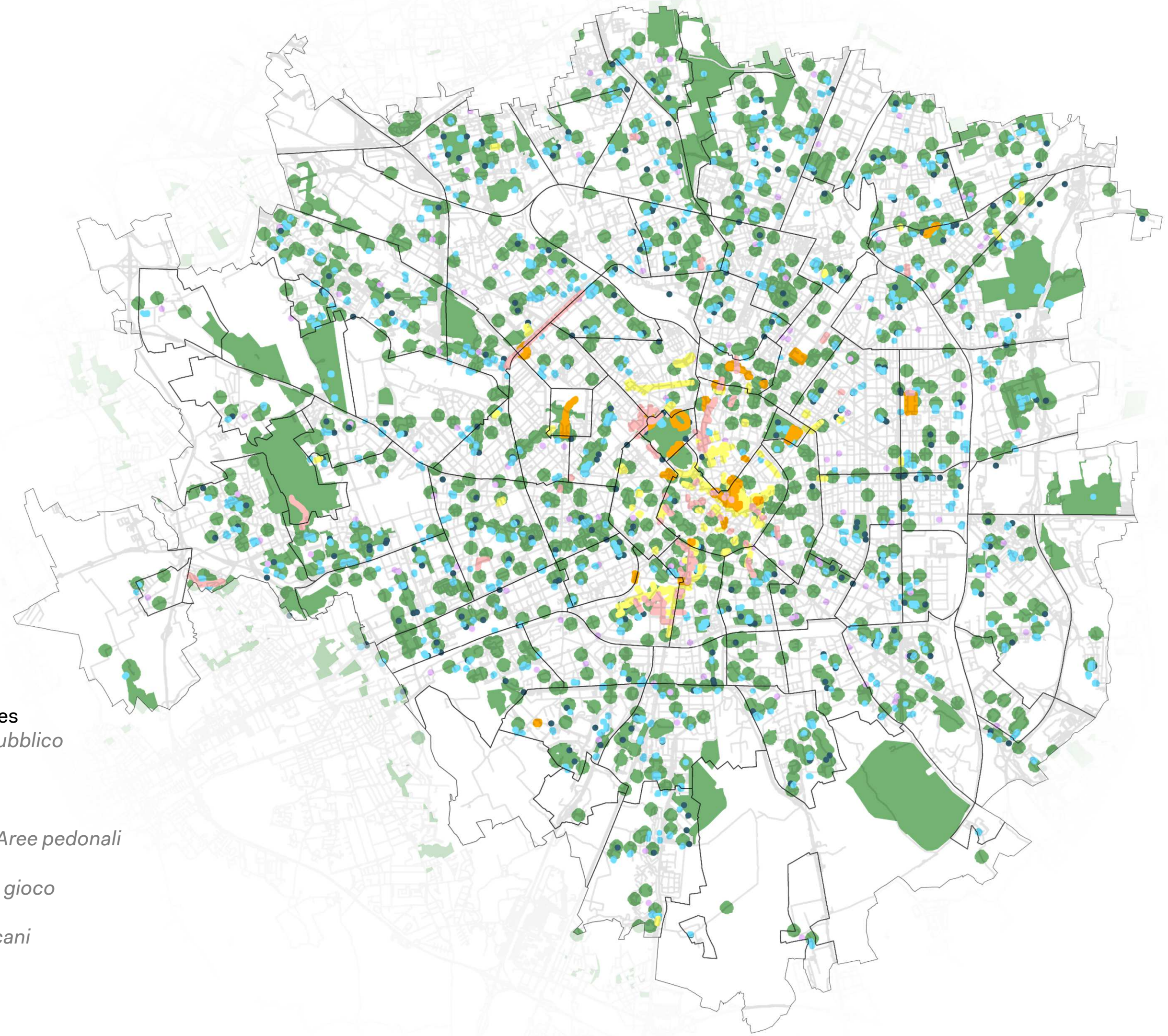
4. Milano | Access to green areas and public realm

Public realm categories

Categorie di spazi pubblici

The study originates from a comprehensive survey of Milan's public space. Data collected from official sources and platforms are integrated with ad-hoc researches to create an atlas of the main categories of public spaces such as parks, gardens, dog areas, oratories, plazas and pedestrian areas.

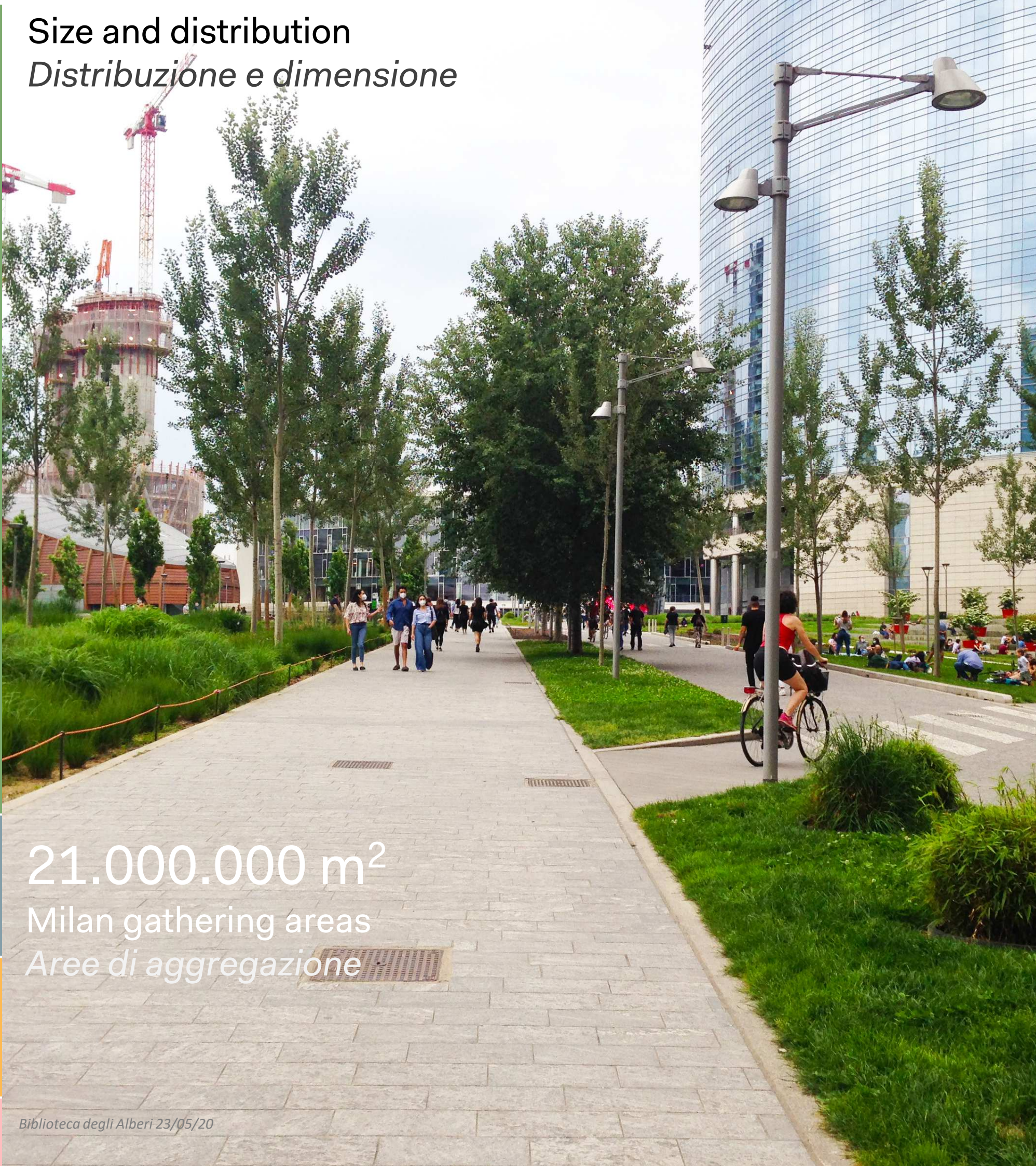
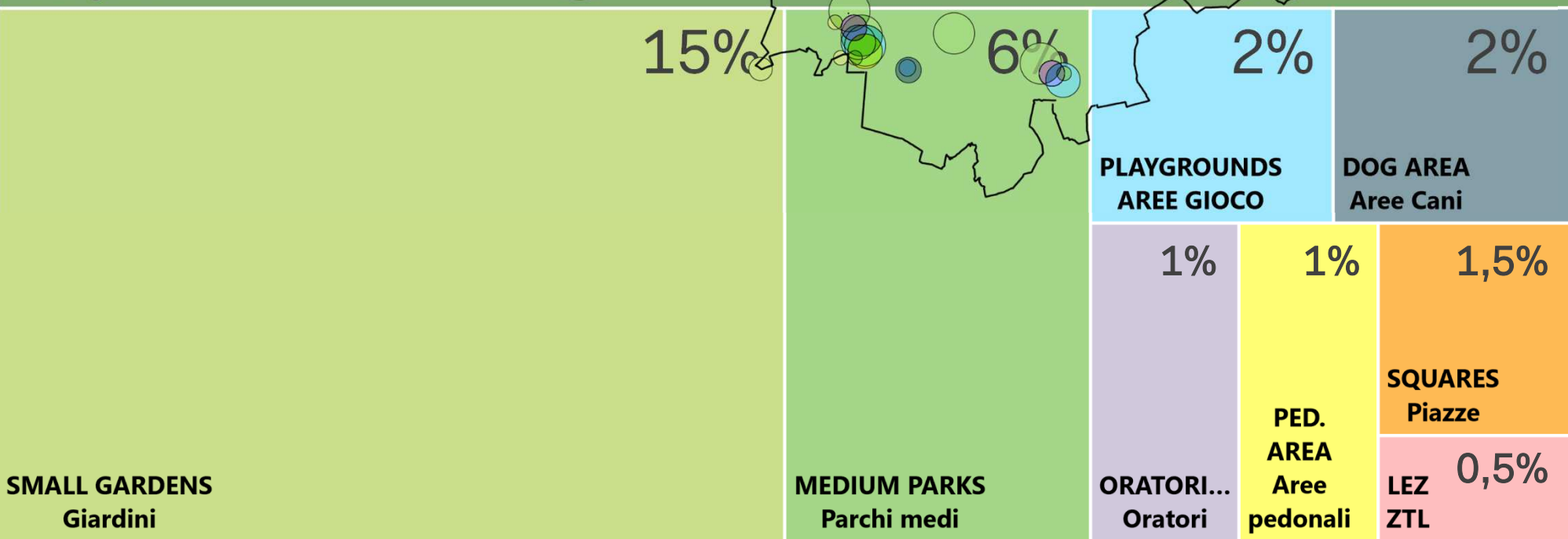
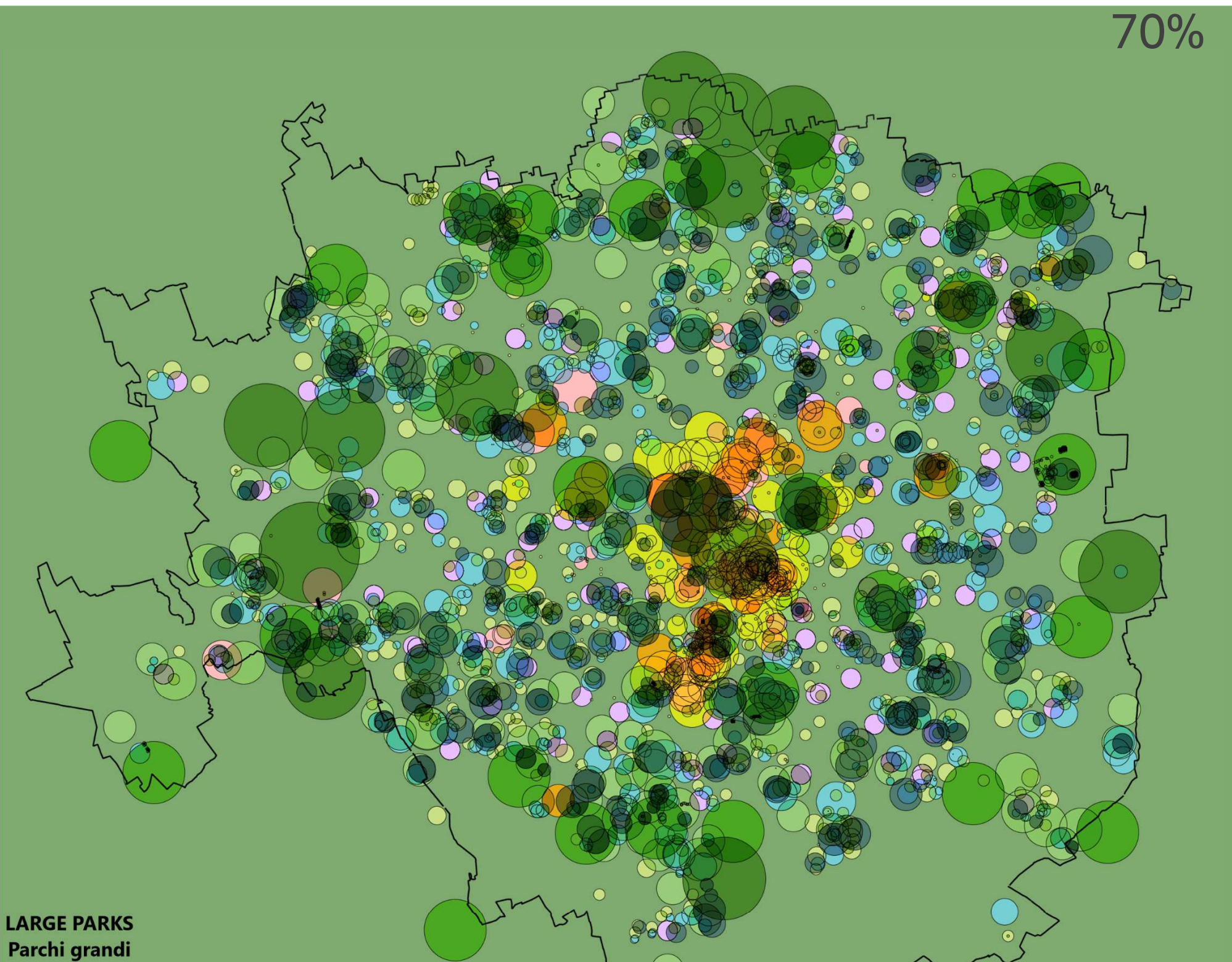
La ricerca qui presentata si basa su un accurato censimento degli spazi pubblici della città di Milano. I dati ufficiali disponibili sono stati integrati con specifici approfondimenti che hanno permesso di ottenere un atlante delle diverse tipologie di spazio pubblico, come parchi, giardini, aree gioco, aree cani, oratori, piazze ed aree a componente pedonale privilegiata.



Public realm categories

Categorie di spazio pubblico

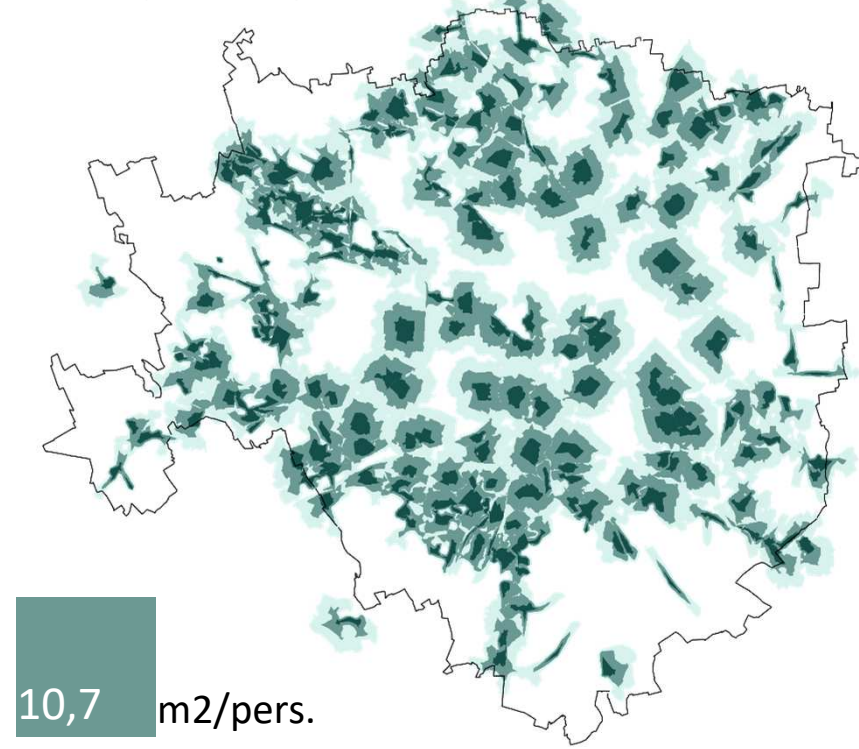
- Parks / *Parchi*
- Plazas / *Piazze*
- Pedestrian areas / *Aree pedonali*
- LEZ / *ZTL*
- Playgrounds / *Aree gioco*
- Oratories / *Oratori*
- Dogs areas / *Aree cani*



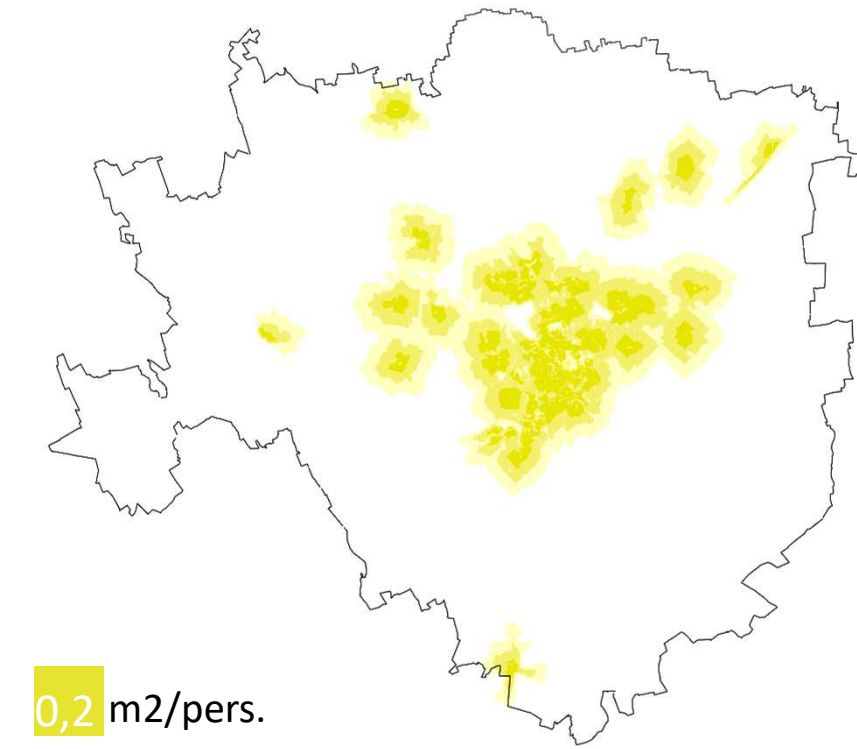
15-minute accessibility per category

Accessibilità in 15 minuti per categoria

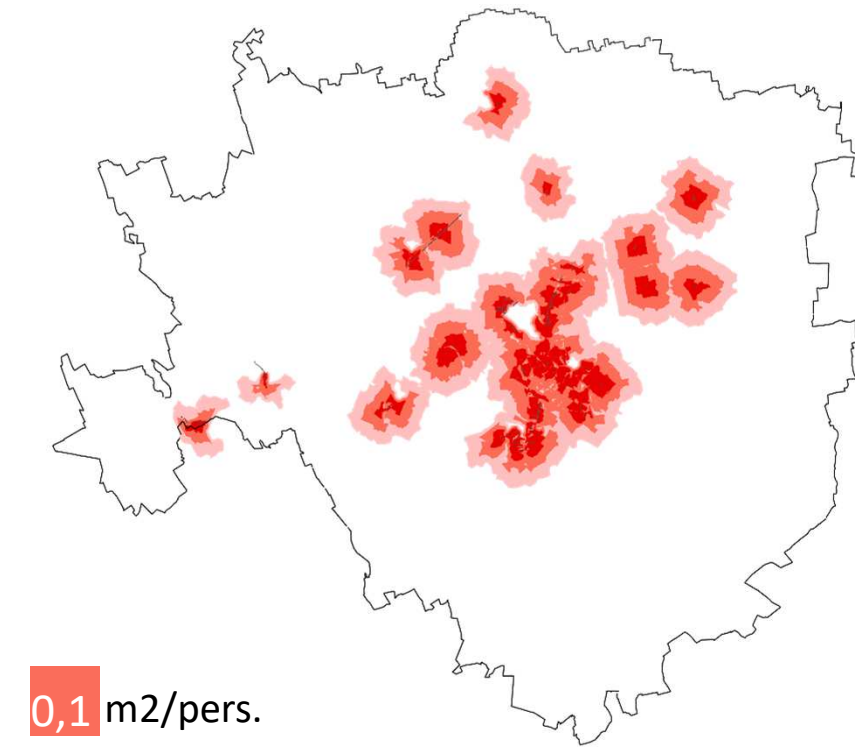
Large public parks (> 12.000 m²)
Parchi pubblici grandi (> 12.000 m²)



