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Sustainable mobility and beauty of public space

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Abstract: The quality of built environment is linked to the space in-between buildings and considers its formal, environmental and use values, due to specific needs for care and project re-appropriation. Sustainable mobility, a strategic objective of the European Union, cannot ignore the quality of the public space. The New European Bauhaus draw a new strategical attention to the critical role the quality of spaces plays in building a better world. The definition of space for active mobility as environmental islands, sidewalks, pedestrian areas, cycle paths or green ways, must follow morphological, functional and organizational needs. The beauty of the space starts from a new language of the street, through qualifying the places and avoiding a passive crossing for the transport logic, but satisfying a need that goes beyond our material dimension and is inspired by creativity and culture. This qualification is represented here in the case study of an Italian Biciplan as a sector plan able to build inclusive and accessible physical spaces for the community. The lack of attention of technicians in the execution of public works leads to reconsider the importance of these issues also in education and training. The fragmentation of technological knowledge must be recalibrated to provide useful tools without forgetting the quality and the overall beauty of the places when street language improve, also for cultural reason.

Keywords: Sustainable mobility; Public space; Urban beauty; Urban quality; Urban regeneration; Accessibility.

1. Introduction

The quality of the built environment depends not only on the identifiability and beauty of the individual building, but also on the definition of conscious choices in the in-between spaces, as the public space between the buildings. A greater awareness of the designers and technicians who work on public spaces is desirable if we want to respond to the new European Bauhaus[1], as understood by the European Community. In the new European Bauhaus it is finally clear that the design component of the material environment we live in, changes our way of thinking, acting and being in the world (Sacco, 2006).

Intervening on the design of cycle networks and infrastructure means looking at active mobility design as an opportunity to improve the idea of public space. Intervening on the language and psychology of the road, and on its cultural potential, could improve the quality of life and the awareness of young generation. If the physical environment produces an extended social mind or a physical environment that changes thinking and individual behaviour also changes the collective one in which we act.

At European level programmes support the vision of creating more liveable urban spaces. By fostering innovation and transformation, Europe wants to improve people's quality of life, decarbonise mobility and make Europe's economy more competitive, through New European Bauhaus, an environmental project, economic and cultural that aims to combine design, sustainability, accessibility, to contribute to the creation of the Green European Deal[2].

2. Integrated approach to liveable city

Three trends will shape the evolution of mobility European cities: decarbonisation, demand and digitalisation. The cities of today face challenges of climate change, air pollution, traffic accidents, noise, accessibility and managing urban space, among others. European vision for mobility in our cities is focused on people, aim for a future in which people live and move in a healthy environment. The public space through its architectural soul, services, and variables related to safety, usability and comfort, identify the indicators of highest incidence in relation to the quality of the urban context.

Many of the problems of Italian cities derive from traffic and its impact on time, air and the quality of people's spaces (Pucher, 2003). The two main reasons that make the weight of traffic on the general road network unsustainable are:

1. The excessive availability of parking that makes the car the main competitor with regard to the transport system and mobility in general, and engulfs the public space between parking lots and passages;

2. The limited safety conditions in which the cyclist and pedestrian traveling through the city find themselves, depending both on the perception of safety and on the real possibility of moving without risks deriving from vehicular traffic.

The policy of increasing the network equipment for public transport and cycle paths do not necessary increase the use of sustainable mobility and the disincentive to the use of the car. In reality, no sustainable means of transport can compete with the car as long as it can park and get anywhere at no cost: on this point Italy must try to imitate other European countries such as Holland and Denmark, and the new urban policies of cities as Barcelona and Paris.

Holland's example of excellence starts from a different cultural and historical bases from the Italian one. After the car boom in '60 in over Europe, a "stop kinder morten" strong movement developed from below wanted more safety on the road for children's autonomy. Since then the roads have been redesigned for active mobility, with a 60% use of the bike and an urban quality and the language of the road attentive to everyone.

In Barcelona Salvator Rueda imagined a city no longer dominated by cars, but by public spaces used by pedestrians and cyclists and organized around the so-called "superillas", a Catalan term that means "superblocks", that is pieces of the city where cars are not welcome. Rueda's plan is ground breaking because it aims to make Barcelona the world's first big "post-car" city, with some experimentation in the city.

