A review of the good practices of active mobility measures implemented by European cities due to the COVID-19 pandemic

Dimitrios Nalmpantis¹,²,⁴, Fereniki Vatavali²,³ and Fotini Kehagia¹,²

¹School of Civil Engineering, Faculty of Engineering, Aristotle University of Thessaloniki, PO Box 452, 541 24 Thessaloniki, Greece
²School of Science and Technology, Hellenic Open University, 263 35 Patras, Greece
³National Centre of Social Research, 105 52 Athens, Greece

⁴Corresponding author: dnalba@civil.auth.gr

Abstract. The scope of this paper is to make a review of the good practices of active mobility measures implemented by big European cities to face the changing travel patterns and the social distancing requirement due to the COVID-19 pandemic. Active mobility good practices were gathered by 50 postgraduate students and they were categorized by the authors. 50 European cities were reported, of which four (4) were examined further as the most reported ones. These were the following: Paris, France; Milan, Italy; Brussels, Belgium; and Berlin, Germany. This does not mean that these cities are the best performing in active mobility, as there could be cities that already had adequate active mobility performance, and other factors interfere, such as the brand name of each city. The most reported good practice was the temporary pop-up bicycle lanes, also applied in Thessaloniki, Greece. Another good practice is the expansion of pedestrianization and the speed limit of 30 km/h. Athens, Thessaloniki, and other Greek cities have a lot to learn from the experience of the other European cities, and this paper is an attempt of knowledge transfer. It seems that the crisis of the COVID-19 pandemic has become an excellent opportunity for the promotion of active mobility in Europe that should not be left unexploited.

1. Introduction
The scope of this paper is to make a review of the good practices of active mobility measures implemented by big European cities to face the changing travel patterns and the social distancing requirement due to the COVID-19 pandemic.

The European Union actively promotes public transport with policies, measures, and funding of research projects in order to fight congestion, pollution, and climate change. Apart from public transport, it is increasingly focusing on active mobility, e.g., walking and cycling, as an alternative to car usage, due to the added benefit of health. Obesity has become a pandemic in the developed world, and active mobility has proven to be a very important factor in facing this problem too. The health benefits of walking and cycling are well-documented, in contrast to a sedentary lifestyle that increases the chances of cardiovascular diseases and depression for the general population, regardless of age [1].
Nevertheless, the transition from motorized transport to active mobility is not always easy. Usually, it takes decades for habits to break and to create a critical mass of walkers and cyclists who will claim their share of public space in the form of walking and cycling paths [2].

The experience of the Dutch woonerven zones shows that sometimes revolutionary grassroots movements are needed to have such a transition [3].

The COVID-19 pandemic and the requirement of social distancing gave the opportunity to big European cities to implement policies and measures of active mobility in a much more disruptive way. Some of them even named such measures “temporary” in order to avoid public resistance, but this is the future, and perhaps the COVID-19 pandemic will prove to be the tipping point of this transition in the European Union. In this frame, the present paper examines the most important temporary or permanent active mobility measures that were implemented by big European cities during the COVID-19 pandemic. These good practices will be discussed to derive useful conclusions, and proposals will be formulated regarding the adoption of some of them by Greek cities, adapted to their particular needs and requirements. It should be noticed that these practices are not always accompanied by a close analysis of the mobility habits of people, as for example reported in [4] and [5].

2. Methodology
The measures and good practices have been gathered in a systematic way by 50 postgraduate students of the Hellenic Open University, comprised of several specialties, e.g., architects, urbanists, civil engineers, etc.

Each of these postgraduate students was asked to find five (5) good practices of active mobility measures implemented by European cities due to the COVID-19 and describe them in the frame of a postgraduate course essay. The authors gathered all the responses, selected the useful responses as some of those were not given in an exploitable format for the needs of this paper (e.g., they were not referring to specific good practices but general concepts), categorized them, and created tables to show which cities were mostly referred.

After that, they discussed the most important ones in a technology-transfer manner, in order for Greek cities to adopt the most suitable for them, according to their needs and requirements.

3. Results
It was found that six (6) out of responses could not be exploited for the needs of the paper. Therefore, the results were derived from 44 answers. The respondents were 20 men and 24 women, i.e., 45.5% and 54.5%, respectively.