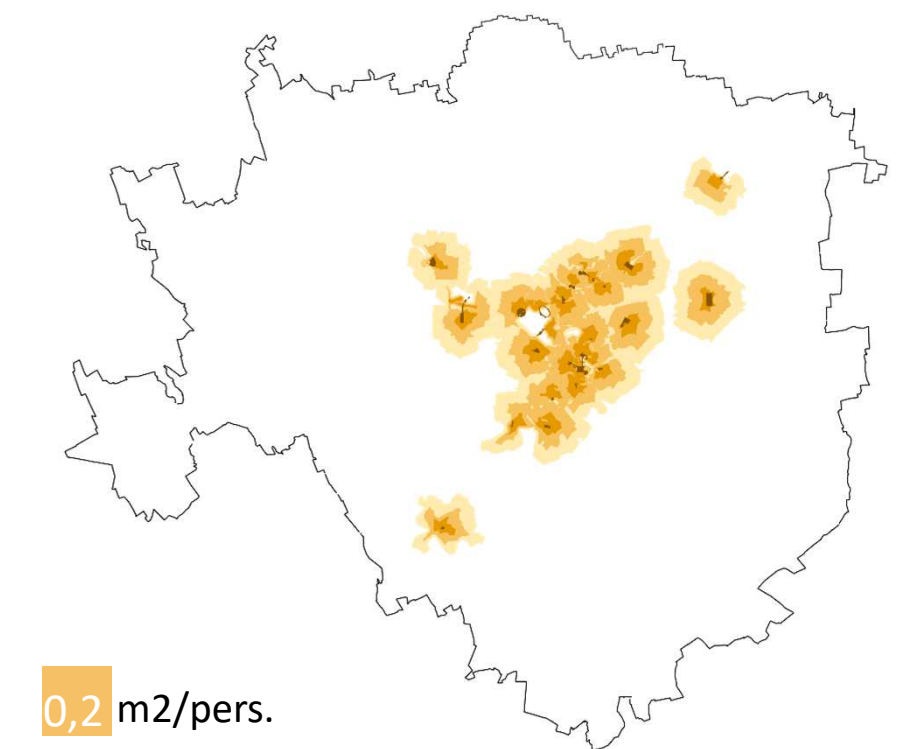
Pedestrian areas
Aree pedonali



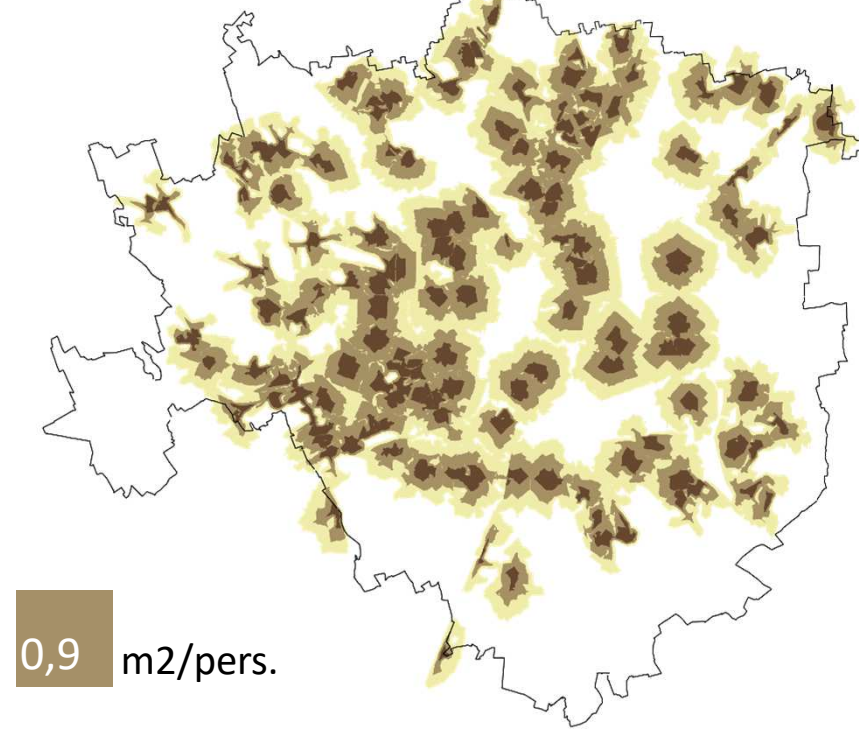
LEZ
ZTL



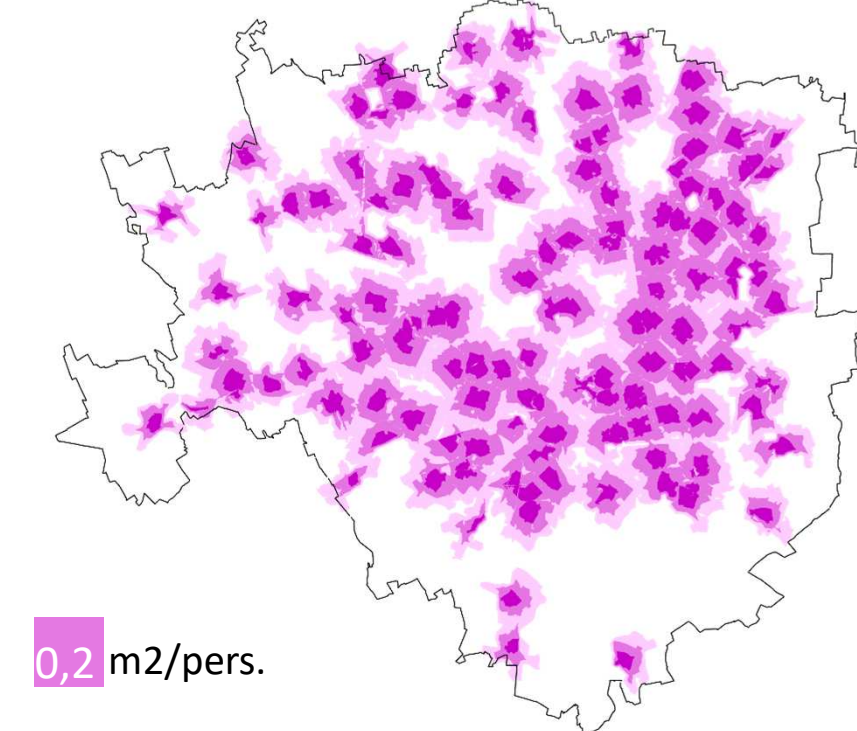
Main squares
Piazze principali



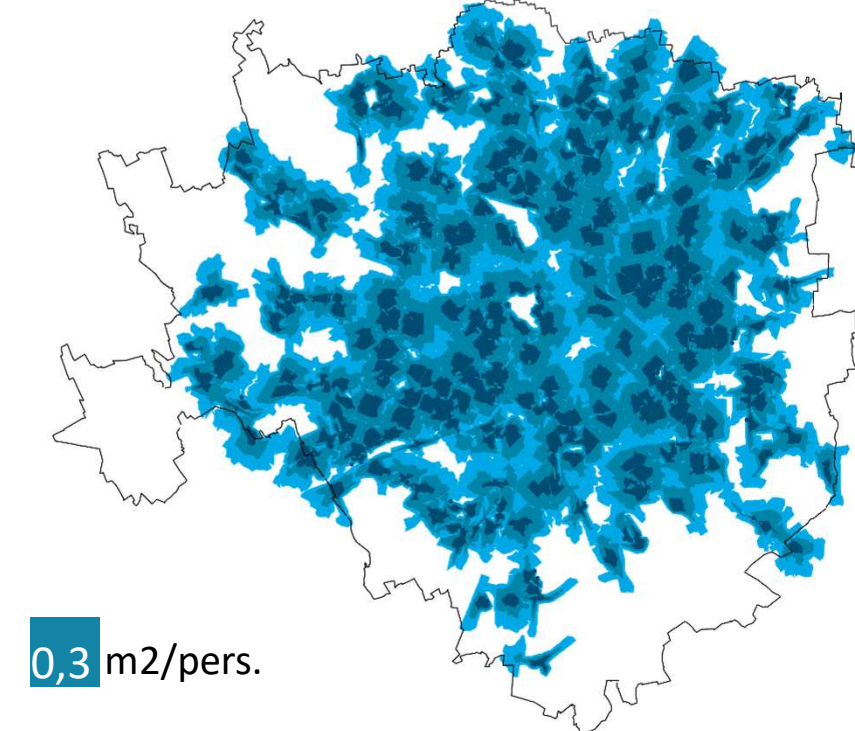
Medium public parks (6.000- 12.000 m²)
Parchi pubblici medi (6.000-12.000 m²)



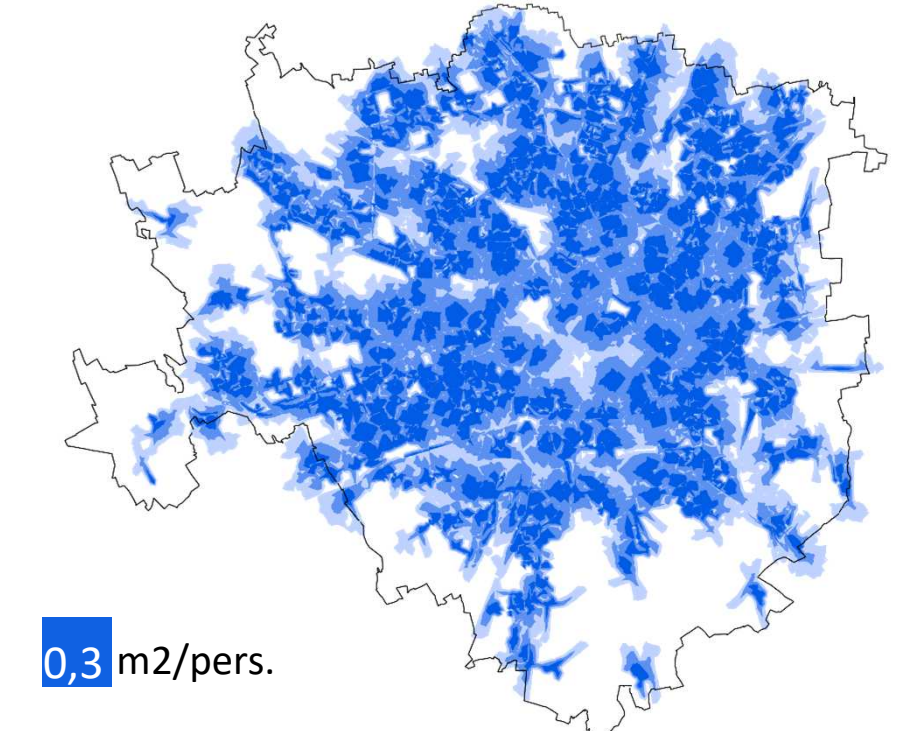
Oratories
Oratori



Dog areas
Aree cani



Playgrounds
Aree gioco



Gathering areas reachable in 15 minutes per inhabitant

Dotazione di aree ricreative in 15 minuti per abitante

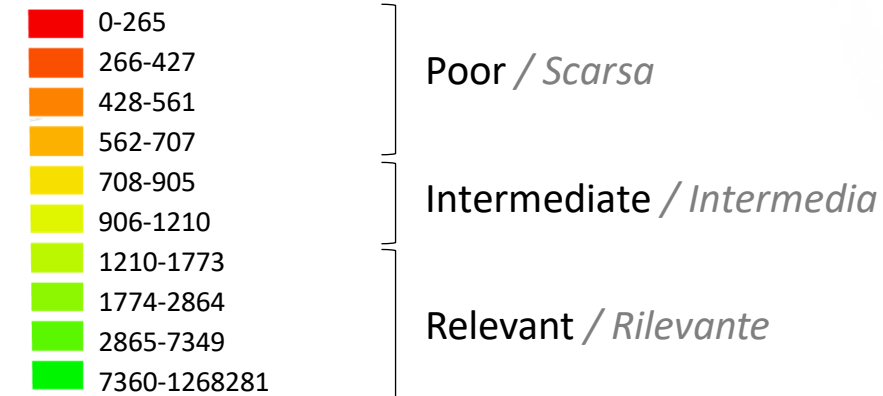
The map shows the detailed processing of the results obtained through the isochronal analysis. The analytical process starts with the public space provision within 15 minutes from each census cell. Then, information about the residing population is analyzed. The methodology allows us to obtain a synthesized reading of the municipal area that compares the population density with the availability of recreational areas within 15 minutes from each census cell. The chromatic scale identifies the total amount of recreational areas available to each resident within 15 minutes. As shown on the map, more critical zones are located in proximity to the external ring-road, with episodic extensions along the north-east, south-east and west axial roads.

La mappa rappresenta l'elaborazione dettagliata dei risultati ottenuti grazie alle analisi di accessibilità. In primo luogo si è ottenuta la dotazione di aree ricreative a 15 minuti da ogni cella censuaria, in seguito si è proceduto ad analizzare la popolazione residente in ogni cella. La metodologia adottata permette di ottenere una lettura di sintesi del territorio comunale che associa la densità abitativa con la disponibilità di aree ricreative entro i 15 minuti da ogni cella censuaria.

La scala cromatica individua la quantità complessiva di aree ricreative a disposizione di ogni residente entro i 15 minuti dalla propria abitazione. Come mostrato nella mappa, le situazioni meno favorevoli si riscontrano a cavallo della cerchia filoviaria, con episodiche estensioni lungo le direttrici di collegamento nord-est, sud-est ed ovest.

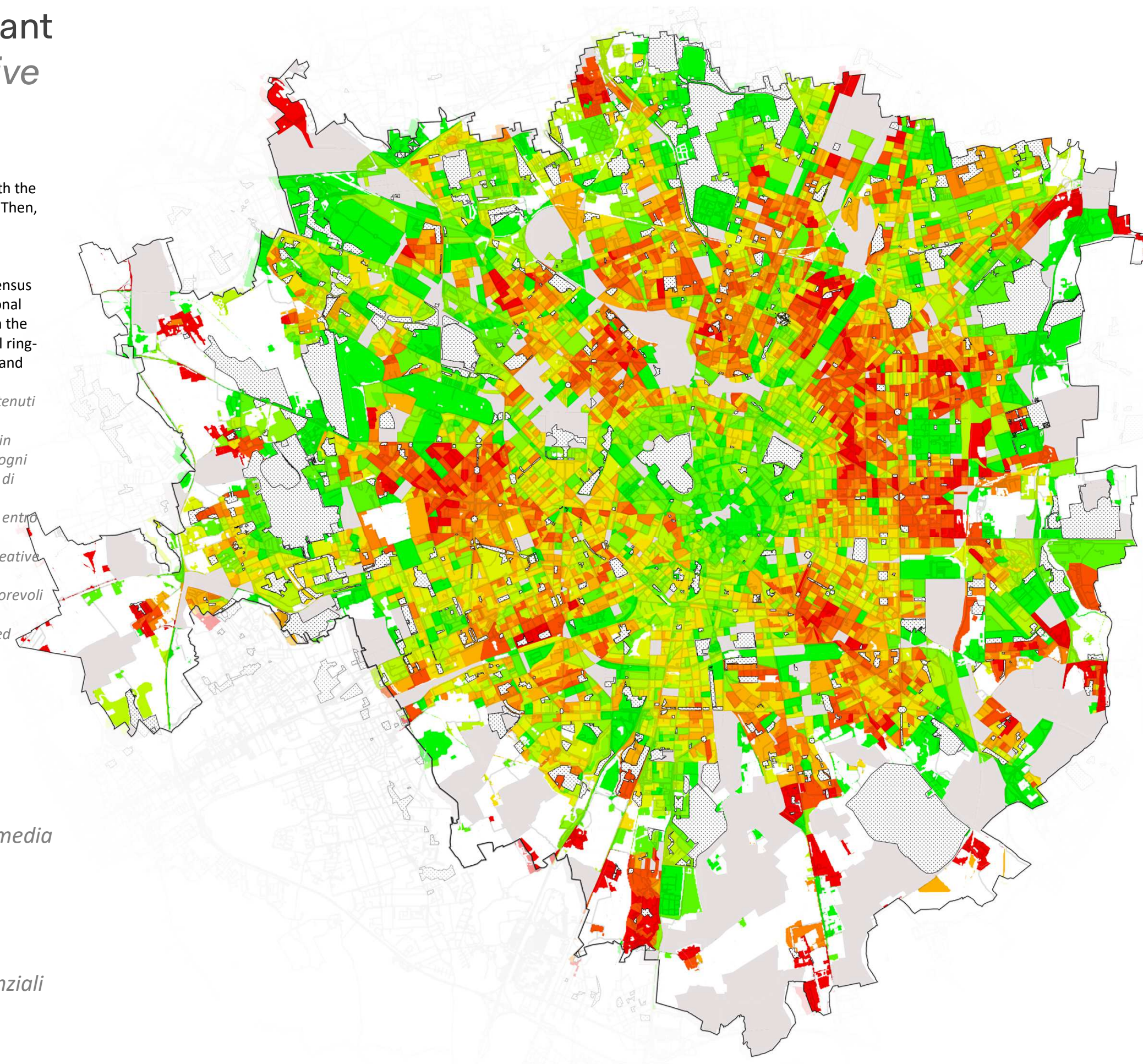
Gathering area provision (m²)

Dotazione di aree ricreative (m²)



Non residential areas / Aree non residenziali

Gathering areas / Aree ricreative



653,000

Inhabitants of scarcely served areas

Abitanti in aree scarsamente servite

293,000

Inhabitants of medium served areas

Abitanti in aree mediamente servite

294,000

Inhabitants of highly served areas

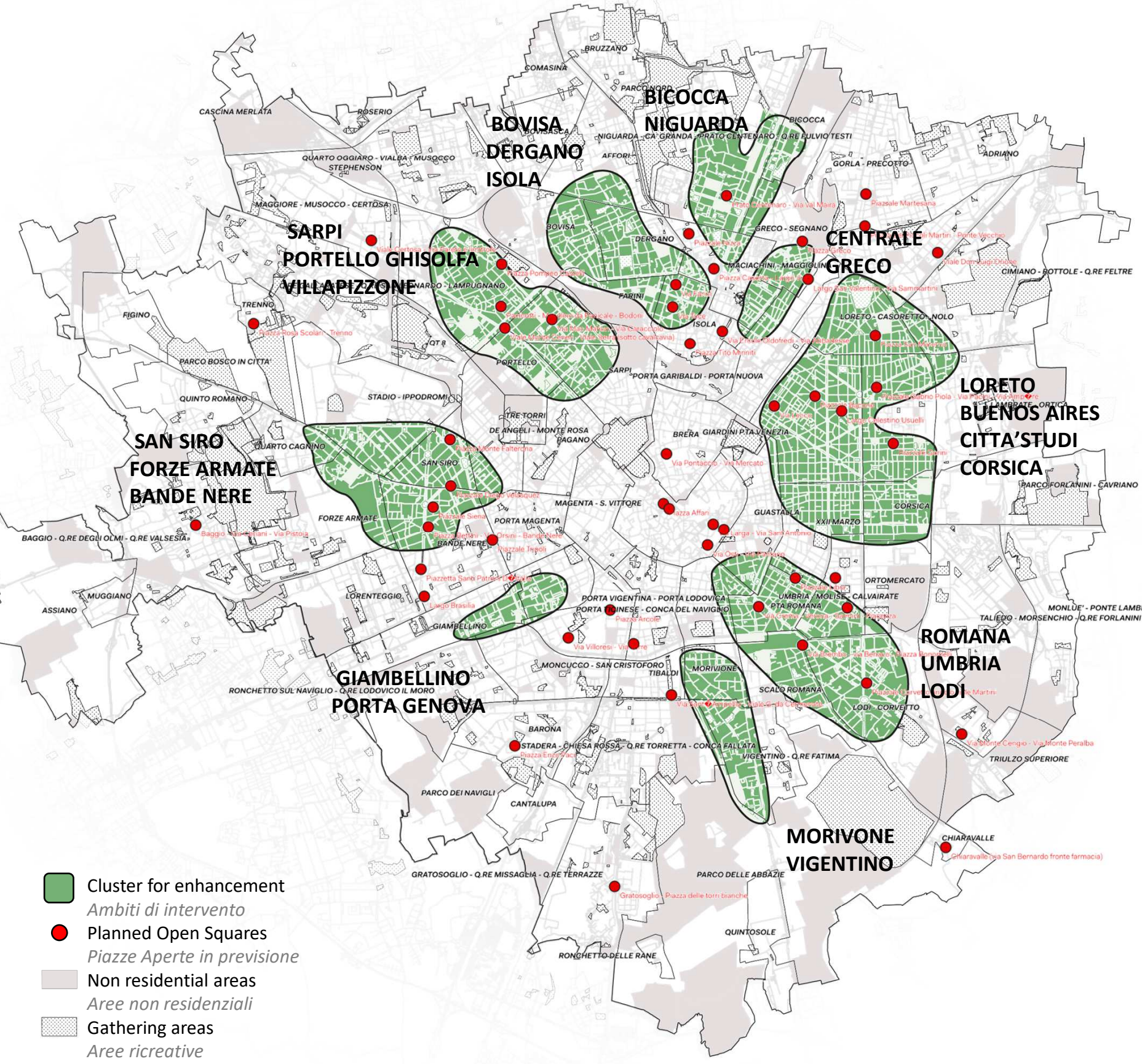
Abitanti in aree altamente servite

Main clusters for enhancement

Principali ambiti di potenziamento

The analytical process leads to the identification of some urban areas with less widespread and less extensive availability of public spaces in relation to the residing population. The map groups these areas into 8 main zones affecting 25 Milanese neighborhoods. For each of them an increase in public areas is suggested based on the intermediate urban provision, as outlined in the paragraph "Gathering area reachable in 15 minutes per inhabitant". The increase reflects the possibility of citizens to have a total amount of 1,000 m² of public space within 15 minutes from their residence. This value would bring the areas concerned closer to the public space provision level currently present in the southern area of the city (Porta Lodovica, Porta Ticinese, Porta Vigentina).