This examples shows the best liveability derives from the sharing of space, rather than segregation (Figure 1). The protection implemented through the division of space in the lanes is counterproductive in the city, because it gives public space to the car, relegating families and cyclists to minimum lanes, without improving the security of weak users in any way. The answer to a complex problem such as the incentive of active mobility cannot be reduced only to the design of a greater number of cycle paths, because in some cases, due to the small size of the roads, these are done on the sidewalk, taking away space for quality, public space and the active mobility of pedestrians.
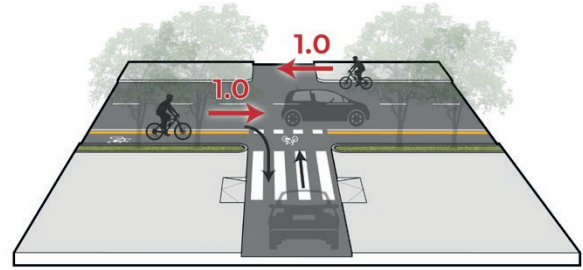
Safety for pedestrians and cyclists is achieved instead by raising the level of attention of motorists and therefore, again, with the sharing of the road and a new and more
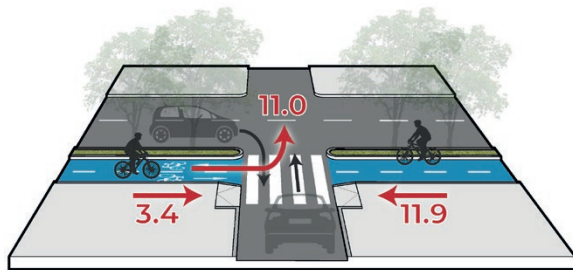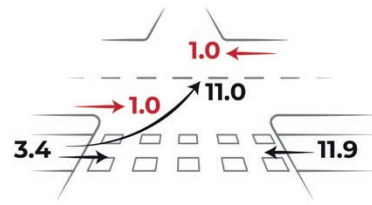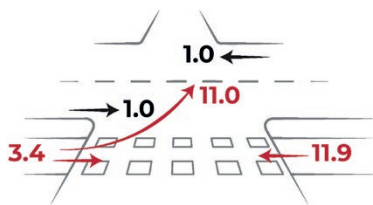
Figure 1 | Road safety study: sharing space increases safety for weak users.

beautiful language of the public space that helps to reduce speed, especially where there are path interference. In this sense, the training of technicians who respond not only in a transport sense to the demand for active mobility is also important.

The morphological, functional, and organisational criteria of the open space are no longer deciphered as a negative sphere in the urban fabric but elected as a generating element (Mussinelli 2018).

3. Sustainable mobility and quality of the streets: the case of Pescara

Pescara BiciPlan (L. 11/01/2018 n. 2) intends to move within the ambitious European objectives, working not on cycle paths but on open public space and active mobility.

The work developed started with a mapping of the cycle and pedestrian routes present in the area to read and connect them, solving the nodes and criticalities, to define a continuous and coherent network. New form of promotion and liveability of the territory were then defined in systematic home/school and home/work trips and in the discovery of recreational tourist itineraries

and in the context of trips related to daily activities. In the medium term, the widespread cycle network was identified by connecting the more peripheral places and the hills, integrating it with the regional and provincial level network, with the main traffic attractors at the local level, with the public mobility system, with the elements of social, historical, cultural and tourist interest of public use and with environmental islands in residential districts (Krizek 2006).

The Biciplan strategy provides for the integration of the widespread network of paths for active mobility in wider urban redevelopment/regeneration actions of public spaces with interventions to moderate speed and increase the resilience of the territories and widespread urban redevelopment.

3.1 Strategies and actions for the quality of public space

The actions are focusing on strengthening the infrastructure endowment, providing a network of routes completed and supported by an adequate network of intermodal exchange parking lots (Figure 2) and service equipment (racks, bike parking lots), and in particular of
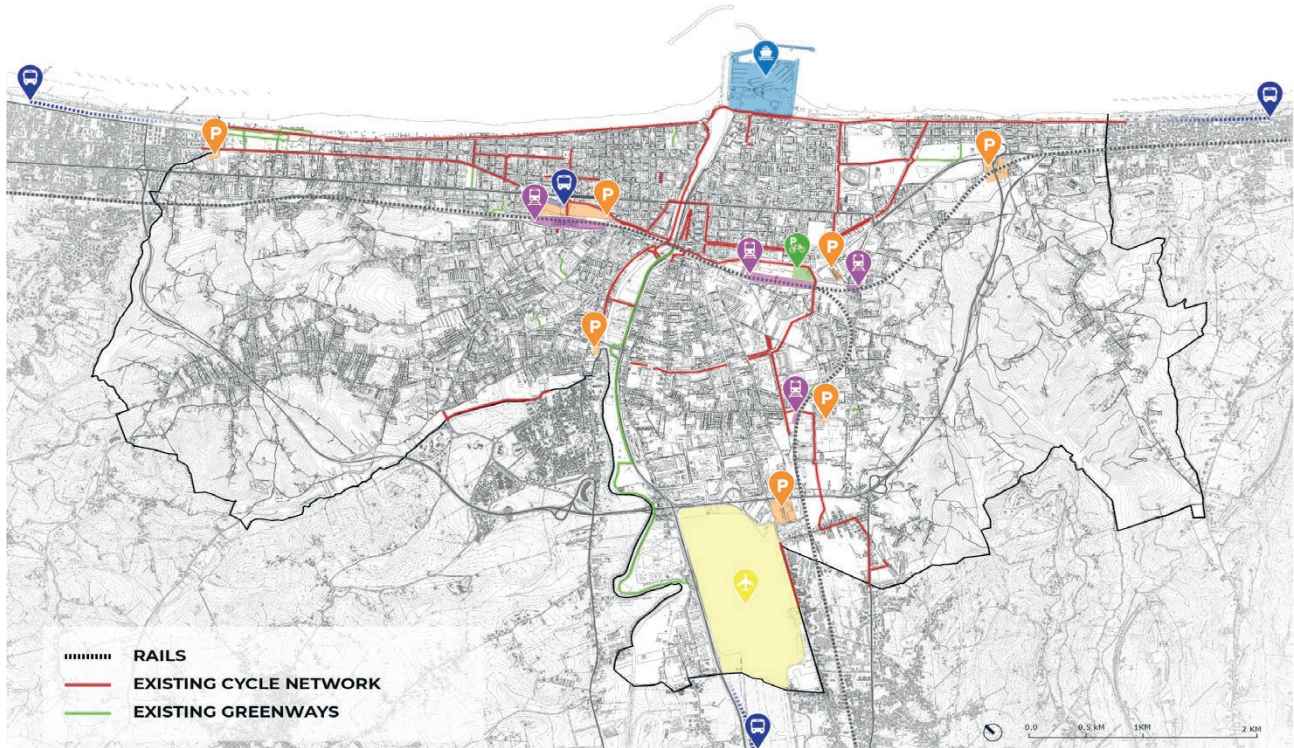
Figure 2 | Intermodality and exchange parking lots.

a hardware component (urban network) and software (communication, participation, training).

