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New scenarios for safe mobility in urban areas

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Urban regeneration effects on walkability scenarios

An application of space-time assessment for the people-and-climate oriented perspective

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Abstract

International programs have shown that implementing people-and-climate oriented cities goes through two processes in physical contexts: (i) urban regeneration of the existing city, particularly on public services for each urban unit, and (ii) planning of their accessibility. Therefore, there is a strong relationship between the goals of people-and-climate oriented and temporal-and-proximity perspectives. Moreover, the Covid-19 pandemic emergency highlighted the relevance of proximity again through the (not new) concept of "15 minutes cities". Nevertheless, an evaluation of how urban regeneration projects can contribute to achieving sustainability goals in ordinary practice still struggles to consolidate. Consequently, according to both perspectives, this contribution aims to observe and evaluate the effects of local urban regeneration projects on pedestrian mobility. Therefore, it presents a space-time and GIS-based methodology to assess the walkability scenarios in public open spaces. The analysis consists of double temporal analysis: (i) it analyses pedestrian accessibility in a cells grid and through a backtracking algorithm that measures the spatialized isochronous of access time, and (ii) it evaluates accessibility in two temporal moments, ex-ante and ex-post. The assessment framework proposed is applied to the case study of unit Tintoretto tower in Brescia. Results show how urban design produces different space-time effects on pedestrian accessibility and proximity connection within 15 minutes.

Keywords

Urban regeneration; Walkability; Isochrones.

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1. Urban regeneration and walkability

1.1 The people-and-climate oriented perspective

In recent decades, there has been a renewed interest in urban planning and design with specific consideration of requirements for proper liveability, against pollution and urban traffic, and the rational use of resources. This approach is expressed in themes of centripetal urban development and sustainable cities, which take the concrete form to create people-and-climate-oriented neighbourhoods.

European and international programs focused on sustainable development pay particular attention to the issue of mobility. The White Paper of the European Commission focuses on reducing GHGs emissions of transport (European Commission, 2011). The Sustainable Development Goals of the New Urban Agenda (United Nations, 2017), on the other hand, highlight the implementation of sustainable mobility systems as a priority. Therefore, the achievement of resilient and sustainable cities is based on developing a quality infrastructural system and the correct planning and design of the urban space. In the first point, rapid and integrated of transport systems extension and strengthening are associated with terminologies of 'efficiency', 'connectivity', 'accessibility'. The second point on the quality of public spaces is associated with actions of 'regeneration' and 'adaptation' of urban areas. Consequently, sustainable actions in the physical context can be divided into two correlated themes: the (urban) planning of public services and public interest for each urban unit and the planning of their accessibility, according to the optimal ranges of action or usability. Both goals are in line with the research of Newman & Kenworthy (1989) which, already in 1989, concluded their work on the need to act in two ways: (1) reorient the priorities of transport and (2) re-urbanize our cities. Nevertheless, both themes are still today usually not connected and present some issues.

Regeneration processes are intended as policies oriented to sustainable development, which contribute to reducing soil consumption and restoring economic, social, and environmental quality (e.g., Musco, 2000; Williams, 2005). However, the urban planning practice mainly focused on abandoned urban areas or the recovery of built structures, actions that alone are not sufficient to achieve desired sustainability goals. Although of considerable importance on the architectural scale, these projects have little to do with a real change in the urban structure and global energy savings. Therefore, effective urban regeneration processes cannot be limited only to single components, but they must be aimed at the simultaneous and integrated adaptation of the physical context of the public city (Roberts et al., 2016; Bakker et al., 2014).

In urban space regeneration, the theme of accessibility to the desired destinations through proper land use and mobility systems interactions, plays a central role (Tiboni et al., 2021). In particular, urban regeneration should strive to enhance pedestrian and cycle accessibility, adequately integrated into the public transport system. Indeed, to obtain a greater share of more sustainable travel modes in the urban environment, it is necessary to ensure that walking is an "attractive" alternative to motorised transport over short-distances-timing. An integrated global approach proposed is the A-S-I, which acts on Avoiding the use of cars, Shifting peoples' movements to other modes of sustainable transport, and Improving its impact by using a mode of transportation with new sustainable technologies (Bakker et al., 2014). Furthermore, this happens if the urban environment is safe and pleasant. Therefore, accessibility is a fundamental principle to enhance sustainability and quality of life (e.g., Annunziata & Garau, 2020; Banister, 2008; Campisi et al., 2021; Handy, 2002; Marshall, 2001; Gaglione et al., 2019; Guida & Carpentieri, 2021; Hull et al., 2012; Ignaccolo et al., 2016; Tira & Pezzagno, 2018) because it provides a framework for understanding one another land use and mobility. Authors like (Matan & Newman, 2016; Schiller & Kenworthy, 2018) demonstrate how the parameters of urban design and pedestrian accessibility contribute to the sustainability of the city by decreasing dependence on the car. In addition, many authors and guidelines highlight how the vitality of an urban settlement is closely linked to the pedestrian movement recovery (e.g., Gehl, 2006). The NACTO Global streets design guide (2016) addresses how the urban regeneration of mobility spaces must connect places and discourage crossing traffic

with traffic calming interventions. The recent policies "Reinventing City Challenge" promoted by the C40 Cities network also move in this direction (C40 Cities, 2020). Another relevant experience on integrated planning is the 2030 strategic plan for sustainable development in Freiburg. The plan offers eight tools (enrich, accentuate, reuse, open, model, align, deflect and connect) orienting the design of the existing space, of which three directly focused on mobility and others four on the enrichment of the public space that indirectly favours the soft mobility (Stadt Freiburg, 2017).