Le analisi condotte hanno permesso di individuare alcuni ambiti urbani con una dotazione meno capillare e meno ampia di aree verdi in rapporto alla popolazione insediata. La mappa a lato raggruppa tali aree in 8 ambiti principali che interessano 25 quartieri milanesi. Per ognuno di essi si suggerisce un incremento di aree pubbliche basato sulla dotazione intermedia presente nel territorio comunale, come risultato dall'analisi esposta nel paragrafo «Dotazione di aree ricreative in 15 minuti per abitante». L'incremento riflette la possibilità dei cittadini di disporre complessivamente di 1.000 m² di spazio pubblico entro i 15 minuti dalla propria residenza. Tale valore avvicinerrebbe le aree interessate ad una dotazione di spazi pubblici simile a quella attualmente esistente in aree come Porta Lodovica, Porta Ticinese, Porta Vigentina.



- Cluster for enhancement
Ambiti di intervento
- Planned Open Squares
Piazze Aperte in previsione
- Non residential areas
Aree non residenziali
- Gathering areas
Aree ricreative

Recommended increase in public space provision
Incremento di spazi pubblici raccomandato
LORETO/BUENOS AIRES/CITTA'STUDI/ CORSICA

CENTRALE / GRECO
+138,000 m²

SAN SIRO / FORZE ARMATE / BANDE NERE
+116,000 m²

BOVISA / DERGANO / ISOLA
+90,000 m²

ROMANA / UMBRIA / LODI
+85,000 m²

MORIVONE / VIGENTINO
+75,000 m²

SARPI / PORTELLO / GHISOLFA / VILLAPIZZONE
+60,000 m²

BICOCCA / NIGUARDA
+50,000 m²

GIAMBELLINO / PORTA GENOVA
+40,000 m²



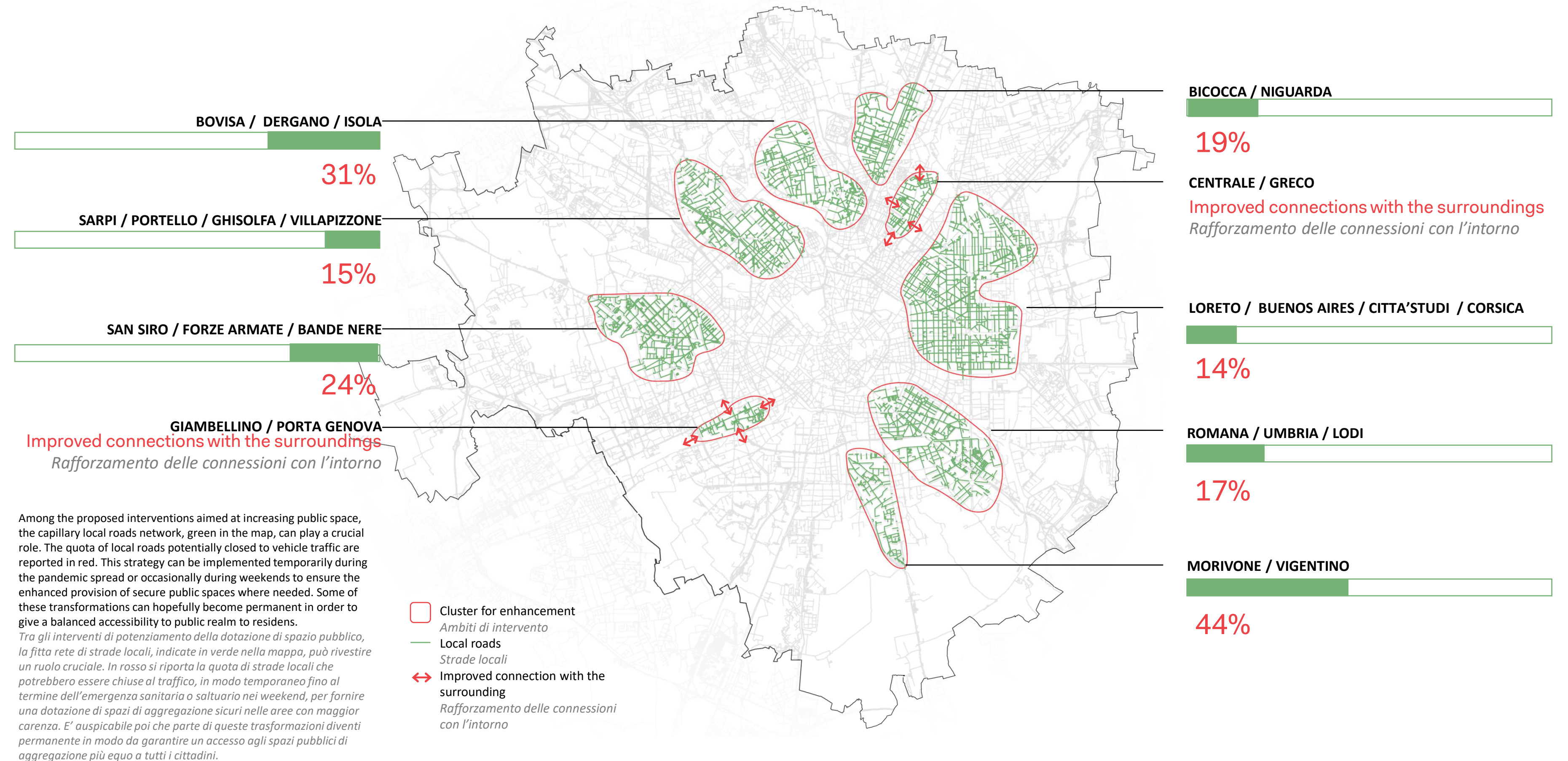
824.000 m²

Recommended increase in public space provision
Incremento di spazi pubblici raccomandato

Enhancement strategy

Strategia di potenziamento

Recommended local street opening to recreational use
Apertura di strade locali agli usi ricreativi



5. Milano | 15-Minute City

The 15-minute city concept

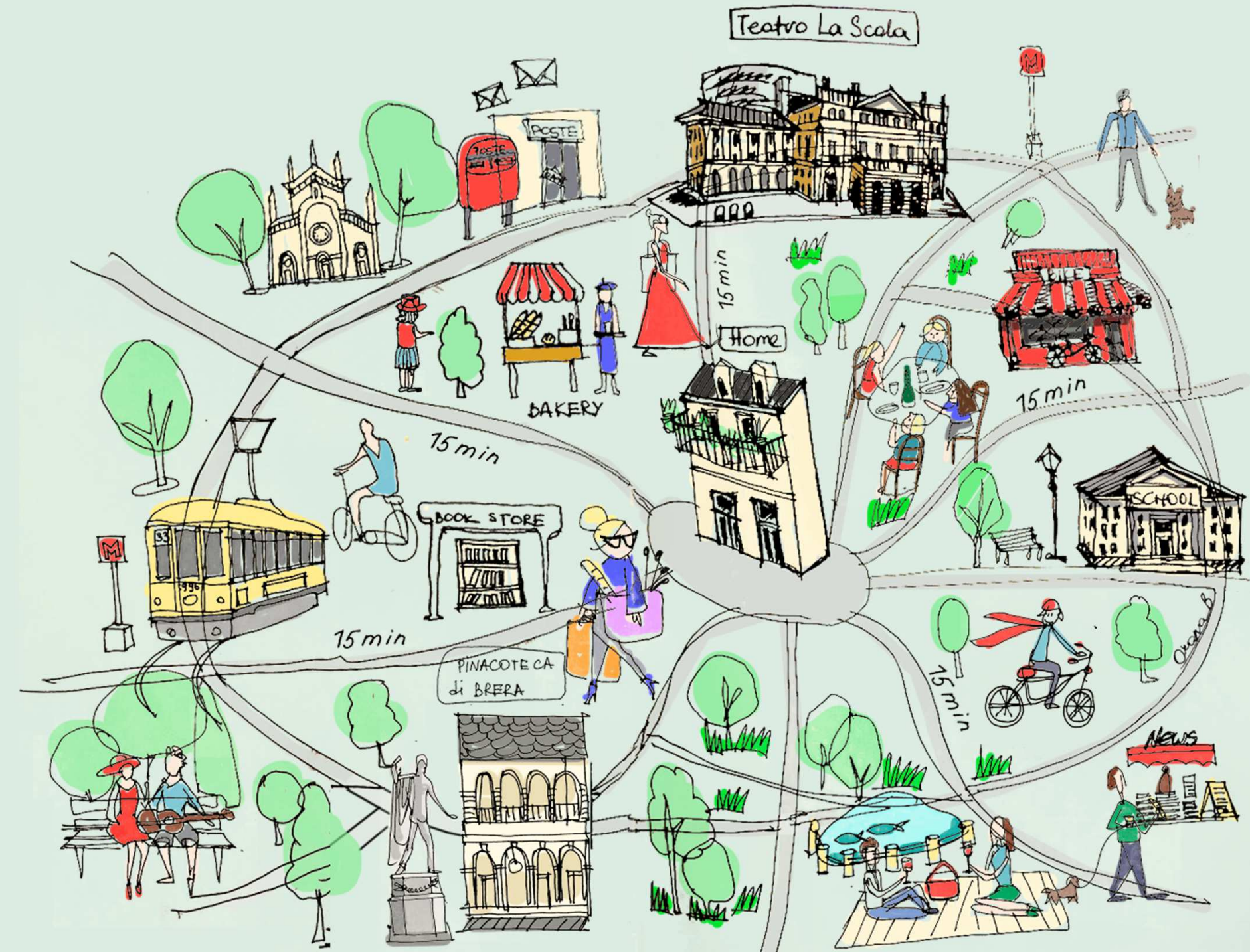
Proximity, density and diversity: Local centers to promote the neighborhood-scale living

Key Findings

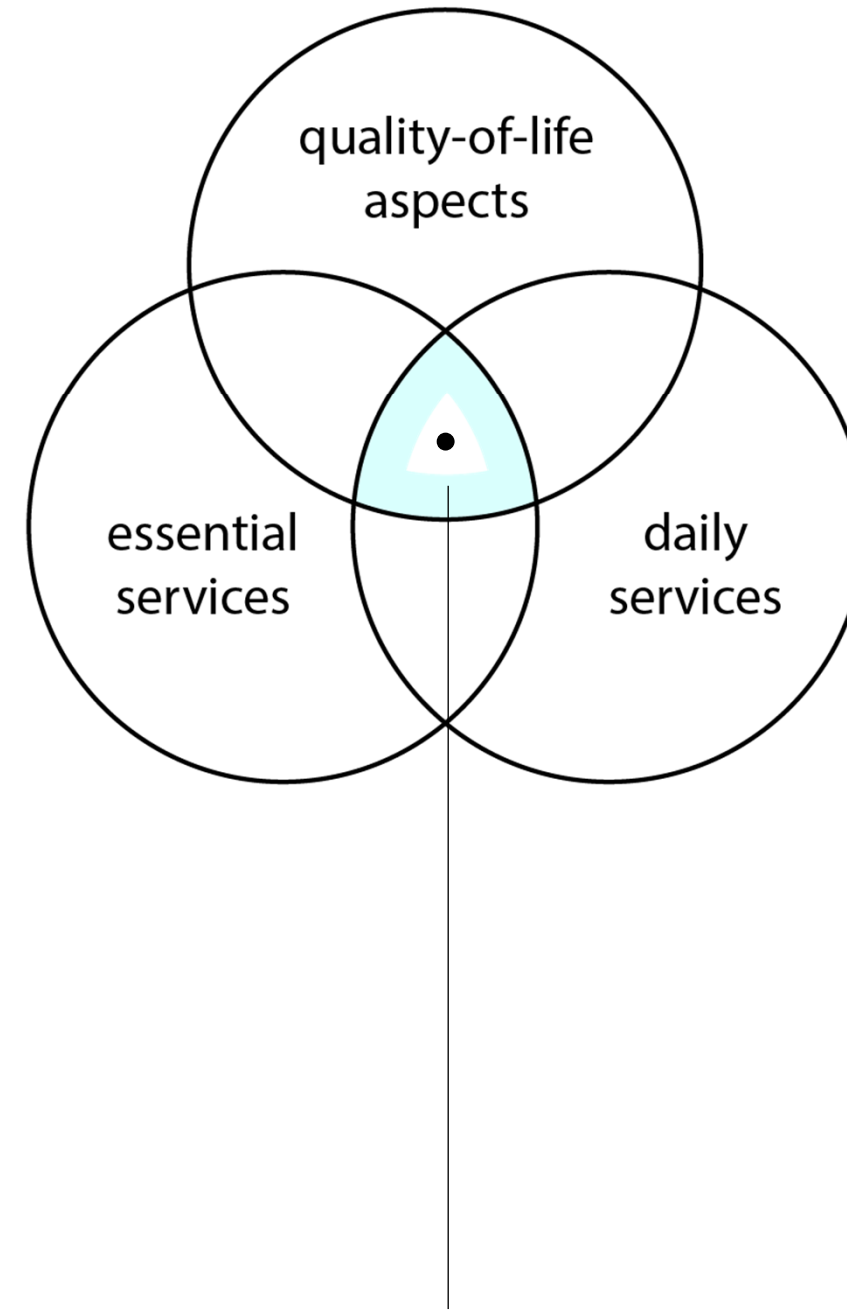
- 54% of Milan does not meet the 15-minute standard for access to daily services by foot or cycling. 27% of the population live in areas that do not abide by the 15-minute access standard.
- Residents in a fifth (21%) of the city by area can meet daily, non-work services within 15 minutes on foot.
- Accessibility follows a radial progression from the centre (most accessible areas) to peripheral areas (least accessible).
- Nutrition services (food outlets and dining options) make up about 40-45% of the service offering in all neighbourhoods across the spectrum.

Context of the Analysis

- Adoptions of '15-minute City' concept in Milan, Paris, Melbourne, Portland (also called 'complete neighbourhoods' or '20-minute neighbourhoods').
- 15-minute City concept endorsed by C40 Mayors' Agenda for Green and Just Recovery as well as Milan 2020 Adaptation Strategy.



Neighborhood essential services



Macro-categories were defined based on a mixed combination of these elements.



Supermarkets
Bars/ Restaurants



Kindergarten
Primary school
Lower Secondary school
Upper Secondary school



Parks and gardens
Cultural venues
(museums, cinema, etc.)
Retail shops



Pharmacies



Public transport stops
(all modes)



Post offices
News stands
ATM machines

The central role of walking

Walkability assessment criteria:

- **Usefulness:** land-use mix, street connectivity, numerous and diverse public services (400 m);
- **Comfort:** continuity on side-walks, ramps, public places for outdoor activities, wayfinding signages;
- **Safety:** zones 30 km/h, lightning systems in proximity of the zebra crossing, traffic signages;
- **Attractiveness:** polycentric structure, quality of the architectural streetscape, vitality of the social context.

Walkability positive outcomes:

- Environmental sustainability;
- Economic development;
- Road safety;
- Public health;
- Community resilience.

Speck, J. (2013) *Walkable city: How downtown can save America, one step at a time*. Macmillan, New York City.

Road accidents represent the eighth leading cause of death in the world population: about 1.2 million people are killed on roads every year.

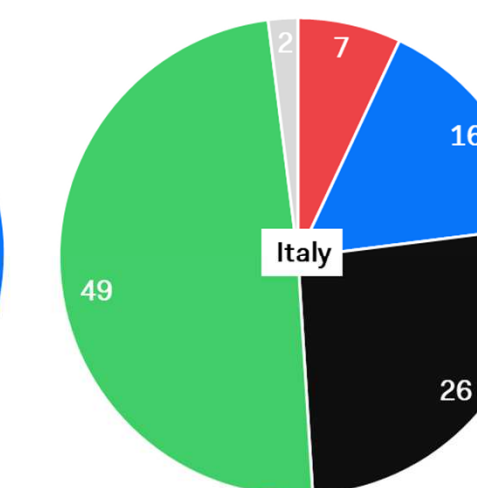
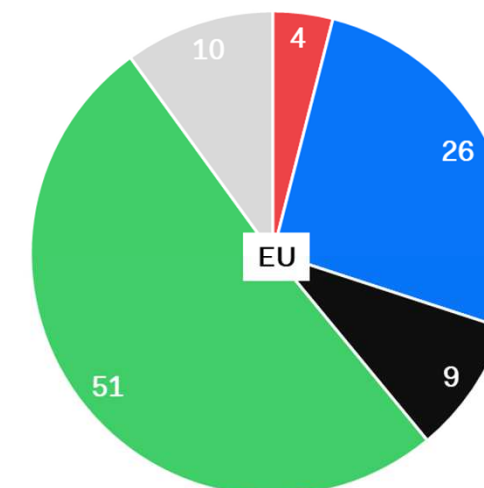
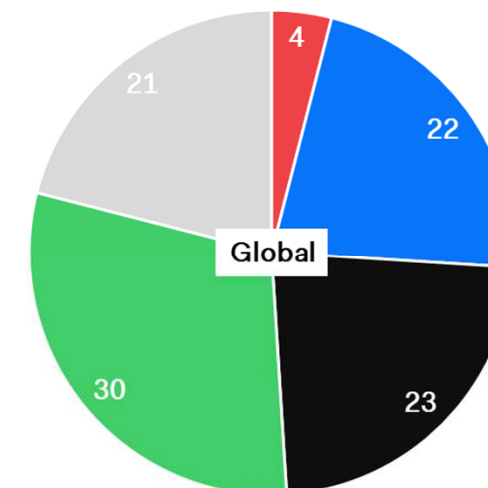
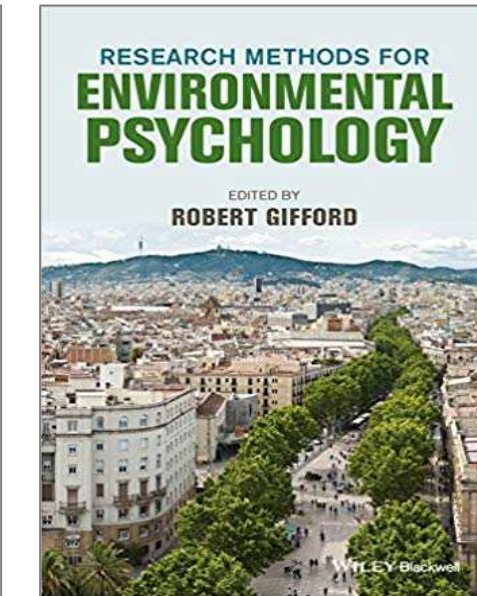
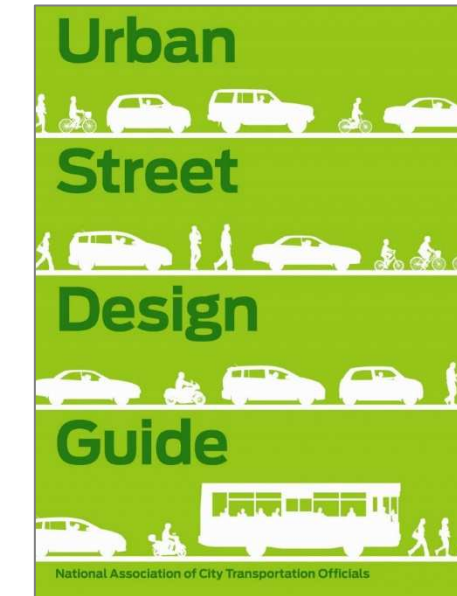
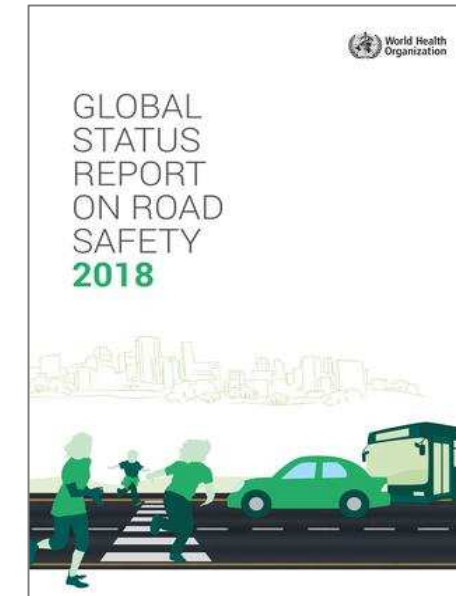
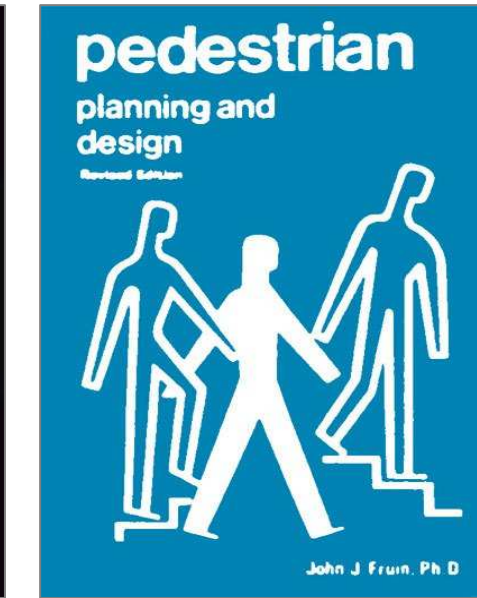
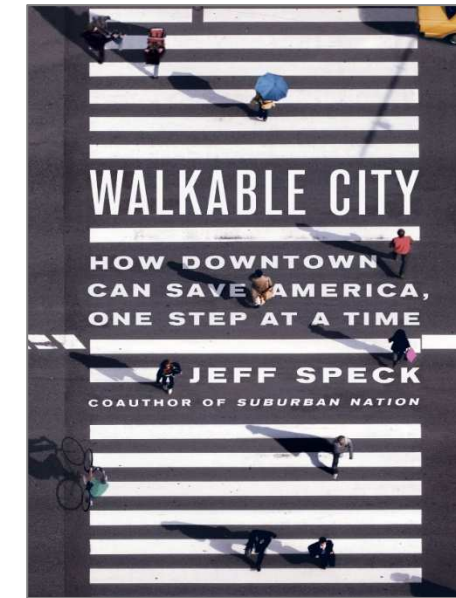
Vision Zero EU: 50% reduction in fatalities and serious injuries by 2030.

