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## Perspective

# What we can learn from birdsong: Mainstreaming teleworking in a post-pandemic world

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## ABSTRACT

Many urban areas suffer from poor air quality as a consequence of high levels of car-based traffic. Even cities with well-developed multi-modal public transport networks and favourable conditions for alternative transportation, such as Barcelona, experience problems with air pollution. The restrictions imposed on movement in response to the COVID-19 pandemic offer insights into the collective social benefits of reduced traffic. This situation also provided much-needed evidence about teleworking that will indicate whether it could become a mainstream and institutionalised practice in certain professions. In Barcelona, the experience of a less polluted, quieter and more liveable city has inspired both the municipal government and the citizens to rethink the use of public spaces and look for ways to reduce car dependency. We argue that this unprecedented crisis is an opportunity to create a more sustainable future of work and mobility in cities in the post-pandemic world.

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## Introduction

Air pollution is a serious threat to human health (WHO, 2016) and many city dwellers in Europe and around the globe are exposed to concentrations of certain air pollutants that exceed the limit and target values (EEA, 2019a, 2019b). Vehicle traffic is one of the main sources of emissions in most urban areas (Oke et al., 2017). Strategies for decreasing traffic emissions seek either to reduce emissions per vehicle by adopting lower-polluting fuels and technologies such as fleet electrification (Soret et al., 2014) or to reduce traffic volume with land-use and pricing measures (Creutzig et al., 2012; Keuken et al., 2012). Reducing car dependency and moving towards public and active transportation has been proven to significantly improve air quality and reduce the negative impact of traffic emissions on health (Khreis et al., 2016; Nieuwenhuijsen, 2018, 2020).

To help contain the spread of COVID-19, governments throughout the world have introduced restrictions on movement, largely confining people to their homes. These measures have resulted in a temporary decrease in CO<sub>2</sub> emissions of up to 26% on average in some countries (Le Quéré, 2020) and a strong drop in NO<sub>2</sub> emissions in urban areas, bringing air quality improvements

(DFT, 2020; Petetin et al., 2020; Tobias, 2020). One of the consequences of the restrictions on movement was that many professions turned to teleworking. This unprecedented experience not only provides a glimpse of how cities could look in the future, with more ambitious air quality measures, but also valuable insights into whether teleworking is a viable strategy to reduce car dependency. Such insights will help to inform local initiatives to accelerate the shift to more sustainable forms of mobility and broader calls for a "green recovery" from the COVID-19 crisis.

### Teleworking: pros and cons

Teleworking is the concept of performing work-related activities remotely using information and communication technologies, for the whole or a part of the working week (Allen et al., 2015; Taskin and Bridoux, 2010). Despite the potential advantages of teleworking in addressing problems related to commuting time, peak-hour traffic congestion and vehicle emissions, it has so far failed to become a popular or widely adopted practice (Harker Martin and MacDonnell, 2012; Hynes, 2016; Peters and Batenburg, 2015; Giovanis, 2018; Ravalet and Rerat, 2019). The failure of teleworking to gain broad appeal can partly be explained by the limited evidence of its societal benefits, as well as certain perceived and demonstrated disadvantages (Aguilera et al., 2016; Hook et al., 2020). While some studies have focussed on the individual benefits of teleworking, the opportunity has hitherto not been available

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to examine the collective social benefits of large-scale teleworking in practice, including the benefit of reductions in congestion and air pollution (Helminen and Ristimäki, 2007; Mokhtarian et al., 2004). Then again, the disadvantages include findings that teleworkers make more journeys for other purposes and thus contribute to longer weekly commuting distances travelled, as well as claims that telework causes urban sprawl (Abreu e Silva and Melo, 2018; Larson and Zhao, 2017; Melo & Abreu e Silva, 2017; Moeckel, 2017).

