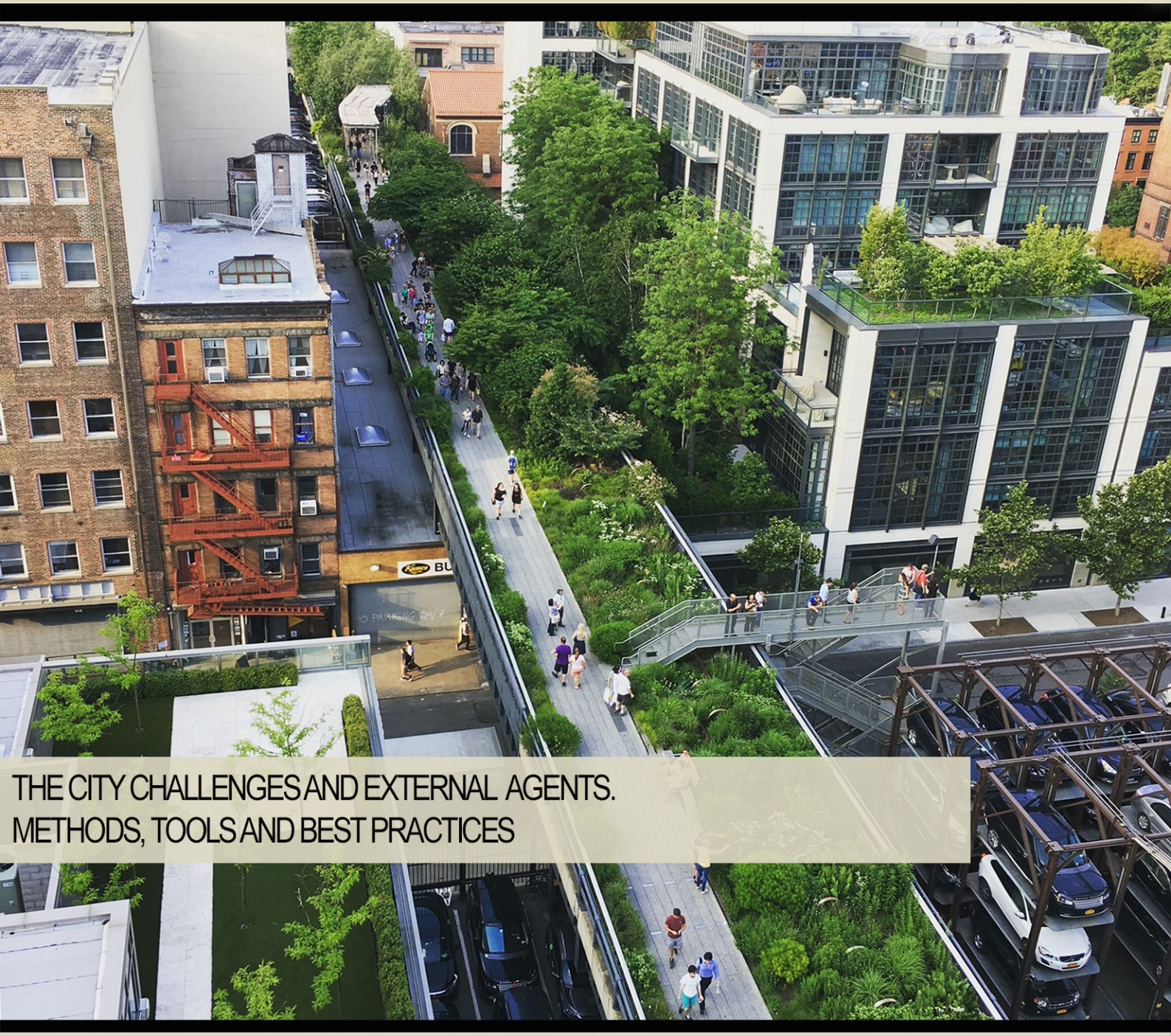
TeMA

Journal of Land Use, Mobility and Environment

Cities need to modify and/or adapt their urban form, the distribution and location of services and learn how to handle the increasing complexity to face the most pressing challenges of this century. The scientific community is working in order to minimise negative effects on the environment, social and economic issues and people's health. The three issues of the 14th volume will collect articles concerning the topics addressed in 2020 and also the effects on the urban areas related to the spread Covid-19 pandemic.

TeMA is the Journal of Land Use, Mobility and Environment and offers papers with a unified approach to planning, mobility and environmental sustainability. With ANVUR resolution of April 2020, TeMA journal and the articles published from 2016 are included in the A category of scientific journals. From 2015, the articles published on TeMA are included in the Core Collection of Web of Science. It is included in Sparc Europe Seal of Open Access Journals, and the Directory of Open Access Journals.



THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES

Vol.14 n.1 April 2021

print ISSN 1970-9889 e-ISSN 1970-9870
University of Naples Federico II

TeMA Journal of
Land Use, Mobility and Environment

THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES

1 (2021)

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

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

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

Editorial correspondence
Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples
web: www.tema.unina.it
e-mail: redazione.tema@unina.it

The cover image by Huaisi Cen | 岑怀斯 (Pinterest).

TeMA. Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include: engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science and complex systems.
With ANVUR resolution of April 2020, TeMA Journal and the articles published from 2016 are included in A category of scientific journals. From 2015, the articles published on TeMA are included in the Core Collection of Web of Science. TeMA Journal has also received the *Sparc Europe Seal* for Open Access Journals released by *Scholarly Publishing and Academic Resources Coalition* (SPARC Europe) and the *Directory of Open Access Journals* (DOAJ). TeMA is published under a Creative Commons Attribution 4.0 License and is blind peer reviewed at least by two referees selected among high-profile scientists. TeMA has been published since 2007 and is indexed in the main bibliographical databases and it is present in the catalogues of hundreds of academic and research libraries worldwide.

TeMA Journal of Land Use, Mobility and Environment

THE CITY CHALLENGES AND EXTERNAL AGENTS. METHODS, TOOLS AND BEST PRACTICES

1 (2021)

Contents

REVIEW NOTES

TeMA Journal of Land Use, Mobility and Environment

TeMA 1 (2021) 69-92
print ISSN 1970-9889, e-ISSN 1970-9870
DOI: 10.6092/1970-9870/7716
Received 4th February 2021, Accepted 25th April 2021, Available online 30th April 2021

www.tema.unina.it

Bicycle and urban design. A lesson from Covid-19

Nicolò Fenu

University of Cagliari, Department of Environmental Civil Engineering and Architecture, Cagliari, Italy
Sardarch spin off UNICA, Cagliari, Cagliari, Italy
e-mail: nicolofenu@gmail.com
ORCID: https://orcid.org/0000-0002-2571-3459

Abstract
The central role of the car in city mobility has led to a decreased capacity for people to choose another alternative form of mobility. In recent decades, some cities have set policies where cycling has become increasingly important. Urban mobility policies in response to Covid-19 have reinforced this perspective. Throughout the analysis of urban bicycle studies, the paper investigates the role of mobility for society and the design of our cities? What the role of sustainable mobility, in particular how the bicycle is addressing the Covid-19 emergency. During and after this emergency, the use of the bicycle addresses urban quality and liveability for spaces. The research studies the urban policies of 5 cities: Barcelona, Bogota, Brussels, Milan and Paris and analyses the measures implemented during the first lock down, since February 2020 to May 2020. In all cities studied, the bicycle modal shares and the bicycle infrastructure has increased. Covid-19 allowed the bicycle to prove it is the safest, most efficient urban mode of transport. The action carried out, in the cities studied, affected not only on the hard aspects reshaping the cities with permanent and temporary solutions but also on soft aspects acting on people's perception and use and choosing how to move. Transport studies and policies involving bicycles are not just 'about cycling', but about sustainable, productive, and prosperous cities.

Keywords
Bicycle urbanism; Urban design; Covid-19 and city.

How to cite item in APA format
Fenu, N. (2021). Bicycle and urban design. A lesson from Covid-19. *Tema. Journal of Land Use, Mobility and Environment*, *14* (1), 69-92. http://dx.doi.org/10.6092/1970-9870/7716

1. Introduction

Recent studies reveal the statistical correlation between Covid-19 mortality rates and long-term exposure to fine particle matter. Long-term exposure to air pollution increases vulnerability to experiencing a more serious Covid-19 consequences (Wu et al., 2020). There is an urge to intervene in order to counteract climate changes and the alteration of ecosystems that might trigger new and unexpected threats to human health, such as of Covid-19 (Setti et al., 2020).

Combustibles used for transportation generate more than half of the nitrogen oxides emitted in the world and an abundant proportion of particle matter, posing a significant threat to human health, particularly in urban areas (World Energy Investment 2017, Watts et al., 2019).

In 2005 the World Health Organisation released the *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide* (WHO, 2005) the guidelines indicate values PM2.5: 10μg/m^3 annual mean; 25μg/m^3 24-hour mean; PM10: 20μg/m^3 annual mean 50 μg/m^3 24-hour mean[1].

In 2016, an estimated 4.2 million premature deaths were caused by air pollution; 91% of the world population was living in areas where the WHO guidelines' levels were not satisfied, and more than 83% of cities did not meet the WHO guideline regarding environment PM2.5 concentrations (Watts et al., 2019)

In 2015, during an informal meeting, the ministers for transport adopted a declaration on cycling where they engaged in integrating cycling into multimodal transport policy, including smart mobility, stressing the need to promote physical infrastructure and behavioural change programs. EU Member States developed an EU level strategic document on cycling various, among them several states developed and implemented policies to increment targets for cycling, France's target to triple by 2024 and a vast number of states envision doubling cycle use by 2030 (Küster, 2019).

During the Covid-19 lock-down[2], in order to allow people to move around cities to reach their workplaces, essential daily needs or provide assistance to vulnerable people. The World Health Organisation (WHO) has released technical guidance on moving around during the Covid-19 outbreak. The guidance promotes cycling and walking to limit physical contact to prevent and slow down the pandemic. *Whenever feasible, consider riding bicycles or walking; this provides physical distancing while helping to meet the minimum requirement for daily physical activity, which may be more difficult due to increased teleworking, and limited access to sport and other recreational activities* (WHO, 2020).

Since the beginning of the Covid-19 pandemic, several scholars (Fenu, 2020; Kang et al., 2020; Lai et al., 2020; Pisano, 2020) have been trying to investigate the dynamics of the pandemic in urban and rural areas to understand the consequences of Covid-19.

According to Sharifi and Khavarian (2020) there are four major themes explored by researchers:

1. environmental quality;
2. socio-economic impacts;
3. management and governance;
4. transportation and urban design.

Murgante et al. sustain that the policies based on urban regeneration, sustainable mobility, green infrastructures, and ecosystem services play an important role in enhancing a more sustainable scenario that can support the quality of public health (2020). Furthermore, architects and urban designers role is fundamental to introducing new solutions to guide the development of urban spaces towards more inclusive

[1] PM10 is particulate matter 10 micrometres or less in diametre, PM2.5 is particulate matter 2.5 micrometres or less in diametre. PM2.5 is generally described as fine particles. By way of comparison, a human hair is about 100 micrometres, so roughly 40 fine particles could be placed on its width. PM10 represents the particle mass that enters the respiratory tract and, moreover, it includes both the coarse (particle size between 2.5 and 10 μm) and fine particles (measuring less than 2.5 μm, PM2.5) that are considered to contribute to the health effects observed in urban environments.