Pedestrians are some of the most vulnerable road users in urban scenarios (22% of the overall victims, in Italy -45% of fatal pedestrian accidents in the period 2001-2015).

Pedestrian-car accidents are caused by:

- Non-compliance to traffic laws;
- Lack of perceptive and attentional skills;
- Environmental factors (e.g., traffic volumes, cross-walk design, lighting);
- Individual sense of control towards hazardous situations.

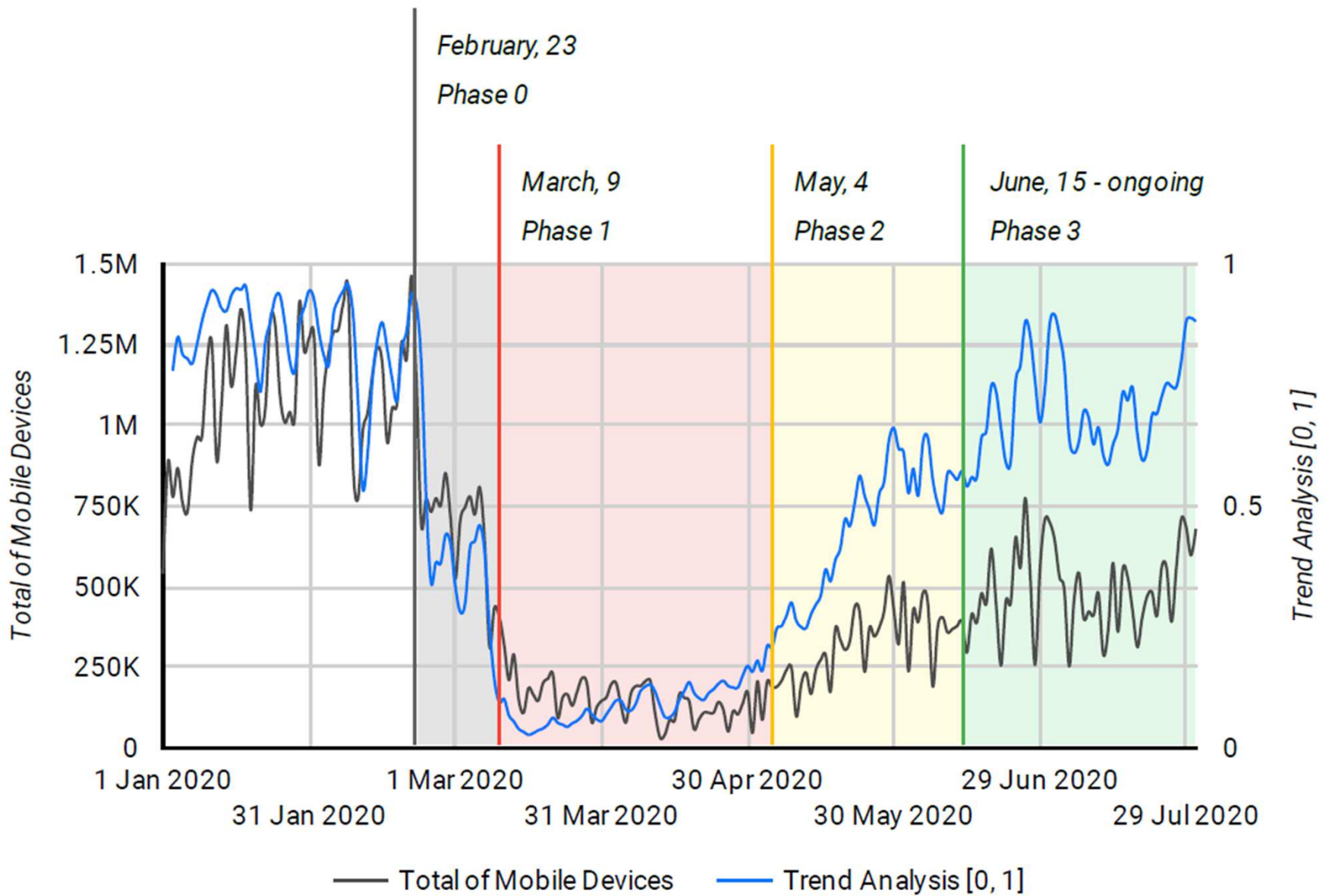
[[5] World Health Organization (2015). *Global status report on road safety 2015*. World Health Organization.



- Cyclists
- Pedestrians
- Motorized 2-3 wheelers
- Car occupants
- Other

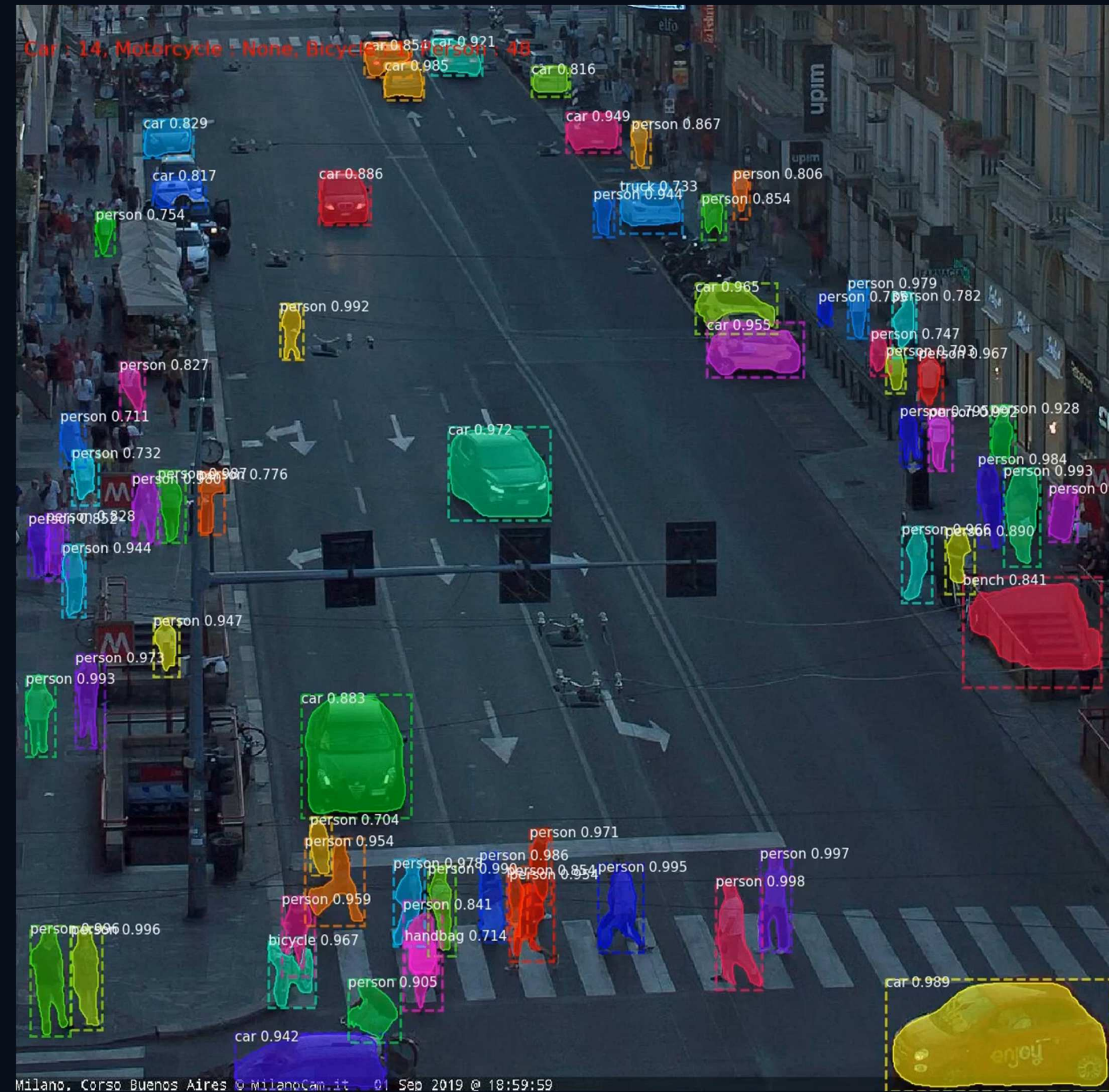
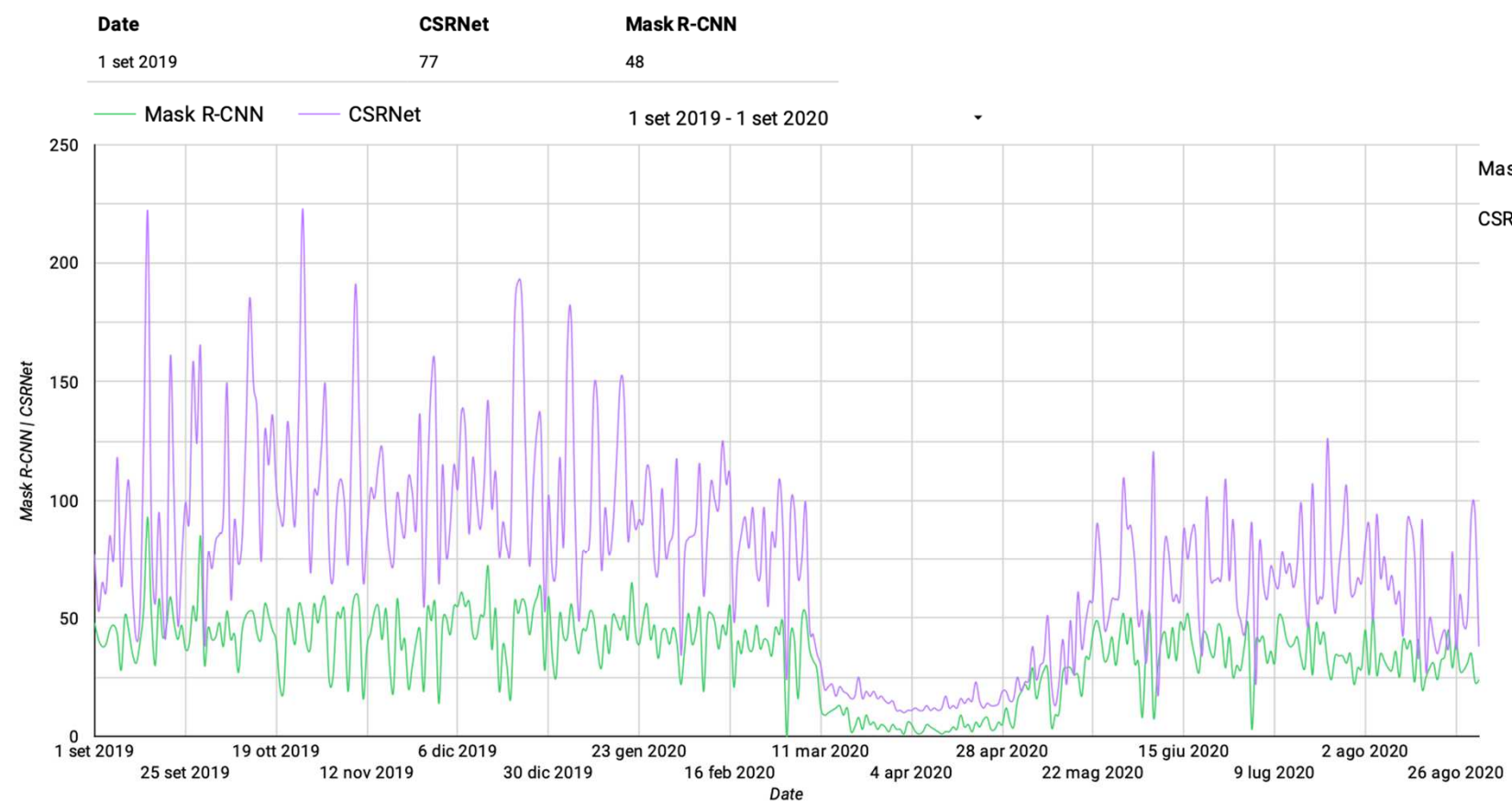
Monitoring (Big) traffic data through Wi-Fi Sensors

- The current research work is based on the analysis of the traffic data collected in Milan through a network of 57 Wi-Fi sensors from the beginning of January 2020 to the end of July 2020.
- The map presented above shows the results of a 7-months period of data collection (from January 1st, 2020, to July 31st, 2020), which consists of about 113,652,582 Million of mobile devices counted in total.



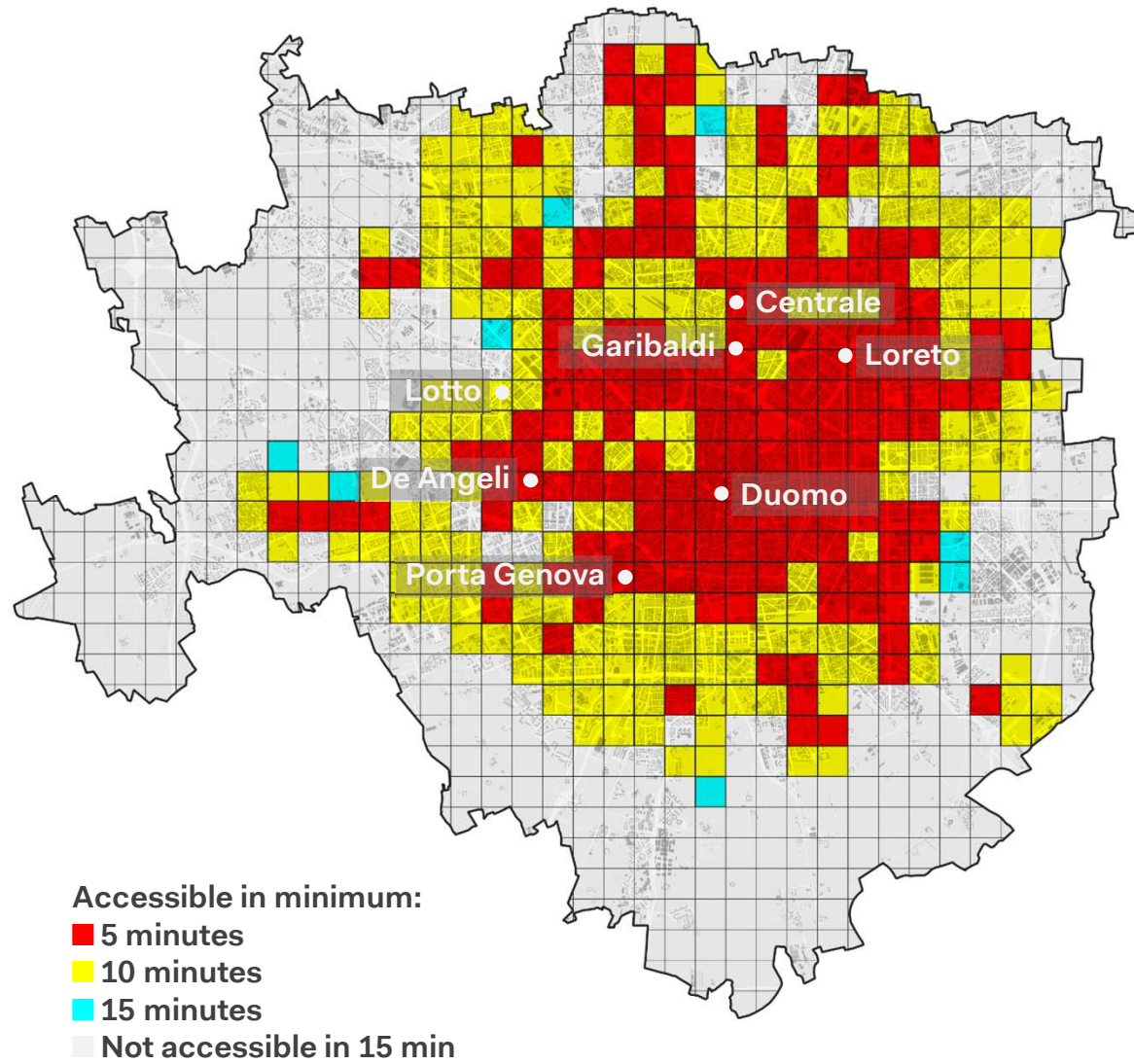
Monitoring (Big) traffic data through image/video analytics

- This project focuses on the analysis of pre-trained deep learning models for object detection, image segmentation and crowd counting.
- The initial purpose was to assess their flaws and potentials given a dataset of images of Corso Buenos Aires. The second goal was to investigate the use of the street for a year period.
- The best performing algorithms were used to perform an analysis of the use of the street from September 2019 until September 2020, with a focus on the Covid-19 pandemic lockdown period.

