Epidemic and mobility
A New Paradigm for mobility plans after the Covid-19 crisis

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Covid-19 epidemic is likely to hasten some significant ongoing developments in physical mobility policies. Among them: (a) the shift from internal combustion to electric engines for cars and buses breaks the close relationship between air pollution and traffic; (b) the physical-distancing requirements weakens the competitiveness of mass transportation and imply a different city form; (c) the diffusion of self-driving cars and driver-assistance technologies considerably affects mobility and urban plans. Hence, we need to revise a century-old approach based on the assumption that more mobility is always welcome and accept that coping with

Introduction: Covid-19 and mobility

In my book "*Mobility and Environment. Humanists vs. Engineers in Urban Policy and Professional Education*" (Poli, 2011), I stay well clear of proposing solutions. The goal of my essay is not to solve the physical mobility problem, and even less to solve it once and for all. It aims instead at restructuring the mobility problem in an alternative way.

Nonetheless, at the end of every presentation, unfailingly someone asks me what solution I do eventually recommend. I answer with a paradox: "My solution is: you'd better stay at home!" In classical philosophy, a paradox is an utterance contrary to what anyone expects and a method that seeks to establish truth through an absurdity (*reductio ad absurdum*) or an exaggeration. After the Covid-19 epidemic, my answer sounds less of a paradox, in fact not absurd at all. I need to add that the

our daily urban problems does not necessarily require 'going somewhere' and instead it is possible to have 'something brought' to where we stay. The approach proposed calls for a 'mobility deflation'.

very circumstance that my lectures' attendees ask me for a solution does not only mean that they miss the very point of my effort, which is clearly my fault since I was evidently not clear enough. It also means that we are not used to argue with the mobility approach, but that we assume that there is a ready-to-buy solution, one we can just pick up from a catalogue. The current urge to contain the virus transmission generates two major effects on mobility. They are quite obvious, but it is worth mentioning them to start a new approach to the urban mobility issue. Times are ripe to move more quickly in the direction that I – as well as other researchers (Urry, 2007; Engwitch, 1989; Richmond, 2005; Gottlieb, 2007) – described in my book (2011), which admittedly requires some updating. I also want to show how the epidemic may convert into an opportunity that the most resilient cities might take advantage of, instead of looking forward to going back as soon as possible to business as usual. In these months, since the contagion spread over, and the governments enforced severe mobility-reduction regulations, we have

become aware that a certain amount of our movements is not really needed. We have realized that the solution to many of our daily problems does not require 'going somewhere' and, on the contrary, it is possible to have 'something brought' to where we stay. The aforementioned literature has already elaborated on it in theory, but the risk of Covid-19 contagion has compelled us to test it in everyday life. A second message Covid-19 is sending to mobility planners regards public transportation. Mass transit has been seen as the cathartic solution to all traffic ills, such as congestion and pollution, not to speak about impoverishment of social life and human communication (see Urry, 2007 and Augé, 1995). Covid-19 challenges the public transportation solution because, in a condition of possible contamination, fewer people would dare to share their comfort zone with others on mass transit vehicles. Any bus and every train have become more dangerous places than private cars. Consequently, also public transportation needs to be deeply reconsidered and tentatively redesigned. This happens while some profound changes are taking place in automotive heavy industry and technologies,

namely the progressive abandonment of endothermic engines and the development of self-driving cars. In Europe, Norway will phase out conventional cars by 2025, followed by France and the United Kingdom in 2040 and 2050, respectively. Many large European metropolises have already banned diesel vehicles, and this clearly opens the way to electrification. All these phenomena require to re-address research in environmentally-friendly mobility. A report issued by ERTRAC, EPoSS and Smartgrids in 2017 shows how the roadmap to the electrification of mobility is to take the subsequent steps. Until now, the automotive industry has invested in research in new electric power technologies and in designing cars suitable to accept them. In 2020, a new major step is taking place which includes the mass production of hybrid and plug-in cars as well and buses, trucks and coaches. Also, the distribution of energy for electric vehicles is soon going to spread all over Europe. We will soon see charging stations appearing everywhere like mushrooms. In 2025, electric vehicles will be fully revised and by 2030 "an automobile paradigm shift will lead to synergetic effects of automation, connectivity and electrification. The adaption of the car to new mobility models with specific purpose profiles will influence the shape, interior and performance features. Active safety mechanisms enabled by automation functions allow the application of lightweight construction, and thus less material use and lower weight" (ERTRAC et al., 2017, p. 35).