[2] February-May 2020

and socially results (Melone & Borgo, 2020). This crisis highlights the need for a significant reflection on the value of the urban environment and how it is managed (Angiello, 2020; Sharifi & Khavarian-Garmsir, 2020).

Fig.1 Who Covid-19 guidelines.

The research is placed within the context of transportation and urban design. In more general terms, the paper questions: what is the role of mobility for society and the design of our cities? What is the role of sustainable mobility, in particular of using bicycles addressing the Covid-19 emergency? During and after this emergency the use of the bicycle can give answers addressing urban quality, liveability for spaces in our cities.

2. Cycling as a transport mode

Walking and cycling are most typical forms of active transportation. Cycling as a mode of transport is an not expensive, health-improving, environmentally friendly and an alternative to automobile (Karanikola et al., 2018; Chen et al., 2012). In economic studies, extensive literature shows the impact of cycling on health, resulting in financial benefit. The shift from car to the bicycle could save 150g of CO_2 per kilometre. The car compared to the bicycle saves 1 kilogram of CO_2 every 7 km. Dutch people, within five years, prevented 1.41 million tonnes of CO_2 each year through cycling. This saving is equivalent to 54.4 million trees being planted each year (UN ENVIROMENT, 2019).

The administrations in many cities are undertaking the process of creating more bicycle-friendly urban environments (Fishman, 2016).

Survey data from the Eurobarometer 422a in 28 EU Member States published in 2014, shows that 8% of all trips made are done by bicycle: the highest figure being for the Netherlands (36%), Denmark (23 %), Hungary (22 %), Sweden (17%) and Finland (14 %). Belgium (13%), Germany (12%); Slovenia 9%, Czech Republic 8%, Romania, Poland, Lithuania and Slovakia 7%; Latvia, Croatia and Italy 6%; Estonia (5%) France, Austria Bulgaria 4%, Spain and UK (3%), Luxemburg (2%), Greece and Ireland (2%), Cyprus and Portugal (1%), Malta (0%) (E.C., 2014).

The Dutch experience is significant as almost 50% of the population made a cycling day trip of an hour or more. 22% of the bicycle day trips are undertaken on a Sunday and 19% on Saturday. The majority (59%) of the bicycle day trips are started directly from home or you cycle to the starting point of the route (26%). In 8% of bicycle day trips, the car is used to go to the starting point of a route. In 2018, bicycle hubs were used in 13% of bicycle day trips. That is almost 25 million bicycle day trips using junctions. Junction use is highest among cyclists who travel between 40 and 75 kilometres, during over 40% of bicycle trips of this length,

junctions are used. A city bicycle is used during 44% of the recreational bicycle tours and an electric bicycle during 32% of the bicycle tours (Fietsplatform, 2019).
In 2016, around 12.4 % of Americans cycled on a regular basis and this has now increased by over 10%. (Statista, 2018). During 2016 in Europe, approximately 19.6 million bicycles were sold; Italy was the first county with a production al 2,339 (x1000) followed by Germany and Portugal (CONEBI, 2018).

3. Bicycle framework and urban design

The advent of the car profoundly changed the fabric of the cities. Before the advent of the car, the streets had a public dimension, civic sense, social and commercial interaction, a diversity given by the people. According to Norton, in American cities, this change has been radical, where the need for the sociality of people has been overshadowed to give space to a physical transformation that had to respond to motorists' needs(Norton, 2011). The car destroys urban life; it is an extremely useful instrument of deculturization, anti-civilization (Lefèvre 1968).
The battles of Jane Jacobs in the seventies for a city on a human scale during the Urban renewal In NYC against Robert Moses could be considered the foundation for a new reflection on the street.
Jane Jacobs battle in New York, for Washington Square Park in 1955 and the Lower Manhattan Expressway is significant. She fought against the new constructions, which, if built, would have expelled thousands of people and changed the life of an entire neighbourhood (Jacobs, 1992).
Starting from Jane Jacobs several reflections as taken place.
Our society once created many different types of streets. A street was not just a conduit for moving cars and trolleys through, but also a place in its own right for socializing, entertainment, commerce, and for civic expression. Pedestrians (and their natural allies, the cyclists) ruled.
Streets have always held a particular fascination for those interested in the city. Streets are the terrain of social encounters and political protest, sites of domination and resistance, places of pleasure and anxiety. Located at the intersection of several academic disciplines, the street is also the focus of many theoretical debates about the city concerning modern and, more recently, postmodern urbanism (Fyfe, 2006).
Rethinking the role of streets and public spaces as sites of collective culture would enable concepts of democracy and difference to be reconstructed so that diverse identities and cultures could intersect as sites of creative cultural production; places where multiple perspectives can accommodate and support young people as valid and valued producers of social capital (Malone, 2002).
Citizens prefer vivacity and a lively street than a desert street (Gehl, 2011) and cycling can provide benefits of contributing to the vitality and liveability of a city, beyond personal health, environmental quality, and even help the economy (Gehl, 2011).
Bicycling is often associated with concepts of sustainability due to its energy-efficiency, and it does not release carbon emissions (Meitz & Ringhofer, 2017).
Auge associates the bicycle to an emancipatory role in the first part of the nineteenth century, as one of the instruments for the liberation of women who had dared to face sexist sticks of all kinds (Augé & Parlato, 2010).
"Bicycling allows the user to explore their spatial surroundings and offers constant opportunity
for spontaneous interaction with other users and the surrounding environment." (Brömmelstroet et al., 2017).
Beyond the social aspect of cycling, the infrastructure plays a crucial role as cycling levels are directly related to bikeway networks or aspects of the network. As suggested by different studies (Buehler & Dill, 2016), cycle infrastructure design can encourage more cycling (Hull & O'Holleran, 2014).
The urban design for cycling differs from that of motorists and pedestrians. There are several similarities between general principles of good urban design and a form of urban design that would engage with more dimensions of the cycling experience such as layout, facilities, processes and detailed design (Forsyth & Krizek, 2011).

3.1 Bicycle urbanism

In the last few decades, studies and research are increasingly addressing the subject in terms of improving transportation, improving personal health, and reducing environmental impact. Recently research reveals that cycling is recognised as an urban design phenomenon, which focus on measurable neighbourhood design qualities such as: street grids, cycle lanes, setbacks and the presence of urban greenery. Many of the debates about cycling have concentrated on bicycle facility design, culture, and only a few considered urban design and planning. The more detailed design aspects affecting cyclists are not yet completely developed in research and study as they are for pedestrians (Liu et al., 2018; Liu et al., 2018)

Several books approach the concept of bicycle urbanism as a way to read and operated within the city (Colville-Andersen, 2018; Bruntlett & Bruntlett, 2018; Berney, 2018).

A new concept emerges in the debate between professionals and academics in the realm of bicycle urban planning. Remarkable is the action Mikael Colville-Andersen founder and ex CEO of Copenhagenize and Marco te Brömmelstroet cycling professor in terms of scientific diffusion and research.

The first authors to introduce the concept of bicycle urbanism where Lorenz and Bufton (Lorenz & Shannon, 2013). They explain their concept by the following definition, engaging the concept of Bicycle Urbanism in several ways:

- As a holistic concept behind our understanding of future urban mobility;
- As an approach for research on urban life in cities;
- As an approach in urban design/planning and landscape architecture.

Bicycle urbanism and cycling urbanism beyond the rhetorical character can indicate an approach to urban planning and design inspired and oriented by the multiple-use practices of the bicycle and, more generally, of pedal vehicles (Bozzuto, 2016).

3.2 Advocate and activism

According with Aldred *Cycling has always been constructed concerning social movements and social identities, and so the politics of cycling varies depending on the relationship of cycling to politics more broadly* (2012).

Former New York City transportation commissioner, Janette Sadik-Khan argues that the transformation can occur without a huge financial intervention as there are "do-it-yourself" fast solutions, which are easy-to-implement and highlight the importance of being smart and creative (Sadik-Khan & Solomonow, 2017).

The urban activism that has manifested itself in the last decade has been an expression of a right to live the city differently, manifesting the right to the city and mobility through a "peaceful struggle". These are a part of urban activism that arises in contrast to a model of the neoliberal world.

Critical Mass is a spontaneous international urban movement born in San Francisco in 1992, campaigning for bicycle and sustainability. Nowadays, it has spread 300 cities across the world, and it is growing continuously. On a monthly basis citizen meet and "occupy" city streets to celebrate cycling, demonstrate their collective strength and send a clear message to politicians / society, not as protests or organised demonstrations. Critical Mass has a positive impact on changing people's travel behaviour and in legitimises the efforts of formal advocacy organisations (Blickstein & Hanson, 2001). Critical Mass has an impact on the progress of formal bicycle advocacy (Blickstein & Hanson, 2001). Critical mass also inspired other similar organizations that evolved in different forms: Courteous Mass and Clitoral Mass (Lydon et al., 2015)[3].

In recent years, several guerrilla cycling actions were promoted globally. Guerrilla cycling is a form of protest carried out by local organisations demanding better transport planning, infrastructure and advocating for safer streets. These actions are economically efficient and straightforward to implement; from pop-up bike lanes to

[3] See https://www.facebook.com/CourteousMassDayton/ http://www.clitoralmass.org/403.shtml

painted potholes and tactical traffic calming[4]."Guerrilla Wayfinding "started as a technically illegal practice in the streets of Raleigh, North Carolina promoted by *Matt Tomasulo* that from 2012 created the association Walk [Your City][5] and supports other municipalities willing to replicate the project. It is a tactic that has spread to many cities around the world, more than 100 communities have ordered signs through their website (Lydon et al., 2015). The purpose of the project is to make people realise that services and places ~~are~~ can be accessible on foot or by bicycle in less time than what we believe[6].

4. Covid-19 and bike

Several cities around the world have set up temporary cycle lanes to facilitate going by bicycle, and thus offer an alternative to public transport and cars. Among them, the most significant examples are Bogota, Berlin, Philadelphia (*470% cycling), New York. Some indication suggests many people are converting to cycling as a safe option to face the emergency. Chicago and Philadelphia saw numbers of users in their bike-share programs nearly double in March 2020. (WRI,2020) and even London published exceptional guidance for cyclists[7].

	Country	Car	Public transport	Walking
1.	Italy	-85%	-90%	-88%
2.	Spain	-82%	-90%	-90%
3.	France	-78%	-88%	-86%
4.	United Kingdom	-70%	-85%	-63%
5.	Belgium	-63%	-76%	-49%
5.	Netherlands	-52%	-78%	-58%
6.	USA	-45%	-76%	-56%
7.	Germany	-46%	-61%	-46%

Tab. 1: transportation data between March-April 2020 Source: OCPI analyses of data from Apple.

In China, Wuhan and Huanggang suspended public transport entirely to contain the virus. According to the analysis of the Wuhan War Epidemic Cycling Report, the anti-epidemic cyclists' riding indicators showed "three increases and one decrease": The average distance of a single ride was 1.42 kilometres, an increase of 22.4% compared with that before the closure of the city; the average time for a single ride was 8.8 minutes, an increase of 29.6% compared with that before the closure; a single ride over 3 kilometres accounted for 7.5%, an increase of 130.8% from before the closure of the city. The average cycling speed was 10.2 km/h, which is 4.7% lower than before the closure and 4.1% lower than usual.