### *The case study of Barcelona*

Barcelona is situated at the core of a network of interrelated cities in one of the most densely populated metropolitan areas in Europe (Eurostat, 2016). The favourable climatic and structural characteristics of the city, with its mild dry climate and compact, dense urban area, together with sustainable transport policies, support a high modal share of non-motorized transport (BCC, 2013, 2018; Catalán et al., 2008). In 2018, for example, active transport such as walking and cycling accounted for more than half of all journeys within the city, while public transport accounted for almost a third (BCC, 2019). In spite of these statistics, car-dependency in the metropolitan area (Muñiz et al., 2005; AMB, 2016) contributes to Barcelona's high density of circulating vehicles, with approximately 5500 vehicles per km<sup>2</sup> in the most congested areas (Benavides et al., 2019). As a consequence, air and noise pollution persist as a serious problem in the city (BCC, 2017; Mueller et al., 2017). In 2017, for example, air pollution in Barcelona was associated with 929 premature deaths (ASPB, 2018). Nitrogen dioxide (NO<sub>2</sub>), generated predominantly from motor vehicle exhausts, is one of the pollutants of main concern due to its adverse effects on the respiratory system. Since 2000, concentrations of NO<sub>2</sub> have every year exceeded the annual mean limit value in the city of Barcelona (ASPB, 2019).

### *Emerging evidence from the lockdown*

During the fifty days of lockdown, from mid-March to early May 2020, the people of Barcelona, like many other urban areas around the globe, experienced a new version of their city, with improved air quality. In the ambience of the city without traffic, noise from vehicles was replaced by birdsong. We saw with our own eyes that air pollution is not an inevitable aspect of city life and that we can mitigate its causes. NO<sub>2</sub> and Black Carbon concentrations decreased by around 50% in the city in the first two weeks of confinement and a 74% decrease in passenger traffic played a significant role in this reduction (DGT, 2020; Petetin et al., 2020; Tobias et al., 2020).

The current situation in Barcelona provides evidence of the broader social benefits resulting from changes in urban travel behaviour and from the pivot to teleworking in many companies. Lacking concrete results, companies have previously been unable to make informed estimates of the benefits of teleworking in terms of productivity, social cohesion and work-life balance (Peters and Batenburg, 2015; Kaplan et al., 2018). Moreover, companies have often cited the alleged incompatibility of working from home with certain management methods as one of the barriers to the adoption of teleworking (Aguilera et al., 2016). However, the current situation has compelled many institutions to change and adapt their management methods to the circumstances imposed by the pandemic. Additional elements, including home offices, internet connection and necessary equipment have also been set up, although, not seldom, at the expense of employees. Managers are thus now in a position to observe the output of teleworking staff, focusing on results, products and deliverables, rather than on monitoring the physical presence of employees (Beauregard et al., 2013). Certainly, the last few months have not provided an

opportunity to study all the aspects of teleworking. Disadvantages cited in the literature, such as the increased number of journeys for other purposes, for example, could not be explored during the lockdown. Similarly, productivity, social cohesion and work-life balance have been the aspects often affected by the pandemic. There is a learning curve related to teleworking, however, and we can expect improved productivity in the post-pandemic world and once workers and managers adjust to the new arrangements, for example by developing more effective communication channels and home-office arrangements (Beauregard et al., 2019; Gajendran and Harrison, 2007).

Positively motivating first-hand experience is one of the imperatives for voluntary changes in behaviour (Semenza et al., 2008; Watts and Stephenson, 2000). The current situation gives citizens an opportunity to relate to something they have never experienced before – the benefits of a massive decrease in traffic and related consequences for the city. To keep the momentum going, the city of Barcelona is modifying its public space with a more human-centric approach (BCC, 2020a). After lifting the lockdown and entering a “new normality”, cycling and road transport (including private vehicles) regained numbers on the streets of Barcelona much faster than public transport, due to the higher risk of airborne transmission of coronavirus inside confined, shared spaces (Fig. 1). Hence, this is a crucial moment for the city to promote and make safe active transport, while discouraging private vehicle use, as otherwise it risks undermining its long-term effort of building the public transport use culture. The city of Barcelona is providing more room for walking and cycling, by widening pavements and cycleways and introducing traffic restrictions, such as prohibiting vehicles' access to the lateral lanes in the central city avenues (BCC, 2020b). Through these tactical urban changes, i.e. low-cost, temporary interventions that can be applied quickly (Silva et al., 2016), the city continues to promote active transportation, while maintaining physical distancing and traffic safety. However, there are trips to work that cannot be accomplished through active transport due to distance or accessibility issues. In this sense, telework can be an effective “invisible” tactical change in the city during the pandemic leading to reduced air pollution and health risk.