Mobility reduction
Mobility supporters claim that the physical possibility to move and travel fosters both economy and culture. This idea has been accepted since antiquity and civil engineers are the advocates of infrastructures designed to ease communication and physical mobility. Communication and physical mobility were linked like Siamese twins at least until the discovery of radio waves and Marconi's experiments. Meeting people in different countries still constitutes a crucial social asset because it helps making people more informed and open-minded. Nonetheless, nowadays the ICT development and their widespread usage allow us to avoid being imprisoned in culturally closed communities even if we never leave home. In fact, the possibility of a relentless hanging around in increasingly larger metropolitan areas or even moving from one city to another – and the very existence of 'another' city out of an 'all-urban world' – is exactly the opposite of the uniqueness of the global condition. If all places are the same, as is the case in the globalized world, continuously moving from a place to the other is the outcome of some disorganization issue rather than an enhancement of opportunities. Countries' and local differences are like post-modern quotations in architecture, namely meaningless relics of the past or fake identities devised to enthrall tourists and visitors. The so-called parochialism is a conception of the world that does not consider anything but one's own community.

Thus, there is nothing more provincial than globalism as long as we cannot move to 'somewhere else', being locked into a single uniform system. Out of the uniqueness of the globe, nothing is left. Furthermore, when we have access to a large number of people, like in the big cities and online, we choose our friends and acquaintances among the ones more similar to us. Cultural anthropologists claim that humans have relatively close relations within 'tribes' of no more than eighty to a hundred people (Morris, 1967-1969). Who are the persons we choose to interact with? If we live in a small town or in a village, we have more possibility to personally meet and have a direct contact with people very different from each other: your neighbors might be a plumber, a couple of farmers, one doctor, a few professionals, two teachers, some retailers, etc. In the big city – contrary to what it used to be when cities were 'variety fairs' – we tend to live in homogeneous tribes of persons with whom we share the same values, profession and lifestyle. Especially in North America, living in socially homogeneous neighborhoods is quite normal as emblematized by gated communities. All other relations are formal and outside the tribe. An easily accessible mobility has fostered this organization of society, allowing people searching for their fellow tribesmen in increasingly larger areas. Telecommunications have enhanced this possibility even more by making it also virtual, but it has not substituted the need and pleasure of physical contact that is still preferred by human

beings. Being forced to stay at home, or not to move as much as in the past because of Covid-19 regulations, might modify the social and anthropological structure of human tribes and make them more internally diversified. The need for monitoring possible contagion also requires smaller communities which can be isolated without severely harming the whole economy and urban organization. A dramatic increase in remote working and education implies a change in neighborhood relations, in retail and other services distribution. It is likely that many different services and the people that provide them will settle in the neighborhoods instead of commuting from different places. The social structure of people living in their immediate surroundings might vary if mobility patterns change and are significantly reduced. The idea of a city meant as the sum of urban villages has fascinated planners since the Sixties. Jane Jacobs was the harbinger of several movements calling for a return to high density towns and unsuccessfully fighting against sub-urbanization. Since the end of nineteenth century and until the mid-Fifties, the anti-density agenda had some strong rationale related to frequent epidemic and incurable diseases which might become relevant again because the Covid-19. The diffusion of vaccines and antibiotics made Jacobs' ideas more viable (Moroni, 2016; Fantini-Poli, 2020 forthcoming; Poli, 2020). However, few cities tried to implement Jacobs' principles and, when they did, they were seldom successful. Thus, while Jacobs

and her followers have been very popular in the academic and activist milieu, we did not see many examples of lively and diverse neighborhoods around the world. Even less, these neighborhoods were the outcome of plans. The few successful examples – which soon became tourist attractions including the original Greenwich Village and now even Brooklyn, which took over after the Village transformed into just an icon of old-time New York – appear to have just happened, independently of any deliberate intent. Along Jacobs' lines, Storper and Venables (2004) (see also Storper, Manville, 2006) argue that "the existing models of urban concentrations are incomplete unless grounded in the most fundamental aspect of proximity; face-to-face contact. Face-to-face contact has four main features: it is an efficient communication technology; it can help solve incentive problems; it can facilitate socialization and learning; and it provides psychological motivation" (Storper, Venables, 2004, p. 351). I maintain that 'face-to-face contact' is a human need possibly rooted in genetic evolution besides being a social structure. As Storper and Venables put it, face-to-face contact helps accomplish the four main features they list. However, when we progress toward a more sophisticated thinking, a more complex economy and more formal relations, the more than fifteen-year-old technologies to which the authors refer, have become less influential than they were at the time. In the last fifteen years, ICT made some unquestionable technical progress, but

the substantial change that has occurred in the last twenty years, is its increasingly widespread use. Thus, it is a matter of social organization that may alter profoundly the patterns of face-to-face relations. Covid-19 has given a convincing impulse to the customary use ICT. All this affects mobility policies as we will see in the following paragraphs.