4.1 Cities and cycling policies

In the first phase of the pandemic, many cities have adopted measures to facilitate the use of bicycles. The choice of case studies focused on 4 European cities and one South American city. The selection method was based on a qualitative analysis of these cities' previous policies in terms of sustainable mobility. Simultaneously, the measures adopted by these cities presented within them a temporal character but were embedded within an existing policy, adding a level of planning. Furthermore, these actions have a long-term vision that goes

5 See: https://walkyourcity.org/

7 See:https://lcc.org.uk/pages/cycling-advice-2020

beyond the emergency. This condition allows the research to analyse the case studies in their immediate emergency condition and wider urban planning and mobility.
The five case cities selected for the study are: Barcelona, Bogota, Brussels, Milan, Paris. These cities have all, in recent years, developed a dynamism concerning the themes of cycling and have implemented urban policies to promote cycling.

BRUSSELS (BELGIUM)

The *Région de Bruxelles-Capitale* (Brussels-Capital Region) has a population of 1,218,255 inhabitants, in an area of 1,575 km^2, with a density of 7,500 inhabitants per km^2. It is constituted of Brussels and 18 contiguous municipalities.[8] The municipality of Ville de Brussels covers an area of 32.6 km^2 with a population of 185,103 which implies a density of 5,596 inhabitants per km^2 and 15 % of the population of the metropolitan area[9]. Brussels launched in 2018 Le plan d'action Vélo 2018-2024 (Ville de Brussels, 2018). The plan has the ambition to give cycling a key role within urban mobility, in line with the objectives formulated in the Good Move regional mobility plan: increase in the modal share of cycling, in particular for trips from 2 to 5km; (1) tripling of bicycle journeys by 2030 and doubling them by 2020 to 2024; (2) The ambition to significantly strengthen the competitive position of the bicycle among the modes of transport. (3) The ambition is to act quickly and with determination, for a tangible impact by the year 2024.

Fig.2 circulation plan Pentagon Brussel

Moreover, since June 2015 the city of Brussels has developed a new circulation plan for the 'Pentagon Brussels' city centre *Plan de circulation Pentagone* (Technum, 2014). The circulation plan has the following main

8 https://www.cittametropolitana.mi.it/portale/territorio/index.html

9 https://ibsa.brussels/chiffres/chiffres-cles-par-commune/ville-de-bruxelles

features: (I) Doubling the pedestrian zone, by fixing new borders for the new pedestrian A comfort zone will be integrated to the existing one; (II) A new city bicycle network. Local cycle routes integrate the existing regional cycle routes within the Pentagon. The pedestrian zone and the surrounding neighbourhoods will be more accessible by bicycle through the cycling facilities provided on the City's cycling network. The City has proposed to STIB that it provide parking for bicycles in the Bourse metro station. (III) New local bike routes are added to the existing regional bicycle routes in the Pentagon (IV) A bicycle parking will be made at the Bourse pre-metro station. Investing in bike racks and bike boxes.

Since June 2019, Belgium introduced six new regulations concerning cyclists updating the road code.

(1) lateral distance to overtake a cyclist = 1.5 m outside built-up areas (and always 1m in built-up areas) (2) drivers of tricycles / quadricycles 1m wide = cyclists (3) "full green light" system for cyclists (4) directional cyclist orange light (= B22 / B23) (5) maximum age for riding on the sidewalk = ten years (compared to 9 previously) (6) speed-pedelecs will also be able to ride two abreast on the road.

This new law also increases the maximum speed of autonomous displacement machines, such as electric scooters and single wheel to 25 km/h.

Brussel and Covid-19

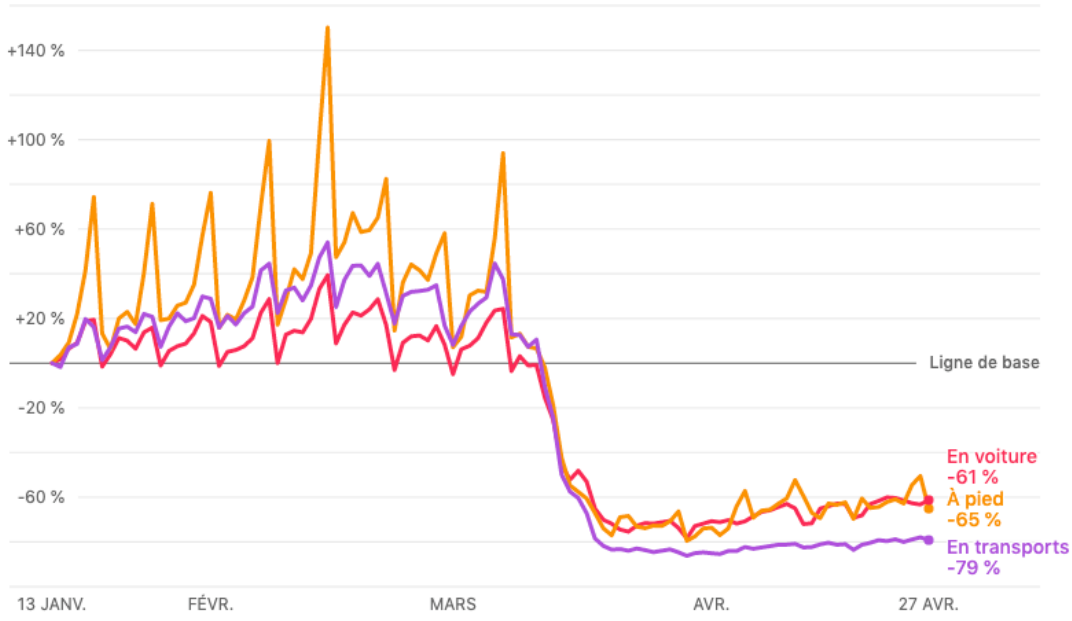


Fig.3 Brussels: mobility data during first lock down Covid-19. En Voiture=By car; En transports=public transportation; A pied=by foot

Brussels has set out a mobility «*plan de mobilité pour le déconfinement*.» proposing 40 km of bike lanes on major roads.

Seven Brussels municipalities have a mobility plan Ixelles, Anderlecht, Brussels-city, Watermael, Evere, Schaerbeek, Saint-Gilles has accepted the invitation of The Minister of Mobility Elke Van den Brandt (Groen) to give more space to pedestrians and cyclists.

Furthermore, *the entire perimeter of the city located inside the Little Belt will pass into the meeting area. Concretely, pedestrians and cyclists will have priority and will be able to circulate on the roads, and no longer only on the sidewalks or cycle paths. The circulation of motor vehicles is authorised, at a maximum speed of 20 kilometres / hour. The same rule applies to trams and buses."*

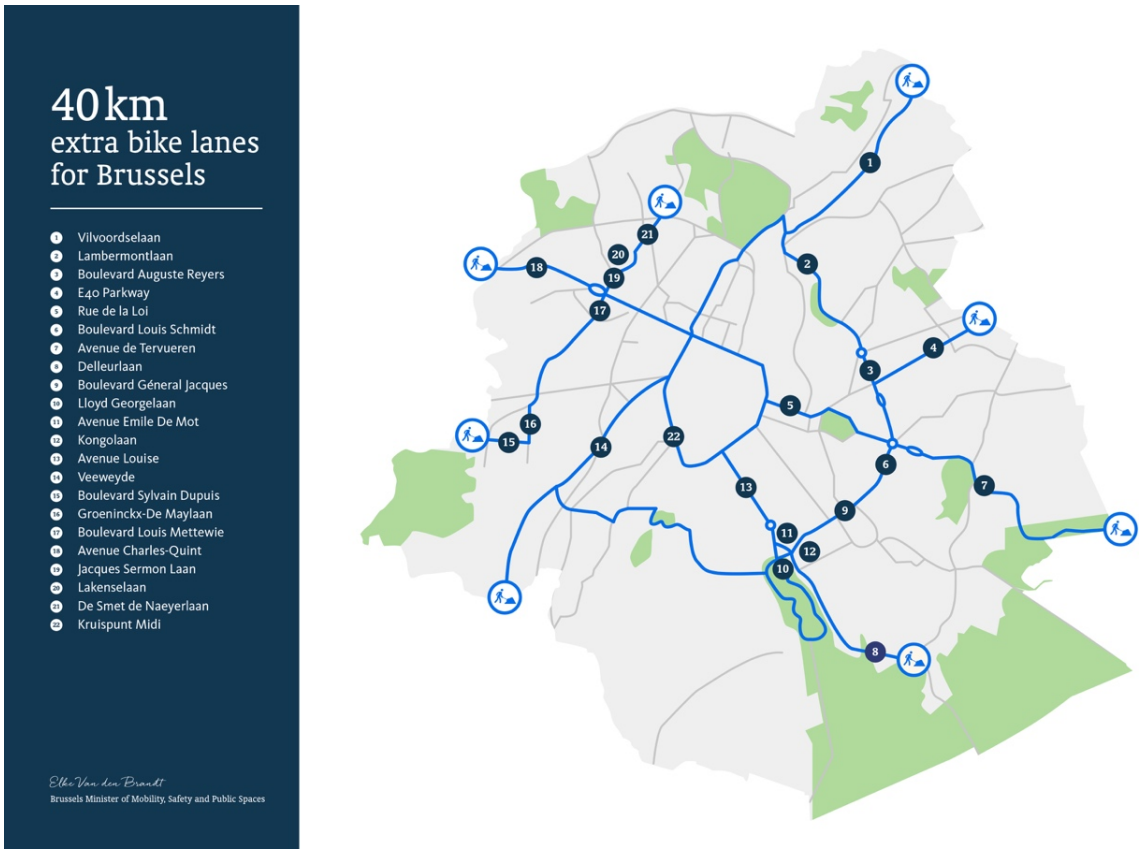


Fig.4 bike lanes Brussel Covid-19

Brussels has planned different types of measures among them: 51 km of bike lanes, of which 34 have been constructed so far; concerning traffic reduction were announced 40 km, of which 23 have been implemented. The number of active cyclists has increased by 87%, and Belgium is now studying to increase its cycling highway plans connecting towns and cities. The Flemish government, in March 2021, announced a total investment of 150 million euros for cycling, divided in proportion to the number of inhabitants. For each municipality, there is a planning right of approximately € 22 per inhabitant. Local authorities whom themselves invest € 44 / inhabitant in their cycling infrastructure can therefore receive the full amount.

BOGOTA (COLOMBIA)

Metropolitan Area of Bogotá is an administrative structure that include the Capital District of Bogotá and 17 of the surrounding municipalities; it has a population of 11'167'000 inhabitants and surface of over 4'042.01 km^2 and a density of 2'763 inhabitants per km$^{2.}$

The municipality of Capital city covers an area of 1'587 km^2 with a population of 7'412'566 inhabitants, which implies a density of 4670.8 inhabitants per km2. [10]

Since 2000 Bogotá is a leading city in urban cycling, in Latin America and in the world, implementing public policies to transform infrastructure and fostered a bicycle culture. Currently there are more than 880,000 daily trips in this form of transport: children go to school, police patrol the streets, mechanics earn a living in their workshops, athletes get up early to conquer the hills and executives arrive at their offices.

