

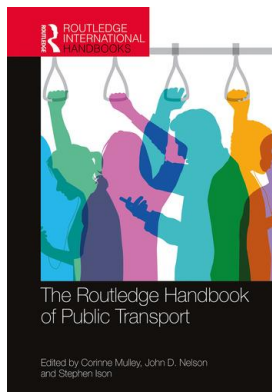
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43

PUBLIC TRANSPORT AND THE
FUTURE OF MOBILITY*Glenn Lyons***Introduction**

Diverse considerations are encompassed within public transport. There are different forms of public transport and technological developments affecting service delivery and user experience. In addition, there are relationships between public transport and other modes that together provide door-to-door journeys. There are the issues of planning, finance and governance, and different user needs to be catered for across the travelling public. It is a complex picture. It is also dynamic, as the situation is changing over time. Since the digital age collided and started merging with the motor age at the end of the last millennium, there has been a great deal of change – change affecting society, change (in turn) affecting mobility and change (in turn) affecting public transport. It is clear that there is still more change to come. What is not particularly clear is what that change could or should be – so there is increasingly widespread uncertainty about the future.

This chapter contemplates the future. Figure 43.1 depicts a frame of thinking for doing so, which is explored in this chapter. To consider the *future of public transport* requires reflection on the wider picture of *future mobility* of which public transport forms a part. Since travel is primarily a derived demand, the future of mobility is strongly intertwined with the *future of society* and the makeup of activities in time and space within that society. In the face of a climate crisis, the future of society and how people's accessibility needs are met (being able to reach other people, goods, services and opportunities) will be strongly influenced by how economies around the world are geared towards reducing greenhouse gas emissions as well as by the effects of climate change and the adaptation required; in short, the *future of the planet*. This chapter is from a UK perspective but with wider references and applicability.

The chapter begins by addressing the state of flux at the time of writing in May 2020, highlighting the importance of context. It then considers the 'four futures' for public transport.

The importance of context

With the passage of time, it is easy to lose sight of prevailing circumstances that may shape the thinking and arguments underpinning a chapter which looks to the future of mobility and public transport. Indeed, it seems more than context but instead integral to the chapter's purpose.

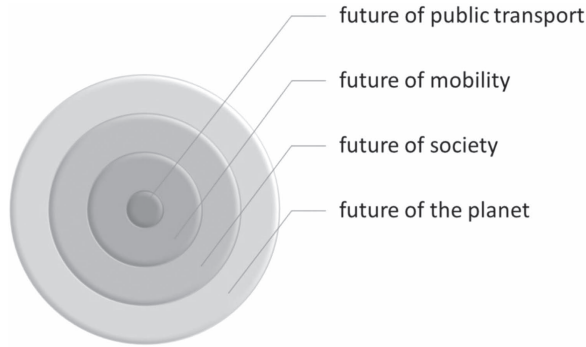


Figure 43.1 Public transport's four futures

This Handbook was conceived when society was living in a pre-COVID-19 world. Greta Thunberg (the teenager from Sweden who began the ‘School Strike for Climate’¹ movement) had recently ignited a global movement calling upon governments and industries to take proportionate action in response to the seriousness of the climate crisis facing society. Many transport professionals, including the author, had already been feeling for some time that fundamental change in the mobility system was underway – a transition away from the regime of automobility towards a different future of mobility (Lyons, 2015). Signs of such transition include, in a number of countries with mature transport systems: overall road traffic growth slowing and, for a period, stopping; economic growth and road traffic growth diverging (having been assumed previously to be ‘coupled’) and young people becoming less likely to hold a driving licence. The future of mobility seems set to be defined as much, if not more, by effects of the digital age as by the motor age.

The writing of this chapter took place during the COVID-19 global pandemic, with the author in lockdown: “the last trip I made to or for work was over seven weeks ago. I’ve since been a full-time homemaker, along with millions of others”. Had a description about the circumstances at the time of writing been put forward ten years ago as a depiction of a plausible future scenario for transport and society in 2020, it would likely not have been taken seriously by transport professionals. It would almost certainly not have been taken seriously by those with decision-making powers to shape our mobility system. Yet here we are.