1.2 The temporal-and-proximity perspective: the (not new) reference framework of 15 minutes cities

Implementing people-and-climate oriented actions, such as adaptation to climate changes, improvement of sustainable mobility or accessibility, goes through urban regeneration processes. Furthermore, the local scale and the feasibility of the interventions suggest a normally small dimension of interventions that we can define as proximity. Indeed, there is a strong relationship between the goals of sustainability and proximity. Proximity improves the quality of life of people acting, in particular, on the urban space by favoring closeness among desired activities, and fostering accessibility though carbon-free movements such as pedestrian and cycle paths. Moreover, it contrasts with the continuous expansion imposed by car-centric systems. However, this dimension has often been forgotten.

The recent spatial confinement of the Covid-19 pandemic emergency has made the concept of proximity linked to individual lifetimes current again, according to 'slow' movements in an urban environment much more limited than long-term acquired habits (Lai et al., 2020). The "city of 15 minutes" represented the opportunity for a broad collective reflection on the relevant, but not always considered, urban planning implications of mobility studies. However, there is no lack of negative aspects such as the 'reductive' approach to planning and management of cities founded in such an exclusive way or the belief in the novelty of the 'idea' (Caselli, et al., in press; Gaglione et al., in press). Nonetheless, there are two (not new) aspects of relevance to the people-and-climate oriented perspective.

Firstly, the role of (physical) proximity in the 15-minute city provides that each individual can satisfy most, if not all, of their daily needs by moving a short distance from their home on foot or, at most, by walking. Assuming this perspective, it would be necessary to reorder the priorities of use of the city according to a model capable of giving priority again to the modes of movement typical of soft mobility, suitably integrated with the lines of public transport for accessibility to the spatial scales of larger cities. The connection with the sustainable perspective becomes clear: physical proximity can be considered one of the strategies, if not the main one, with which urban accessibility can be developed and improved. The objective can be achieved by working: (i) on the improvement or implementation of the available mobility infrastructures, i.e., on the characteristics of practicability, and (ii) on the reorganisation of the space offer of possible destinations to allow and encourage pedestrian (and cycling) movement, i.e., operating on the criteria for the localisation of potential destinations. The first action was the most prevalent, if not the only one, in the first 15-minute city applications during the health emergency, like in the cases of *Strade Aperte* in Milan, or in the new cycle lanes in Paris, Bogotà and Berlin (Pozoukidou & Chatziyiannaki, 2021; Pinto & Akhavan, in press). They were mainly implemented through "tactical urban planning" solutions. However, often these are emergency actions/plans that do not find permanent re-solutions. Some alternative solutions, such as the Barcelona *Supermanzana* model, show how sectoral interventions can compete and fall within a coordinated management model for the overall adaptation of the city's public space system (Manzini, 2021; Staricco & Vitale Brovarone, in press).

Secondly, the slogan "city of 15 minutes" introduces the satisfaction of a "temporal" objective, i.e., the possibility of 'measuring' how well an urban area is structured to be effectively accessible in 15 minutes. There is a clear need for a better specification of the technical tools through which to deal with the integrated study of the physical and morphological characteristics of urban areas, the design of networks and infrastructures

for soft mobility as well as the offer of activities and services. In particular, the topic of analyses on the pedestrian accessibility characteristics of a neighbourhood or, more generally, of an urban area can refer to well-established studies that allow even very sophisticated analyses of walkability levels. Various walkability indices and measures are available in the literature (Conticelli et al., 2018; Garau et al., 2020; Caselli et al., 2021), realised through GIS applications and geoprocessing tools that process different sets of data (e.g., connectivity, safety, comfort, accessibility and convenience). These analyses clarify how walkability can be best described using a composite set of indicators (Maghelal & Capp, 2011). Specifically, temporal walkability can be described in different ways. It is possible to use a topological buffer or overlay instrument with Euclidean distance measurement capable of creating simple or multi-ring circular isochrones based on average speeds or distances for a specific mode of transport. Alternatively, it is possible to create spatial isochrones which, according to specific speeds and costs, are able to represent the catchment areas in a more realistic way than the previous one, as they are able to consider barriers (e.g., highways, railways, walls, etc.), speed variations, the convenience of proximity. Despite the greater accuracy of the second tool, common practice still focuses on the first.

Finally, a final methodological problem concerns the data analysis in two or more different moments in time. The analysis, when present, often focuses solely on the conditions of the state of affairs. Therefore, the promulgated solutions do not include an ex post analysis of the effects generated (Carra & Ventura, 2020).