On the other hand, Boschma (2005) cunningly draws attention to the negative aspects of proximity on innovation. Proximity, when forced by large and non-flexible organizations – such as old-fashioned (so-called 'Fordist') factories, present-day schools and hospitals, bureaucratic bodies, etc. – may become an obstacle to change and innovation as organization theorists, such as Simon, Cyert and Crozier, have claimed since the Fifties.

Self-sustainable neighborhoods

Both the availability of ICT and the restrictions due to the contagion offer the opportunity to rethink our cities and regions as the sum of almost self-sustainable neighborhoods, without losing neither the freedom to travel nor the possibility to exchange information and commodities. As a matter of fact, the re-invention of the neighborhoods equals the re-discovery of the 'others' in a society and cities that had become basically identical (Aime, Papotti, 2012). There are keen differences among social groups, income levels, ethnic origin and lifestyles that are occasionally reported in the territory. They are no longer the urban villages

that Jane Jacobs dreamed of more than half a century ago and rarely established in some cities (Jacobs 1961, 1969): while socially different human communities are often separated and do not communicate with each other, the overall urban organization works as one, mostly thanks to specific transportation infrastructures. The contemporary urban areas are characterized by the total absence of official barriers (with the exception of the gated communities which have spread all over North American metropolitan areas over the past few decades). This settlement pattern has created an indifference to geography and space. An out-of-control mobility growth boosted this trend to the annihilation of space and time in the physical space (Harvey, 1990). This is a well-known geographical theoretical issue which requires to be approached from a more updated perspective. ICT allow the removal of every physical barrier and consent an apparently easy exchange of opinions, knowledge and information worldwide. At the same time, the establishment of new unofficial boundaries defines distinctive compounds characterized by different lifestyles and, which is even more important, by self-sustainability (Viard, 2011; regarding the distinction between barriers and boundaries see Sennett, 1990 e Poli, 2017a, 2017b). A new urban form – no longer based on an ever-growing and limitless mobility – might become necessary in order to lockdown parts of regions in the case another possible epidemic. Hence, we should design the city in order to ease

possible lockdowns while containing economic losses and social distress. For as long as a century – approximately since the Spanish flu epidemic –, in the western world we have learnt to live in reasonably safe environments from the point of view of health care and contagions. Covid-19 is teaching us that risks have not entirely disappeared. Thus, urban design and mobility plans ought to keep into consideration new types of risks that we have long underestimated. The reconstruction of a more direct relationship between space and people is a new likely goal for contemporary society. In this altered social and physical environment, mobility plays a crucial role in defining the new urban form and organization.

A cultural revolution for resilience

Resilience could happen in this physical and cultural newfangled milieu. ITC and 3D design can reduce a significant and growing quota of daily movements that might become unappealing or not convenient. Purposely, I do not specify a figure because the significance of the possible reduction is highly variable and mostly cumulative. Until now, working and meeting from remote were not used as much as they could because (a) the organization of labor and society is typically slow in getting adapted to the opportunities offered by new technologies; (b) we are psychologically cautious to change our behaviors, habits and consume patterns. The Covid-19 epidemic is just hastening a change process which was already in progress.

Thus, I call for a cultural revolution in mobility planning and this paper is more a philosophical and methodological contribution rather than a technical one. It is based on the assumption that we conceive progress as an improvement in quality of life obtained by increasingly utilizing local resources, while in the past we perceived development as the possibility to use resources coming from more distant areas. Among these local resources, a crucial one is democracy, which can be effective when there are direct relations among individuals and between people and nature. Obviously, I do not deny that progress involves two attitudes: the skill to transform and use local resources; and the ability to acquire and process goods from all over the world. Over the past few decades the latter attitude has been abused. The suspension of useless movements, enforced by anti-Covid-19 regulations, can invert the mobility inflation spiral and substitute the leadership of civil engineers in mobility policies with ICT and organization technicians, architects and other professionals (Poli, 2011, chapters 7-9).

