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Lindberg, Malene Rudolf; Freudendal-Pedersen, Malene; Hartmann-Petersen, Katrine; Kristensen, Nikolaj Grauslund; Christensen, Toke Haunstrup; Grinsted, Thomas Schou

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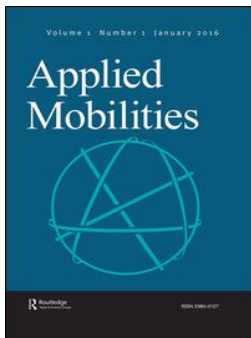
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# Pandemic Detours or New Sustainable Pathways? Post-pandemic Mobility Futures in Danish Cities

Malene Rudolf Lindberg <sup>a</sup>, Malene Freudendal-Pedersen<sup>a</sup>, Katrine Hartmann-Petersen<sup>b</sup>, Nikolaj Grauslund Kristensen<sup>a</sup>, Toke Haunstrup Christensen<sup>c</sup> and Thomas Skou Grindsted<sup>b</sup>

<sup>a</sup>Department of Planning, Aalborg University, Copenhagen, Denmark; <sup>b</sup>Department of People and Technology, Roskilde University, Roskilde, Denmark; <sup>c</sup>Department of The Build Environment, Aalborg University, Copenhagen, Denmark

## ABSTRACT

When mobility normality breaks down, new futures can emerge. This paper explores COVID-19 disruptions of everyday mobility in Danish cities and new emerging pathways toward less carbon-intensive mobility futures in the light of the mobile risk society and practice theory. It uses a stakeholder workshop with public transport providers as empirical outset to start conceptualizing new discussions that have emerged in the wake of COVID-19. Through four inquiries into pandemic-induced changes – including *reducing*, *remoding*, *rescheduling* and *replacing* mobility practices – it discusses how a new critical view on “business as usual” has emerged from the pandemic, especially in relation to public transport and linkage to other transport modes.

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## 1. Introduction

In early 2020, a global pandemic paralyzed cities around the world. The COVID-19 outbreak fundamentally challenged urban life as we knew it with dramatic disruptions of mobility normality (Campisi et al. 2020; Cresswell 2021; Freudendal-Pedersen and Kesselring 2021; Jensen 2021). The swift and steady rhythms of urban everyday life were curbed for millions of urban citizens overnight. Suddenly, one’s usual spot on the bus or waiting at the underground platform became a place of risk and fear of spreading COVID-19. People were urged to stay at home and streets, trains, and undergrounds were emptied.

Approaching COVID-19 disruptions as sites of breakdown, repair and innovation in mobility provides unique possibilities for imagining sustainable innovation in urban mobility systems (Graham and Thrift 2007; Doughty and Murray 2018; Marsden et al. 2020). This paper critically engages with COVID-19 mobility disruptions, emerging discussions, and new directions for transport policies. It discusses pandemic abnormalities of reducing, remoding, rescheduling, and replacing everyday mobilities in the light of the mobile risk society (Kesselring 2008) and practice theory Shove, Pantzar, and Watson 2012). Special emphasis is put on public transportation and how the pandemic forced

**CONTACT** Malene Rudolf Lindberg  [malene@plan.aau.dk](mailto:malene@plan.aau.dk)

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public transport providers to imagine innovative mobility policies. A stakeholder workshop with public transport providers is used to start conceptualizing new discussions that have emerged in the wake of COVID-19. The stakeholder workshop was arranged by the authors of this paper and was part of the Sustainable Innovative Mobility Solutions (SIMS) research project that works with sustainable mobility experiments. Examining the workshop allows us to discuss how a new critical view on “business as usual” has emerged from the COVID-19 pandemic, especially in relation to public transport and linkage to other transport modes. Denmark is traditionally thought of as a country with a relatively well-developed public transportation system, but the pandemic especially had consequences for public transport, as fear of getting infected has favoured the car and a re-emergence of car-dependent urban mobility cultures. As such, the discussions here resemble the challenges of car-based mobility that cities around the world are fighting.

During the pandemic, new norms and practices were established. Many changes have turned out to be temporary, but others are pointing towards permanent transformations. Sheller and Urry (2006), and Freudendal-Pedersen and Kesselring (2018) suggest that while fluid interdependencies and mobilities are networked, they nevertheless operate based on car ownership. Car-based norms and practices are the starting point for negotiating path-dependent practices that are hard to return from. Insofar as pandemic mobilities established new permanencies and practices in favour of the car, it not only disconnects from pre-pandemic decoupling and decarbonizing planning discourses and policies (Budd and Ison 2020), but these mobilities may also lead to new transport policies. In addition, the financial pressure due to fewer passengers has forced the public transport sector to form new imaginaries and think about a radical change in their services and how these can be implemented. This we argue, may foster radical innovations from within the public transport sector, and may also bring about considerable changes in the policy framework for public transport.