Consequently, the contribution of this paper allows observing and evaluating the effects of urban regeneration on pedestrian mobility according to the people-and-climate oriented perspective. Therefore, it presents a time-space GIS-based methodology to assess the walkability scenarios in public open spaces. The assessment framework consists of double temporal analysis: first, it measures the pedestrian accessibility through spatialized isochronous of 5, 10 and 15 minutes; secondly, it evaluates the accessibility in two temporal moments, ex-ante and ex-post. Applying the method to a case study, the results show how urban design produces different space-time effects on pedestrian accessibility and proximity connection within 15 minutes. Therefore, the contribution presents a useful framework for practitioners and public administrators to evaluate how urban regeneration projects can contribute to achieving goals for people-and-climate oriented cities.

The remaining paper is organised as follows. Section 2 explains the method to analyse the double-temporal effects of urban regeneration. Section 3 describes the ex-ante and ex-post scenario of the unit Tintoretto tower case study in Brescia. Section 4 presents the results of walkability and proximity scenarios. Lastly, Section 5 concludes the contribution by providing some limits and suggestions for a research and policy agenda.

2. Towards an assessment framework: from urban regeneration to pedestrian accessibility

Carrying out local physical interventions of urban regeneration aimed at achieving people-and-climate-oriented objectives is not trivial. If the theoretical references are generally shared and applied in the design stage, according to solutions to be adapted case by case, the preliminary evaluation of effects is often lacking. However, if urban regeneration interventions cannot neglect the accessibility analysis (i.e., pedestrian and/or cycle path), it is necessary to define prior evaluation methodologies of effects on the existing urban space.

Consequently, the proposed method integrates urban planning with mobility planning to evaluate the mutability of pedestrian accessibility scenarios. It is possible for areas subject to urban regeneration and those indirectly affected in proximity (depending on the analysis). The multiphase method was created in a GIS environment as a generally approved accessibility analysis tool (Hull et al., 2012). The first phase consists of defining the ex-ante cognitive framework of the informative layers concerning the permeability (or impermeability) attributes of the pedestrian areas in the case study. The method considered a composite set of attributes: viability (routes, pedestrian and cyclist paths, sidewalks, public transport stops and lines),

buildings (volumetric unit, transport infrastructure, partitioning elements, e.g., wall, fences, etc.), hydrography (watercourse, lake, pond, reservoir), services (green areas, public open spaces/plaza, parking, public services). As a development of previous research (Rossetti et al., 2020), the evaluation is based on the discretization of the area in a uniform vector grid of 3x3 meters cells operated with the ET-Geowizard tool. Each cell (i.e., ET_ID) is connected to the informative layers on land use attributes and contains a record field for evaluating pedestrian permeability value (i.e., ET_Index) from the shape file (spatial analysis) to computation algorithm (temporal analysis). Indeed, the application of a "backtracking" algorithm (Wirth, 1976) on each cell allows assigning a timing between the links mapped between cells to an origin/destination reference point (cell). The algorithm optimizes distances by determining the pedestrian path with the shortest (timing) distance. However, the computing pedestrian crossing speed it is not constant but varies according to the information layers of land use, i.e., it provides speed reductions from standard 4 km/h in the presence of cells with a mixture of land uses that produce less permeability. The crossing time was assigned considering the possible land uses of each cell, e.g., the speed of 4 km/h was assigned to road surfaces, while slower speeds were chosen for parks and green areas due to curvier paths (3 km/h).
Finally, the GIS processing maps pedestrian isochrones from the point/cell assigned to all points on the map. In addition, it returns the catchment area of each established 'boundary' of accessibility, i.e., proximity. Given the 'pedestrian' dimension of the analysis, this method adopts a time intervals of 5 minutes (Geurs & Van Eck, 2001; Curtis & Scheurer, 2010; Zazzi et al., 2018).
Again, the procedure is carried out in for the ex-post analysis of the urban regeneration project. The comparison between the ex-post and the ex-ante situation provides the scenario of how much improvement (or worsening) the urban regeneration project generates. Consequently, the method can show how much the project is in line with the people-and-climate-oriented perspective for pedestrian accessibility.

3. The urban regeneration of unit Tintoretto tower. A case study

3.1 The ex-ante scenario

The methodology was applied to the case study of the housing unit Tintoretto tower, an internal portion of the San Polo neighbourhood in Brescia.
Conceived by the architect and planner Leonardo Benevolo, the neighbourhood represents one of the most relevant Italian "social housing" examples. The original masterplan (1972) consisted of the settlement of 12,000 people in an area of 350 hectares (Fig.1a). Benevolo proposed an alternative urban model, organic and rational, based on a repetitive urban system of large dimension and characterised for the rigorous application of the tree aggregation principle extended to automotive roads. Moreover, it is characterised by high urban facilities that provided 18 m^2 of public services (e.g., kindergarten) and 50 m^2 of green areas for each inhabitant. The elementary housing unit consisted of the juxtaposition of three types of residential buildings: five pairs of rows of single-family houses with 2 and 3 floors, a long multi-family house perpendicular to them, and a tower of multi-family building with 15 and 17 floors high (Fig.1d). Consequently, about 5,000 apartments were built, and only five towers were realised (i.e., Tiziano, Raffaello and Michelangelo to the west, Tintoretto and Cimabue to the east). They are still today the most identifying element of the neighbourhood (Belli, 2020). Nevertheless, the equipment provided and the social and housing mix achieved did not prevent a certain degree of gentrification and consequent of social and physical degradation problems. The main problems occurred in the Tintoretto tower (1984-1987) and later the Cimabue tower, both characterised by the largest concentration of low-income residents. The unit is localised in the San Polo Cimabue district and consists of a 17 floors parallelepiped tower with 195 apartments (north) and a green plate of 700 m^2 on a floor above ground (south) (Fig.1b). The plate is configured as a compact block that does not allow any permeability, defining a barrier between the area and the neighbourhood (Fig.1c). In 2008, the