In total, 208 good practices were identified, but many of them were overlapping, i.e., were the same good practices reported by different students. It was expected to have 220 overlapping good practices since each student was asked to report five (5) good practices and the respondents of the exploitable sample were 44 (44⋅5=220), but some students reported less than five (5) practices, and some students included good practices not of European cites, and these answers were excluded.

In Table 1, it is shown that there are ten (10) good practices from Greece, four (4) from Italy and the Netherlands, three (3) from Spain, two (2) from Germany, Poland, and the United Kingdom, and one (1) from Albania, Austria, Belgium, Denmark, Finland, France, Hungary, Ireland, Lithuania, Portugal, and Switzerland. It seems that the respondents were either biased or responded according to which good practices they were more familiar from theirs or other Greek cities. It is worth mentioning that during the time of the answers’ collection, there was an extensive discussion about the “Grand Promenade” of Athens, a pilot application of pedestrianization next to moving vehicles, which attracted much negative attention from the media, and finally, it was considered not such a good practice, and it was not adopted as a permanent measure. Many students reported this pilot application as “good practice,” which is wrong. Nevertheless, the overrepresentation of Greek good, or not so good, practices is not a problem in the frame of this paper, as its purpose is to identify good practices from non-Greek cities that could be adopted by Greek cities, in a knowledge transfer manner, and, therefore, the good practices from Greek cities will not be further discussed.
Another problem that is obvious from Table 1 is the overrepresentation of well-known cities with a famous brand name. It was expected that these cities would be overrepresented since their fame promotes their visibility on the Internet, and the Google PageRank algorithm is expected to rank higher good practices from such cities. On the one hand, this is kind of a problem in case the researchers want to be as objective as they could be, but on the other hand, since the purpose of this paper is knowledge transfer, well-known cities with a famous brand name could more easily facilitate such a process.

Table 1. Identified active mobility good practices of European cities.

| No. | City      | Country | References | Percentage |
|-----|-----------|---------|------------|------------|
| 1   | Paris     | France  | 27         | 12.98%     |
| 2   | Athens    | Greece  | 25         | 12.02%     |
| 3   | Milan     | Italy   | 24         | 11.54%     |
| 4   | Brussels  | Belgium | 20         | 9.62%      |
| 5   | Thessaloniki | Greece | 16         | 7.69%      |
| 6   | Berlin    | Germany | 15         | 7.21%      |
| 7   | Barcelona | Spain   | 11         | 5.29%      |
| 8   | Rome      | Italy   | 11         | 5.29%      |
| 9   | Lisbon    | Portugal| 8          | 3.85%      |
| 10  | Budapest  | Hungary | 7          | 3.37%      |
| 11  | London    | United Kingdom | 7 | 3.37% |
| 12  | Viena     | Austria | 5          | 2.40%      |
| 13  | Amsterdam | the Netherlands | 3 | 1.44% |
| 14  | Dublin    | Ireland | 3          | 1.44%      |
| 15  | Karditsa  | Greece  | 2          | 0.96%      |
| 16  | Trikala   | Greece  | 2          | 0.96%      |
| 17  | Bern      | Switzerland | 1 | 0.48% |
| 18  | Białystok | Poland  | 1          | 0.48%      |
| 19  | Catania   | Italy   | 1          | 0.48%      |
| 20  | Copenhagen| Denmark | 1          | 0.48%      |
| 21  | Drama     | Greece  | 1          | 0.48%      |
| 22  | Edinburgh | United Kingdom | 1 | 0.48% |
| 23  | Florina   | Greece  | 1          | 0.48%      |
| 24  | Groningen | the Netherlands | 1 | 0.48% |
| 25  | Helsinki  | Finland | 1          | 0.48%      |
| 26  | Heraklion | Greece  | 1          | 0.48%      |
| 27  | Kavala    | Greece  | 1          | 0.48%      |
| 28  | Kleve     | Germany | 1          | 0.48%      |
| 29  | Larisa    | Greece  | 1          | 0.48%      |
| 30  | Madrid    | Spain   | 1          | 0.48%      |
| 31  | Palermo   | Italy   | 1          | 0.48%      |
| 32  | Patras    | Greece  | 1          | 0.48%      |
| 33  | Rotterdam | the Netherlands | 1 | 0.48% |
| 34  | Santander | Spain   | 1          | 0.48%      |
| 35  | Tirana    | Albania | 1          | 0.48%      |
| 36  | Turin     | Italy   | 1          | 0.48%      |
| 37  | Utrecht   | the Netherlands | 1 | 0.48% |
| 38  | Vilnius   | Lithuania | 1          | 0.48%      |
| Total |          |         | 208        | 100.00%    |
In Table 1, it is shown that the good practices mentioned are 12.98% (27) from Paris, France, 12.02% (25) from Athens, Greece, 11.54% (24) from Milan, Italy, 9.62% (20) from Brussels, Belgium, 7.69% (16) from Thessaloniki, Greece, 7.21% (15) from Berlin, Germany, 5.29% (11) from Barcelona, Spain, and Rome, Italy, 3.85% (8) from Lisbon, Portugal, 3.37% (7) from Budapest, Hungary, and London, United Kingdom, 2.40% (5) from Vienna, Austria, 1.44% (3) from Amsterdam, the Netherlands, and Dublin, Ireland, 0.96% (2) from Karditsa and Trikala, Greece, and 0.48% (1) from Bern, Switzerland, Białystok, Poland, Catania, Italy, Copenhagen, Denmark, Drama, Greece, Edinburgh, United Kingdom, Florina, Greece, Groningen, the Netherlands, Helsinki, Finland, Heraklion, and Kavala, Greece, Kleve, Germany, Larisa, Greece, Madrid, Spain, Palermo, Italy, Patras, Greece, Rotterdam, the Netherlands, Santander, Spain, Tirana, Albania, Turin, Italy, Utrecht, the Netherlands, and Vilnius, Lithuania.