To track pandemic mobility trends, this paper is structured around four concepts of adaptive travel behaviour presented in Parkes, Jopson, and Marsden (2016) and Marsden et al. (2020) as *reducing*, *remoding*, *rescheduling* and *replacing*. While *reducing* is about making fewer trips or not conducting a trip at all, *rescheduling* and *remoding* cover changing times and modes of transport. With *replacing* we explore changes in how or by whom movement is conducted. To analyze trends, the paper starts by broadening these somewhat simple concepts through the theoretical lenses of mobile risk society and practice theory specifically related to working from home and new mobility practices as tipping points. Following this, we present the empirical material from the stakeholder workshop with mobility providers in Denmark, which focused on COVID-19 impacts on public transport. Then, the four concepts are used to structure four discussions on possible post-pandemic mobility futures. We conclude by considering how pandemic experiences of mobility abnormality can lead cities onto new sustainable pathways.

## 2. The mobile risk society and practice research in the light of COVID-19

This paper takes its outset in an understanding of everyday life as being filled with numerous choices and consequent activities where mobilities are rarely reflected upon. Focus remains on activities and their importance. Drawing on practice theories, emphasis is not on individual behaviours, but rather on *practices* – collective entities that are

constituted by heterogeneous and interrelated elements such as materials, competences and meanings (Shove, Pantzar, and Watson 2012). An example is the practice of car driving, which is made possible through specific combinations of elements. These include *material* elements such as the car itself, filling stations, roads, and traffic lights; *competences* such as the ability to steer the car, judge distance and know traffic rules; and finally, *meanings* such as cultural conventions of the car as the epitome of freedom, convenience, comfort, and safety. How specific practices are performed is dependent on the elements and their combinations. For example, faster cars invite speedy driving, and changes in social norms on alcohol and driving have changed the mobility practices interconnected with social occasions involving alcohol.

Practices develop over time; they are essentially historically contingent, which means that they are open to re-evaluation and change. This key observation invites new ways of thinking about promoting sustainable practices, including sustainable mobility practices. Practice theories offer a conceptual framing of mobilities as a (dynamic) matter of “derived demand”. As such, sustainable mobility transitions are about the temporal and spatial relationships between social practices that can reconfigure and change the bundles and interconnections between mobility practice bundles (Spurling and McMeekin 2015). As Watson (2012) describes it, sustainable mobility solutions require direct and/or indirect changes in the complexities of mobility practices, including changes in practices such as working, going to school, shopping, travelling etc.

This suggests that to the extent that COVID-19 have changed working, travel, and commuting practices permanently, the cities and mobility systems in which they are embedded will adapt accordingly. Following this line of thought, a possible post-pandemic scenario might be an increasingly hyper-digitalised, network-based future, where people, places and technologies melt together in what has been described as “motile hybrids” (Kesselring 2008).

The idea of a future characterised by motile hybrids was developed by Sven Kesselring to capture how mobilities transform through different phases of modernity in the *mobile risk society* (Kesselring 2008). With the mobile risk society, Kesselring builds on Ulrich Beck’s ideas in *Risk Society – towards a new modernity* (1992), and argues that the risk society in a world of global complexity and flows is a mobile risk society (Kesselring 2008, 2019). He combines the risk society with the mobilities paradigm (Sheller and Urry 2006; Urry 2000) regarding mobility as a general principle of modernity (Kesselring 2008; Bonß, Kesselring & Weiß, 2004).

Mobility alters due to the changing conditions of the different phases of modernity. In the first phase, the train was the symbolic transportation mode, as it represented stable connections, clear structures and timetables, and the capacity to move masses. The first modernity was a period characterised by “one best way” solutions for fast, direct, and calculable transportation of people and goods (Freudendal-Pedersen et al. 2020; Kesselring 2008). In contrast, the second phase of modernity is characterised by non-directional change propelled by risk management, inconsistency, transience, and liquidity. Individual modes replace collective solutions for moving and organising, and the private car is the transportation mode embracing second modernity lifestyles that circle individuality, possession, autonomy, fluidity, and suboptimal solutions (ibid). The third phase of modernity, as Kesselring sees it, relies on motile hybrids; that is, constellations of bodies, technologies, physical spaces, knowledge, and skills moving in a constant flow. In

motile hybrids, digital tools and technologies melt together with humans in a modernism characterised by pluralism, networks, air travel, the internet and fragmented mobilities (Kesselring 2008).

The technologies, infrastructures and materials of motile hybrids have been available for decades, and many expected motile hybrids to emerge with the spread of home computers, the internet, mobile phones, and e-mail services in the digital revolution in the late 20<sup>th</sup> century. However, practising the lifestyles of the third modernity has until now been limited to a small, global mobile elite. But the pandemic pushed the lifestyles of motile hybrids onto broader urban publics, with everyday lives increasingly characterised by pluralism, networks, internet cables, and fragmented commuting. Looking at COVID-19 through the lenses of the mobile risk society and practice theory, the difference between before and after is not so much our technological abilities, but that COVID-19 pushed the competencies and meanings of the third mobility modernity and altered everyday life and mobility practices around the world.