demolition of both towers was planned, and in 2013, the Tintoretto tower was emptied (Badiani & Savoldi, 2014). However, the emptying of the tower did not have any positive effect on the area. Therefore, in 2021 demolition has begun.

(a) (b)

(c) (d)

Fig.1 (a) The Benevolo's masterplan; (b, c, d) the unit Tintoretto tower in the ex-ante scenario

3.2 The ex-post scenario

Recently, the Municipality of Brescia presented an urban regeneration project of social housing for the unit Tintoretto tower, which involves the demolition of the tower and enhances (among other goals) soft mobility by increasing accessibility.

It modifies the structure and existing unbalances and activate new relationships with its surroundings. Indeed, the project proceeds to overcome the concept of separation between housing units by the re-appropriation, re-ordering and sharing of the public space between parts.

The new buildings are articulated around two open green courtyards (the existing one to north and the new one of 4.000 m^2) that define the relationship between north and south spaces and east-west, between the Tintoretto and the Cimabue unit. The covered area is reduced to about 25%, and buildings are retreated compared to the existing one, guaranteeing wide and tree-lined public paths also around the unit (Fig.2b and 3). The planivolumetric composition of the open system generates new visual and physical openings in the context. Indeed, cycle and pedestrian permeability within the unit and between the unit and the neighbourhood are primary.

Fig.2 Urban scheme of the urban regeneration project approved by the municipality

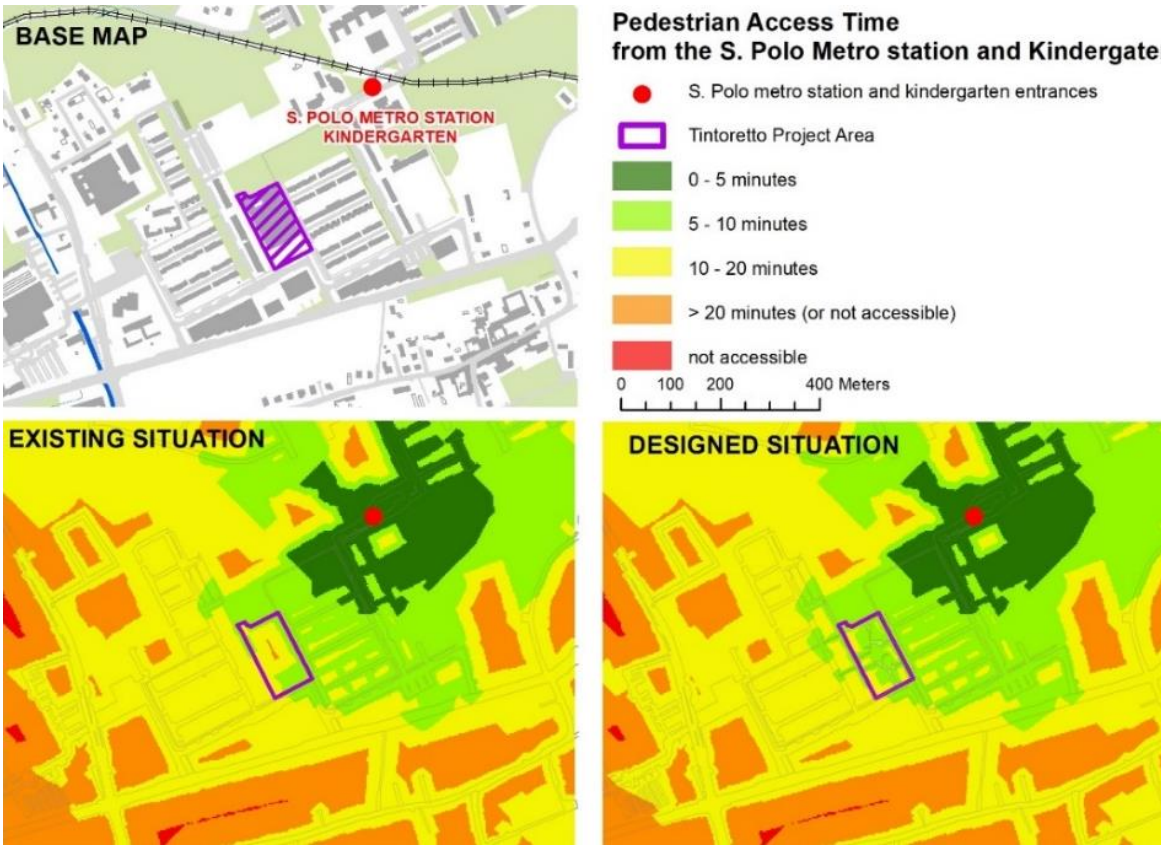
Fig.3 The masterplan and an internal view of the unit