On the city website you can read *"we promote a culture of sustainable mobility that, instead of thinking about how many vehicles are mobilized, takes into account the number of people who manage to move using the same space, but in other means of transport. Therefore, giving rise to the bicycle is one of the main strategies that we have implemented in the city."*

10 https://www.dane.gov.co/files/varios/informacion-capital-DANE-2019.pdf

Every Sunday, the Colombian capital of Bogotá shuts down 75 miles of streets and highways, handing them over to cyclists, runners and walkers. Known as La Ciclovía, the initiative has inspired similar events across the world.

Bogota and Covid-19

Fig.5 bike lanes Covid-19 Bogota

Bogota provided at the beginning 35 kilometres and then 80 kilometres of temporary bike lanes and six connections on vehicular bridges for exclusive circulation of cyclists. *These temporary bike lanes are implemented taking into account that the bicycle is the means of transport considered as one of the most hygienic alternatives to get around today, since it avoids close contact and crowds. This measure seeks to decrease the use of the massive public transport system to contribute to its operation under conditions of efficiency and sustainability, to generate parallel corridors to those of TransMilenio and more connections in the cycle routes network*[11].

[11] https://planbici.com/distrito-dispondra-35-kilometros-de-ciclovias-temporales-durante-el-aislamiento-preventivo-obligatorio/ https://www.movilidadbogota.gov.co/web/bogota-en-cuarentena

MILAN (ITALY)

The Area Metropolitana di Milano (Milan Metropolitan Area) has a population of 3,279,944 inhabitants, in an area of 1,575 km^2, with a density of 2,081.64 inhabitants per km^2. It is constituted of Milan and 133 contiguous municipalities[12]. The municipality of Milan covers an area of 101.353 km^2 with a population of 1,406,242 which implies a density of 7,741 inhabitants per km^2 and 43 % of the population of the metropolitan area[13].

In November 2018, the City Council approved The Urban Plan of Sustainable Mobility (PUMS) containing the strategies and guidelines on the future of mobility in Milan.

The PUMS introduces the concept of 'privileged cycling routes', a series of interventions and disciplines towards "cycling priorities". To implement bike paths and signage are planned: pedestrian cycle; pedestrian areas where bicycles are allowed to circulate; zone 30 where speed moderation ensures safety; Restricted Traffic Zones; realisation of the opposite direction of travel cycling in the roads that have the appropriate characteristics to accommodate it.

Fig 6 bike lanes plan Milan

Milan and Covid-19

Milan mobility data during Covid-19 -78% car use – 86% pedestrians.

The municipality of Milan released the document *"Milano 2020. Strategia di adattamento"* (Comune Milano, 2020a) to develop a strategy for "Phase 2". It presents some immediate or planned actions. It is conceived as an open document to observations and contributions from across the city. The strategic plans highlight the redefinition of "the use of roads and public spaces, increase the non-polluting surface movements (walking, bikes, light mobility) and develop areas that will allow commercial, recreational, cultural, sporting developments, respecting the respective physical distances. *Improve air quality as a precautionary measure for health and well-being policies and consolidate the development of sustainable mobility, promoting and drastically increasing individual mobility means, such as bicycles, scooters and electric motorcycles, also in sharing." Improve and diversify the offer of mobility, making the most of the potential allowed for public transport and promoting the use of bicycles, scooters, sharing and individual public transport. Make a decisive leap towards the use of bicycles and scooters, extending the cycle network and encouraging sharing mobility systems. Encourage the use of motor vehicles, especially electric scooters*

12 https://www.cittametropolitana.mi.it/portale/territorio/index.html
13 https://www.tuttitalia.it/lombardia/provincia-di-milano/34-comuni/popolazione/

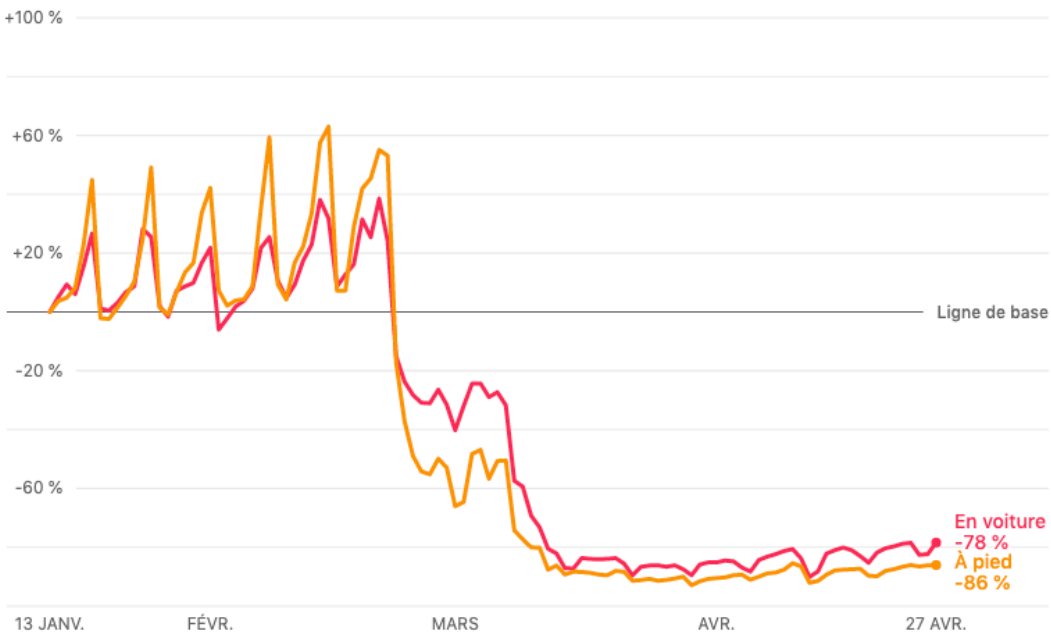


Fig.7 Milan: mobility data during first lock down Covid-19. En Voiture=By car; En transports=public transportation ; A pied=by foot

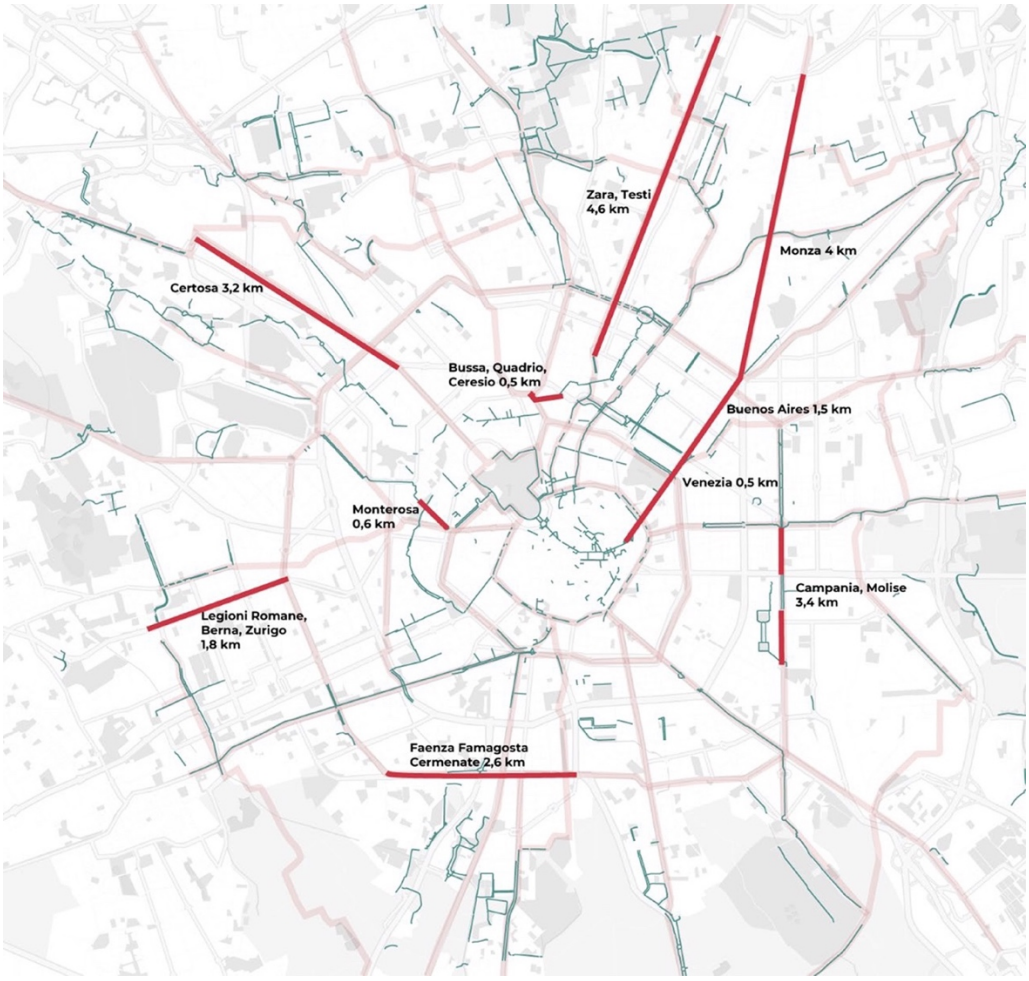


Fig.8 bike lanes plan Covid-19 Milan

Moreover, the "*progetto ciclabilità*" (Comune Milano, 2020b) is part of the interventions promoted by the municipality for phase2 Covid-19 for the reorganisation of the times and services of the city with the aim of

containing contagion and facilitating travel. To limit the number of cars on the road and congestion and limit the possible increase in city air pollution, the city of Milan aims to encourage the use of bicycles, normal or pedal-assisted, and electric scooters, both private and shared, but also of electric scooters. The plan provides for the construction of 35 kilometres of new cycle paths which will add to the current 220 km and new parking spaces for bikes and motorbikes. The extension of the cycle network will cover routes along the main radial and circular routes of the city connecting the existing cycle sections.

The plan is implemented through the following interventions:

- the construction of about 23 kilometres of cycle paths, with light interventions of tracks throughout them (such as) road signs and markings drawn on the ground;
- establishment of 30 zones to encourage the safe use of bicycles;
- urban redevelopment.