### 3. Methodology

To understand pandemic impacts on mobilities, a stakeholder webinar, *Mobility under COVID19*, was conducted in November 2020 at Aalborg University as part of the EU-funded project CCAMEU<sup>1</sup> and in collaboration with the research project SIMS.<sup>2</sup> The stakeholder webinar was initiated to discuss the pandemic's impact on the use and reputation of public transport, and what this means for future sustainable mobility patterns.

With the workshop, we were especially interested in exploring perspectives from public transport providers as they had experienced extreme drops in passengers during the pandemic (up to 90% according to the participating providers). One factor in this was that in Denmark, a general enforcement notice on the use of masks was not issued with the lockdown in March 2020. The use of masks in Denmark was not introduced until August 2020, when masks were made compulsory during all journeys and transits with public transportation (Danish Health Authorities 2020). Thus, public transportation was the first place where masks were obligatory, and for months, it was also the only place with mask injunction. It was not until the end of October 2020 that the mask requirement was extended to shops, public institutions, and cultural activities. The mask thereby came to signify the use of public transportation as the riskiest of all practices during the pandemic. In the workshop, the conversations thus circulated around questions of risk: Is it riskier to enter a bus than a supermarket? What did it mean in terms of loss of passengers? To which transportation forms did they remode? And how may public transportation rebound from risk perceptions and other COVID-19 disruptions?

The pivot of these conversations was the situation in Denmark and how it affected mobility systems in Danish cities. Denmark is a small country of 42,933 km<sup>2</sup> with 5.8 million inhabitants. The Ministry of Transport is the supreme authority for all transportation in Denmark, while various self-governing organisations and private operators provide public transportation through busses, trains, metro, and light-rail services. Denmark is administratively divided into five regions, and each region has a self-governing organisation responsible for the public infrastructure. Inter-regional trains, S-trains and local trains are run by Danish State Railways (DSB) and Arriva (who won

tenders on several bus and train lines), while Banedanmark is responsible for the train tracks. Metros and light rails are also owned and run by companies. The coordination between the transport companies is primarily based on voluntary collaborations supported by the Ministry of Transport, about coordinating timetables, traffic information and pricing. Examples of this are the Danish travel card that can be used for all public transport in Denmark and the travel planner that includes all public transport options, and which has recently included car- and bike-sharing options. In 2016, the company DOT was created to coordinate customer service across transport modes. Apart from this, organisations such as the Confederation of Danish Industry (DI) and Local Government Denmark (KL) and large consulting companies have departments working with transport. In these associations and consultancies, small-scale collection of data on the current development within transportation is ongoing, and together they can thus provide an overview of the current transport situation.

For the online stakeholder workshop discussed in this paper, we invited twelve key Danish private and public mobility stakeholders to gather perspectives on mobility trends during the pandemic. The participants included two regional companies responsible for busses and local trains, a car-sharing company, a ride-sharing company, the metro and light rail company, a large consultancy firm, the Confederation of Danish Industry, DOT, and researchers from three universities. As such, the participants provided a comprehensive picture of the situation for public transportation in Denmark during COVID-19 but does not however allow for a generalisation of the status of public transport.

The workshop aimed to allow the participants to openly express their frustrations with the current situation and think beyond the pandemic. Therefore, the workshop was an open forum with a lot of time for common reflection and discussion. The transportation network in Denmark is tight-knit, which provides fertile ground for open and trustful communication and makes this kind of setup possible. The participants were informed from the beginning that it was a closed space and that any use of the material from the workshop would be anonymised. The workshop was divided into two sessions and each session was opened with a brief presentation to start the discussions. In the first session, a speaker from K2, the Swedish knowledge centre for public transport, started a discussion on the challenges the stakeholders' organisations faced during the pandemic. Subjects such as the decline in public transport passengers, the new work situation and general alterations in mobility patterns were areas of lively debate. The second session started with a presentation from the Swedish Association of Green Motorists (Gröna Bilister) and initiated a fruitful discussion of rethinking stakeholder cooperation around integrated shared and public mobilities, placing the needs of the customer in the centre. As one of the participants argued, prioritising customer needs has been neglected by public transport providers for a long time. Several private and public mobility operators expressed a strong drive to engage in a Mobility-as-a-Service (MaaS) cooperation with the ambition of enhancing flexible sustainable mobility in both rural and urban areas. The current situation should be used to rethink and organise simple pragmatic private-public collaborations, the participants argued.

The online workshop was conducted in Danish and Swedish. It was recorded, transcribed, and coded in NVivo. Marsden et al.'s (2020) four concepts of disruption were utilized in the coding process as tools to identify pandemic mobility trends, preparing the



ground for the structure of the paper. Selected quotes have afterwards been translated into English.