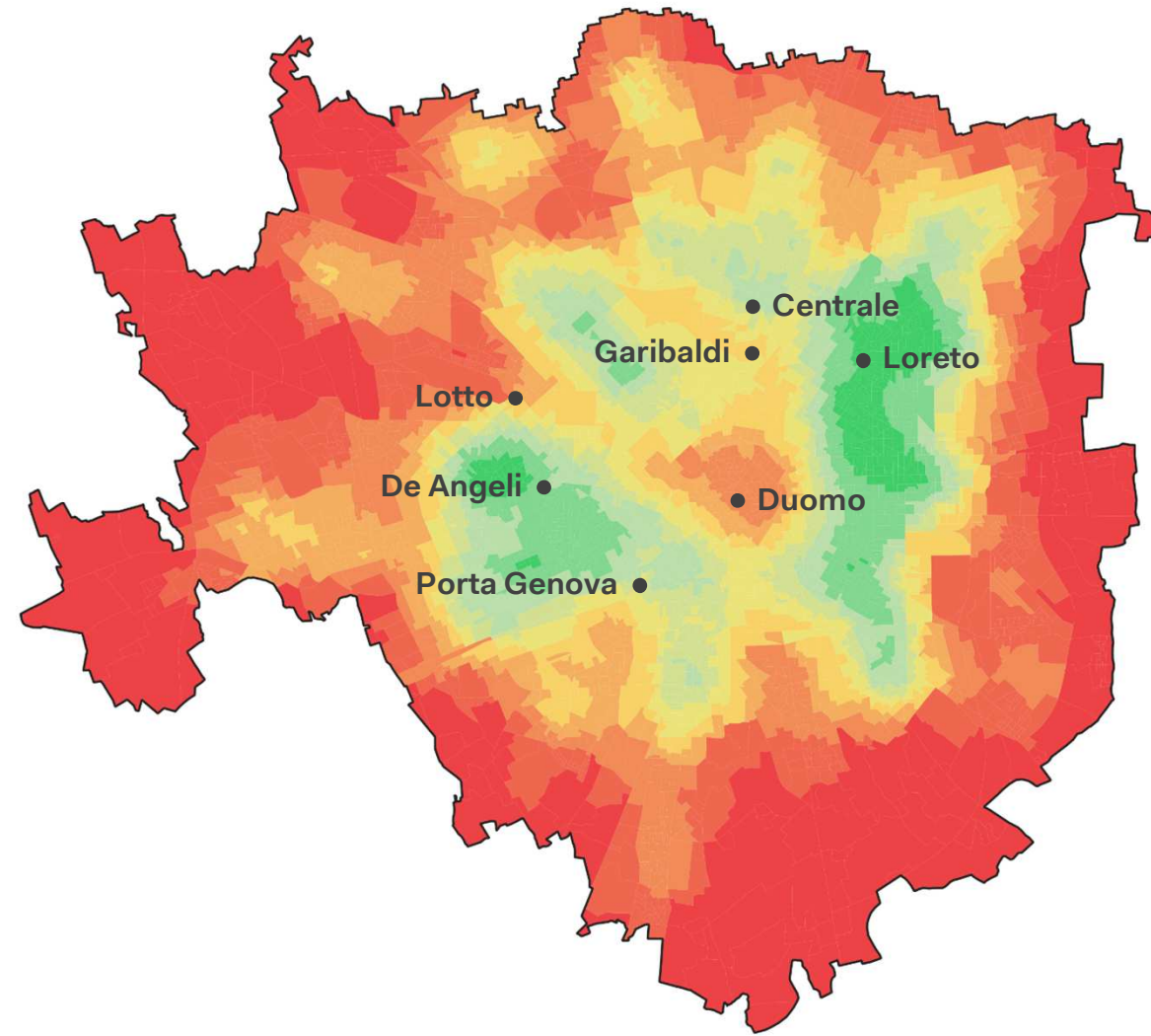


Access to Services

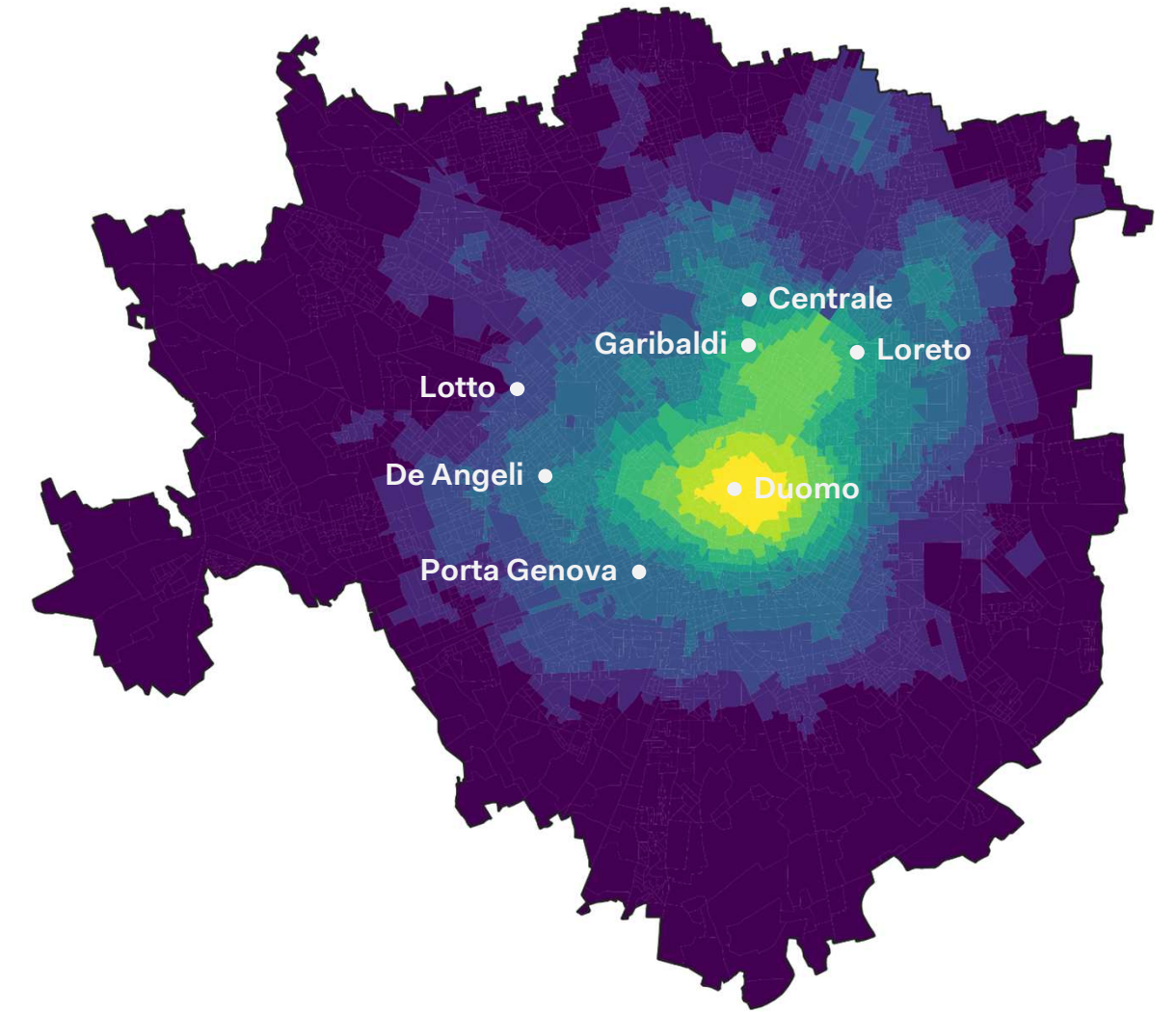
Comprensence of accessible typologies



Access to at least 7 categories of services



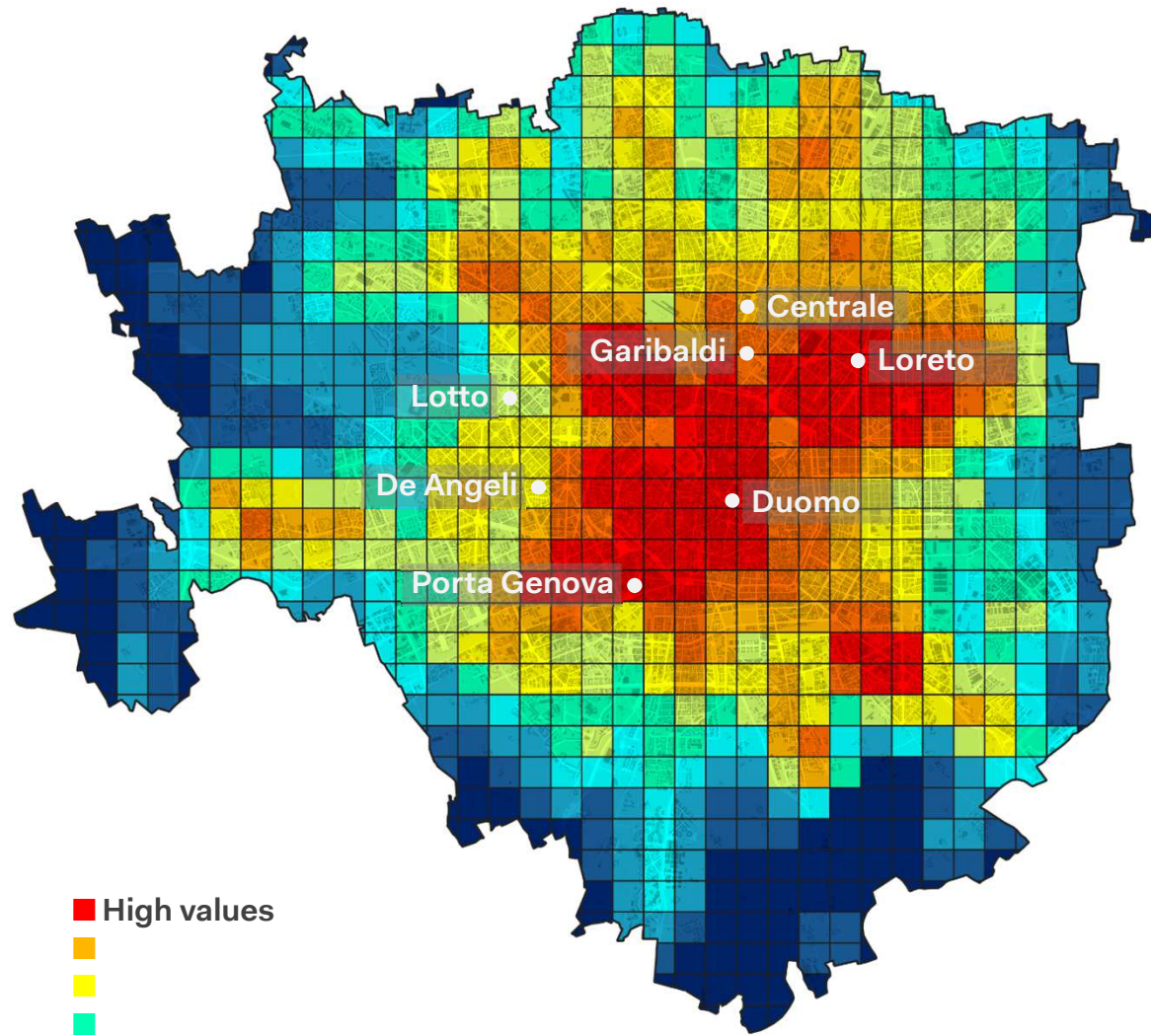
Cumulative population



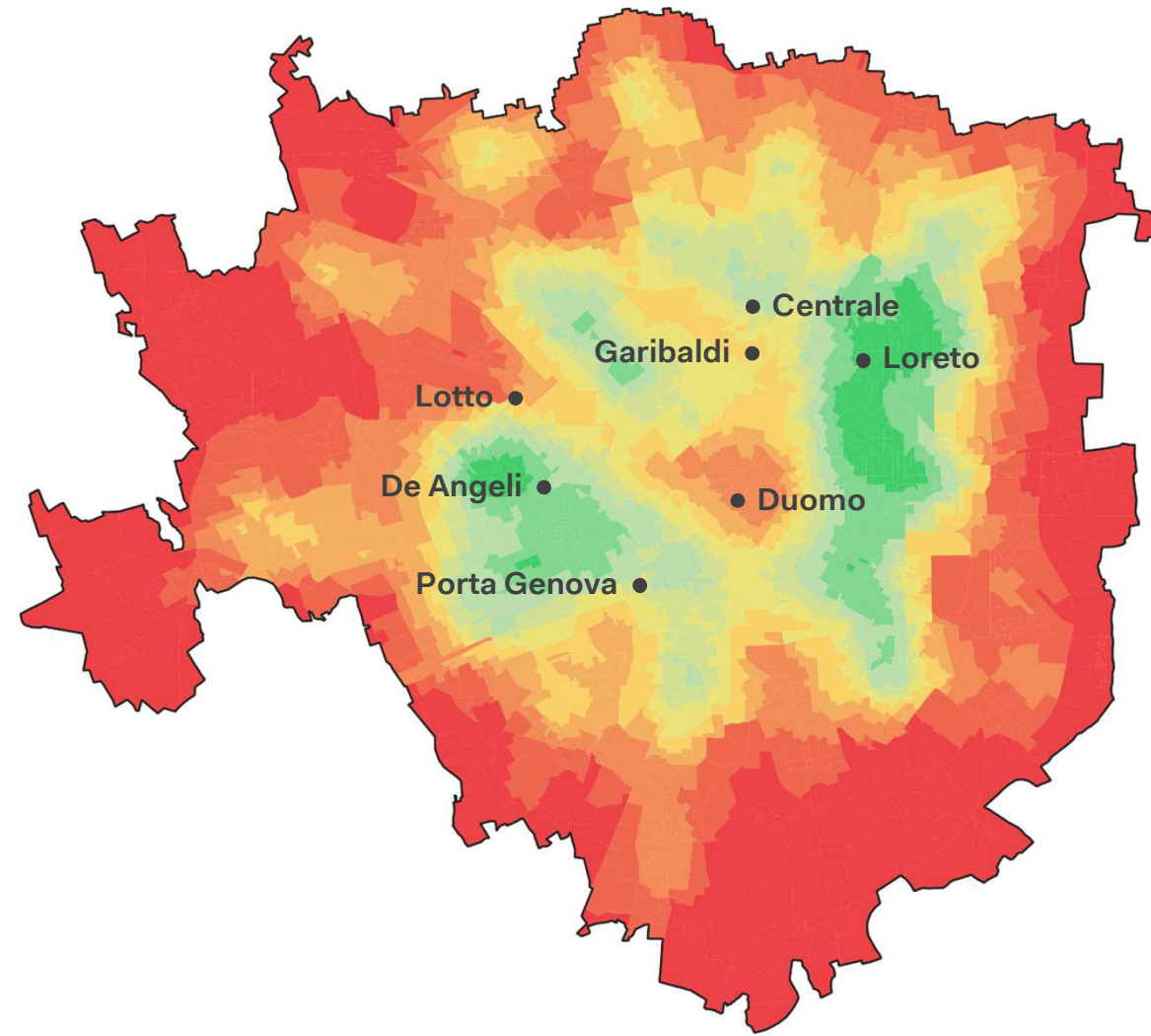
Cumulative working population

Access to services

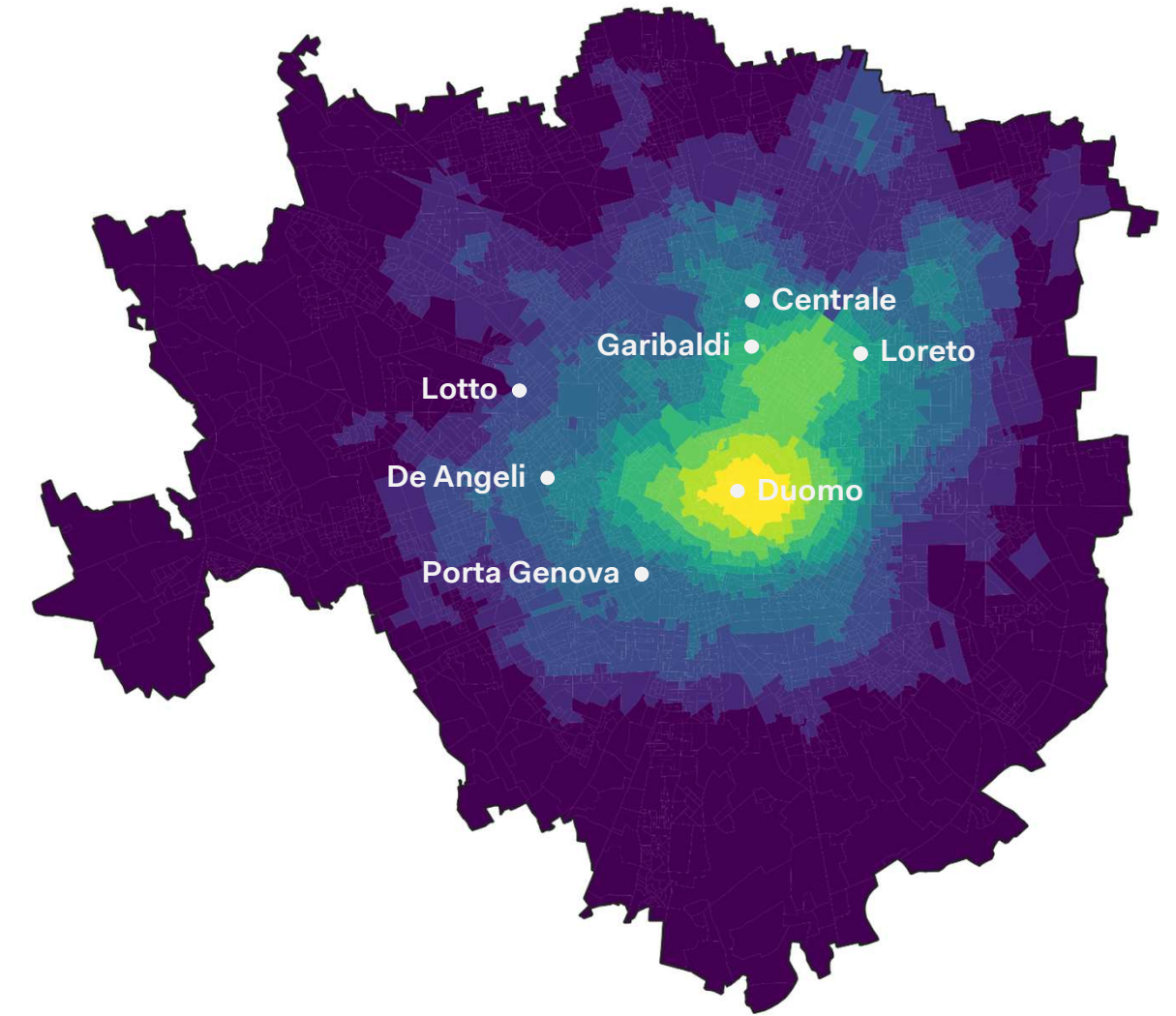
Walkscore® of 15 minutes radius



Walkscore (15 minutes)



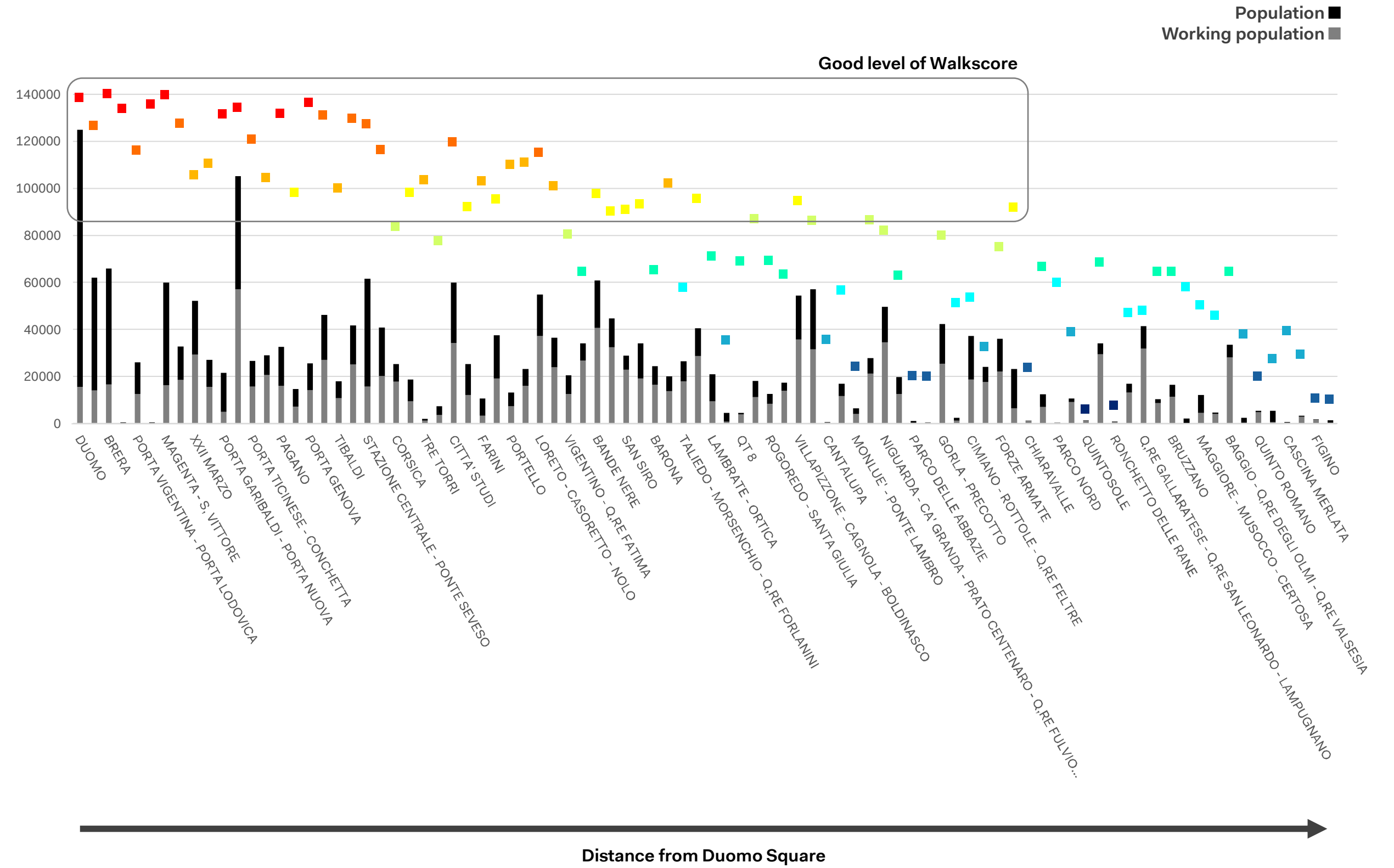
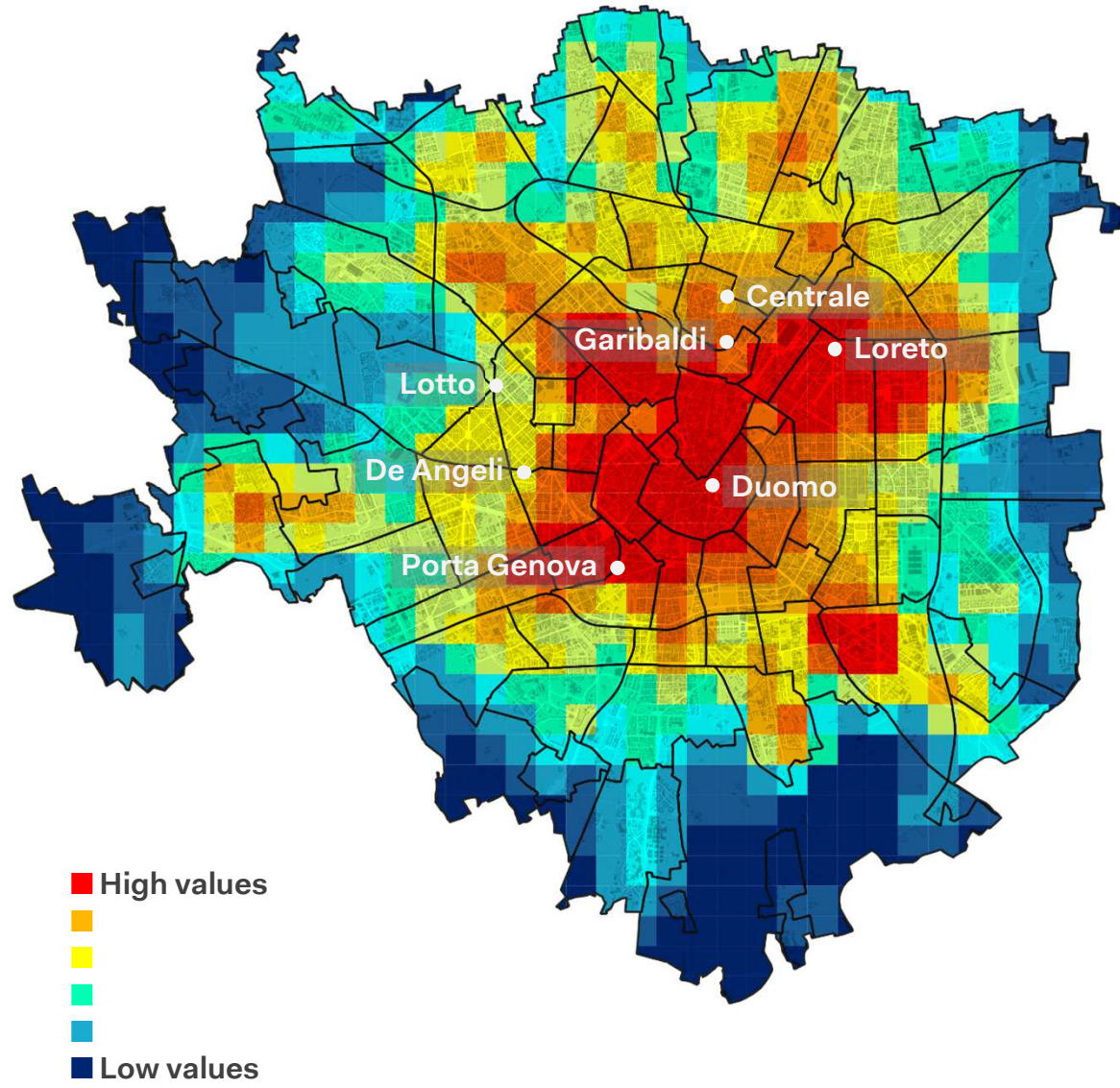
Cumulative population



Cumulative working population

Access to services

Walkscore and populations



Mobility as Innovation

What about Micro-Mobility?