Lockdown has seen world oil prices falling sharply, with the prospect that they may never recover (Grubb, 2020), prompting a question over whether fuel tax should be increased as a result (BBC, 2020a). The aviation industry has been in crisis (Financial Times, 2020) with aircraft grounded, jobs being cut and significant signs of loss of investor confidence (Binding, 2020). Motorised mobility went into retreat, while digital connectivity moved centre stage. Netflix (online films and television programmes) moved to have a higher market valuation than US oil giant ExxonMobil as demand for home entertainment has grown during lockdown (Partridge, 2020). An April 2020 poll of nearly 20,000 drivers in the United Kingdom (AA, 2020) showed that of those still working during lockdown: two-thirds were doing *some* working from home (the remaining 34% indicating being unable to do so) compared to 43% before lockdown, and 45% were working *five or more days a week* from home compared to 8% before lockdown (AA & Populus, 2020). Cities have been enjoying cleaner air and clearer skies than many citizens have experienced in their lifetimes, with reportedly fewer deaths related to air pollution (Watts, 2020). Meanwhile, public transport has found itself in an uncomfortable position because of

a massive slump in ridership (typically more than 80% decrease) during lockdown, threatening financial viability in the face of its fixed costs, and is faced with accommodating social distancing concerns for the immediate future (Canon Rubiano & Darido, 2020). In an online survey of just over 1000 British adults (aged 18+) in late April 2020, respondents were asked to imagine lockdown measures ending in the next month and to indicate their level of comfort with undertaking the activities they did before lockdown (Ipsos MORI, 2020a). While 35% of those employed would not be very, or not be at all, comfortable going to their place of work, 61% of all respondents would not be very, or not be at all, comfortable using public transport. A UK ‘think tank’ drew mixed reactions when it suggested that managing the emergence from lockdown should include a relative increase in fares for peak travel on public transport compared to off-peak to encourage behaviour change (alongside the possibility of suspending the London congestion charge for drivers) (Partington, 2020). The London congestion charge was suspended temporarily in late March 2020 (Transport for London, 2020) but was subsequently reinstated.

At the time of lockdown in the COVID-19 world, there has been a real sense of being in a state of flux [whose definition is as follows: “a state of uncertainty about what should be done (usually following some important event) preceding the establishment of a new direction of action”].² It may be more appropriate to say that some players in shaping the future of mobility are more certain than others about what should be done and that it is a state of collective uncertainty (lack of consensus) that currently exists. There are protagonists for change, and there are incumbents from the ‘old normal’ protecting their interests.

The future of mobility and public transport divides into two important considerations *at the time of writing* regarding the nature of the transport system and its operation: (i) what to do during lockdown and as we begin to transition out of lockdown (in terms of regulations, operations, attitudes and behaviours – a transition that could take years, going beyond the eventual reduction and removal of the immediate health threat of the virus) and (ii) what to do regarding the longer-term future of mobility (typically 20+ years ahead when transport authorities are examining this).

Several important questions have been prompted in the United Kingdom and elsewhere, including:

- *Should ailing airlines receive a bailout from national governments?* The French government has approved a multibillion Euro loan to Air France on condition that it cut some domestic flights – with the government’s economy minister saying “[w]hen you can travel by train in less than two and a half hours, there is no justification for taking a plane” (BBC, 2020b).
- *Should towns and cities be reallocating roadspace away from the car and towards supporting walking and cycling – on a temporary basis during lockdown and social distancing and perhaps on a more permanent basis?* City mayors from around the world are looking, and acting, to deliver low-carbon sustainable recovery from the crisis including hundreds of miles of new cycle lanes and widening of pavements to help ease pressure on public transport and improve air quality (Taylor & Laville, 2020).
- *Should government programmes to further invest in highway capacity be rethought with the associated major investment potentially redirected?* Campaigners have launched a High Court challenge against the UK government’s latest 5-year £27bn road investment strategy on the grounds of its incompatibility with addressing the climate crisis.
- *Does public transport need greater subsidy both to survive but also to play a (revised) role in a new modal mix for the future that also includes a larger role for virtual mobility (digital connectivity instead of travel)?* The UK government announced £30m of support for trams and metro systems

in a number of cities to be kept running in the weeks ahead (BBC, 2020c) and followed this with £254m for buses to help protect and increase services (Department for Transport, 2020a).

- *Can we take steps to recover economically from the COVID-19 crisis that are in step with what is required to respond to the climate crisis (which includes an urgent need to decarbonise the transport sector as a major source of greenhouse gas emissions)?* Polling across 14 countries found that 65% of respondents (and over half in each country surveyed) agreed that “[i]n the economic recovery after COVID-19, it’s important that government actions prioritize climate change” (Ipsos MORI, 2020b).

At the time of reading this chapter, the world will (hopefully) have moved on from being in the midst of the COVID-19 crisis, and the answers to these questions may have emerged, or started to emerge; there may well be new questions and dilemmas being faced. Deep uncertainty about the future and about the context for public transport and its prospects is likely to still prevail.

Public transport’s four futures

Having tried to capture some of the relevant signals for public transport’s future from the heat of a global pandemic, the chapter now turns to ‘public transport’s four futures’ as depicted in Figure 43.1. The focus is on planning for, and shaping, these futures rather than anticipating what they might be.