## 4. Pandemic mobility trends

The stakeholder workshop is in this paper used as an example against which some of the key changes in mobilities practices during COVID-19 can be critically discussed. Structured around the analytical concepts of disruption and adaptation presented in Parkes, Jopson, and Marsden (2016) and Marsden et al. (2020) as *reducing*, *remoding*, *rescheduling*, and *replacing* the next parts of the paper use the workshop material to discuss pandemic mobility trends and new opportunities for urban mobility futures.

The four concepts are employed to support us in taking up the discussion from different perspectives. The pandemic offers a chance to rethink urban mobilities, and we are inspired by Marsden et al. (2020) exploring these four concepts fundamental for interpreting mobility under the drastically changing conditions of the pandemic. The pandemic forced us to break with the past and imagine mobilities anew, and in the next sections, we engage with the discussion of what broke down and which new mobility imaginaries arose from COVID-19 with a special focus on public transportation in Denmark.

### 4.1. Reducing

On 11 March 2020, the Danish Prime Minister announced a lockdown of Denmark due to the COVID-19 pandemic, initially for two weeks (Ottosen and Ancher-Jensen 2021), but the first phase of lockdown in Denmark continued until the end of May 2020, entailing an unprecedented decline in all types of movement (Statistics Denmark 2020a, 2020b). In many sectors, people worked either full- or part-time from home. In the second quarter of 2020, 40% of the total Danish labour force was working from home (50% in the capital region) (Statistics Denmark 2020b). As many sectors strived for unaltered productivity, much activity was upheld but now transmitted through cables rather than streets. This pushed the lifestyles of third modernity's motile hybrids onto broader publics, with everyday lives increasingly relying on internet cables and only fragmented commuting (Kesselring 2008).

Much of the discussion in the stakeholder workshop centred on the dramatic increases in working from home and how it reduced both the use of public transport and traffic on the roads. Participants saw working from home as the main driver of dramatic drops in traffic numbers and passenger numbers in public transportation. As one participant noted:

"(...) we are struggling, of course, with the fact that there are no people in public transport (...). Some of them have of course taken other modes of transport, but most are working from home" (Public transportation provider)

Discussions of working from home as a way to reduce transport levels, pollution and congestion are not new. Since the rapid diffusion of information and communication technology (ICT) in the 1990s, there has been a focus on the potential of ICT to dematerialise the wider economy through new and less resource-intensive practices such as



telemediated working and meeting practices. Thus, ICT-enabled services were in the early years of the “digital revolution” often wrapped in visions about the “information society as a ‘weightless economy’, in which ‘bytes replace kilograms’” (Heiskanen et al. 2001, 9). This “death of distance” (Cairncross 1997) and the emancipation of modern life from the constraints of time and space was prophesied already in the last half of the 20<sup>th</sup> century when new digital computing and communication technologies provided the materials and infrastructures for a digitalised everyday life with teleworking, teleshopping, telebanking, telemedicine etc. The rise in virtual mobilities, fluidity, and flexible boundaries ushered in a new phase of modernity – what Ulrich Beck thematised as the second modernity in the risk society (Beck 1992). But though the technological foundations for virtual everyday life were invented more than 20 years ago, they did not result in reductions in physical travel. Instead, historical data for Denmark shows that physical commuting increased by 35% from 2002 to 2017, with an increase in the average commuting distance from 34 km/day to 44 km/day (Dansk Byggeri, 2019). Rather than replacing physical travel, we saw a general rise in mobility and connectivity – both virtual and physical.

Before the pandemic, the frequency of teleworking in Denmark remained steady, with around 8–12% working from home at least half of the time and 27–30% working from home at least one day per four weeks (Statistics Denmark 2021a). In 2020, the first year of the pandemic, these figures rose by 26% and 40%, respectively. While the materials for teleworking have long been accessible, it was not until the pandemic hit that the competences and meanings for making use of these tools were broadly disseminated. The pandemic reengineered a long-standing debate on the end of geography (Graham 1998). During lockdowns, car dependency turned into virtual dependency, and the end of geography became a temporary reality. Yet the extent to which disruptions lead to mobile tipping points (Graham and Thrift 2007, 5; Urry 2004, 27) disassociating mobility from other everyday practices is debatable (Budd and Ison 2020). However, COVID-19 made practices of remote working and schooling accustomed to a large part of the population and to an extent that could transform mobilities permanently. Assessments made by the Confederation of Danish Industry (DI) suggest that private companies expect more than double the number of employees to work from home on an average day after the pandemic as compared to before (Sørensen and Kaldahl 2021).

The possibility that urban mobilities could be steering towards a mobile tipping point following pandemic-induced teleworking practices is supported by the fact that for the first time in 30 years the City of Copenhagen is facing a net reduction in population (Risager 2020). During the pandemic, people moved out of the city and settled further away from working places, indicating that employees, like their employers, expect working from home to become post-pandemic normality. In the workshop, we saw how key mobility stakeholders are planning for lasting changes in commuting practices:

“We assume that in any case, more flexibility is needed in the future. We must look at the [ticketing] products for people commuting to work, and if they only travel to work one or two days per week, then the traditional [pricing and ticketing] products are not attractive enough. That is one part of the future, [revising] the products ...” (Public transport provider).