- As cities face rapid population growth, the need to move more residents through existing transportation networks is becoming ever more pressing.
- Over half of the world's population now lives in urban areas, and that could climb to two-thirds by 2050. Demand for urban passenger-miles across all modes could almost double between 2015 and 2050.
- While mass transit remains the most efficient means of moving large numbers of people long distances, getting people to and from transit remains a perennial difficulty: **the first-mile/last-mile challenge**.
- Micro-mobility should support the city's efforts to **reduce transport's impacts on climate change**, in terms of minimizing the use of fossil fuels and reducing the lifecycle carbon footprint of the individual vehicles.



Mobility as Innovation

What about Micro-Mobility?

- Trips made by micro-mobility vehicles often are part of **intermodal trips**. In cities with high public transport access, the potential for closing the first- and last-mile gap using e-scooters is high.
- As car use decreases, multimodal trips increase in cities.
- Micromobility modes are used for **short trips** and thus have the potential to capture short passenger trips made by other modes of transport
- **The modal shift to e-scooters is highest from active travel modes**, especially from walking; i.e. kick scooters are mainly used as a way to replace walking trips (almost 68% of Europeans walk everyday and 12% of Europeans cycle everyday)

E-scooters for first- and last- mile



27%

of Lime riders in major urban markets during 2018 used an e-scooter to connect to and from public transport during their most recent trip

In Paris, **23%** of scooter trips were part of a multi-modal trip; and in Brussels, **46%** of scooter trips found to be multi-modal.

Average trip distance



8Km

Average trip distance for micro mobility vehicles

0,5-5Km

Average trip distance for the electric kick scooter

Average trip time



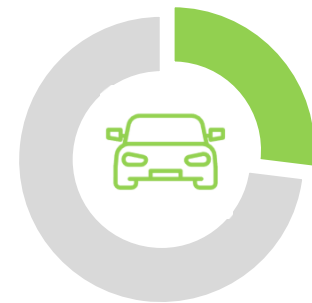
5-20min

Average trip time for micro mobility vehicles

<10min

Average trip time for the electric kick scooter

Car mode shift



30%

of Lime riders globally replaced a trip by automobile during their last e-scooter trip in 2018

Car modal shift represents a significant portion of captured short passenger trips, even in major capital cities where car use is relatively low, such as Paris and Brussels. About **60% of car trips** are **less than 8 kilometers** and could benefit from micro mobility solutions

Public Transport mode shift



10%

of e-scooter riders in major urban markets replaced a trip by public transport (2019)

Specific European city experiences also reveal that **a third of trips made by shared e-scooters** are foregone trips by public transport; a value that's higher than the **global average of 10%**. **20% of public-transport travel** could be converted to micro mobility modes.

Active mode shift to MM



50%

of e-scooter riders in major urban markets replace trips by walking and cycling (2019)

Active mode shares constitute the highest modal shares users give up to replace by e-scooters. There is a high potential for micro-mobility to capture a portion of **walking trips (>1,5km)** and **cycling trips (0,5-8Km)** across the EU

Demand-Responsive Transport Services

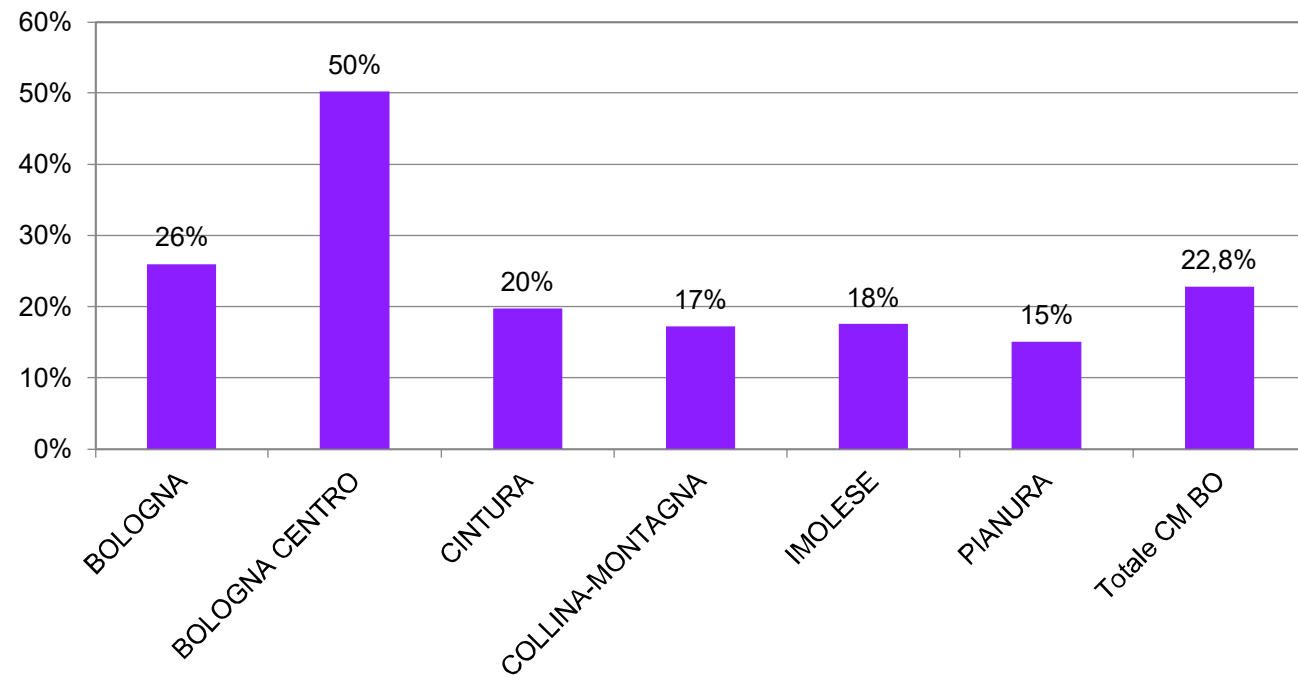
- Micro-Transit (mobility for all)
- First & Last Mile (feeding services to public transport systems)
- Corporations (shuttle services, Home-to-Work trips)
- Low-density / weak transport demand areas
- Off-peak services
- Elderly people
- PRM (universal accessibility)
- Universities / Schools
- Night services



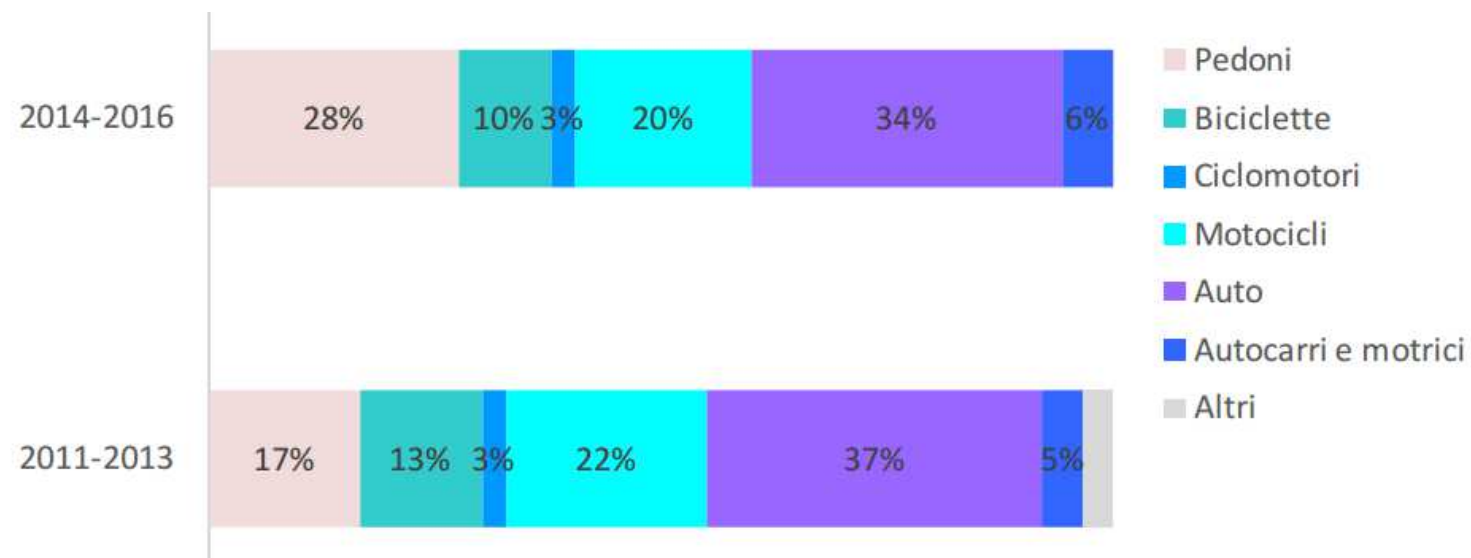
6. Bologna | Biennale dello Spazio Pubblico

PUMS Bologna | Mobilità Attiva

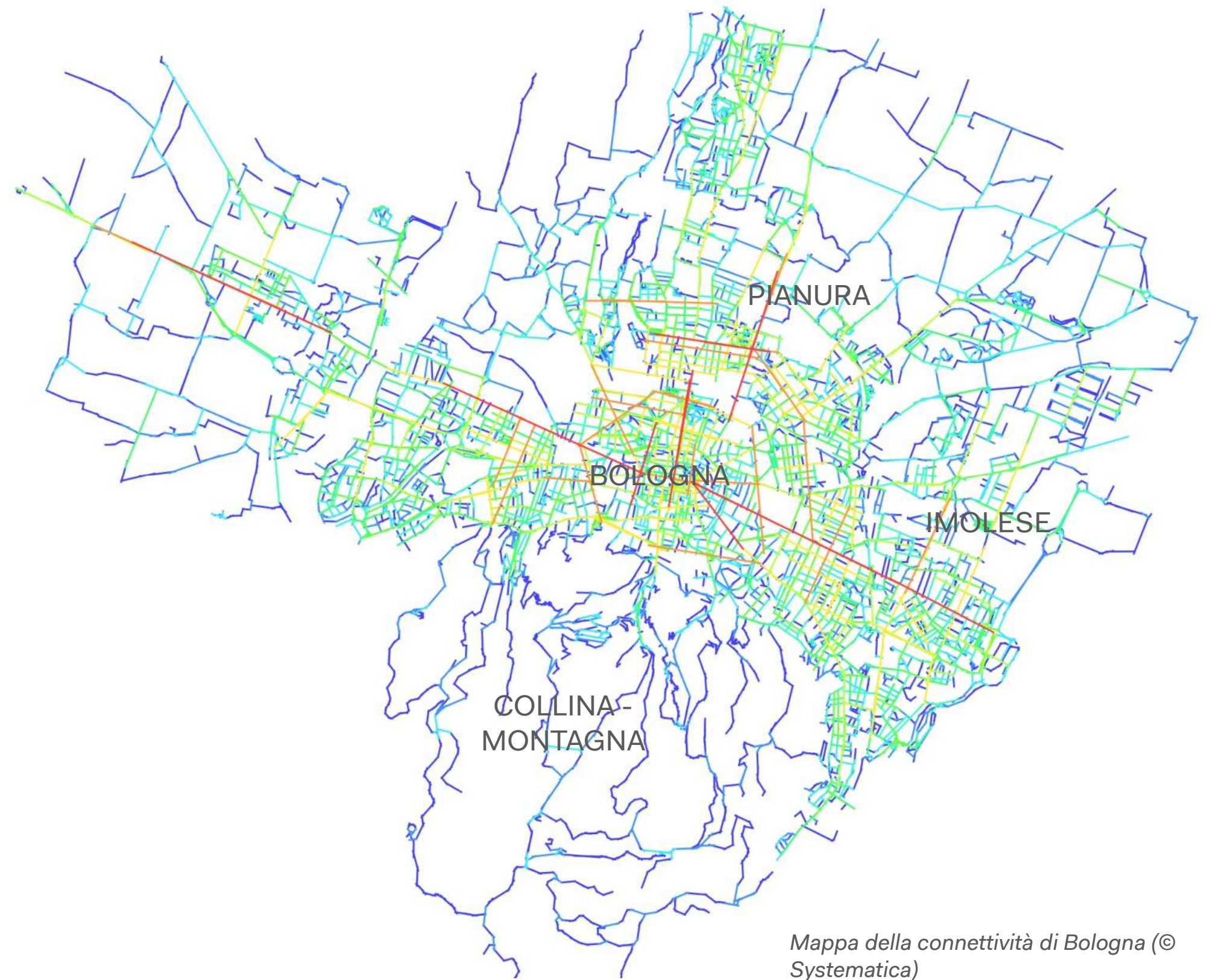
Sintesi del Quadro Diagnostico



Mobilità pedonale attuale | Quota modale (Fonte: PUMS CM Bo)



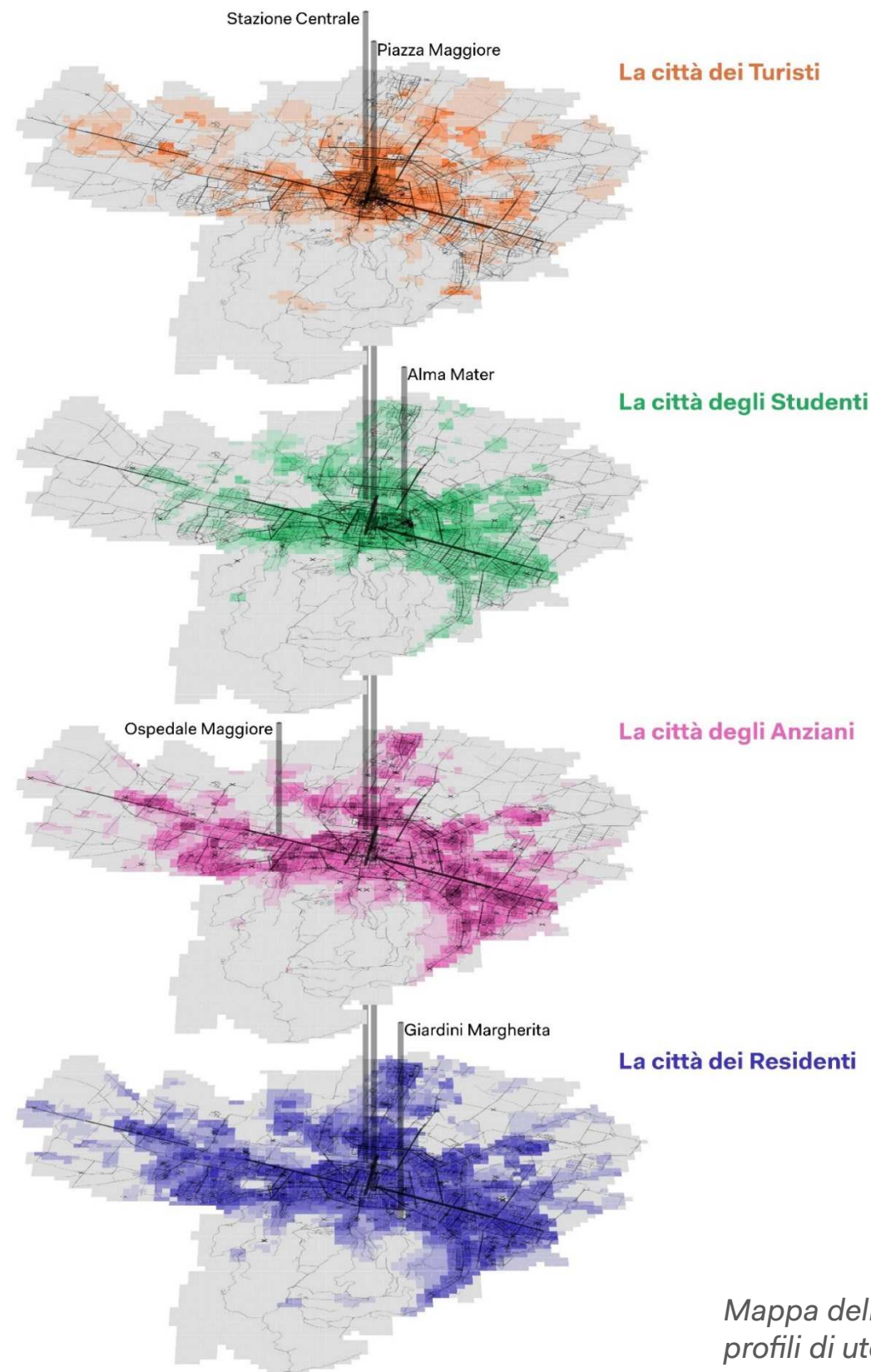
Incidentalità nella CM Bo: variazioni storiche per categoria di utenti stradali (© PUMS CM Bo)



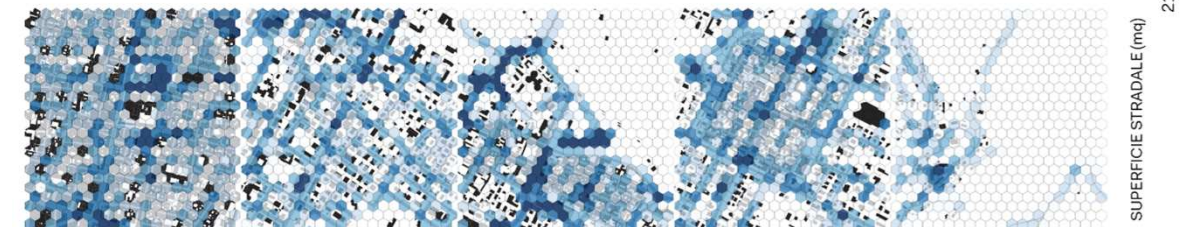
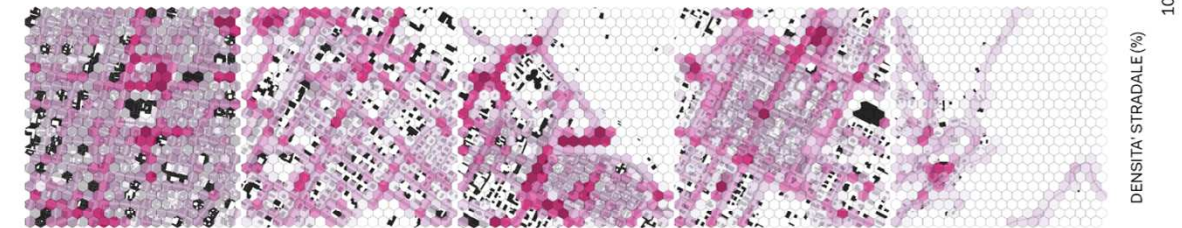
Mapa della connettività di Bologna (© Systematica)