The specific actions are:

- strengthening of the dedicated infrastructure network (with the connections between the cycle paths, some completed, others in the executive phase),

- incentives for daily use for systematic home-work trips by bicycle (also thanks to the activation of bike trials, with prizes and incentives for the most active users already delivered),

- train-bike intermodality through the creation of a cycling station (at the Porta Nuova station) with 120 bikes for rent and internal parking,

- train-bike car-bike intermodality with the new central cycling with an agreement between the Municipality, RFI and Legambiente, with important equipment, eco-desk, bike parking and other services for mobility,

- the organization of awareness raising events and sharing of themes, the public discussion of strategies and the sharing of objectives,

- the implementation of intermodality through effective communications with the port (cycle path) and airport (reachable by bike),

- motivation and communication through four counters active on the main cycle paths (seafront, riverside, park road),

- the widespread strategy for the city through the installation of 10 eco-mobility points throughout the territory for charging parking and information related to cycling,

- the experimental motivational signs in the executive phase which will indicate the main cycle paths on the ground and with vertical signs, to recognize and motivate users.

Figure 3 | Wayfinding.

Figure 4 | Urban conurbation.

With a view to a prolonged post-emergency relaunch and coexistence with Covid of urban and peripheral areas, of proximity trade, which if recovered and relaunched makes the city safer, the strategy adopted allows the weakest users (elderly and under 18) to be able to move around the city in a continuous path that can lead safely to the nodal points of the city and of the individual neighbourhoods.

In order not to let this crisis go to waste, Pescara relaunches accessibility to peripheral areas of collective and neighbourhood importance, to increase the quality of sociality, albeit at the right safety distance and improve the quality of life of the inhabitants (Pucher, 2003).

4. Contest and objectives

Pescara is a nerve centre of a larger metropolis which extends far beyond its administrative limits and which has a total of 300,000 inhabitants (Figures 4 and 5).

In recent years the city has begun to lose residents to the detriment of the neighbouring municipalities
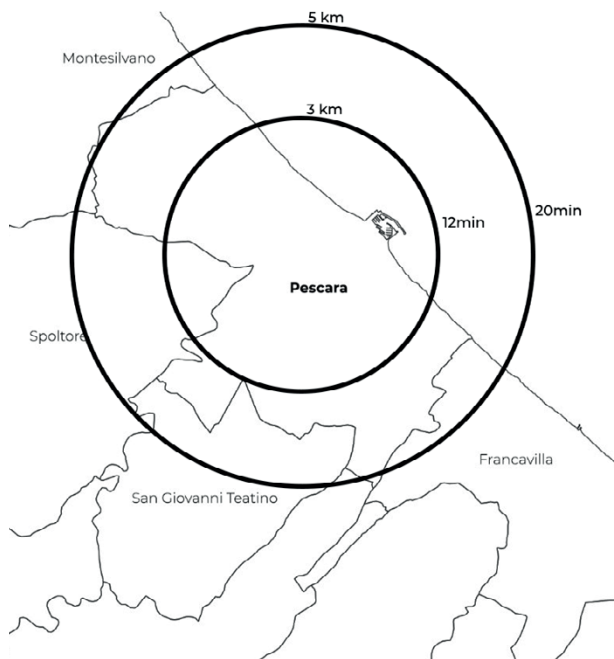
Figure 5 | Distances and borders.

represented by Montesilvano(6.7 km), Spoltore (6 km, with the hamlet of Villa Raspa which is part of Pescara conurbation), San Giovanni Teatino (6 km), Francavilla (6.7 km), Chieti (13 km) which have the greatest demographic growth of the Abruzzo Region.

The morphological conformation along the coast favours bike travel, the hills to the right and left of the river make it more difficult to reach the centre, but not impossible in axes that can be travelled with pedal assisted bikes. The basic philosophy that animates the planning choices of Pescara's BiciPlan starts with the enhancement of public space for the benefit of weak users, downsizing the importance of the private car when traveling, in favour of the quality of the space shared safely by the inhabitants.

4.1 Displacement and poles

Despite the great tradition of Pescara in the use of bicycles, thanks to the morphology of the territory, the presence of the coast, and its territorial development, only few inhabitants uses it for systematic movements within the city, also for cultural and habits. The city of Pescara has more than 80% use of the private motorized vehicle for daily commuting, a use of bicycles still of a few percentage units and of public transport of less than 10% (Istat 2011). These data illustrate a single-modal city in which the set of all sustainable modes (public transport, pedestrian and

cycling) does not reach one fifth (20%) of the entire daily mobility, with all the consequences and impacts on the urban system (pollution, noise, congestion, accidents, occupation of public land by vehicles, etc.).