Various grassroots movements and initiatives in Barcelona are demanding more ambitious measures. For example, the Catalan Bike Association proposed to extend bike lanes to enhance a segregated cycling network, assuring safe cycling in the main thoroughfares of the city and in the access roads (BACC, 2020). The Platform for Better Air Quality has launched a petition among health and environmental professionals with the demand: “Lockdown the cars, let's get our city back!” (PQA, 2020). These calls are part of a global awakening, as demonstrated in an open letter to G20 leaders and signed by 350 organisations, on behalf of over 40 million health professionals from 90 countries, demanding a healthy recovery from the COVID-19 crisis that prioritises pedestrians, cyclists and public transport in cities to preserve clean air (HealthyRecovery, 2020).

### *The way forward*

The COVID-19 pandemic has provided citizens with a unique opportunity to experience a drastic decrease in urban traffic. This glimpse into an alternative mode of urban life may serve to motivate residents to rethink and change their commuting practices to take better advantage of alternative transportation possibilities. In addition, the experience of teleworking on such a large scale could shift working from home from being a marginal to a widespread formalized practice. This experience has provided evidence of the social benefits of reduced traffic and alternative forms of mobility and shown whether and in which cases teleworking is effective.



**Fig. 1.** A photo of one of the main avenues in Barcelona (Avinguda del Paral·lel) during the lockdown (left). Relative change (%) in public transport demand, bicycle-lane and road usage in Barcelona compared to the week before the start of the lockdown (8–15 March 2020) (right). Public transport includes: bus, metro, tram and train. Road transport includes: local city roads, collector, arterial roads and ring roads. (Data source: <https://dades.ajuntament.barcelona.cat/seguiment-covid19-bcn/>, photo by: Marc Lozano (CC-BY-NC-ND 4.0)).

However, teleworking has its limitations. Certainly, high-skilled and autonomous work in sectors such as academia and finance are particularly suited to teleworking (Aguilera et al., 2016; Welz and Wolf, 2010; Noonan and Glass, 2012; O'Neill et al., 2009). Still, in many other professions there are significant differences between the countries, including the Global North-South divide, in terms of availability and capacity of the telecommunication infrastructure necessarily to support teleworking (Brussevich et al., 2020). Any decision to adopt teleworking will clearly depend on the nature of the work and will only be available for jobs that can be performed away from the office (Beauregard et al., 2019). However, even if teleworking will remain beyond the reach of many professions, offering it as an option for some city dwellers brings broader social benefits for all residents.

Even if the newly available evidence yields positive examples and motivation for more institutionalised teleworking on a large scale, this practice should be on a voluntary basis. Ideally, workers should have the opportunity to choose whether and to what extent they want to perform their work activities from home, since this could place an additional burden on work-family balance for some people (Lapierre et al., 2016). If we want to move from sporadic to large-scale teleworking, companies will need to provide support such as technical assistance for establishing home offices and guidance on best practice (Radcliffe et al., 2019). Finally, work-related communications are not the only relationship dynamics that happen in an office: informal communications and social relationships, for example, are another aspect of office interactions that should be reinvented in the online world (Allen et al., 2015; Fay and Kline, 2011). The plethora of communication channels and practices we have been applying during the lockdown will ultimately show us whether it is possible to sustain a healthy social network and build social capital in workplaces without physical contact.

To maintain this new vision of the city, we need a more ambitious mixture of policy packages and measures for decreasing dependence on motorized transport and commuting in peak hours (Bigazzi and Rouleau, 2017). Initiatives such as enhancing the cycling network and public demands for further car restrictions provide early evidence of how the lockdown experience has shaped people's ideas of the kind of city they want to live in. The critique of rationalist urban planning paradigm and the decline of cities' neighbourhoods and vitality is more than half a century old (e.g. Jacobs, 1961). The lockdown experience, however, seems to have

recaptured the collective imagination and could lead to a more coordinated, global transformation of cities in the post-pandemic world. We are reinvigorating concepts such as connected, compact and healthier neighbourhoods: the so called "15 minute city" concept where everyone can reach their work, home, and any amenity within a 15-min walk or bike ride (The C40 Knowledge Hub, 2020). In line with this, the Global Mayors COVID-19 Recovery Task Force supports the recovery of cities and citizens in a manner which avoids returning to "business as usual" and instead promotes an equitable and sustainable process (c40.org, 2020). In this scenario, teleworking is one possible future of the workplace.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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