PUMS Bologna | Non il Pedone ma i Pedoni

Sistema delle Relazioni e Impianto Urbano



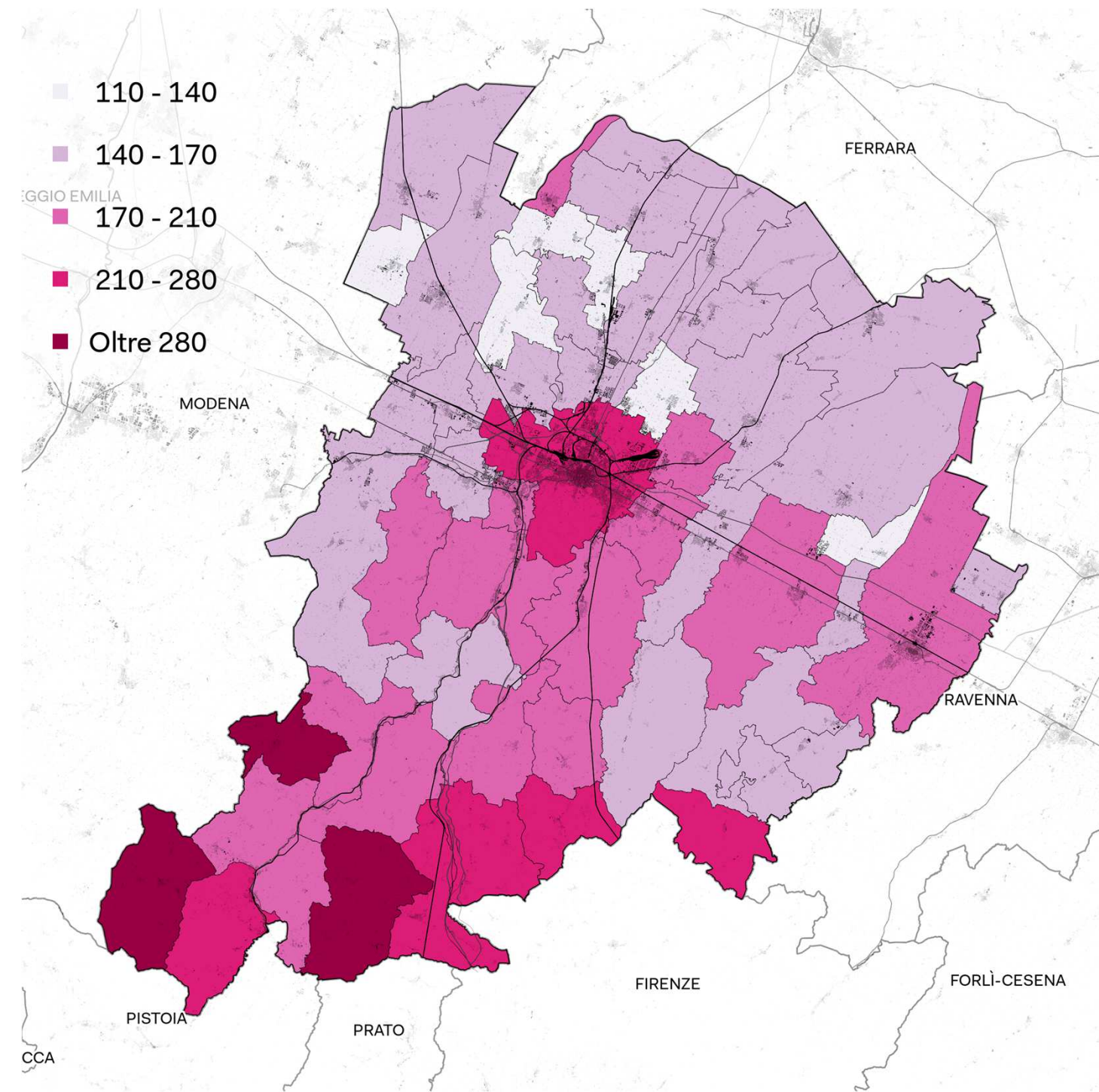
Mappa della connettività di Bologna per profili di utenza (© Systematica)



BOLOGNA CINTURA IMOLA PIANURA COLLINA / MONTAGNA

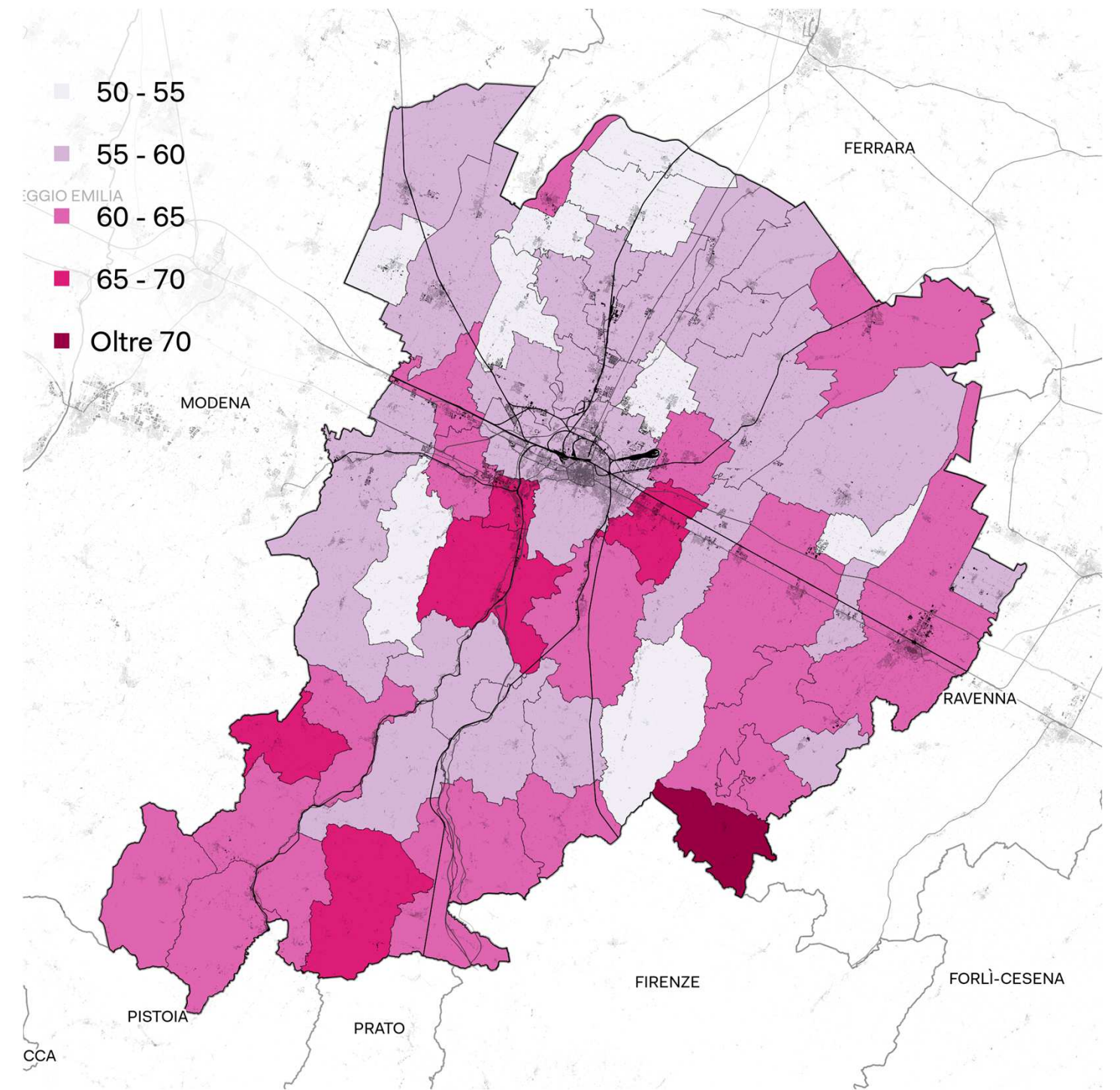
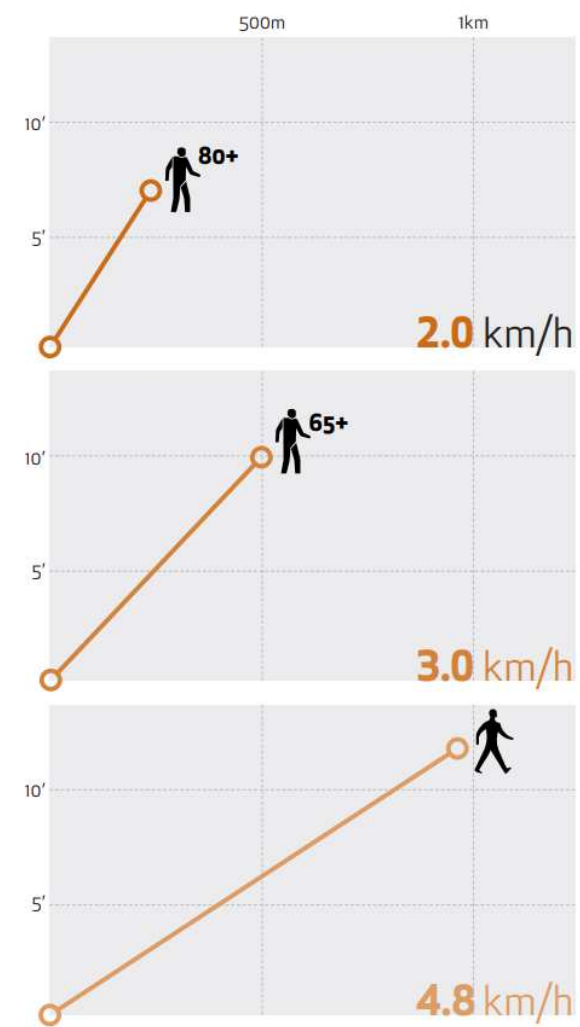
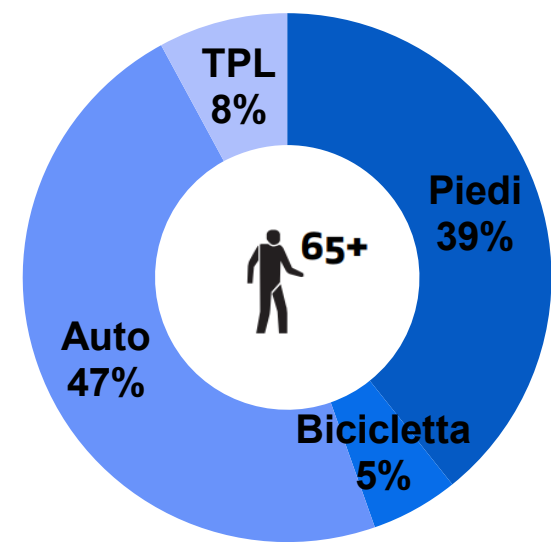
Analisi topologica dell'impianto urbano per i 5 ambiti della CM Bo (© Systematica)

PUMS Bologna | Mobilità Pedonale e Invecchiamento della Popolazione



Valore Medio: 188

CM Bo: Indice di Vecchiaia, 2017 (Fonte: ISTAT, © Systematica)



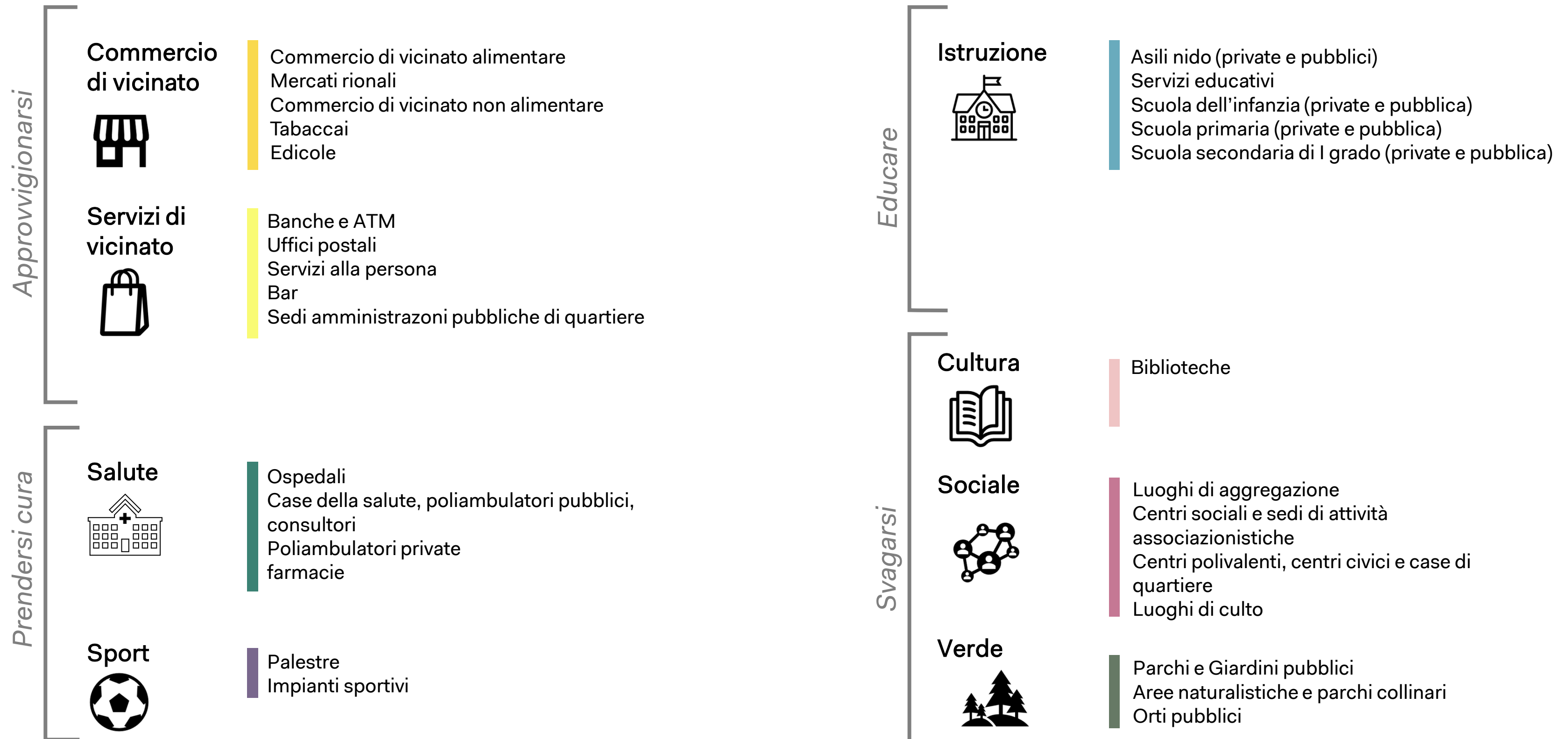
Valore Medio: 59.5%

CM Bo: Indice di Dipendenza Strutturale, 2017 (Fonte: ISTAT, © Systematica)