4. Results of ex-ante and ex-post walkability scenarios

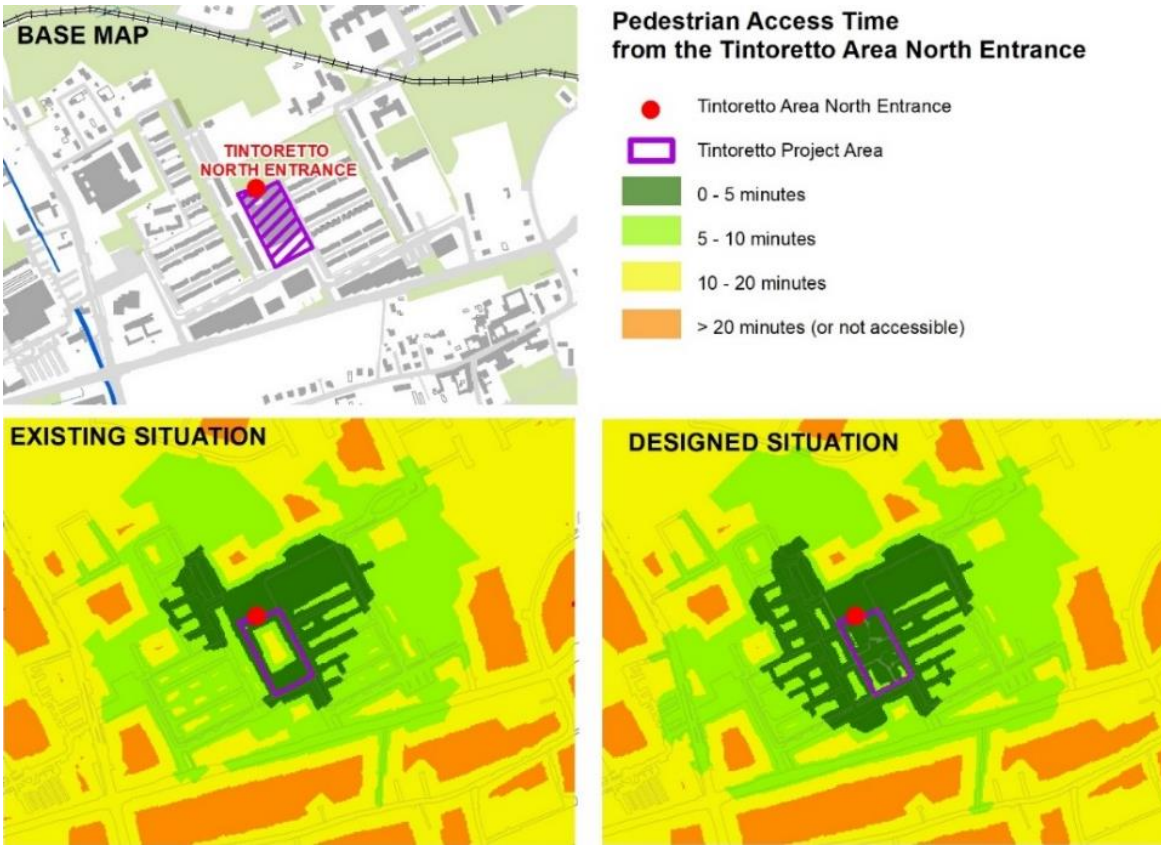
The method was applied to the Tintoretto urban regeneration project starting from three origin points. The maps show the results of the three evaluations, providing the pedestrian isochrones for the ex-ante (on the left) and the ex-post (on the right) walkability scenario. As the figure shows, the comparison allows us to understand the positive effects of urban regeneration at different scales: punctual, for areas directly subject to urban regeneration, and synergic for those indirectly affected proximities.