Mobility stakeholders expect permanently distorted working, studying and commuting practices. Against this background, public transport providers are looking into new

solutions for new mobility futures characterized by greater flexibility and less routinized mobility. In contrast to former ticketing products, providers are now looking into new solutions circling the changing needs and practices of commuters. Such initiatives exemplify innovation at sites of breakdown and recovery (Graham and Thrift 2007). It indicates that COVID-19 disruptions have generated a need to adopt new strategies, mobilize adaptive capacity, and adjust to the changed mobility practices following changed working and housing practices. Together, these trends indicate a move towards third modernity (Kesselring 2008) with motile hybrid working practices, less commuting and new mobility futures in cities, where physical movement is less based on where we need to go and more on where we want to go.

A future characterised by increased teleworking could have positive effects on the environment and liveability in cities. During lockdowns, urban inhabitants increasingly sought outdoors places to move and dwell in their neighbourhood – for instance in urban parks and squares. It created a growing demand for local urban spaces that invite activities of physical exercise, outdoor socialising, and recreation. To accommodate this, some cities have installed temporary tactical changes such as opening car lanes to bicycles and pedestrians (King and Krizek 2021). In this way, the lockdown presented an opportunity to rethink the balance between different modes of transport and activities. This can be a first step in altering street spaces to serve people rather than cars, and it can be a valuable resource in sustainable mobility change (King and Krizek 2021). COVID-19 revealed how much public space is devoted to private cars, and thus presents an opportunity to re-think car-dominated cityscapes. Redistributing public space in cities away from motorised transport could also support a further shift in means of transport. In this way, COVID-19 present an opportunity to revitalise the liveability of cities and steer urban transport systems towards less car-based futures.

#### 4.2. Remoding

A related post-pandemic mobility trend encompasses remoding – especially to private cars. The outbreak of COVID-19 caused a general reduction in mobility across modes, but reductions in public transportation exceeded reductions in car traffic due to a trend of remoding from public transportation to private cars. One mobility provider expressed:

“There is a lot of talk about working from home. So, it is interesting that many cars are still on the roads. There is something there which we might also have to figure out. What does that mean?” (Public transportation provider)

This mobility provider had seen a drop in passenger rates of up to 90%, while car-related mobility in Denmark dropped only 22–48% (The Danish Road Directorate 2020a). Thus COVID-19 caused the general transportation mix in cities to take a detour towards automobility. Further, car sales grew by 5.1% for new cars and 22% for used cars compared to pre-pandemic car sales (The Danish Road Directorate 2020a, 2). By contrast, passenger rail transport dropped by 45–65% on average during the months of lockdown – with drops up to 80–93% (DSB 2020). Similarly, public bus companies report a 75–90% passenger drop during lockdowns (Hansen 2021). Even more worrying is the fact that public transport passenger numbers did not stabilise between lockdowns and that cars absorbed some 30% of public transport in 2020 (Lindqvist and Rantorp 2020). To the

extent that COVID-19 is changing the patterns of settlement with more people deciding to move out of the major Danish cities, this could also affect the choice of mobility mode in unsustainable ways. As mentioned by participants in the workshop, moving out of larger cities also typically means moving to areas with a lower public transport service and/or to areas away from the main public transit routes to cities. COVID-19 has therefore probably caused some degree of permanent remodeling to private cars. This was a major concern in the workshop:

"We share the concerns of others in this group, including the concern that some of the passengers will not return. At least, that is what we have observed and measured. That around 11-13% of former passengers do not expect to use public transport again after COVID-19" (Mobility stakeholder)

These numbers were backed up with arguments on private cars:

"(..) You know, it does not take that long to get used to sitting in a car. And there we have probably lost some [passengers]. (...) After all, car ownership has only gone one way – and that is up. We are looking into a future where the Danish Energy Agency estimates that we will see around 600,000 new cars over the next 10 years. Even if they are electric vehicles, they will still occupy space in the streets" (Mobility stakeholder)

COVID-19 disruptions have changed the meaning of public transport and caused a share of passengers to be permanently recruited to other mobility practices. A remodeling trend prompting motorised transportation might steer urban mobility away from sustainable pathways and entail a re-emergence of unsustainable car-based mobility cultures in urban environments. Adding to this, stakeholders in the workshop expressed concerns about the long-term effects of school lockdowns and remote learning:

"(..) there is a lot of focus on changes in work-related commuting because people's work habits are going to change. But I think an even bigger challenge to public transportation, in the long run, lies in the fact that educational institutions are going to change. A lot might happen here. Things like distance learning and universities that establish as online institutions" (Public transportation provider)