The good practices that will be further discussed are the good practices from cities that gathered 15 references or above, excluding the Greek cities for reasons that have been mentioned above.

These cities are the following:
1. Paris, France;
2. Milan, Italy;
3. Brussels, Belgium; and
4. Berlin, Germany.

4. Discussion

4.1. Paris, France

In Paris, France, a network of spacious bicycles lanes was created that follows the routes of some of the busiest underground public transit lines, including metro lines 1, 3, 10, and 13, and RER lines A and B on the left bank. This bicycle network adds more than 50 km to the existing bicycle network of the city [6] (Figure 1). The character of these specific interventions is temporary with soft materials used (Figure 2) [7], but 300 million € will be provided to part-pay for a mix of new infrastructure and temporary “corona cycleways,” 60% of which will be financed by the Île-de-France region, for a bicycle network that is planned to cover 650 km of the broader Île-de-France region [8].

Moreover, many Parisians are being offered 50 € toward getting old bicycles repaired as part of the French capital’s 20 million € Plan Vélo to encourage the use of bicycles [9]. Plan Vélo calls for making every street in Paris bicycle-friendly by 2024 and removing 72% of the city’s on-street car parking spaces [10].

A nice feature of Plan Vélo is an online observatory of the actions taken so that any Parisien can see the progress of the works [11]!

![Figure 1. 50 km of bike lines in Paris [12].](image-url)
4.2. Milan, Italy

Milan, Italy, was particularly hard hit by COVID-19. It has developed the Strade Aperte (Open Roads) plan that includes 35 km of additional bicycle lanes and new 30 km/h speed zones (Figure 3) [13]. The Strade Aperte plan also calls for a significant increase in the number of micromobility vehicles allowed in the city, doubling the amount of bicycles from 8,000 to 16,000 and more than doubling the amount of electric scooters from 2,250 to 6,000. The authorities of Milan hope to significantly reduce car use and maintain the steep decrease in air pollution that was experienced during the country-wide lockdown [6].

4.3. Brussels, Belgium

To prevent the spread of COVID-19, the City of Brussels decided on May 11, 2020, to turn the city center into a traffic calming zone from January 1, 2021. This enables pedestrians to use the full width of the public road and not just the sidewalks, and car traffic is done at a maximum speed of 20 km/h to ensure pedestrian priority and cyclist safety while existing pedestrian lanes are maintained as sidewalks. In this way, the city created more space to comply with the rules of social distancing [14].
Subsequently, the City of Brussels decided to introduce a 30 km/h speed limit in most parts of the city from January 1, 2021, with the exception of the main avenues where the maximum speed remains 50 km/h or 70 km/h. These exceptions are marked with signs.