4.1 Punctual effects

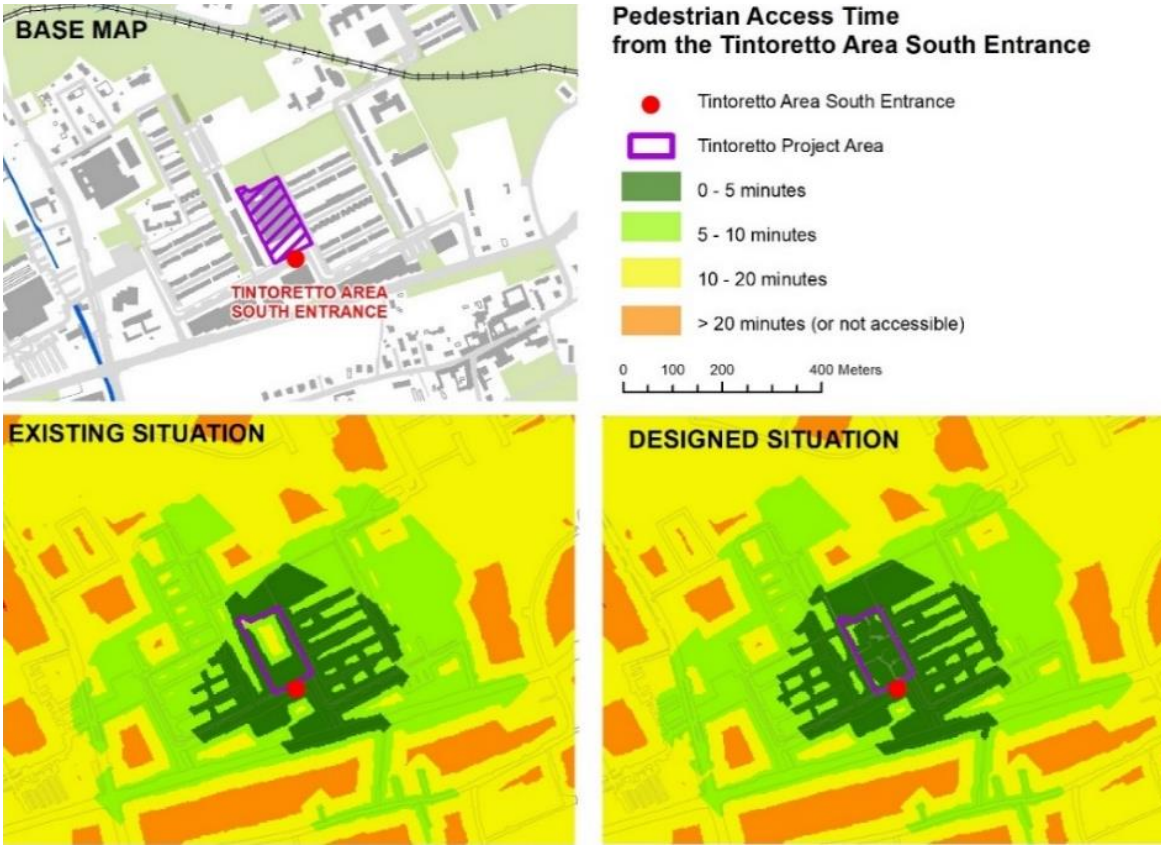
The analysis of punctual effects highlighted an enhancement of the walkability scenario within the regeneration area since it is based on the demolition of the plate in front of the tower, which limits pedestrian permeability across the site. However, the punctual effects differ depending on the point of origin.


BASE MAP
S. POLO METRO STATION
KINDERGARTEN
Pedestrian Access Time
from the S. Polo Metro station and Kindergate
S. Polo metro station and kindergarten entrances
Tintoretto Project Area
0 - 5 minutes
5 - 10 minutes
10 - 20 minutes
> 20 minutes (or not accessible)
not accessible
0 100 200 400 Meters
EXISTING SITUATION
DESIGNED SITUATION

(a)


BASE MAP
TINTORETTO
NORTH ENTRANCE
Pedestrian Access Time
from the Tintoretto Area North Entrance
Tintoretto Area North Entrance
Tintoretto Project Area
0 - 5 minutes
5 - 10 minutes
10 - 20 minutes
> 20 minutes (or not accessible)
EXISTING SITUATION
DESIGNED SITUATION

(b)



(c)

Fig.4 Pedestrian isochrones from San Polo metro station and kindergarten (a), unit Tintoretto in the north (b) and south (c) entrance

The first considered pedestrian isochrones from the S. Polo Metro Station and the adjacent kindergarten. Fig.4a shows how the variation of the unit's access time does not affect the range of 0-5 minutes, but those between 10-20 and >20 minutes ranges, which are reduced almost completely to 5-10 minutes in the unit Tintoretto tower area. Moreover, the improvement has an east-west trend even in the proximity of the area.
The second and the third points of origin presented isochrones developed from the main entrances of the Tintoretto area, north (Fig.2b) and south (Fig.2c). Both isochrones show a clear improvement within the area, previously reachable for a part of it between 10-20 minutes, despite the close distance from a zenith view. Furthermore, few if any variations are evident in the north, east and south. The greatest variations extend over the ranges of 0-5 and 5-10 minutes to the west.

4.2 Implications from the temporal-and-proximity perspective: synergic effects

The analysis results focused on punctual effects showed an improvement outside the unit Tintoretto tower for all points of origin, with a clearly oriented trend. Therefore, a network analysis was developed to analyse the synergic effects of the urban regeneration process on the proximity of the neighbourhood (Fig.5).
The outcomes of the analysis clearly show the relevance of extending a correct pedestrian infrastructure favouring home-service proximity. In the ex-post scenario from the metro station point of origin, the pedestrian accessibility is clearly improved within the S. Polo neighbourhood, especially in the west-east axis. Figure 5 highlights the percentage reduction in the pedestrian access times values with a decrease between more than 5% (dark green area) and 0.5% (light green areas). Therefore, the method clarifies the positive externalities of a local urban regeneration project on proximity access time.