A private mobility stakeholder agrees:

"I agree, and we share the concern about the youth. It covers more than public transportation; it also covers cycling. For many years, we have seen fewer children biking to school. Then, when they enter secondary education and begin to commute longer distances, we are beginning to see more and more young people using the car. But if they do not get used to using public transport in childhood and adolescence then (...) it is difficult to become public transport users later in life because they are used to something else" (Private mobility stakeholder)

To the extent that COVID-19 have caused children and adolescents to remodel away from bicycles and public transportation, the long-term consequences for sustainable and inclusive mobility systems could be devastating. The skills needed for using cycling and public transportation are acquired early in life, and the children potentially become non-recruitable to sustainable travel practices as an adult. Thus, the "end of geography" (Graham 1998) seems car resistant.

However, the above quotations also reflect another interesting tendency emerging in the workshop, namely the tendency to stage the private car as a common enemy. The car

challenge unites public transport providers and mobility stakeholders. This broad consensus reflected in the workshop might suggest another future for urban mobilities and allow new solutions to surface. The shared perceptions created an atmosphere of being in the same boat, openness towards learning from other cities and mobility providers, and willingness to admit to previous failures and develop new solutions. A constituting element in practices is shared meanings. If the shared meaning of the private car as a common enemy is spreading among mobility stakeholders, it might provide momentum for mobility stakeholders to engage in new practices, i.e. organise in new ways, adopt new strategies, and allow for new MaaS solutions to develop and diffuse across cities. As such, it could support sustainable mobility transition in cities.

### 4.3. Rescheduling

During COVID-19, time structures have been radically changed. Instantaneous time is taking over (Hannam, Sheller, and Urry 2006; Urry 2000) and behind the screen, the individual is present in multiple places at the same time. That challenges the possibilities for readjustment in the in-betweens. When transport time is reduced or even eliminated, the time for adjustment in between tasks is also limited. Transition time can be used for preparing, for backstage time to be oneself, for “time to unwind”, for daydreaming and for other “activities” that serve a reloading purpose in a compressed everyday life (Lyons 2014, 157). During COVID-19 transport was removed from the sequence of everyday life, and the sequence of activities was thus fundamentally changed. According to Marsden et al. (2020) rescheduling is about changing when the trip is made and in which sequence activities are being done, and this is akin to what happened to many people under COVID-19 because of the decreased number of daily activities in general.

During the stakeholder workshop, the concepts of future rescheduling in everyday life were discussed about the increased tendency of working from home in the future. More houses being sold outside the biggest urban areas indicates that both employers and employees expect digital work routines to be an integrated part of working lives in post-pandemic times. This created a discussion about how public transport providers could develop a flexible product for commuters in the future and develop economic encouragement not connected to how often public transportation is used, which is the case in Denmark today:

“... economically speaking it is not that attractive to have a traditional commuter card right now because a lot of people are working from home. That is part of the explanation for why people are pushed out of the public transport system. When the price increases and their car is parked right outside their door, they might as well just take that to work. So, we are working on developing new price structures and products” (Public transport provider)

It was argued that this for instance could be targeted at people who are only commuting two or three days a week. Due to COVID-19, daily routines had to be reorganised overnight into the digital sphere that until now for most people was un-routinised. At the same time, the spatial fixation created a feeling of being inflexible in front of the screen within the household, while being physically immobile and virtually hypermobile at same time. This highlights the argument that COVID-19 has pushed modern societies in the direction of third modernity (Kesselring 2008). The use of digital tools and technologies

has melted daily work routines and become the window to the rest of the world – the social and logistical lifeline that connects the dots that the physical trips did before the pandemic. If developments towards practices rooted in third modernity are accepted (by society, by companies, in families, etc.) there might be a post-pandemic momentum for developing (self-controlled) retiming in everyday life. Restructuring the expectations of physical presence provides the opportunity to do physical travel detached from the rush hour and reduce congestion, or even replace the travel with virtual modes.

But rescheduling is not only a matter of people changing their schedules. The stakeholders also discussed how systems and structures are also reproducing inefficient mobility patterns because of the way they schedule. In both Denmark and Sweden, for instance, there are discussions on differentiated start times in the school system (Junge and Kring 2012). More efficient urban mobility systems could result from a more dynamic or flexible model for scheduling school start times, it was argued:

“By changing the start time, the spreading of arrivals to school gets better. It is not a matter of moving it by hours. Only a few minutes will optimise the use of the public transport system. You can have quite remarkable effects only by changing it by a few minutes.” (Swedish researcher).