The logic of a sustainability-oriented vision considers the city to be reachable by active users, because everyone has the right to move safely first of all pedestrians, then bicycles, buses and finally even cars. A medium-term vision is needed, in a strategic metropolitan dimension, considering all modes of transport (pedestrians, bicycles, public transport, private vehicles, parking), in multimodal mode.

4.2 Specific objectives

The city must be made safe and on a human scale, to improve liveability and quality of life through the strategies of:

1. Security improvement

2. Intermodality within the different modes of transport

3. Traffic moderation for greater safety and widespread cycling suitable for all users.

Based on the reconstruction of the state of affairs and the superordinate plans, the vision already envisaged by the PUMS is to increase the total movements made from, to, to Pescara from the current 2% to more than 10% by 2031.

The general objective is therefore aimed primarily at increasing active travel and not only at defining a greater number of chilometres of cycle path through an increase in the modal split in the daily movements of inhabitants and city users.

To achieve this vision, it is necessary to (Figure 5):

1. Resolve the mayor conflicts that generate accidents

2. Define a continuous and safe network of cycle links between the attractors of the city (primary network) and a network of secondary connections;

3. Define the recognisability of the routes and of the connection routes through a recognizable and identifiable Cyclopolitan network;

4. Define natural environmental islands within residential areas, in which different modes of transport at moderate speed coexist in a substantial sharing and improvement of a quality public space.
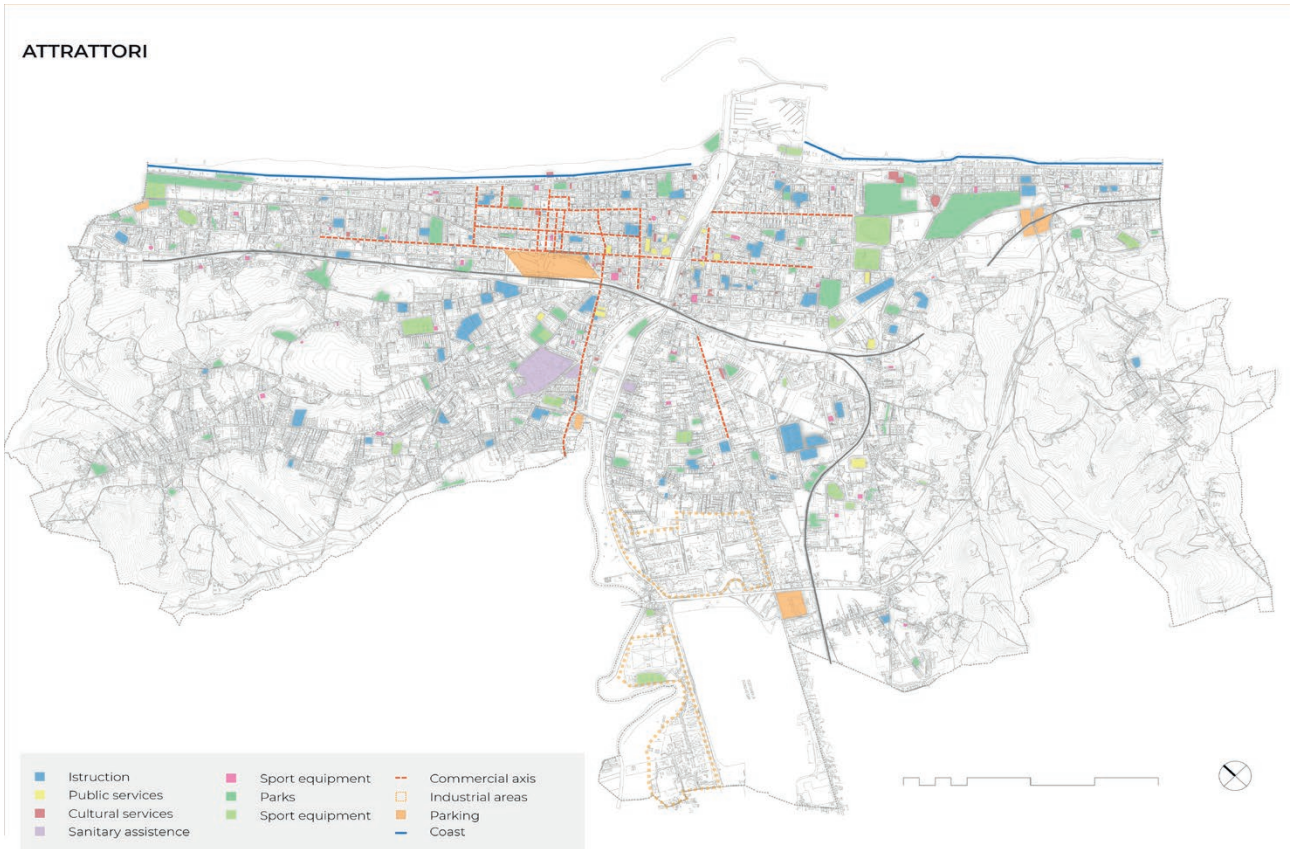
ATTRATTORI

■ Istruction	■ Sport equipment	--- Commercial axis
■ Public services	■ Parks	□ Industrial areas
■ Cultural services	■ Sport equipment	■ Parking
■ Sanitary assistence		— Coast

Figure 6 | Urban attractors.

a. Safety of roads

b. Primary cycle network

c. Traffic moderation

d. Secondary cycle network

Figure 7 | Urban Strategies.