A Traffic Reduction Sequence

Until the Covid-19 crisis, traffic-related decision-making – both public and private – had been trapped in a vicious circle that brought about an escalation of mobility, similar to a currency inflation. The transportation and traffic patterns are one of the main keystones of industry and of people's lifestyle. Changing them requires a thorough transformation of many mental schemes and daily habits that most of us do not question in normal times. The unexpected regulations, due to the epidemic, create an opportunity to invert the traffic inflationary spiral. In economics, inflation – which means filling something with air, i.e. metaphorically with nothing – occurs when supply fails to meet an increasing demand. Scarcity makes prices rise exponentially. Applied to mobility, we can conclude that if we increase the supply of new traffic infrastructures and fail to bridle the additional mobility demand that they generate, new mobility infrastructures will soon prove necessary. Hence, when satisfied administrators proudly inaugurate a new road (or a bridge or beltway) which brings temporary relief to a traffic congestion problem, they should simultaneously explain to their constituency what measures they have adopted to counteract the extra traffic that the additional infrastructure is going to create. Only then can the construction of a new infrastructure be justified. There are a lot of traffic models, but very few of them deal with the supply-driven demand for more mobility. The lack of interest in this approach to mobility is the result of the professional education of those who usually manage policies and research. Because they are mostly civil engineers or mathematicians, they show little interest in social, economic and psychological aspects which, however, are a major driving force behing people's mobility behaviors.

This approach is difficult to explain to a lay audience. In fact, in the last two centuries, we took for granted that an increase in the mobility of people and goods would unquestionably create positive effects on cultural and economic progress. Nowadays, we can safely believe that a further increase in the overall physical mobility – and consequently in the infrastructures that make it possible – does not add any extra value to the welfare of society. If we calculate all the values involved, every physical mobility growth – both of people and goods – generates a loss rather than a gain. From mobility growth, taken as an end *per se*, we should move on to a selective growth of effective mobility, which might suggest a reduction of mobility in absolute terms. Whoever protests against a further growth of mobility and mobility inflation has to fight entrenched and unquestioned biases. Now, we have the opportunity to develop new research based on different assumptions. The idea that more mobility is good *per se* can be replaced with the new hypothesis of a fixed (or optimal) amount of people-mobility needed. The new models might include both economic and public health issues, as well as others such as social and emotional concerns.

New non-ICT technologies

As noted earlier, the lockdown caused by Covid-19 contagion happens while some radical changes are occurring in mobility, namely (a) the substitution of endothermic with electric engines and (b) the mass production of self-driving cars already preceded by driver-assistance systems (ERTRAC et al., 2017). This mobility revolution will not considerably modify neither traffic congestion nor mobility patterns if the city structure goes unchanged. It is also questionable how much it can reduce local and global environmental impacts. It might or not, depending on many other decisions, some of which are linked with public health problems that the current contagion has disclosed. The need to permanently reduce concentration of people in large factories, schools, conference halls, buildings, stadiums, requires a new idea for an urban planning which minimizes the need to aggregate large amounts of people in the same place at the same time. We can still meet up as a mass society virtually, but huge metropolises are no longer healthy and safe, if they ever were.

Public transportation has been for a long time 'the solution', somehow mythical, for reducing pollution and congestion. Actually, it was seldom successful: in most cases, transportation infrastructures have created more urban dispersal and environmental impacts. Large infrastructures and mass transportation are often underused for long periods of the day, the week or the year. It is obvious that the Covid-19 epidemic will discourage the use of public transportation, and it is likely that it will not be possible to make mass transit infrastructures larger in order to keep people at the adequate safe distance from each other. Not only the

operational costs of empty buses are too high, but also the environmental impacts would not justify investment in mass transit. The diffusion of electric self-driving cars and (locally) zero emission engines will certainly change traffic patterns and organization, and consequently also the physical and telecommunication infrastructures needed. Depending on economic and financial policies adopted, it might reduce (local) pollution, and probably the number of cars circulating, thanks to a growth in communal ownership (e.g. car-sharing) or easy-to-rent facilities. However, it is an open question whether the new phenomena and organization will reduce congestion and the overall mobility. To keep distance from others, we need more space and more physical protection (screens, single occupancy vehicles, etc.) which implies a likely unaffordable and high environmental impact solution.

The end of mass transit?

Mass transit has never been 'the' solution to urban pollution and congestion; it has hardly been 'a' solution. From some points of view, it is part of the problem and has become an even more serious issue in recent decades. Thinking that mass transit was a viable solution has distracted researchers from the real problem. They have confused the symptoms with the disease as sometimes happens in medicine. The actual 'disease' is urban defective (or obsolete) organization and more precisely the over-dependence on mobility.

During the Covid-19 lockdown, people were not allowed to leave their houses. I live in an Italian midsize-city, in an urban neighborhood made of townhouses, small condominiums, and single-family houses with a lot of gardens and communal green areas. Before the lockdown, you could hardly see people using the open space and the gardens, no children playing, no old people sitting on benches or porches, and even fewer adults taking sunbaths, talking to each other, or exercising. During the lockdown all the otherwise-abandoned and just ornamental open space was brought to a new life – the very purpose it was designed for – and you finally could see people hanging out in the vicinity. Where were they before? A good many of them were in their cars or on public transportation taking children to sports facilities or extra-school courses, to attend meetings, to catch up with friends in far-away pubs: they were in fact wasting time traveling. During the lockdown, many of us discovered new opportunities to enjoy life in a different manner and take advantage of our (indeed quite expensive) open space which until now was just a decoration, a kind of a post-modern quotation of the town as it used to be.