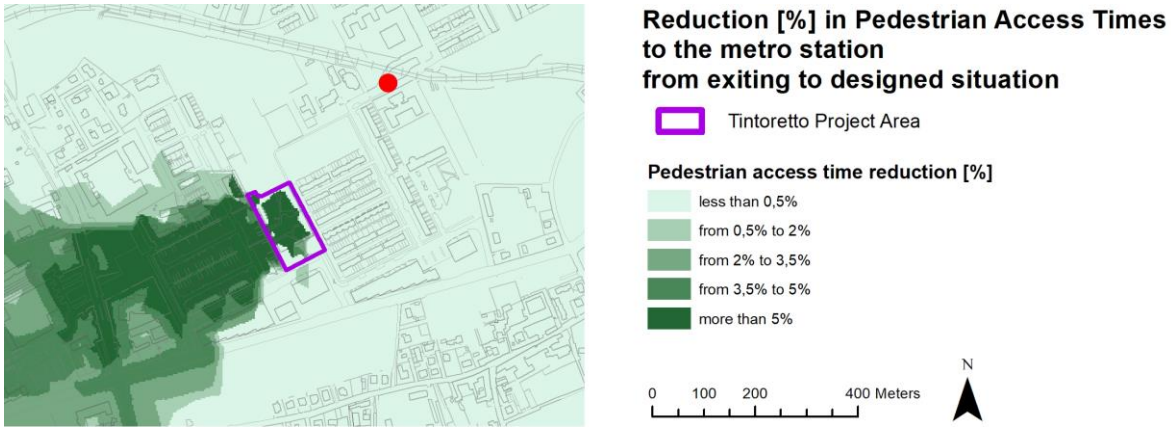


Fig.5 Percentage reduction in pedestrian access times to the metro station

Focusing on the existing distribution of services, activities and structures within the San Polo Cimabue district, southern area, Figure 6b shows a fairly rarefied and single-issue service system (3 and 4 necessities shops). Therefore, the decrease in access times to the west favours the proximity of 15-20 minutes to the greater number of services in the adjacent San Polo park district.

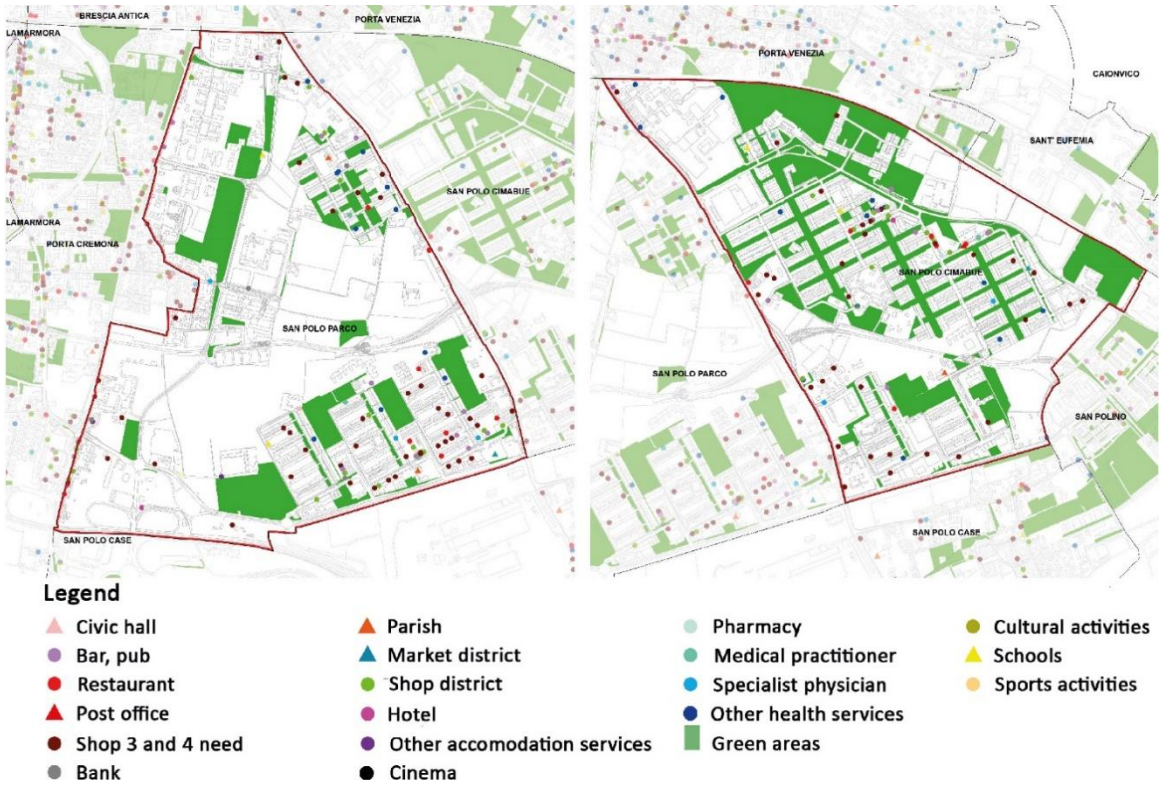


Fig.6 Services, activities and facilities within San Polo Cimabue district (right), where unit Tintoretto tower is located, and within adjacent San Polo Parco district (left)

However, to provide a real enhancement that moves towards a 15 minutes city model, interventions on the pedestrian infrastructures should not be limited only within the implementation boundary of the unit Tintoretto tower, but also involve the surroundings. For instance, Fig.7 clearly shows some existing pedestrian paths and links adjacent to the Tintoretto implementation area, which need a redesign to boost the impact of the regeneration project on the surroundings.