5 km

3 km

2 km

1 km - 4 min   8 min

500 m - 2 min   12 min

20 min
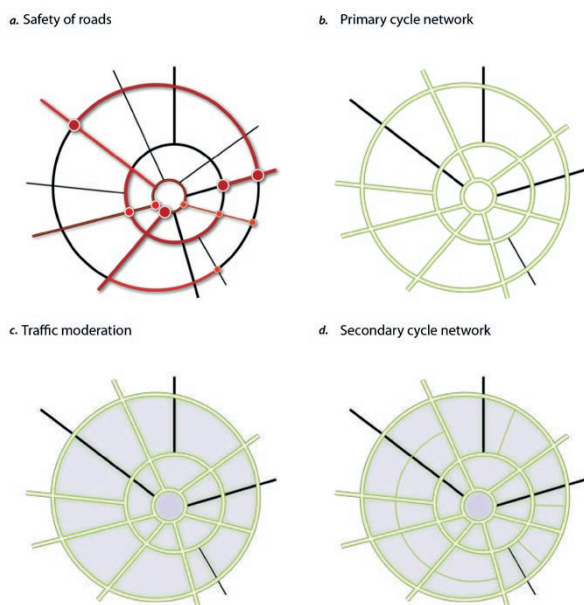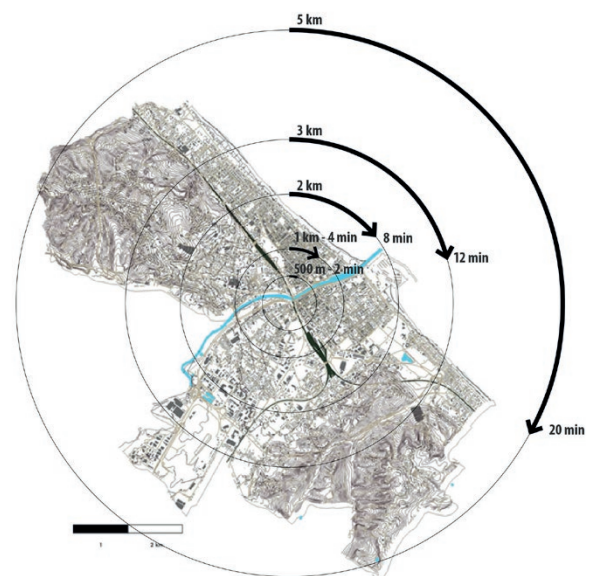
Figure 8 | Urban distances.

Figure 9 | Pescara Cyclopolitan.

Within the general objectives there are specific objectives that aim to experiment with new living solutions, to be shared with the inhabitants for demonstration projects on which to set up participatory and demonstrative actions. They concern, for example, the increase in the cycle network from the current 35 km to a development of 50 km, which, however, do not only concern linear development, but also environmental islands in which the space of the road is shared and the language is aimed at slowing down flows. Another theme is to adopt a proactive approach to the safety of cyclists and pedestrians, reducing the speed of vehicular traffic along the axes of the cycle network and at the nodes, through physical traffic moderation interventions, to significantly reduce the number of accidents with deaths and injuries between weak users (pedestrians, cyclists, children and over 65s).

Another fundamental aspect concerns the Cyclopolitan, which allows the inhabitants to move along a recognizable path and which identifies crossing points and arrival points in a clear and safe way. The Definition of a Cycle Network as an integrated system of routes created according to homogeneous solutions that comply with the requirements of recognisability, usability, continuity and safety, which also see internal cycle-parking lots near

the attraction poles to reduce the risk of theft (schools, hospital, university,).

The adoption of communication campaigns and promotion of cultural events on the theme of cycling targeted for the different target groups, with a focus on experimentation with environmental islands, becomes a fundamental objective to reduce the number of those who use the car. Strategies aimed at favouring proximity services and connections of an economic and cultural nature and at improving public space and supporting social and commercial relations in the urban centre also go in this direction, also starting from the enhancement of some road routes that cross the city.

The work priorities identified and to be shared with the PA and with stakeholders are:

1. Physical separation of flows along the main routes of vehicular traffic and use of new legislative tools for sharing spaces (cycle lanes) for all other roads;

2. Making the existing infrastructural network safe by re-stitching the discontinuities of the crossings and fine-tuning the subsystems;

3. Interconnections and permeability of cycle paths through projects to improve the passages between different roads to make the network open and widespread;

4. Networking of existing cycling systems;

5. New tracks and cycle lanes for the main axes of the Cyclopolitan;

6. Environmental islands and traffic calming in residential neighbourhoods and areas with mixed land use and functions;

7. School roads (with response interventions of internal parking spaces and accesses), close dialogue with school Mobility Managers;

8. Cycling stations near the main intermodal transport hubs (stations, airport port);

9. Bike BOX and other bike parking points at the main attractions.

10. Interlocution with Mobility Manager

5. Demand and supply of quality public space

In the process of designing the road as a space for everyone, it is necessary to evaluate the demand and needs of active mobility, define adequate interventions to satisfy it, manage the impacts on other modes of transport as well as the priorities for intervention. An uncritical transposition of the transport models traditionally applied for motorized mobility, including cycling, may be inadequate for several reasons, but above all because the behaviour of cyclists and the matrix of needs/performances associated with the different categories of users is not yet perfectly included (Giuliani et al. 2018).