Mobility is like wine: a couple of glasses are tasty and even good for well-being; if we drink more, it harms our health and, even worse, provokes addiction. If we think that we can get rid of an alcohol addiction problem just by shifting from wine to beer, I doubt we are on the right route. The same happens with

the dream of substituting car-commuting with mass transit in order to reduce pollution and traffic jams. Environmentalists have traditionally advocated the use of public transportation and opposed the use of private cars. Environmentalism developed in the Seventies and Eighties also as a critique to the libertarian individualistic society. Private car ownership was a meaningful representation of this individualistic society. This bias is now so entrenched in the environmentalist stance that it has become a dogma. Even the Pope in his Encyclical "*Laudato si'* (Praise Be To You)" advocated for more public transportation. The Popes' naïve utterance does not weaken the high moral value of his message, but it explains even too well how much we rely on *prêt-à-porter* technical 'solutions' instead of relying on the necessary abstract thinking.

Shifting from cars to mass transit was a reasonable policy when most investments converged on building roads and cars that in the twentieth century radically transformed the cities and mobility patterns, beginning in Northern America. Later, when the growth rate of investment in road construction and car ownership decreased, investors joined the environmentalists – who in the meanwhile had become more conservative and part of the establishment – in calling for more public transportation infrastructures. The federal administration transferred a considerable amount of money to the local governments to build trolleys and public transportation

infrastructures. As Richmond (2005) clearly shows in his book "Transport of Delight. The Mythical Conception of Rail Transit in Los Angeles", the local government did not build a new public transportation facility because it was necessary or just useful, but only because there was federal money which was made available thanks to powerful constructors' lobbies in Washington D.C. If the local governments would have had to pay for the Los Angeles trolley by collecting taxes, they would have never approved it.

Conclusion

Car-oriented urban planning, the growth of car ownership and the construction of infrastructures to let them run freely have shaped contemporary urban areas. People like private cars and the freedom to move. As a consequence, the car and the car-related industries have become a staple activity of an economy that will take a long time to restructure. Cities and social life were organized around movement and cars. Public transportation has never been competitive with private cars, with few exceptions. In large metropolises, the construction of massive public transportation infrastructure increased the number of people moving around but did not significantly reduce street congestion and car circulation. The Covid-19 epidemic might reverse the mobility inflation into a deflation or at least stop the mobility growth. A great deal of research is needed because we are not yet ready to analyze traffic flows while thinking about 'solutions' that imply

their reduction rather than fulfilling demand with an extra mobility supply. A significant case is students' commuting: instead of providing more housing near universities, we respond to their request for more subsidized transportation, which by the way often includes even more car-parks.

Thus, with this contribution I urge decision-makers, engineers and traffic practitioners in general to deal with mobility problems from a different perspective. The mobility supply, in terms of roads, public transportation and the like, is not supposed to grow. On the other hand, we solicit professionals and politicians to develop new policies focused on traffic reduction and on an optimization of the existing structures. It is possible, thanks to ITC and thanks to the innovative design of roads and public transportation. The innovation begins from changing the goals and constraints of the plan in order to prevent mobility growth.

Self-driving and assisted-driving cars require technological support to be safe and to let them run. Substantial investment is necessary to transform part of the economy and to adapt cities and roads to the new technologies. More ICT needs to be developed to catch up with innovation, so that a large part of production will shift from car manufacturing and infrastructure construction to other economic sectors. Labor, training and education will change as it is already doing. Because of distancing

requirements – in case they will indeed last for a long time or we will consider them as a recurrent possibility – we need to refashion the spaces of transportation means. A remote reservation system or a seat availability information system might become a regular approach also for daily commuting and mobility in general. Electrified mobility will modify pollution and traffic patterns. Also, it will involve car design, car ownership and car operation.

I would like to conclude my essay with an utterance that lies between prediction and wish: Covid-19's emergency will heavily affect mobility, urban planning and administrative geography. It will force to downsize several physical structures and some government units. At the same time, it will imply more social control and some concentration in strategic sectors such as medicine and knowledge economy. Good news might be that the environmental impacts will be softer; bad news is that big powers will take more control of information and we all might turn into 'data subjects' instead of free citizens.

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