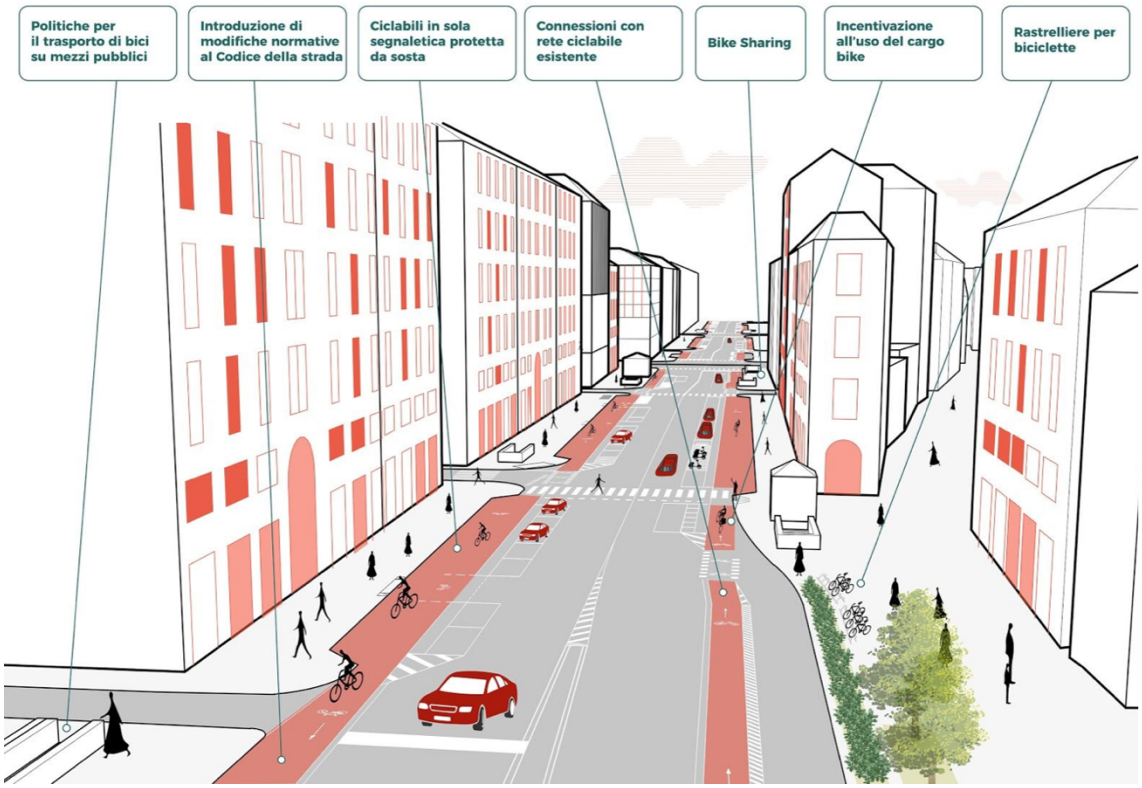


Fig.9 New emergency cycle route in Corso Buenos Aires.

Milan has developed different measures among them: 35 km of bike lanes of which 5,5 have been implemented so far; concerning traffic reduction were announced only 0,25 km of streets reallocated for public use all implemented. It is estimated an increase of cycling of 122% in the last months.

BARCELONA (SPAIN)

The Àrea Metropolitana de Barcelona (AMB; "Metropolitan Area of Barcelona") has a population of 3,239,337 [14] in an area of 636 km^2, with a density of 5,093.3 inhabitants per km^2. It is constituted of Barcelona and 36 contiguous municipalities. The municipality of Barcelona covers an area of 101.353 km^2 [15] with a population of 1,328,952 inhabitants16, which implies a density of 13,312.12 inhabitants per km^2 and 41% of the population of the metropolitan area.

14 https://www.amb.cat/en/web/area-metropolitana/coneixer-l-area-metropolitana/poblacio

15 https://www.bcn.cat/estadistica/angles/dades/timm/tterr/a2018/S01.htm

16 https://opendata-ajuntament.barcelona.cat/data/en/dataset/est-padro-domicilis-sexe

In 2015, Barcelona launched the program Bicycle Strategy for Barcelona (Ajuntament de Barcelona, 2015), in, in continuity to the Barcelona Urban Mobility Plan (PMU 2013-2018) (Ajuntament de Barcelona, 2014)[17] the planning tool for defining the action lines to govern mobility with the strategic aim of continuing to move towards a more sustainable, efficient, safer, healthier and fairer mobility model. Bicycle Strategy for Barcelona planned to implement 308 km of cycle lanes by 2018, increasing of 165% the network of 116 kilometres in 2015.

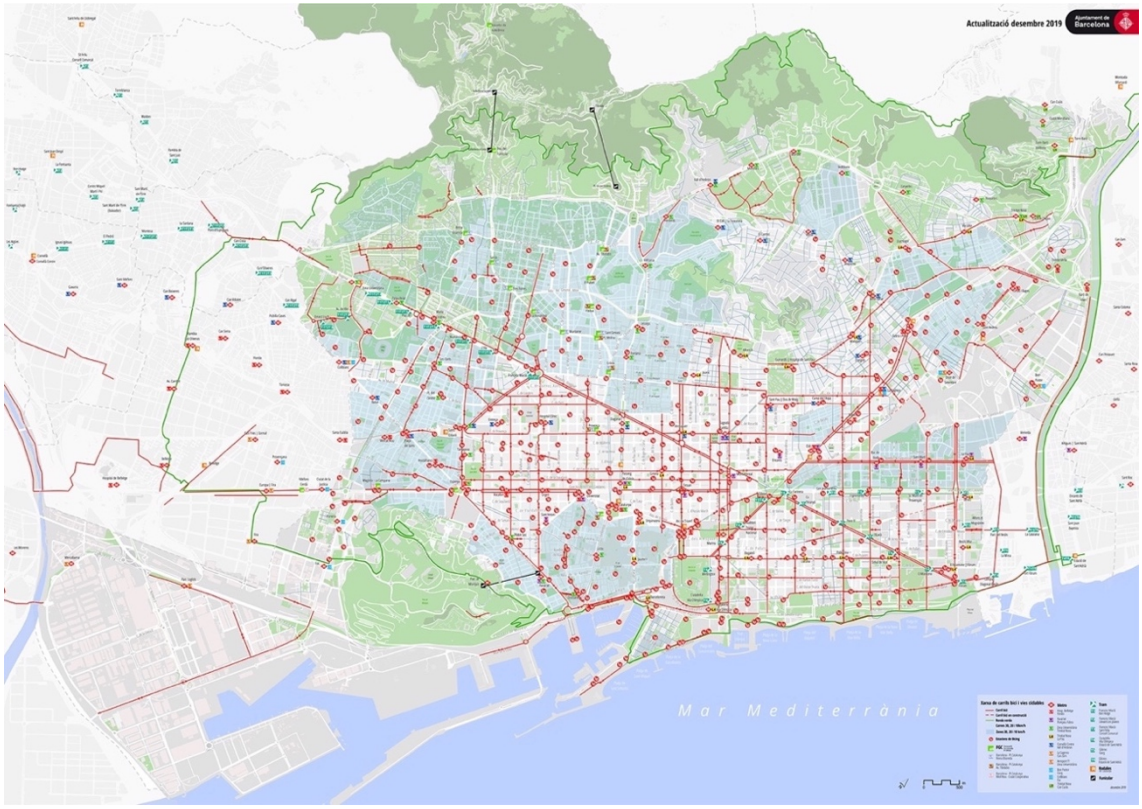


Fig.10 bike lanes plan Barcelona

Currently more than 209 km have been created and the number of cyclists increased by almost 50%. from approximately 140,000 daily users to 200,000 current users[18].

More than 20 associations are involved to work with the planners and municipality to monitor the implementation of the initiatives proposed, which include initiatives to raise awareness and promote the use of bikes that will be launched in coordination with the various players involved, who will be jointly responsible for them. *Bicing* is the public bicycle sharing system and is available since 2007. With a fleet of 6,000 bicycles spread across 424 stations it attracts over 47,000 users per day on average. 100,000 annual subscribers as of February 2016 (Braun et al., 2016)**.**

Barcellona and Covid-19

Barcelona mobility data during Covid From -80% car users -85% public transportation – 90% pedestrians .

Barcelona's administration identifies bicycles as essential within the Covid-19 context for short- or medium-distance journeys. Bicycles are contemplated as an alternative way of getting around during the day and the

[17] The next Urban Mobility Plan (2019-2024) presents a new mobility model that follows the line of the
[18] https://www.barcelona-metropolitan.com/living/cycling-in-the-city/

most efficient means of transport in terms of energy. They minimize contact between people, and they enable safe distances to be maintained.

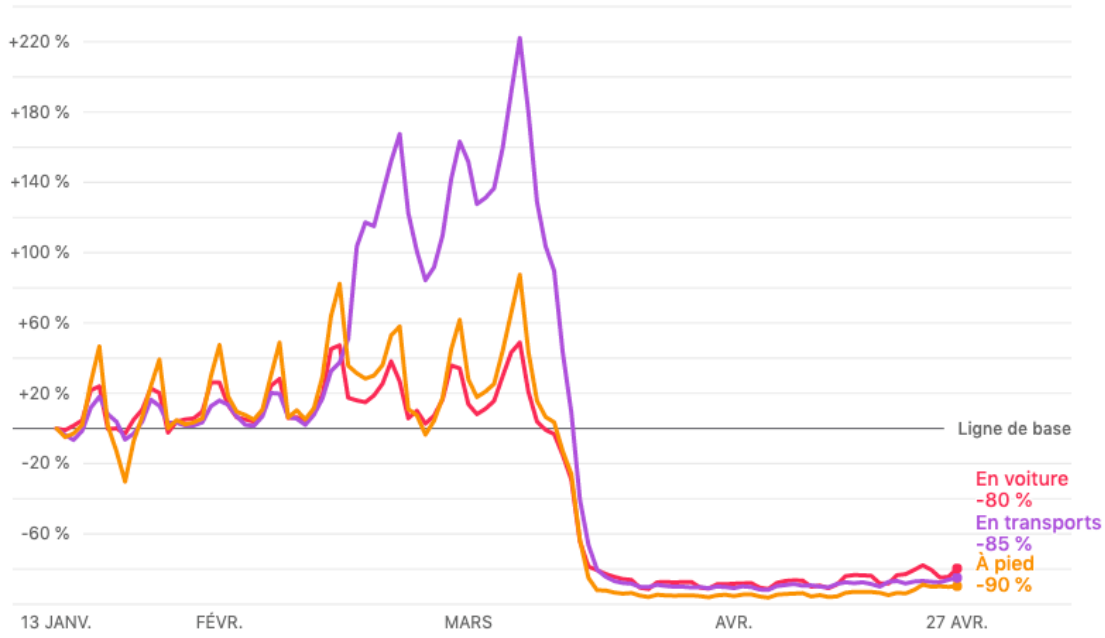


Fig.11 Barcelona: mobility data during first lock down Covid-19. En Voiture=By car; En transports=public transportation; A pied=by foot

They established initial and short-term measures:

INITIAL MEASURES

- Start up and expand the Bicing service. The Bicing service is being reactivated, with 57 more stations now operational and preventive health measures for both users and maintenance personnel in place;
- Create 21 new kilometres of cycle lanes. New cycle lanes are being created, which means reducing traffic lanes in the city and on roads connecting it to the rest of the metropolitan area.

SHORT-TERM MEASURES

- Promote respect for cyclists in streets declared 30 km/h zones. Signs will indicate cyclists have priority in these streets and an awareness-raising campaign will promote respect for cyclists there among car drivers and motorcyclists.
- Finish and distribute definitive licences for bike-sharing and scooter-sharing operators. The aim is to encourage shared bicycles and motor scooters, which come under the umbrella of sustainable mobility, for individual use[19] Ajuntament de Barcelona (2020a) (2020b).