Rescheduling in this context is affecting the rhythms of everyday life at both individual and systemic levels, which could enable more efficient use of public transport systems in cities. The changes in rhythms in everyday life (Edensor 2010, 2011; Hartmann-Petersen 2020), physically and virtually, following the pandemic have provided an occasion to discuss retiming and rescheduling in both daily routines and practices and the systems and structures upholding certain rhythms and sequences related to work and schooling. Even though flexible start times in schools and new ticketing structures in public transport may not be implemented tomorrow, increased flexibility and new approaches to timing, scheduling and physical and virtual presence are certainly occurring and spreading amongst stakeholders and planners. COVID-19 provided experiences of how these systems, often perceived as very static structures, could reschedule almost overnight. These experiences of flexibility in systems invite to creative thinking about policies for rescheduling everyday mobilities and the systems in which they are embedded.

#### 4.4. Replacing

As previously mentioned, practices of everyday mobilities are highly routinised, so thinking about replacing practices requires different aspects of everyday life to be altered. The COVID-19 crisis has forced many changes upon everyday life and changed received notions of what is (im)possible. This has forced conversations previously on an abstract “nice to have” basis closer to a “must have” situation, especially among public transport providers who have been impacted heavily by the pandemic. There are different approaches to understanding what replacing entails. For Marsden et al. (2020) it is a question of *relocating* and *rerouting* the planned route or destination of a journey.

Living in an autologous society formed by concepts including Le Corbusier’s idea of the city as a space where the automobile cuts through like a projectile has given the car a dominant role and has dominated city planning for the last century. Only within the last 10 years have MaaS and the importance of public transport as the backbone in a MaaS

system been considered as an alternative worth pursuing. Still, so far, there has been much talk but not a lot of action, with an acknowledgement that public transport plays an important role in this transition but with too many barriers to seriously pursue this. The loss of passengers due to the pandemic brought up discussions in the workshop that suggest that this might be changing. During these discussions, one mobility provider said:

“We are experiencing a greater interest in looking at other forms of mobility. It is about creating hubs in many more places and linking them with the super cycle paths, we just decided to spend DKK 2 million of the regional money on exactly that. It is all about how to get a better combination between bus and bike. Not necessarily to take the bike on the bus, but to be able to park it safely” (Public transportation provider)

While this provider is now investing heavily in integrating bus and bike infrastructures, another mobility provider is developing new MaaS solutions by cooperating with local carpooling services:

“We are in the process of integrating with the local carpooling service. It is integrated with public transport and the travel planner. We have developed this hub and works a lot with hubs. Then we can connect private carpooling with public transport around this hub and it can be accessed through the travel planner, which gives the users the full journey. You can also see it on our platform, where we put the user in the centre. That is because we do not have a principle that public transport must be first and everything else like scooters and carpooling must be last. We are focusing on giving the user what is the most optimal journey in relation to travel time.” (Public transportation provider)

During COVID-19, fears imposed by “social distancing” have made the individual car the “safest” mode of transport and public transport an “incubator” of fear. The question is if the work on transforming the “system of automobility” (Urry 2016) into a system of multiple mobilities is stalled when suddenly the concept of multiple mobilities implies enormous risks for individuals, governance, and the economy. In this sense, the previous discussion on whether we are moving into the third modernity or retreating into the second is also very relevant in relation to replacing current mobility practices. With the above quotations in mind, it can therefore also be viewed as if the pandemic created an everyday experience with the digitalisation of routinised practices such as working, shopping, and socialising. New practices that previously seemed impossible are now something many people have experience with. COVID-19 caused the replacement of everyday practices and revealed flexibility in behaviours that were previously perceived as more or less inalterable.

Earlier in this paper, we exemplified how innovation after disruption was manifested in the workshop. The above quotations provide further insight into how new solutions emerged from the discussions on breakdowns and the response of public transport systems. While the public transportation providers disclosed that they had previously operated from an underlying basis of “public transport first”, they now advocate deploying alternative strategies centred around user needs, integration across transport forms, and optimal solutions. Examples are the integration of public transport with private mobility modes such as cycling and carsharing mentioned in the above quotations, encompassing the essence of MaaS solutions. The discussions continued in this direction, highlighting innovative multi-modal solutions as the future of urban mobilities. Though participants underlined the difficulty of developing and testing new strategies in an

abnormal COVID-19-disrupted city, some of the solutions discussed were already mobility reality, for example, the integration of carpooling and public transportation in the city of Aalborg:

“If you have a monthly card for public transport in Northern Jutland, then you also have free use of Nabogo [carpool]. At least for a while. Why should it be so difficult, why can we not make it easy for people to switch completely freely between different modes? One day you take the train and the other day you take a carpool, and you can combine the two, without having to think of two systems. And that, of course, is just the beginning of getting it all connected.”

This public transportation provider argued that such innovations are crucial after the COVID-19 breakdown:

“Why have commuter products at all? Should we not just have some simple products in terms of doing these things, and here I am challenging the basic premise. How can we make it easy, simple, and attractive to get into the system to start with? I think this is something we can work on. Right now, in the current situation, it is the only right thing to look at those things.”  
(Public transportation provider)

Further, the provider argued that a return to mobility normality is undesirable:

“I don’t think we can just expect that the current situation and current structure can just be continued and then it becomes interesting. I think there are some fundamental structural things we need to look at to make it seriously interesting.”