For example, assuming that the choice of the route of an urban network is fundamentally linked to the travel time is an acceptable simplification for cars, but unable to reproduce the choices of cyclists and pedestrians who seem to depend on a plurality of factors that are not all easily decipherable.

Even the simplification of the O/D origin destination matrices seems to respond to the needs arising from a daily home/work, home/school journey, but is nullified by the latest ISFORT 2020 analyses[3] which identify only 1/3 of bike trips as systematic, defining instead the majority of trips, or the remaining 2/3 as unsystematic or family mobility.

There is a certain consensus on the fact that some demographic and territorial variants are easily correlated to the observed cycling flows, while the same cannot be said for the descriptive variables of the infrastructures and policies for cycling. Some large differences in the demand for bicycle transport in different contexts can only be explained by historical and cultural factors that are not easily observable.

A possible classification of the main factors that determine the demand for cycling is linked to factors (Bernhoft 2008):

(1) Demographic and economic

Many studies indicate a positive correlation between the use of bicycles for systematic travel and medium-low incomes, young age, student status, while a negative correlation occurs with high motorization rates, high socioeconomic level, high income and travel length.

(2) Environmental and spatial

The environmental and spatial variables that favour demand are the presence of a high quality cycling network, which in addition to reducing the risk of accidents, also mitigates the effects of traffic in terms of exposure to atmospheric pollution; the level of precipitation, temperature and wind also have an impact.

(3) infrastructural and urban planning

Infrastructural and urban planning factors, land use and urban design policies play an important role: cities with well-designed routes and short distances, with a mixed and compact urban development, seem to favour high cycling flows. The prevalence of segregated cycling itineraries over mixed ones does not always have a statistically significant impact, while some studies have found that the value of time for a cyclist is three times the value of alternative modes of transport.

(4) Attitudinal

The latent variables that reflect specific characteristics of the decision maker are need, values, taste. Due to the impact of various factors that influence cyclists' choices, many applications that suggest the best cycle route provide a variety of options, each based on each of these factors. For example, the path with the least slope, with the shortest distance, the safest, the most attractive, the least polluted, the greenest, etc.
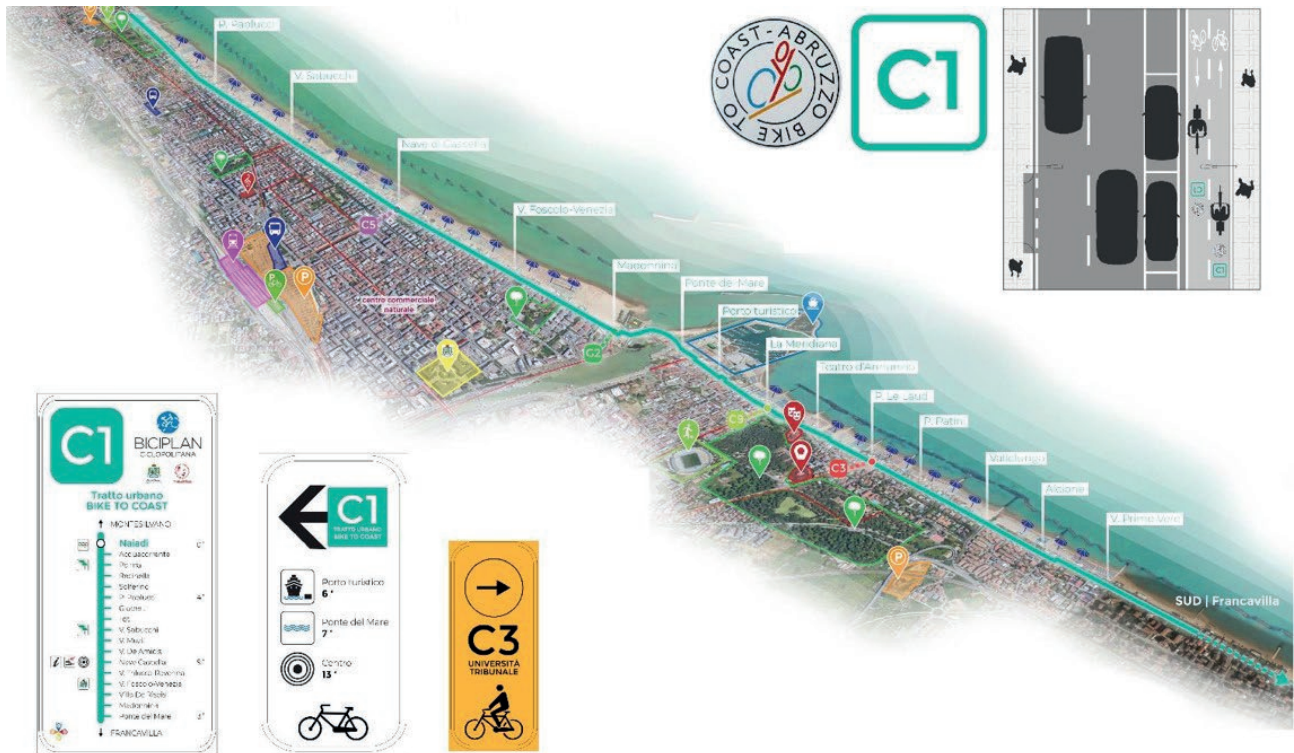
Figure 10 | Study on singular path.