The City 30 initiative aims at safer urban transportation, improving the health of residents, and reducing noise pollution. With this measure, different road users can coexist, as the roads are safer even for the vulnerable road users, such as pedestrians, people with disability, cyclists, and motorists [15]. The 30 km/h speed limit has been adopted also by other European cities, such as Graz, Austria, Grenoble, France, Helsinki, Finland, Valencia, Spain, Zurich, Switzerland, Lille, France, Bilbao, Spain, and others, in the general frame of promoting the Vision Zero policy for road safety, adopted by the European Union [16].

Figure 4. The project City 30 in Brussels [15].

4.4. Berlin, Germany

In Berlin, Germany, traffic lanes were temporarily provided for use by cyclists, allowing the observance of social and physical distancing measures [6]. The total length of these temporary bike lanes is 22.53 km, and they were built in less than ten (10) days using traffic beacons. This operation, although temporary, may eventually be permanent, as the construction of similar bicycle lanes in Berlin could take up to a decade due to the special traffic arrangements it requires, and the percentage of Berliners who do not own a car is increasing; 43% at last count [9]. A nice feature of Berlin’s experience is that it issued special guidelines for the construction of such kind of temporary bicycle lanes, “pop-up” as they are called, that are free for all to use [17].
5. Conclusions
From the good practices that were discussed above, a pattern seems to emerge. The most common measure of active mobility due to the COVID-19 pandemic is the construction of temporary so-called “pop-up” bicycle lanes. Moreover, there is an expressed intention to make these new bicycle lanes permanent even after the pandemic. Therefore, the crisis of the COVID-19 pandemic seems to have become an opportunity for the promotion of active mobility. Active mobility is not so easy to promote, as the mobility patterns of commuters follow specific habits [2]. It is difficult to fight the inertia of travel habits, and in this fight, the COVID-19 pandemic seems to have become an excellent ally.

In Thessaloniki, Greece, the same approach was followed with the construction of pop-up bicycle lanes in the Konstantinou Karamanlis avenue and the Nikis avenue, and it seems that the intention of the Municipality of Thessaloniki is to make these permanent. Thessaloniki has much to learn from the experience of other cities, like Paris, by expanding its bicycle network, reducing traffic lanes for motorized vehicles, publishing online an interactive map showing the progress of the construction of such a bicycle network, and from Berlin by introducing bicycle lanes’ guidelines adapted to the city’s needs and requirements. Moreover, it should start considering its transformation to a 30 km/h city, according to Brussels’s example, and enhance its walkability [18][19].

On the other hand, in Athens, Greece, the good practice that was most referred was the Grand Promenade. This measure was not a success, and the Municipality of Athens decided to cancel it. The reasons were the bad publicity it gathered by the media among rumors of overspending and its proximity to motorized traffic. It seems that Athens has a lot to learn from the experience of Brussels and the concept of 30 km/h cities, and Paris with its expanded bicycle lane network.

Other Greek cities should develop their specific strategies towards becoming active mobility-friendly cities. It is worth mentioning that there are already some very good examples like Trikala, which is pioneering in smart city applications; Karditsa, which has developed an excellent bicycle lane network; Larisa, which is promoting walking with extensive pedestrianization; and others.

References
[1] Nalmpantis D 2021 School campus traffic circulation International Encyclopedia of Transportation vol 2, ed R Vickerman (London: Elsevier) pp 568–575 https://doi.org/10.1016/B978-0-08-102671-7.10183-6
[2] Tsafarakis S, Gkorezis P, Nalmpantis D, Genitsaris E, Andronikidis A and Altsitsiadis E 2019 Investigating the preferences of individuals on public transport innovations using the Maximum Difference Scaling method Eur. Transp. Res. Rev. 11 (1) 3 https://doi.org/10.1186/s12544-018-0340-6
[3] Nalmpantis D, Lampou S-C and Naniopoulos A 2017 The concept of woonerf zone applied in university campuses: the case of the campus of the Aristotle University of Thessaloniki Transp. Res. Proc. 24 450–458 https://doi.org/10.1016/j.trpro.2017.05.071
[4] Chita E, Drimili E, Garciou Z, Milioti C, Vranna A, Poulopoulos S and Zervas E 2020 Impact of economic crisis on passenger transportation – case of travelling to the Greek mainland from Crete Promet 32 (3) 347–360 https://doi.org/10.7307/ptt.v32i3.3255