Barcelona has budgeted €4.4 million to implement different types of measures among them: 21km of bike lanes that have been completely implemented and concerning traffic reduction. They announced 12km of streets reallocated for public use all implemented. Bicycle use has now risen to 10% above pre-pandemic levels. Furthermore, this action is part of a bigger plan of the super-block programme, of which cycling mobility is an essential component to decrease car usage by 25% in 2024.[20]

PARIS

Paris metropolitan area *"Métropole du Grand Paris"* is an administrative structure created in 2016, it is the inter-municipal authority and a public establishment of inter-municipal cooperation bringing together 131

[19] https://www.barcelona.cat/mobilitat/en/news-and-documents/new-sustainable-mobility-model-new-public-space
[20] See: https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/en_gb_MESURA%20GOVERN%20SUPERILLES

municipalities including Paris with a surface of over 814 km², 8 times the area of Paris. It has a population of 7,057,905 inhabitants and a density of 8,668.1[21].

In 2015, Paris launched the program Plan vélo 2015-2020 (Ville de Paris, 2015) to bring up to 15% the journeys by bike. The plan intended to improve the air quality as well as the comfort and safety of the city's daily cyclists to make Paris become "the cycling capital of the world". By 2020, the municipality aspired to triple travel by bicycle (225,000 in 2015). One hundred and fifty million euros of investment, the main objectives of the plan are: to double the length of the bike lanes from 700 km to 1,400 km. 15% modal share, 7,000 bicycle airlocks, 2500 bicycle traffic signs; 10,000 additional parking spaces, 4 Véligo stations planned in 2015 35% of bicycle journeys in Vélib'.

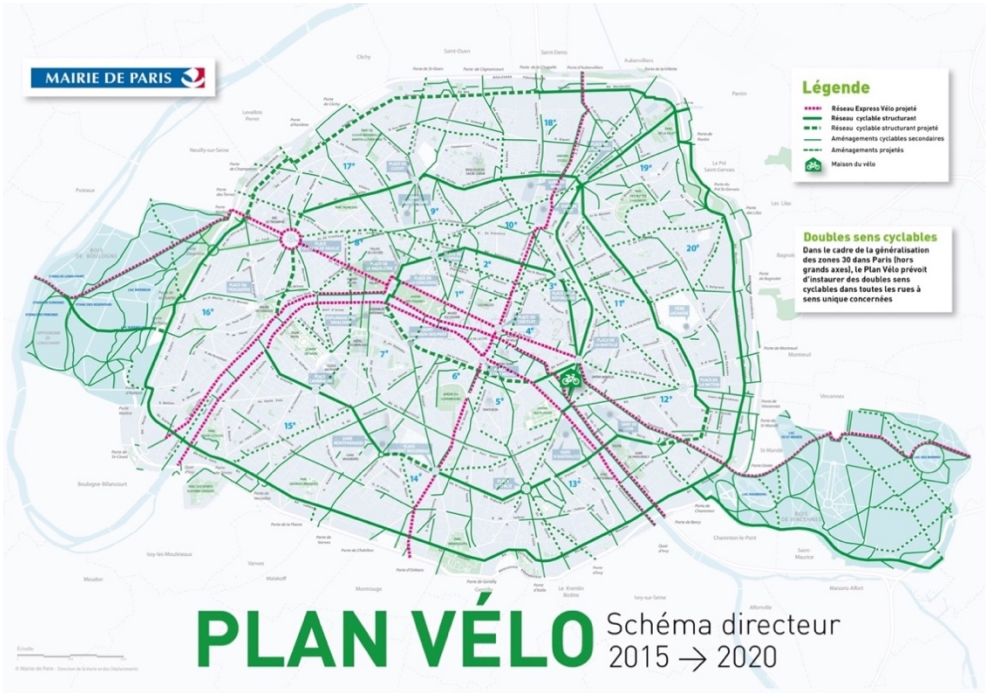


Fig.12 Plan Vélo Paris 2015

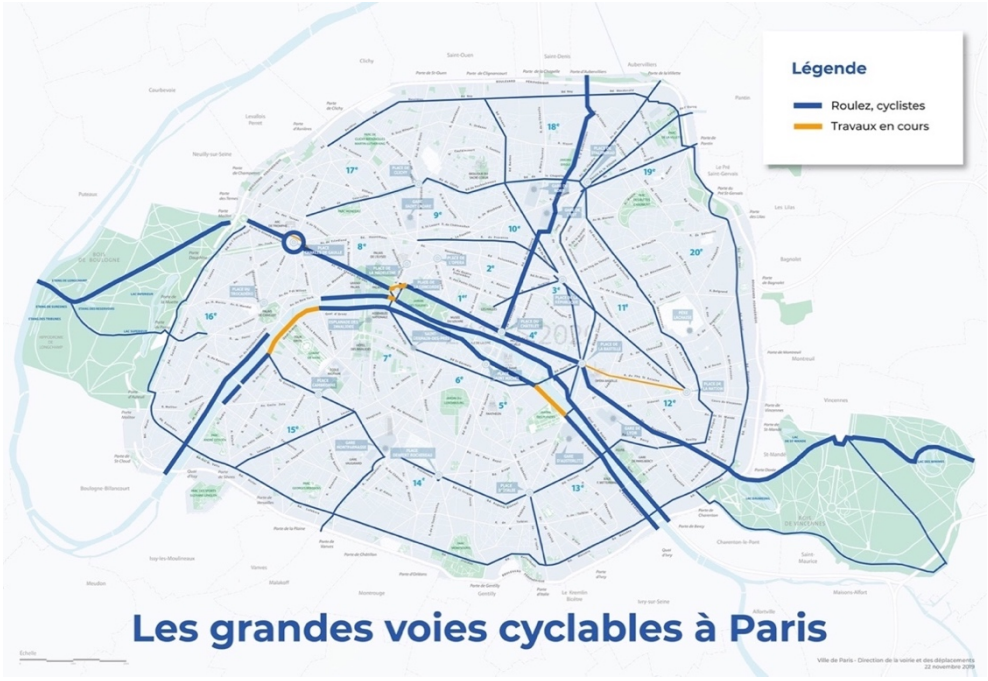


Fig.13 Plan Vélo state of realization 2019

21 https://www.insee.fr/fr/statistiques/1405599?geo=EPCI-200054781

Today 55% of planned bike lanes have been completed. the association *"Paris en Selle"* created a Bike Plan Observatory, with a map designed to follow the development and progress of the network of bike paths showing only new cycling infrastructure. Some cycling infrastructure is carried out under different programmes (Participatory Budget, road renovation in connection with the LAURE Act, other projects).

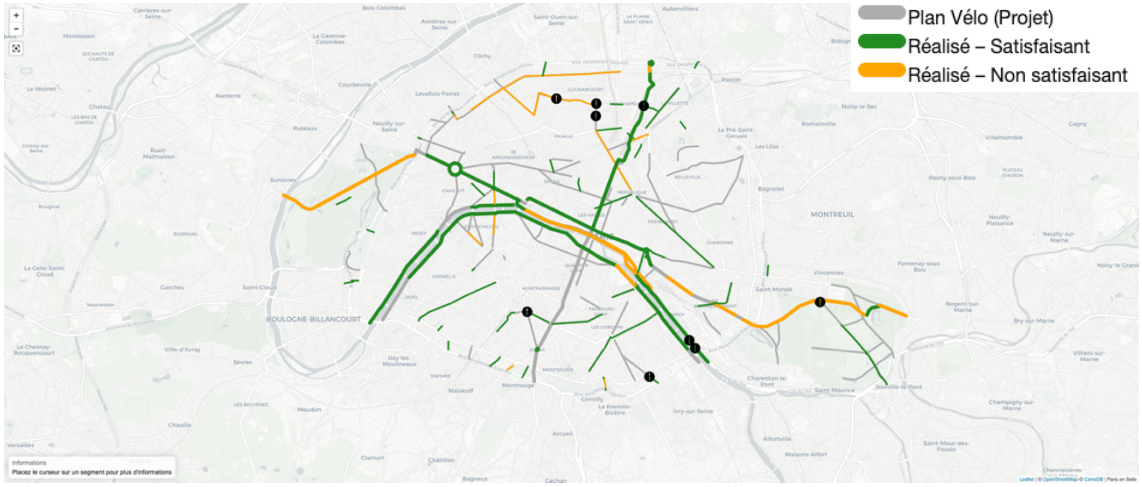


Fig 14 Plan Velo state of realization 2019 *https://planvelo.paris/*

Since January 2016, France introduced new regulations concerning cyclists updating the road code

- The possibility of circulating inconsistently on all streets limited to 30 km/h or less is extended, provided that the city council does not prevent it;
- Cyclists no longer have to stick to the right edge of the lane: they can now use the centre of the lane too;
- Parking on bicycle paths is prohibited and the fine for transgressors is € 135;
- Restrictions on cycling in pedestrian areas in both directions are eliminated, always at the person's pace and if not prevented by the police or the city council.

Paris and Covid-19

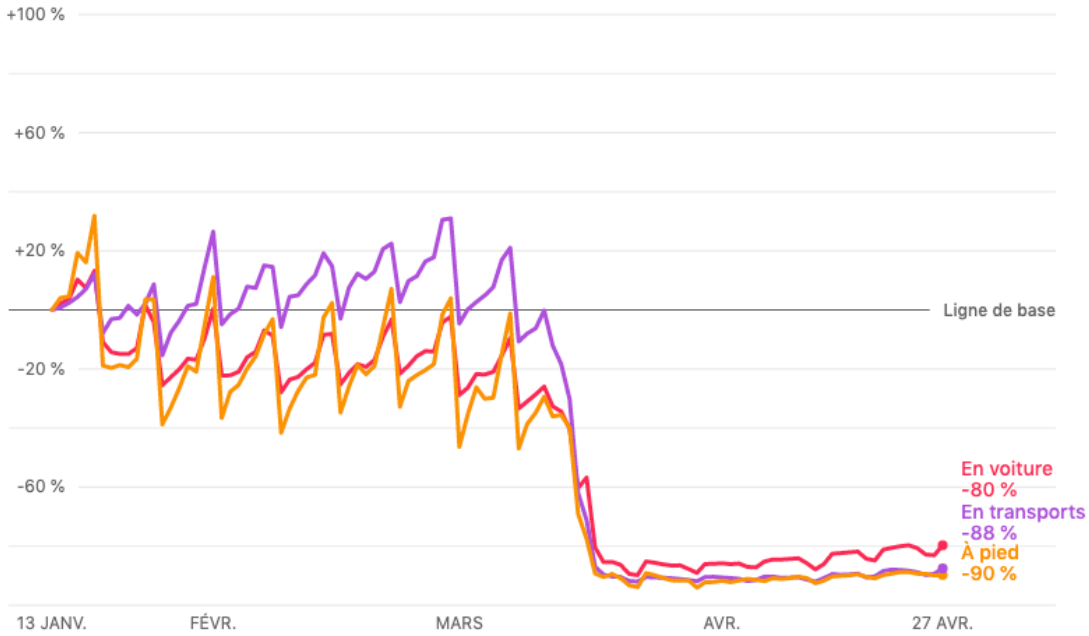


Fig.15 Paris: mobility data during first lock down Covid-19. En Voiture=By car; En transports=public transportation ; A pied=by foot

Paris mobility data during first lock-down Covid-19: -80% by car -88% public transportation – 90% on foot (Apple, 2020).