Bologna

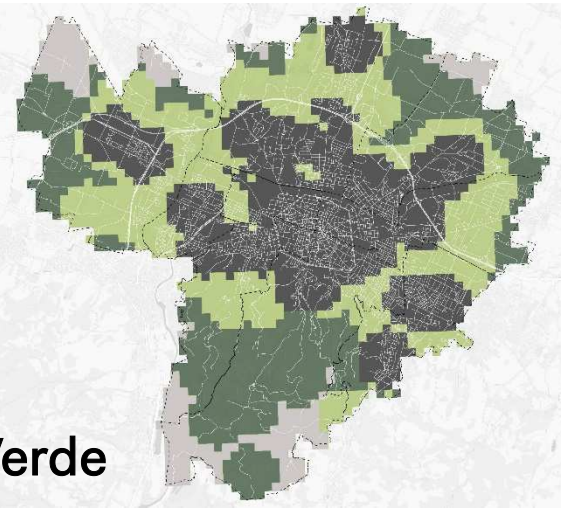
Biennale dello Spazio Pubblico

Le 8 macrocategorie di analisi

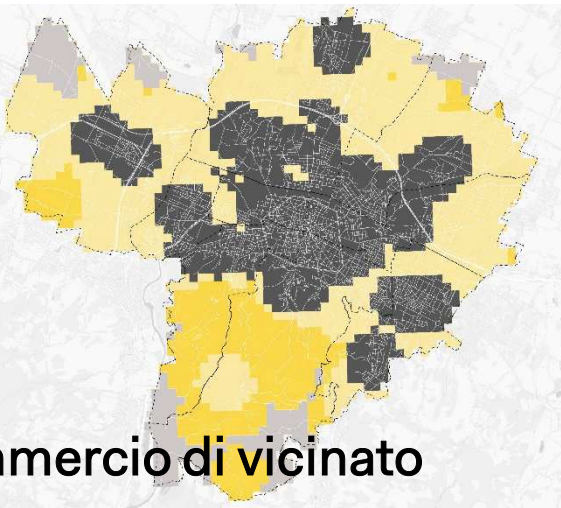


Bologna

Biennale dello Spazio Pubblico



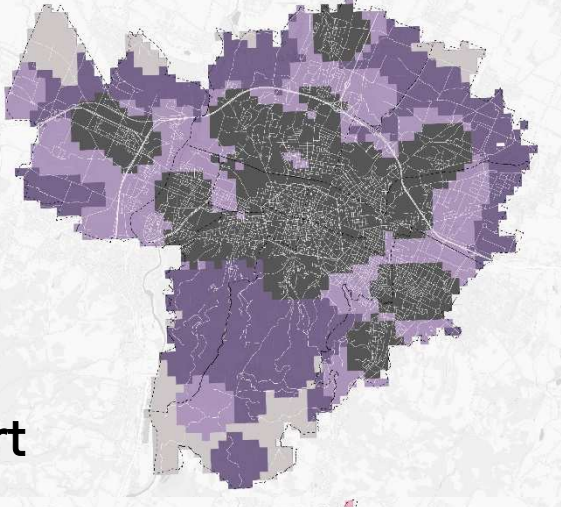
Verde



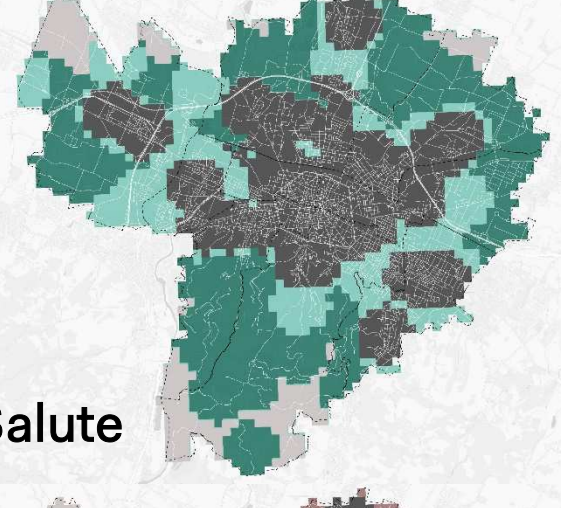
Commercio di vicinato



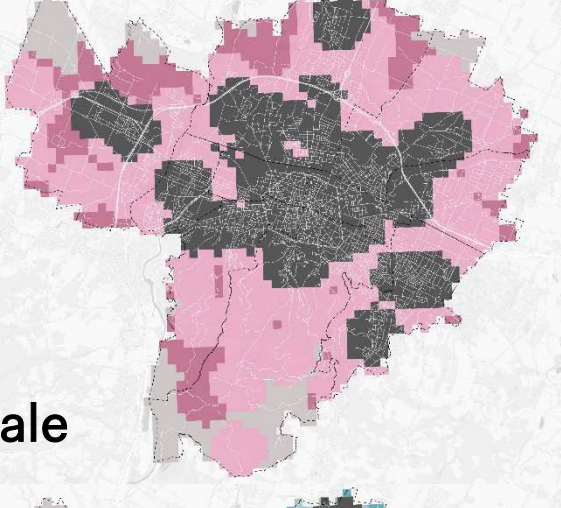
Servizi di vicinato



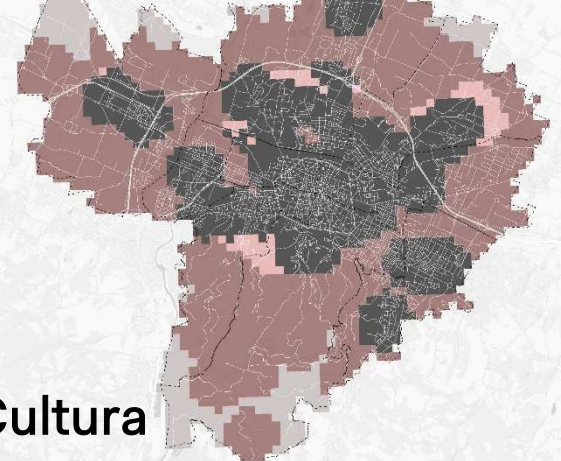
Sport



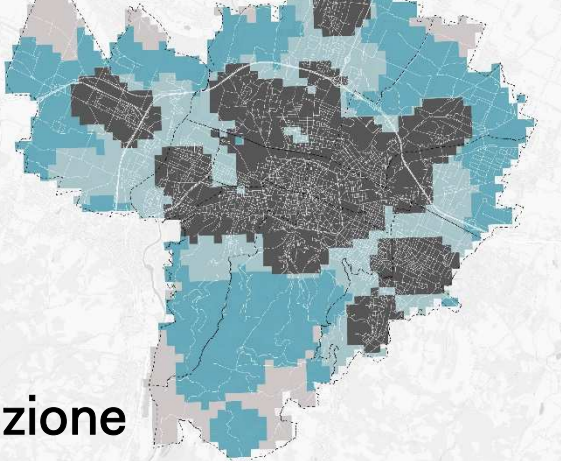
Salute



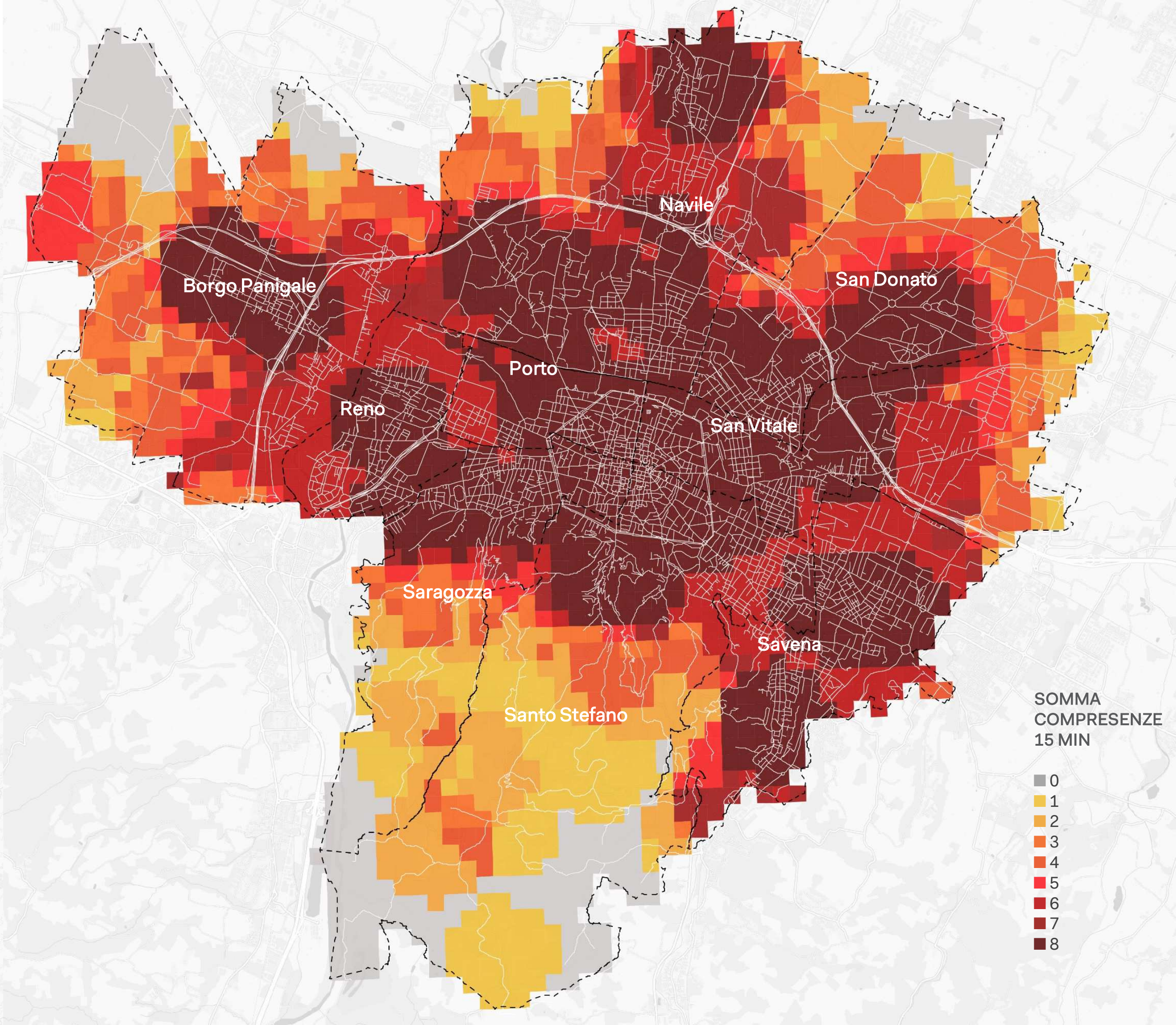
Sociale



Cultura



Istruzione

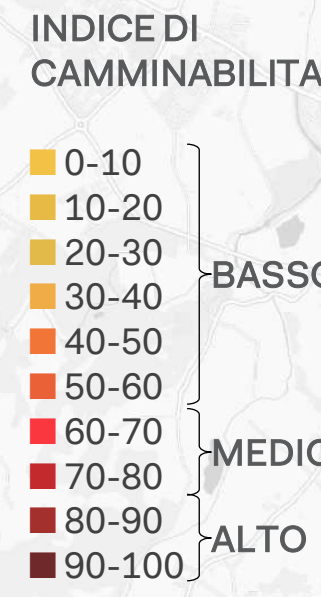
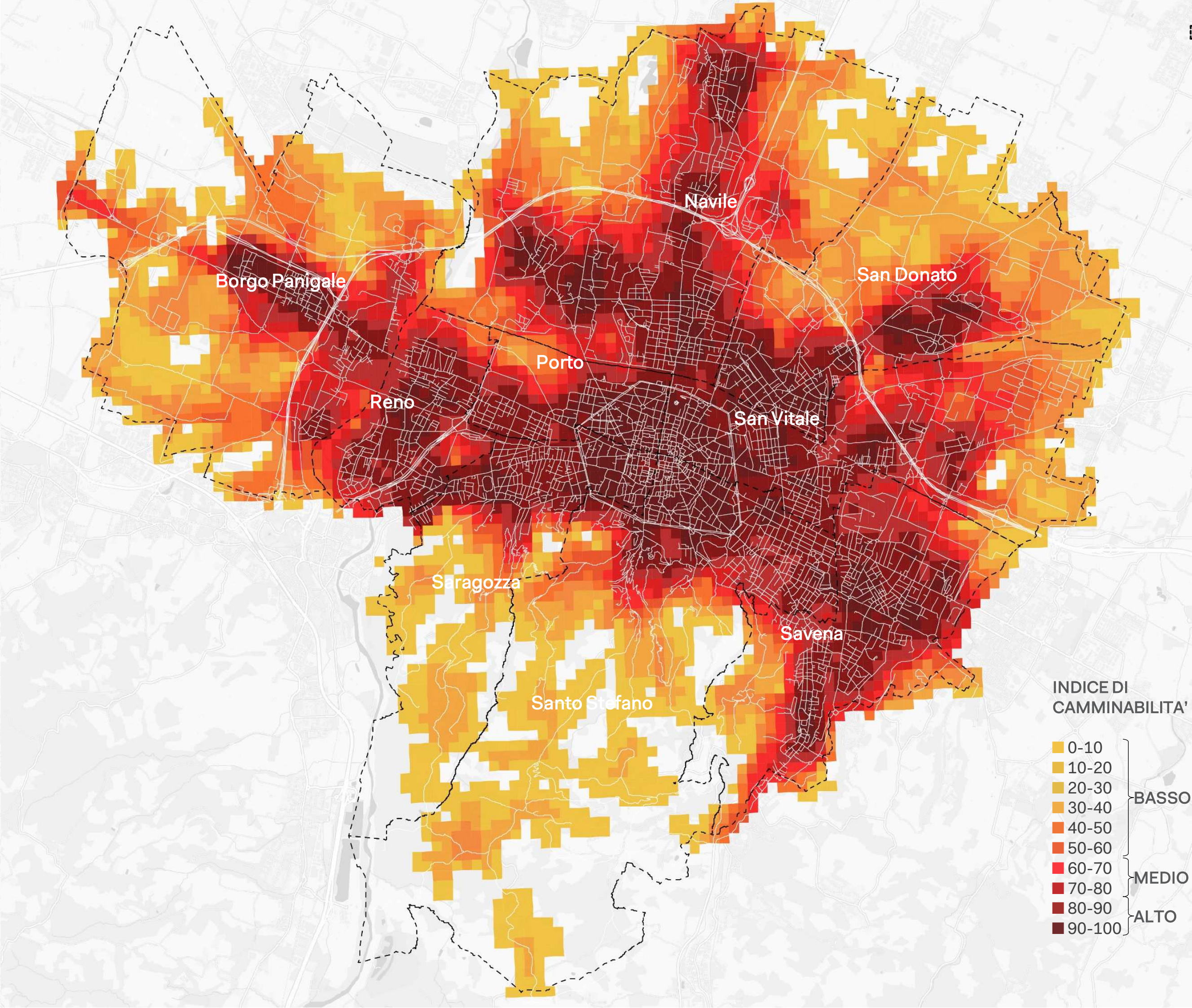
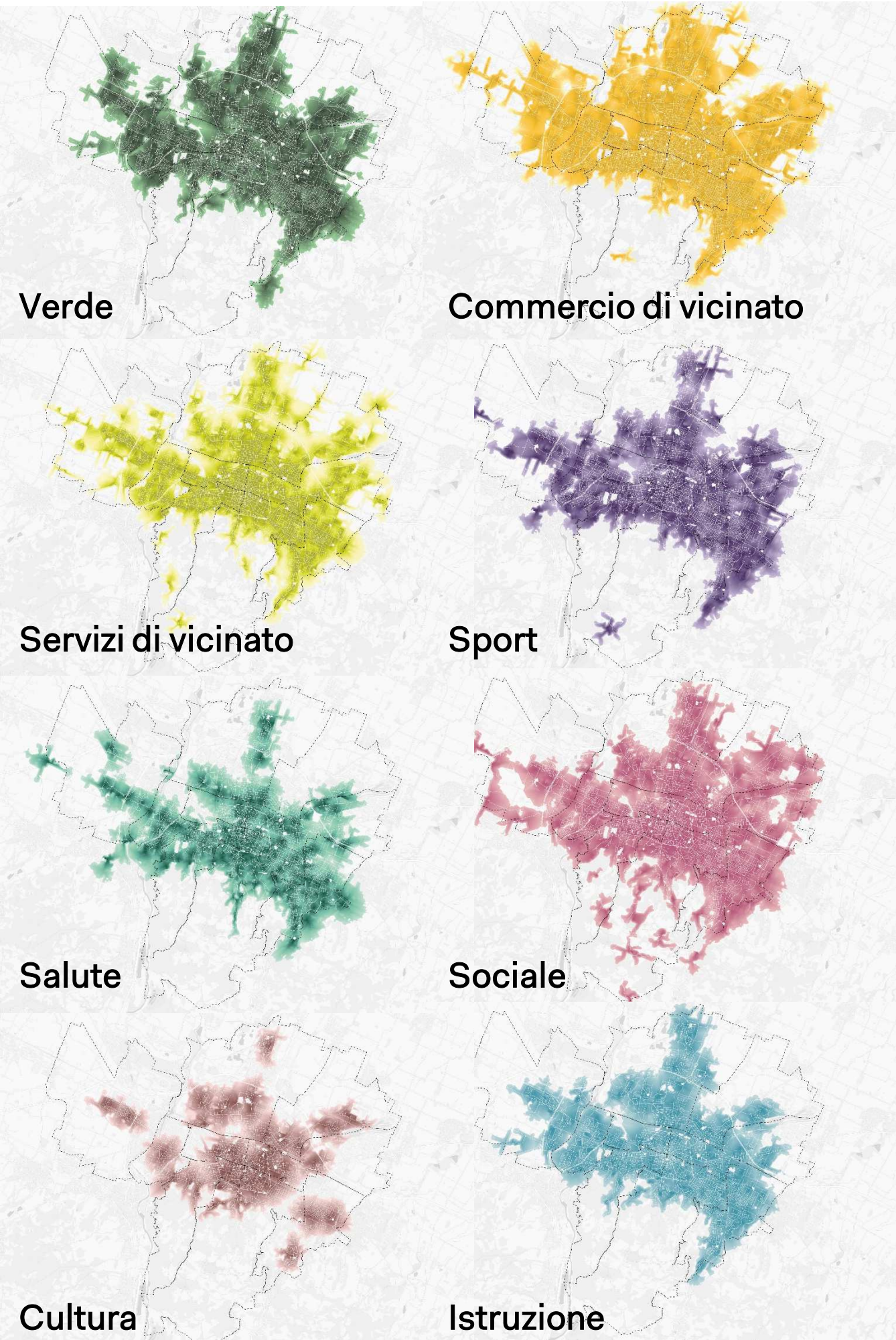


SOMMA
COMPRESENZE
15 MIN

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Bologna

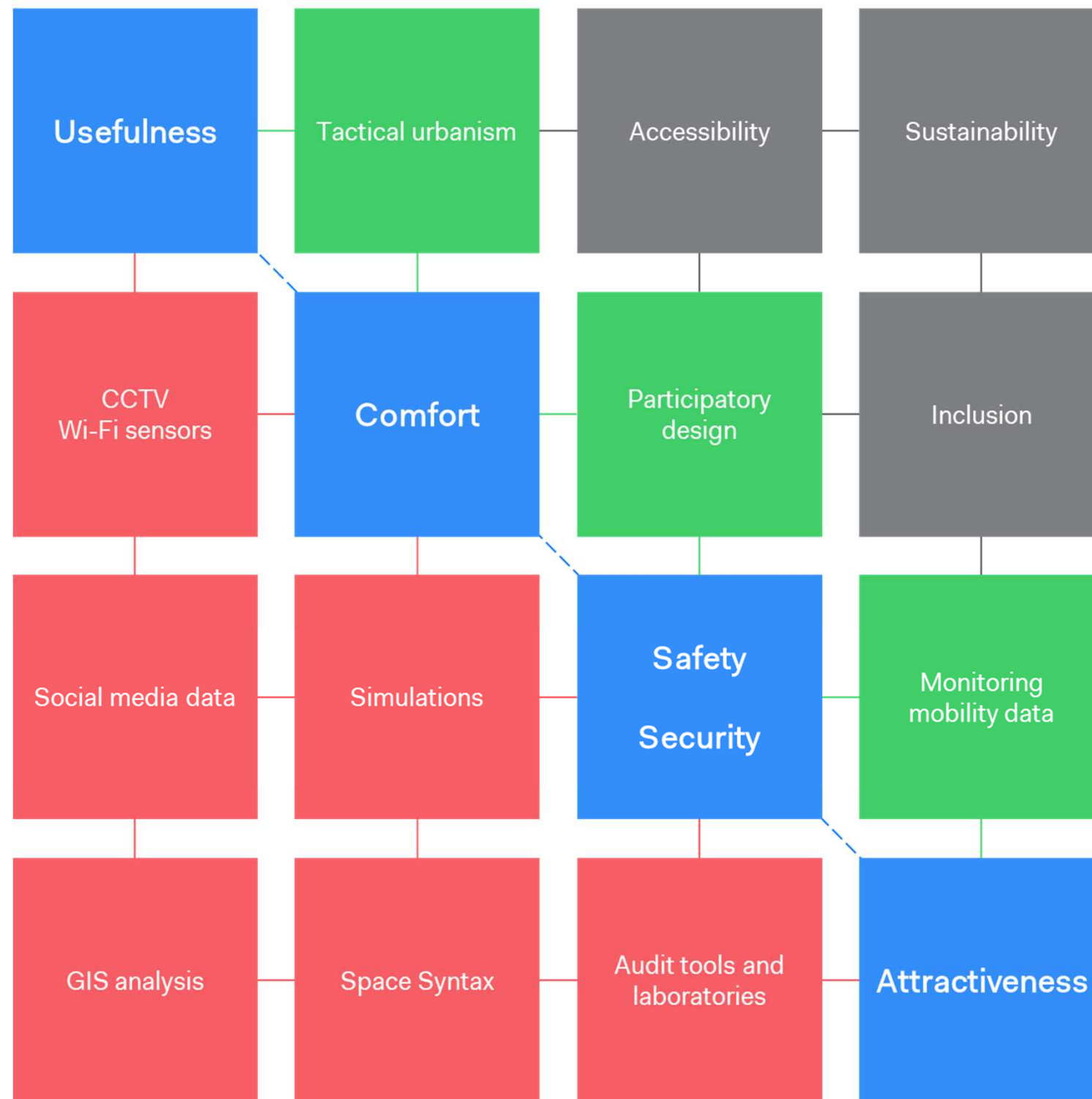
Biennale dello Spazio Pubblico



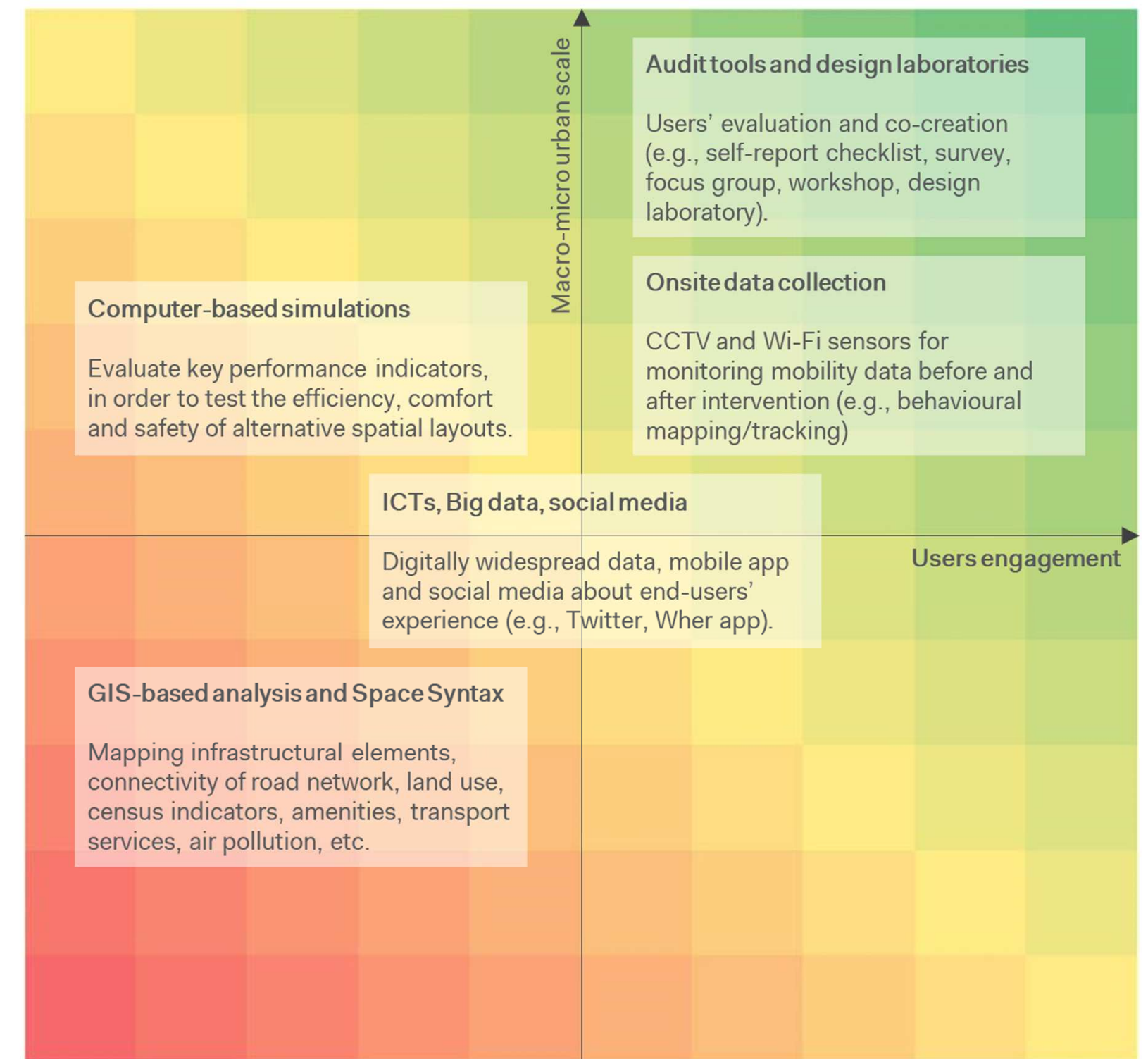
Bologna

Biennale dello Spazio Pubblico

La vivibilità dei quartieri



Objectives
 Processes
 Criteria
 Methods



Grazie per l'Attenzione!

DIEGO DEPONTE

Partner / Managing Director

349.2284083

d.deponte@systematica.net

GIULIA BONI

Senior Consultant

320.0325393

g.boni@systematica.net

© 2021 Systematica Srl

All mobility studies presented in this document are developed by Systematica Srl. All rights reserved. Unauthorised use is prohibited.

Systematica Srl
Via Lovanio 8
20121 Milan
+39 02 62 31 19 1
www.systematica.net
milano@systematica.net