[5] Vatavali F, Garciou Z, Kehagia F and Zervas E 2020 Impact of COVID-19 on urban everyday life in Greece. Perceptions, experiences and practices of the active population Sustainability-Basel 12 (22) 9410 https://doi.org/10.3390/su12229410

[6] Bird Rides 2020 May 16 These 5 cities are getting micromobility right in response to COVID-19 Bird Cities Blog https://www.bird.co/blog/these-5-cities-getting-micromobility-right-response-covid-19/

[7] National Association of City Transportation Officials 2020 Streets for pandemic: response & recovery National Association of City Transportation Officials https://nacto.org/wp-content/uploads/2020/09/109-Streets_Pandemic_Response_Recovery_Final_20-09-24.pdf

[8] Polis 2020 April 23 Île-de-France prepares network of pop-up bike lanes for post-confinement Polis https://www.polisnetwork.eu/article/paris-prepares-650-km-of-pop-up-bike-lanes-for-post-confinement/

[9] Connolly K 2020 May 18 ‘Cleaner and greener’: Covid-19 prompts world's cities to free public space of cars The Guardian https://www.theguardian.com/world/2020/may/18/cleaner-and-greener-covid-19-prompts-worlds-cities-to-free-public-space-of-cars

[10] COVID Mobility Works nd Paris adding 650 kilometers of emergency bicycle lanes https://www.covidmobilityworks.org/responses/paris-adding-650-kilometers-of-emergency-bicycle-lanes-4c3456adf1

[11] Observatoire du Plan Vélo de Paris nd Observatoire du Plan Vélo https://planvelo.paris/

[12] Hidalgo A 2020 May 16 D’ici cet été, nous allons créer à Paris 50km de pistes cyclables supplémentaires pour favoriser les déplacements à vélo dans le cadre du déconfinement. Ils viennent s’ajouter aux 1.040km qui existent déjà dans la capitale [in French] Facebook https://www.facebook.com/HidalgoAnne/photos/a.10151574208984597/1015807317927957/1015807317927959

[13] Municipality of Milan 2020 Milan 2020: adaptation strategy https://www.comune.milano.it/documents/20126/7117896/Open+streets.pdf/d9be0547-1eb0-5abf-410b-a8ca97945136

[14] Brussels Regional Public Service, Brussels Mobility nd City 30 https://city30.brussels/

[15] De Muelenaere M 2020 December 30 Bruxelles au défi du 30 km/h [in French] Le Soir https://plus.lesoir.be/346323/article/2020-12-30/bruxelles-au-defi-du-30-kmh

[16] European Commission 2011 White paper on transport: Roadmap to a single European transport area: towards a competitive and resource efficient transport system (Luxembourg: Publications Office of the European Union) p 28 https://doi.org/10.2832/30955

[17] Land of Berlin 2020 Regelpläne zur temporären Einrichtung und Erweiterung von Radverkehrsanlagen [in German] https://www.berlin.de/sen/uvk/_assets/verkehr/verkehrsplanung/radverkehr/regelplae_radverkehrsanlagen.pdf

[18] Gkavra R, Nalmpantis D, Genitsaris E and Naniopoulos A 2019 The walkability of Thessaloniki: citizens’ perceptions Advances in Intelligent Systems and Computing vol 879 ed E Nathanail and I Karakikes (Cham: Springer) chapter 23 pp 191–198 https://doi.org/10.1007/978-3-030-02305-8_23

[19] Vasileiadis I and Nalmpantis D 2019 Development of a methodology, using multi-criteria decision analysis (MCDA), to choose between full pedestrianization and traffic calming area (woonf zone type) Advances in Intelligent Systems and Computing vol 879 ed E Nathanail and I Karakikes (Cham: Springer) chapter 38 pp 315–322 https://doi.org/10.1007/978-3-030-02305-8_38