Fig. 7 Adjacent inadequate pedestrian paths and links

5. Discussion and conclusion

The present contribution presented a time-space assessment to evaluate the effects of local urban regeneration projects on people-and-climate-oriented goals, specifically in pedestrian mobility and behaviour. The assessment framework consists of a GIS analysis based on a detailed discretisation of urban areas in a uniform grid of cells, on which a "backtracking" algorithm is applied. The algorithm optimises distances by determining the pedestrian path with the shortest space-time distance (i.e., isochrones). Applying it to the case of the unit Tintoretto tower in Brescia, the analysis ex-ante and ex-post show the variable walkability scenarios in public open spaces. The results demonstrate the validity of the method in quantifying the positive (or negative) effects, both punctual and synergistic, of an urban regeneration project on walkability scenarios. However, the proposed method highlights three controversial facets.

Firstly, the assessment framework could be useful to verify the achievement of sustainability goals in ordinary practices. However, the integration between analysis tools and urban planning and design strategies is still poorly applied. The evaluation of urban regeneration effects on accessibility (e.g., pedestrian, cyclist, etc.) and monitoring changes through time seems not integrated into the administrative routine. Therefore, how do administrations know if the proposed intervention pursues its sustainability objectives? Or how do they plan actions for the 15 minutes city? The significant theme of "how to make a city" remains today divided between theoretical, technical and practical issues. If on one hand the research on how to create pedestrian-friendly and thriving urban environments is dense and consolidated, on the other hand, there is a lack of innovation on how to actually implement the research knowledge in the planning and design practice of urban administrations. Therefore, a transfer of solutions and skills from research to operational practices is still necessary to bridge this implementation gap. For instance, the proposed method could provide a framework in urban planning for decision support in SUMPs and can be replicated in several territorial contexts.

Secondly, the subject of how and what to measure is still vast. The method utilises isochronic curves characterised by equal temporal amplitude, which identify a contour of pedestrian catchment area from/to a given origin/destination point. However, the space-time analysis is still focused generally on buffer tools, which cannot consider real permeability (e.g., presence of limits). In terms of isochronic analysis, the contribution could be improved through further qualitative and quantitative factors (e.g., pedestrians and vulnerable road users). The complexity that characterises the daily needs of the population is highlighted, influencing their behaviours, modal choices and systematic and non-systematic movements. Therefore the good 'measure' of the people-and-climate oriented city (or the 15 minutes city) must pass through the collection and cataloguing of increasingly refined data: direct observations, surveys using GPS devices for tracing real routes, simulation models for construction behaviour-based mobility scenarios and schemes.

Thirdly, the analysis seems to focus on a circumscribed area. However, the results prove how each urban regeneration project could be a "springboard" for further systemic mutation of urban spaces of cities. In particular, they highlight the importance of the local scale and social and spatial structures in the interventions

on the existing city, for which a widespread regeneration of proximity is hypothesised as a prospect of greater concreteness.

Finally, the results framework reflects the proactive importance of analysis tools for public space's systemic regeneration strategies towards "streets people-and-climate oriented", both for public administrations' sustainable mobility policies and users' specific needs. This is also particularly relevant in the Covid-19 pandemic, in which several cities are reinventing and regenerating neighbourhoods to promote the 15 minutes cities. Although this theme of temporal proximity is often dealt with in a sectorial way, it is actually intimately connected with the challenges of environmental sustainability, the energy transition, resilience, inclusion and social equity and the quality of life. In particular, soft mobility, walking and cycling, properly integrated with the public transport system, should be at the heart of transport policies and of the public agenda for a more sustainable urban environment, being an answer (even if partial) to problems such as oil dependence, air pollution, urban decay, but also a tool to improve personal health conditions. To achieve a higher share of more sustainable travel in the urban environment, walking has to be made an 'attractive' alternative to motorised transport over short distances and an integrated mode of travel with an efficient public transport system in the city. And this happens if the urban environment is safe and pleasant environment.

However, in the contemporary city, there is still often a lack of quality public spaces. Walking in this city is sometimes difficult and even dangerous. Streets and squares are occupied by vehicles, sidewalks are barely wide enough for a pedestrian, or occupied by parked vehicles, waste bins, traffic signs or billboards. In these conditions, even trees planted along the pavement or public drinking fountains become difficult for pedestrians. The result is an urban landscape poor in aesthetic qualities, and the result is a city poor in the qualities of urbanity, attractiveness and beauty of public space. A city lacking in life, a city to be re-generated to enhance the quality of life of its inhabitants.

Therefore, urban regeneration interventions in the suburbs should be pursued primarily by redeveloping, designing and building quality public spaces and encouraging soft mobility, as is happening in the case of the Tintoretto area in Brescia.

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Image Sources

Figg. 1-5: Comune di Brescia;

Figg. 4-6: Made by the authors;

Fig. 7: Google Street Map.

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