The planning and design of cycling infrastructures are also confronted with two apparently conflicting needs:

1. A holistic approach to sharing urban space between pedestrians/cyclists and motorized vehicles by sharing space thanks to the adoption of traffic moderation systems. The reduction of the speed differential between motorized and non-motorized modes of transport induces a certain capacity for self-limitation of conflicts, with a consequent increase in safety and urban liveability.

2. An infrastructural separation approach that considers cycling as a separate and dedicated network.

The two modes of transport are considered incompatible. Having already outlined a strategic choice of the BiciPlan of Pescara towards the first strategy, of a holistic type, it is emphasized that the first is the only way to encourage the quality and beauty of the public space and the widespread use of bicycles (Asperges 2008). It is emphasized that there is no single solution to provide an adequate cycling infrastructure, but there is certainly a hierarchy of priorities of actions that must be evaluated before others:

1. Traffic limitation

2. Speed Moderation

3. Reassignment of the carriageway spaces

4. Segregation through a cycle path

5. Cycle and pedestrian use of sidewalks (to be avoided).

Surely covid gives us a city that is more open to neighbourhood services and active micro-mobility, which shuffles the cards on the use of vehicles a little, as the ISFORT 2020 research.

From the survey of the consistency of the existing cycle network, the graph of the municipal cycle network was defined with the identification of the various types of routes, potential critical issues, the main attraction poles. From the graph we have therefore tried to identify paths, or segments of paths, which could define a network divided into hierarchical levels, based on: type of cycle path, criteria such as origin-destination, type of movement served, the role of itinerary in the municipal and extra-municipal network, to the construction characteristics, etc.
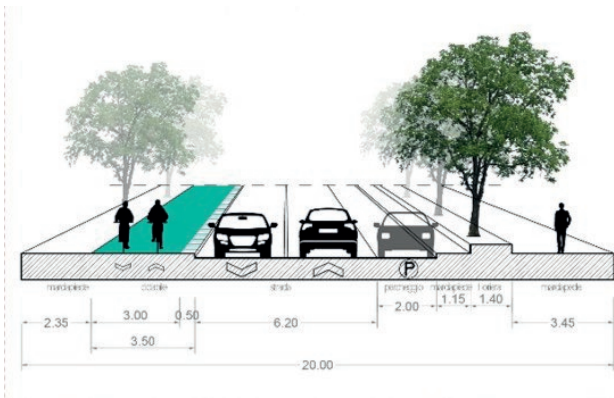
Figure 11 | Example of project section of C1.

Subsequently, the graph was divided into subsegments, corresponding to points considered significant:

- intersection with existing cycle paths

- possible new intersections

- significant and identifying places

- potential places for urban regeneration interventions.

From this analysis, a first approximation bicipolitan was defined, generated by the existing routes (both the complete ones and the segments connected and / or connectable to each other), following the example of the of the City of Pesaro. The identification of immediately recognizable paths identifies a hierarchy of the network not only of a spatial-functional type, but also a generator of social connections.

Aiming at a high architectural and urbanistic quality of the public space as a strategic axis for increasing the overall urban quality means instead operating with a unitary and systematic approach, aimed at protecting and enhancing first and foremost the environmental pre-existences, i.e. the historical-identity values, the works and artificial and natural artifacts that already characterize the open spaces of the city. Furthermore, the public space is an "equipped" space at the service of the community, made up of flooring, building curtains and arcades, services, systems, equipment, works of art and technical and functional artifacts that support use, flower beds, lawns, variously configured shrubs and trees. The design and management of these components must therefore be based on a principle of necessity, which means correct response to the demand for use, comfort and decoration,

ease of cleaning and maintenance, high durability, reliability and safety, integration and environmental efficiency, which define in a deterministic way the technical solutions to be adopted according to the improvement of specific performances (energy, ecological-environmental, maintenance, safety, accessibility, etc.).

The project represent the basic infrastructure for the development of a network of new attractors through the creation of a sense of belonging to the city and the territory, which in addition to the strategic objectives of increasing the existing cycle network, its safety and the connection with the collective mobility system must be an opportunity for urban redevelopment and regeneration processes, in particular for the portions that will go towards the periphery and the neighbouring municipalities.

6. Training needs

The results of the study conducted concur in the evidence of working on quality public space and on shared paths, even with technicians and inhabitants, through continuous training.

The "contributing causes" of accidents in the urban environment, in fact, are strictly related to the training/information sphere. On the same spaces there is the maximum heterogeneity of sharing, both the pedestrian, the public transport bus and the heavy vehicle that is delivering the goods can circulate: the different needs in terms of size and performance can determine situations of insecurity. Furthermore, the technical standards for road design are designed to allow motorized vehicles to move: all dimensional and performance standards refer to the motorized vehicle, resulting in fact more suitable for an extra-urban context, and causing confusion in the technicians who must respond in performance terms to the urban context. The Italian highway code is therefore focused on the automotive transport logic, effectively confusing the designer on the specific object of the project. Distractions and unsafe behaviour of all categories of road users can lead to dangerous situations and highlight the need for training and information also for road users.