It seems fair to speculate whether COVID-19 is creating a tipping point in the system of automobility (Dennis and Urry 2009). The deceleration might push toward a future where the car is not as much in the centre of the new system as it was in the past. At this point, after two years of pandemic mobility abnormality, it seems that the future of mobilities is more open than ever. Instead of being stuck in a “one best way” solution, COVID-19 might provide an opening to experiment with possible solutions at a time where mobilities and their impact on modern economies, cultures, and cities have shown their vulnerability (Freudendal-Pedersen and Kesselring 2016).

## 5. Conclusion

This paper explored COVID-19 disruptions of everyday mobility in relation to public transport use in Denmark and discussed if these new circumstances have provided momentum for better and more sustainable urban mobility systems. These post-pandemic years present a critical moment to evaluate what happened and exploit the previously unthinkable rise in new digitalised everyday practices to rethink urban mobilities and push for sustainable development.

To avoid unwanted consequences of pandemic fear-infused rises in automobility, public transport’s “business as usual” no longer suffices. Using a workshop on “Mobility under COVID-19” with key mobility operators and stakeholders from Denmark as an example provided insight into how new solutions emerged from the discussions on breakdowns and the response of public transport systems. For example, public transportation providers reflected on how they had previously operated from an underlying basis of “public transport first”, while they now pursue alternative strategies centred around



user needs and integration across transport modes to create optimal solutions. New discussions placing MaaS and innovative multi-model solutions at the centre stage in the future of urban mobilities emerged in the wake of pandemic disruptions, as reflected in the paper's four discussions on pandemic *reduction* in mobilities, *remoding* from public transport to private cars, *rescheduling* of everyday life, and *replacement* of practices and strategies.

Based on the discussions, we suggest the fragility of urban mobility systems disclosed by pandemic disruptions also reveals great agility in urban mobility practices. New practices that previously seemed impossible, such as remote working, learning, socialising, and shopping, spread and revealed flexibility in behaviours that were previously perceived as more or less inalterable. In this sense, the pandemic can be perceived as a portal to a third phase of the mobile risk society and a possibility for promoting sustainable mobility transitions in cities.

The future of mobilities is now more open than ever. With COVID-19, mobility breakdowns led to a newfound openness towards alternative mobility futures and an increased inclination for developing new solutions. Such tendencies could provide momentum for MaaS solutions to develop and diffuse across cities, and release formerly car-occupied urban spaces for human and climate-friendly purposes. In this sense, the radical disruptions that COVID-19 enforced on cities, planners, public transport providers and passengers gave a taste of urban mobilities as it could be. This provides a new backdrop for experimenting with alternative solutions, making it even more visible how mobilities impact modern economies, cultures, and cities.

We conclude that pandemic breakdowns have paved the way for a broadened scope of imaginaries, collaborations, and initiatives among public transport providers favouring new solutions that are promising in terms of sustainability in urban mobility systems in Denmark. If utilised properly, the innovations and learnings from COVID-19 can lead cities onto more sustainable mobility pathways than what was previously perceived as possible. However, as routinised practices are deeply embedded in existing institutions and infrastructures which do not necessarily change with COVID-19, we might not expect such changes to happen "by themselves". Rather, the realisation of such positive benefits will need continued investments and active policymaking.

Further research and newer data are needed to determine how far the potential of the new initiatives identified in this paper reaches: To what extent do they herald post-pandemic normality in mobility systems? Exploiting the pandemic momentum for new sustainable pathways depends to a large degree on supportive political and financial initiatives. Therefore, we recommend policymakers support greater flexibility in the systems and infrastructures surrounding everyday urban mobilities. The recommendation concerns both policies specifically targeted at the transport area such as initiatives for strengthening the opportunities for establishing mobility hubs and investing in MaaS solutions. But, as the paper has emphasized, mobility practices and mobility systems are networked and interwoven with other practices and systems, and therefore, it is also about policies supporting new imaginaries, investments, and flexibility in the interrelated systems, such as the school system and the labor market. This paper has touched upon the examples of differentiated start times in schools and policies supporting remote working practices. New policies in these areas have not yet been implemented in

Denmark. But concludingly, we will emphasize that such measures are essential for supporting emerging mobility innovations triggered by the COVID-19 pandemic.

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## Notes

1. I Cooperative, Connected and Automated Mobility: EU and Australasian Innovations – research project: <https://www.unisa.edu.au/research/Hawke-EU-Centre-for-Mobilities-Migrations-and-Cultural-Transformations/CCAMEU-jean-monnet-Network/>
2. Sustainable Innovative Mobility Solution research project: [www.sims.aau.dk](http://www.sims.aau.dk)

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## ORCID

Malene Rudolf Lindberg  <http://orcid.org/0000-0003-4148-5270>

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