Fig.16 Plan Velo state of realization 2019 (plan observatoire)

The Prime Minister announced on the 28th of April concerning transport, that the City of Paris encourages the use of alternative mobility in order to limit the influx in public transport where maintaining social distancing can be complicated. Ile-de-France called also *région Parisienne* ("Paris Region") will invest 300 million euros to support the Regional Bike Express Network (RER V)[22] an existing project developed with the technical support of *l' Institut Paris Region*. The RER V, for 'regional bike express network' establishes 650 km of cycle paths throughout Greater Paris via 9 separate lines. The total amount for the project was estimated at 500 million. At the origin of the project, the collective Vélo Ile-de-France, signed agreements with the department of Val-de-Marne and the *Métropole du Grand Paris*. The *Vélo Collective Ile-de-France* is composed by 33 cycling associations, in more than 80 municipalities representing 4,000 members.

Paris has planned different types of measures among them: 71.3 km of bike lanes of which 29.23 have been implemented so far; concerning traffic reduction were announced 4.31km of streets reallocated for public use all implemented. Since spring 2020, cycling is estimated to have grown by 70%. The proportion of women cycling has risen to 41%, and 62% of residents approve temporary cycle lanes to become permanent, something Hidalgo committed to last year[23].

5. Bicycle and antifragility

The belief that urban planners and planning should be capable of dealing with the future and transform the world has proved to be a failure. Predicting is difficult; the forces acting in the city's transformation are defined by processes and dynamics that have nothing to do with planning.

A right attitude is to think of bringing out more essential cities and citizens, favouring urban antifragility.

22 See: https://rerv.fr

23 https://road.cc/content/news/6-10-users-pop-bike-lanes-paris-new-cycling-280681

Antifragility diverges from categories such as resilience, robustness or adaptability. Robust or resilient systems are the ones that can sustain shocks and recover. Adaptive systems are those that can respond effectively after a shock. Antifragile ones do not respond or react but feed on them.
The anti-fragile urban planning should construct urban anti-fragile systems that deal with improving instability; they should operate (to do what?) and should refrain from operating (what better not to do?) in order to:

- promote and strengthen the anti-fragile of cities and the territory;
- make the same choices, actions and interventions antifragile, i.e. those with little to lose and much to gain from the unexpected and the unpredictable (Blecic & Cecchini, 2016).

The notion of antifragility is essential because planning that works in the direction of anti-fragility can be useful and build the conditions to avoid iniquity and ugliness and favour the right to the city.
One way of anti-fragile intervention on the city is to think of modular, reversible interventions, exploratory, autonomous, experimental ones that design and carry out concrete, unprecedented, unusual, anticipatory; "tactical" interventions capable of producing immediate results, but oriented towards visions and strategic objectives even in the long term (Blecic & Cecchini, 2016).
The bicycle interpreted as a planning tool for antifragile planning could lead the paradigm shift for the construction of future scenarios for our cities, where people spontaneously coordinate to make that future possible (Blecic & Cecchini, 2016). Understanding the antifragility as *something that gains from disorder (Taleb, 2012) antifragile means to examine its possible responses to stressors, perturbations and volatility, and to place those responses somewhere along a harm-gain dimension* (Blečić & Cecchini, 2020).
The tenets of antifragile planning could be summarized: (1) the via negativa, (2) the shared vision and the 'coordination by means of future' and (3) the space of the projects.
The shared vision is of the set of different freedoms which compose the right to the city. The bicycle carries with it the freedom to move, choosing how to move, in an entirely accessible city. The freedoms of movement can be outlined in terms of design possibilities, with reference to the spatial dimension, we could see some possible actions. Blečić e Cecchini (2020) argue the practice of construction not as a prediction, but rather of a process: *"the construction of meaning and shared knowledge of possible futures, which the agents participating in the process of scenario construction can appropriate, in order to mobilize for action and for collective coordination."* The bicycle in this sense empowers the citizens to act simply cycling realizing a *"private transformation."*
So the 'space of the project' could be actually daily constructed, recurring of the simple act of cycling that express within the right of mobility future, agents can effectively coordinate, sometimes spontaneously, to make that future possible (Blečić & Cecchini, 2020).

6. Conclusion

The Covid-19 crisis has heavily transformed many aspects of our society. All the cities analysed in this paper planned cycling projects before Covid-19 and established actions to implement cycling infrastructure during the first lockdown.
The cities analysed have made significant upgrades in cycle lanes, traffic reduction, car-free sections, none of the cities has invested in wider sidewalks. Moreover, most of the interventions consist of new cycle lanes implementing planning already. Nowadays, there is a difference, among the level of implementation of the various types of intervention. Significant is Barcelona in terms of cycle lanes, and traffic reduction has completed the announced goals.
The cases analysed show that structural mobility planning is necessary and is an integral part of the metropolises' overall design. Covid-19's transformation has increased the recognition among politicians and citizens that cycling could be active transportation. In antifragile terms, all cities have responded to Covid-19's related problems by taking advantage of the crisis. These experiences reinforce the concept that cycling

strategies should be developed at a national, regional or city level with a medium to a long-term vision for cycling (EU, 2021). Transport studies and policies involving bicycles are not just 'about cycling', but about sustainable, productive, and prosperous cities (Fishman, 2016).
The lockdown allowed the bicycle to prove itself as the safest and most efficient urban mode of transport.
The action carried out during CODVID 19 acted not only on the hard aspects reshaping the cities with permanent and temporary solutions but also on soft aspects acting on people's perception and use allowing them to choose how to move.

City	car-free sections announced (Km)	car-free sections implemented (Km)	cycle lanes announced (Km)	cycle lanes implemented (Km)	Traffic reduction announced (km)	Traffic reduction announced (km)
Brussels	7,1	5,15	51,05	34,09	40,4	23,4
Paris	10	0	71,3	29,23	4,31	4,31
Milan	-	-	35	5,5	0.23	
Bogotá	n.a.	n.a.	n.a.	n.a	n.a.	n.a
Barcelona	-	-	21	21	12	12

Tab.2 Covid-19 measures track. SOURCE: https://ecf.com/dashboard

Even though googling: "future of mobility"[24] the first result is the website page of the car company BMW proposing 5 trends for urban mobility: (1) Electric vehicles: improve urban mobility with a slight hum. (2) Mobility on Demand: Car sharing instead of exclusive ownership (3) Autonomous driving: let the car drive (4) Car-to-X communication: when machines communicate with each other and with their environment (5) Urban mobility and local public transport, autonomous electric shuttle buses.
The use of bicycles even electric ones is not contemplated. The Covid-19 policies impose a sixth trend: the bicycle.
In recent years, activists' bottom-up actions have been central and have led the political debate on the right to mobility issues. The problem is not cars against bikes, but as the Paris municipality spokesman said: "The idea is not to kick cars out, but to share our public space in a better way". The city where bicycles play a central role in mobility policies should not be understood as a victory for bikes against cars, but rather a move towards improving the quality of our cities' spaces, creating more livable and human-friendly places.
Focusing on the importance of mobility in the contemporary city, understood as a tool to "create cities", as a phenomenon that not only regulates flows (transport practice), practice time-space but that is a space generator, and the bicycle is one of the main features (Pucci & Colleoni, 2016).
Furthermore, the use of the bicycles helps the development of the citizens' abilities to move, motility as defined by Kauffman. The use of the car has entirely cancelled the possibility to think of an alternative at on an urban scale. La Cecla commenting di Illich's book argues: "I do not think the bicycle won" It is an excellent idea that's still marginal." "it does not destroy the model of society if this model is not questioned in-depth".
Covid-19 does not lead to a total change of society, but it opens up opportunities to rethink our cities from a mobility perspective where cycling plays a central role, and the strategies put in place by the various cities are evidence that we are moving towards an irreversible path.
David Harvey in conclusion of an article about Covid-19 argued: …*we need a collective response to the Collective Dilemma of Coronavirus isn't this an interesting moment to really think about the dynamism and possibilities for constructing an alternative, socialist society? But in order to get onto such an emancipatory*

[24] Research was done in the google.it by including the word "futuro della mobilità"

path, we first have to emancipate ourselves to see that a new imaginary is possible alongside a new reality. We could answer citing José Antonio Viera Gallo "Socialism can only arrive by bicycle.

References

Ajuntament de Barcelona (2014). *Plan de Mobilitat Urbana de Barcelona PMU 2013-2018*. Ajuntament de Barcelona.

Ajuntament de Barcelona (2015). *Mesura: Estratègia de la cbicicleta per Barcelona*. Ajuntament de Barcelona.

Ajuntament de Barcelona (2020a). https://ajuntament.barcelona.cat/bicicleta/en/opting-for-bicycles

Ajuntament de Barcelona (2020b). https://ajuntament.barcelona.cat/bicicleta/en/services/cycle-routes/the-bicycle-lane-network

Aldred, R. (2012). *Chapter 4 The Role of Advocacy and Activism*. https://doi.org/10.1108/S2044-9941(2012)0000001006

Angiello, G. (2020). Toward greener and pandemic-proof cities: EU cities policy responses to Covid-19 outbreak. *TeMA - Journal of Land Use, Mobility and Environment*, *13* (3), 471–477. https://doi.org/10.6092/1970-9870/7251

Augé, M., & Parlato, V. (2010). *Il bello della bicicletta*. Bollati Boringhieri. Recuperato da https://books.google.it/books?id=IpTUtwIdG8YC

Berney, R. (2018). *Bicycle Urbanism: Reimagining Bicycle Friendly Cities*. Routledge. https://doi.org/10.4324/9781315569338

Blecic, I., & Cecchini, A. (2016). *Verso una pianificazione antifragile: Come pensare al futuro senza prevederlo*. Franco Angeli Edizioni.

Blečić, I., & Cecchini, A. (2020). Antifragile planning. *Planning Theory*, *19*(2), 172–192. https://doi.org/10.1177/1473095219873365

Blickstein, S., & Hanson, S. (2001). Critical mass: Forging a politics of sustainable mobility in the information age. *Transportation*, *28*(4), 347–362. https://doi.org/10.1023/A:1011829701914

Bozzuto, P. (2016). *Pro-cycling territory.: Il contributo del ciclismo professionistico agli studi urbani e territoriali*. Franco Angeli Edizioni. Recuperato da https://books.google.it/books?id=pDxSDQAAQBAJ

Braun, L. M., Rodriguez, D. A., Cole-Hunter, T., Ambros, A., Donaire-Gonzalez, D., Jerrett, M., … de Nazelle, A. (2016). Short-term planning and policy interventions to promote cycling in urban centers: Findings from a commute mode choice analysis in Barcelona, Spain. *Transportation Research Part A: Policy and Practice*, *89*, 164–183. https://doi.org/10.1016/j.tra.2016.05.007

Brömmelstroet, M. te, Nikolaeva, A., Glaser, M., Nicolaisen, M. S., & Chan, C. (2017). Travelling together alone and alone together: Mobility and potential exposure to diversity. *Applied Mobilities*, *2* (1), 1–15. https://doi.org/10.1080/23800127.2017.1283122

Bruntlett, M., & Bruntlett, C. (2018). *Building the Cycling City: The Dutch Blueprint for Urban Vitality*. Island Press. Recuperato da https://books.google.it/books?id=v8JdDwAAQBAJ

Buehler, R., & Dill, J. (2016). Bikeway Networks: A Review of Effects on Cycling. *Transport Reviews*, *36* (1), 9–27. https://doi.org/10.1080/01441647.2015.1069908

Chen, L., Chen, C., Srinivasan, R., McKnight, C. E., Ewing, R., & Roe, M. (2012). Evaluating the Safety Effects of Bicycle Lanes in New York City. *American Journal of Public Health*, *102*(6), 1120–1127. https://doi.org/10.2105/AJPH.2011.300319

Colville-Andersen, M. (2018). *Copenhagenize: The Definitive Guide to Global Bicycle Urbanism*. Island Press. Recuperato da https://books.google.it/books?id=H6dMDwAAQBAJ

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

Comune Milano. (2020b). *Progetto ciclabilità*. Comune di Milano.