These contributing causes make training and education policies increasingly urgent in the design of spaces for weak users, which are continuous and coherent, and which return information that is easy to decode for the various users. It is not always easy to make technicians and administrators understand that the roads must be welcoming, safe, attractive and dynamic. For this reason, the role and constant training of all categories of users

becomes fundamental because if we talk about cycle infrastructures we cannot think exclusively of the cycle path which is only one of the plausible solutions for traveling by bicycle. People are looking for be able to move actively not only in cycle path from A to B and then inevitably stops before C, but the certainty of being able to travel safely. For this reason, cycle paths are useful, but are only needed in certain cases, such as:

- Along the extra-urban roads, where bikes cannot share the road with cars.

- Along urban traffic roads, where, albeit in a city context, cars can move at 50 km /h.

Similarly, it is unthinkable to fill cities with cycle paths: narrow streets, parking lots and tree-lined avenues cannot disappear overnight just to make way for a cycle path. First of all, it is necessary to start from the safety of the road and not from how a cycle path is technically made, if with a concrete or travertine curb. The important thing is to guarantee the safety of movement for people and this goal in the vast majority of urban areas is achieved thanks to traffic moderation, i.e. infrastructural interventions that modify the layout of the road to force motor vehicles to adopt reduced speeds, and that restore space to conviviality, children's play and sharing among the inhabitants.

Traffic moderation is not implemented by inserting a zone 30 sign. To obtain a more liveable and safer street or neighbourhood, it is necessary to complete these actions with physical interventions on the road that require vehicles not to exceed certain speeds, and that give back space to activities and people (Figure 12).

From an infrastructural point of view, the urban road network must be re-conceived, re-organized and re-classified on two levels: a main road system intended for motorized vehicles (where pedestrians and cyclists can travel only in their own and reserved premises.) A secondary road network intended for vulnerable users, represented by Environmental Islands, areas in which vulnerable users have priority and there is maximum sharing of public space.

Training centre must respond to this call by teaching adequate tools and methods to students, and technicians already trained must be constantly updated in the awareness that around the buildings there are spaces that must be designed to meet the needs of the categories of users who use the road (Mastrolonardo, 2016).
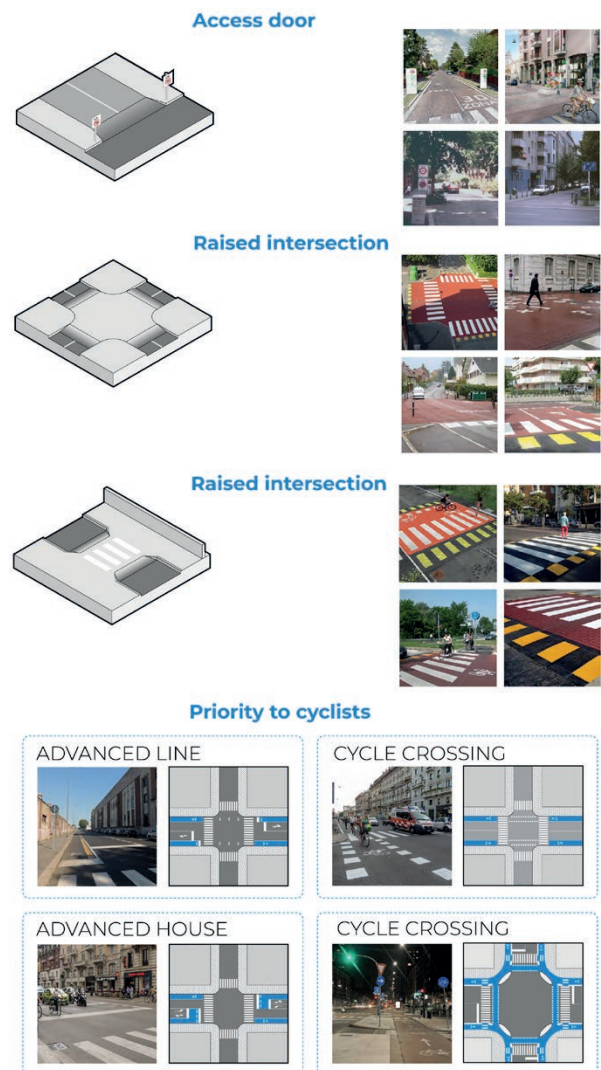

Figure 12 | Some example of semantics of the new language of the road for traffic moderation.

7. Conclusions

Environmental protection, health and safety, mobility and accessibility to services, to which the strategies for sharing the road are now added: these values embody the centrality of new emerging needs, ending up being config-ured as essential rights of proper planning. The concept of accessibility of public space, its tendency towards total fruition, have to innervate the multiple sectors of the indi-vidual levels of the local government. Environmental and urban planning and design, culture, training, mobility, psycho- physical well-being, technological innovation, work and security are the essential cornerstones aimed at ensuring a widespread diffusion of places and flows.

The real challenge is to start to think at the disciplines of the project as tools of socio-behavioural change for the public interest, making us more responsible in relation to the environment around us, starting with a revolution in the semantics of the language of the street. The quality and beauty of our city also passes through here.

Acknowledgments

Notes

[1]   New European Bauhaus.

[2]   Green Deal europeo, Bruxelles, 11.12.2019 COM(2019) 640 final.

[3]   Rapporto ISFORT 2020, [WWW document]. https://www.isfort.it/wp-content/uploads/2020/12/RapportoMobilita2020.pdf (accessed 20 October 2021).

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