CONEBI. (2018). *European Bicycle market*. Confederation of the European Bicicle Industry. Recuperato da http://www.conebi.eu/wp-content/uploads/2018/09/European-Bicyle-Industry-and-Market-Profile-2017-with-2016-data-update-September-2018.pdf

E.C. (2014). *QUALITY OF TRANSPORT. Special Eurobarometer 422a*. European Commission. Recuperato da https://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_422a_en.pdf

EU. (2021). Preparing city cycling strategies and plans. Recuperato da https://ec.europa.eu/transport/themes/urban/cycling/guidance-cycling-projects-eu/planning-cycling-cities/preparing-city-cycling-strategies-and-plans_en

Fenu, N. (2020). *Aree interne e covid*. LetteraVentidue.

Fishman, E. (2016). Cycling as transport. *Transport Reviews*, *36* (1), 1–8. https://doi.org/10.1080/01441647.2015.1114271

Forsyth, A., & Krizek, K. (2011). Urban Design: Is there a Distinctive View from the Bicycle? *Journal of Urban Design*, *16* (4), 531–549. https://doi.org/10.1080/13574809.2011.586239

Fyfe, N. (2006). *Images of the Street: Planning, Identity and Control in Public Space*. Routledge. https://doi.org/10.4324/9780203026496

Hull, A., & O'Holleran, C. (2014). Bicycle infrastructure: Can good design encourage cycling? *Urban, Planning and Transport Research*, *2*(1), 369–406. https://doi.org/10.1080/21650020.2014.955210

Jacobs, J. (1992). *The Death and Life of Great American Cities*. Vintage Books. Recuperato da https://books.google.it/books?id=P_bPTgOoBYkC

Kang, M., Choi, Y., Kim, J., Lee, K. O., Lee, S., Park, I. K., … Seo, I. (2020). Covid-19 impact on city and region: What's next after lockdown? *International Journal of Urban Sciences*, *24* (3), 297–315. https://doi.org/10.1080/12265934.2020.1803107

Karanikola, P., Panagopoulos, T., Tampakis, S., & Tsantopoulos, G. (2018). Cycling as a Smart and Green Mode of Transport in Small Touristic Cities. *Sustainability*, *10*(1), 268. https://doi.org/10.3390/su10010268

Küster, F. (2019). *Practitioner Briefings: Cycling. Supporting and encouraging cycling in Sustainable Urban Mobility Planning*. European Commission. Recuperato da https://www.eltis.org/sites/default/files/supporting_and_encouraging_cycling_in_sumps.pdf

Lai, S., Leone, F., & Zoppi, C. (2020). Covid-19 and spatial planning. *TeMA - Journal of Land Use, Mobility and Environment*, 231–246. https://doi.org/10.6092/1970-9870/6846

Liu, G., Krishnamurthy, S., & Wesemael, P. van. (2018). Conceptualizing cycling experience in urban design research: A systematic literature review. *Applied Mobilities*, *0* (0), 1–17. https://doi.org/10.1080/23800127.2018.1494347

Lorenz, F., & Shannon, B. (2013). *Beijing's pedal-based livelihoods as a muse for bicycle urbanism*.

Lydon, M., Garcia, A., & Duany, A. (2015). *Tactical Urbanism: Short-term Action for Long-term Change*. Island Press. Recuperato da https://books.google.it/books?id=MaJ0BgAAQBAJ

Malone, K. (2002). Street life: Youth, culture and competing uses of public space. *Environment and Urbanization*, *14* (2), 157–168. https://doi.org/10.1177/095624780201400213

Meitz, A., & Ringhofer, K. (2017). The Bicycle and the Arctic – Resilient and Sustainable Transport in Times of Climate Change. In K. Latola & H. Savela (A c. Di), *The Interconnected Arctic—UArctic Congress 2016*, 157–164. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-57532-2_16

Melone, M. R. S., & Borgo, S. (2020). Rethinking rules and social practices. The design of urban spaces in the post-Covid-19 lockdown. *TeMA - Journal of Land Use, Mobility and Environment*, 333–341. https://doi.org/10.6092/1970-9870/6923

Murgante, B., Balletto, G., Borruso, G., Casas, G. L., Castiglia, P., & Dettori, M. (2020). Geographical analyses of Covid-19's spreading contagion in the challenge of global health risks. *TeMA - Journal of Land Use, Mobility and Environment*, 283–304. https://doi.org/10.6092/1970-9870/6849

Norton, P. D. (2011). *Fighting Traffic: The Dawn of the Motor Age in the American City*. MIT Press. Recuperato da https://books.google.it/books?id=RxfqJoqhtpUC

Pisano, C. (2020). Strategies for Post-Covid Cities: An Insight to Paris En Commun and Milano 2020. *Sustainability*, *12* (15), 5883. https://doi.org/10.3390/su12155883

Pucci, P., & Colleoni, M. (A c. Di). (2016). *Understanding Mobilities for Designing Contemporary Cities*. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-22578-4

Sadik-Khan, J., & Solomonow, S. (2017). *Streetfight: Handbook for an Urban Revolution*. Penguin Books. Recuperato da https://books.google.it/books?id=zwUdDgAAQBAJ

Setti, L., Passarini, F., Gennaro, G. D., Barbieri, P., Perrone, M. G., Piazzalunga, A., … Miani, A. (2020). The Potential role of Particulate Matter in the Spreading of Covid-19 in Northern Italy: First Evidence-based Research Hypotheses. *MedRxiv*, 2020.04.11.20061713. https://doi.org/10.1101/2020.04.11.20061713

Sharifi, A., & Khavarian-Garmsir, A. R. (2020). The Covid-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management. *Science of The Total Environment*, *749*, 142391. https://doi.org/10.1016/j.scitotenv.2020.142391

Taleb, N. N. (2012). *Antifragile: Things That Gain from Disorder*. Random House Publishing Group. Recuperato da https://books.google.it/books?id=5fqbz_qGi0AC

Technum. (2014). *Plan de circulation dans le Pentagone—Circulatieplan Vijfhoek.pdf*. Technum.

UN ENVIROMENT. (2019). Cycling, the better mode of transport. Recuperato da Https://www.unenvironment.org website: https://www.unenvironment.org/news-and-stories/story/cycling-better-mode-transport

Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Boykoff, M., … Montgomery, H. (2019). The 2019 report of The Lancet Countdown on health and climate change: Ensuring that the health of a child born today is not defined by a changing climate. *The Lancet*, *394*(10211), 1836–1878. https://doi.org/10.1016/S0140-6736(19)32596-6

World Energy Investment 2017. (2017). 191.

Wu, X., Nethery, R. C., Sabath, B. M., Braun, D., & Dominici, F. (2020). *Exposure to air pollution and Covid-19 mortality in the United States: A nationwide cross-sectional study* [Preprint]. Epidemiology. https://doi.org/10.1101/2020.04.05.20054502

Image Sources

Fig.1 Who Covid-19 guidelines. SOURCE: WHO

Fig.2 circulation plan Pentagon Brussel. SOURCE: https://www.brussels.be/sites/default/files/bxl/CEN20_004_v02.pdf

Fig.3 Brussels: mobility data during Covid-19. SOURCE: APPLE**.** https://covid19.apple.com/mobility

Fig.4 bike lanes Brussel Covid SOURCE: https://www.politico.eu/wp-content/uploads/2020/04/Elke-Van-den-Brandt_Pistes-cyclables-carte.pdf

Fig.5 bike lanes Covid-19 Bogota source:https://www.movilidadbogota.gov.co/web/sites/default/files/Paginas/27-04-2020/80km-v2.pdf

Fig.6 bike lanes plan Milan https://geoportale.comune.milano.it/MapViewerApplication/Map/AppShort/393

Fig.7 Milan: mobility data during Covid. SOURCE: https://covid19.apple.com/mobility

Fig.8 bike lanes plan Covid-19 Milan SOURCE: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=11&cad=rja&uact=8&ved=2ahUKEwiP1uTJwa7pAhUDNOwKHcH-C9AQFjAKegQIAhAB&url=https%3A%2F%2Fmedia2-col.corriereobjects.it%2Fpdf%2F2020%2Finterni%2FProgetto-ciclabilita-2020.pdf&usg=AOvVaw1Gwjelq36U5ThdcGJ_TDgV

Fig.9 New emergency cycle route in Corso Buenos Aires. source: https://www.comune.milano.it/documents/20126/992518/Strade+Aperte_IT_200430_rev.pdf/a100d04c-6b55-ae74-e0f8-b52563e07822?t=1589460655416

Fig.10 bike lanes plan Barcelona SOURCE: https://ajuntament.barcelona.cat/bicicleta/sites/default/files/Mapa_Carrils_Bici.pdf dic 2019

Fig.11 Barcelona: mobility data during Covid-19. SOURCE: https://covid19.apple.com/mobility

Fig.12 Plan Vélo Paris 2015 souce: https://cdn.paris.fr/paris/2019/12/04/6fe1c386b1be1cccf12a6620e13c7f4c.pdf

Fig.13 Plan Vélo state of realization 2019 https://cdn.paris.fr/paris/2019/12/04/6fe1c386b1be1cccf12a6620e13c7f4c.pdf

Fig.14 Plan Velo state of realization 2019

Fig.15 Paris: mobility data during Covid-19. SOURCE: https://covid19.apple.com/mobility

Fig.16 Plan Velo state of realization 2019 (plan observatoire) https://rerv.fr/

Author’s profile

Nicolò Fenu

Graduate in 2007 in architecture. In 2009, he obtained the Master in Advanced Studies in Urban Design at the ETH Zurich. He is registered at Order of Architects of Cagliari. Since 2017 he has carried out research and didactic assistance at the University of Cagliari on the themes of internal areas and low-density areas. He has gained a decade of experience in the field of participatory urban research and all phases of architectural project management: preliminary, design and construction, in international contexts mainly in Switzerland, Holland and Italy. Co-founder of Sardarch Spin-off, a laboratory specialized in research and urban regeneration, which applies multidisciplinary approaches stimulating the involvement and participation of active citizenship, with which he has published the books "Verso un urbanistica della collaborazione" (2015) and "SPOP – Istantanea dello spopolamento in Sardegna "(2016); Barbagia arcipelago Italia (2019); Covid e aree interne (2020).