Future of the planet

For environmental scientists and campaigners, the climate crisis facing the planet, or more accurately the planet’s inhabitants, has been of concern for some time. Indeed, the United Nations has, for three decades, seen world governments meeting to consider, and attempt to agree upon, commitments and actions to respond to the crisis. However, it seemed to take the intervention from Greta Thunberg to sharpen the minds, focus media attention, mobilise protest and galvanise further (intent for) action. Countries and cities have since declared climate emergencies. Indeed, according to the website <https://climateemergencydeclaration.org/>, in May 2020, “1,488 jurisdictions in 30 countries have declared a climate emergency”. In June 2019, the United Kingdom undertook to enter into a legally binding commitment to “eradicate its net contribution to climate change by 2050” (UK Government, 2019).

Moving away from humanity’s carbon intensive existence on the planet is highly challenging. Progress in some countries is being made. In other countries, carbon emissions are still trending upwards. What is clear is that to rise to the challenge of averting potentially catastrophic effects of climate change will require monumental change to human activity. For some, partly for reasons of self-preservation, a ‘technology fix’ is seen as the primary, if not overarching, solution – ‘greening business as usual’. Others recognise that a two-pronged attack is needed. Technology fixing will play a major part, but so too must behaviour change. Demand for consumption has to go down, or the makeup of consumption has to change.

This is certainly true for transport, which is both a sector that contributes substantially to carbon emissions and which has also been the most stubborn in terms of achieving any reductions in emissions. In the United Kingdom, for example, the Department for Transport has developed a series of technology roadmaps for the reduction and removal of ‘tailpipe’ (point of use) emissions from UK domestic transport modes (this does not address embodied carbon). At the time of writing, the final report (co-written by this chapter’s author) sits with the

Department for Transport. As at 2018, direct emissions from buses and coaches accounted for 3% of the United Kingdom's domestic transport emissions, with 1% from rail (BEIS, 2020). A combination of battery-electric and hydrogen-fuel-cell propulsion is expected to achieve full or near-full removal of direct emissions from buses and coaches by 2050. For rail, near-full removal will be achieved through a combination of line electrification, battery-electric-hybrid and hydrogen-fuel-cell locomotives. Road-based public transport electrification is well advanced in terms of technology readiness and early market adoption, with accelerated market penetration to be expected. While most of the world's fleet of electric buses operates in China, other countries are advancing. In February 2020, the UK government announced a five-year funding package including 4000 new zero-emission buses (in the context of an overall bus fleet in the UK of around 34,000) (BBC, 2020d). This forms part of the government's first ever Transport Decarbonisation Plan, currently under development (Department for Transport, 2020b). Importantly, this Plan is about behaviour change as well as technology fix, with the Secretary of State for Transport noting the following. "Public transport and active travel will be the natural first choice for our daily activities. We will use our cars less and be able to rely on a convenient, cost-effective and coherent public transport network" (Department for Transport, 2020b, p. 3). Public transport has an important part to play in the future of the planet.

Future of society

So how will society adapt to live within environmental limits? Or might it fail to do so and suffer the consequences? The mistake made in the past in the transport sector has been one of adopting a 'transport is here to *serve*' mentality (Lyons, 2004). It has followed from this that travel is understood as a derived demand – derived from our need or desire to reach destinations to undertake activities. This has led to 'demand-led supply', whereby how much demand there will be in future (based upon future activities) is predicted and then transport capacity to 'serve' this demand is provided. Yet in reality, transport supply *shapes* demand and patterns of activities in society, just as they shape transport. It would be better to adopt a mentality of transport needing to *support* the sort of society we would like to see. This involves 'supply-led demand', which considers what nature and extent of supply of transport capacity may be appropriate in supporting future society with an expectation that society (people's behaviours) will adapt in response to that supply makeup.

In such an approach, it is in fact not simply a matter of transport supply, within which public transport will play its part. Rather it is about supply of the means for people to *access* other people, goods, services and opportunities – which provide a basis for economic prosperity and social wellbeing. An earlier paper introduced the concept of the triple access system (Lyons & Davidson, 2016). This recognises that there are three interrelated systems that provide people with access: (i) *the transport system* provides access through physical (motorised) mobility, (ii) *the land-use system* provides access through spatial proximity (and active travel) and (iii) *the telecommunications system* provides access through digital connectivity. COVID-19 has shone a bright light upon this triple access system, with lockdown highlighting the importance of digital connectivity for continuity of access as well as the challenges and opportunities of spatial proximity. With barely half the world's population having internet access (ITU, 2018), alongside the importance of digital connectivity is the digital divide – those who have access and those who do not.

As society continues to evolve, the approach taken to triple access planning will dictate how society configures and in turn significantly influences the part to be played by the transport system and the demand placed upon it. It is arguable that society has come to rely too much upon the transport system for access, at an environmental and social cost. In the future, there

needs to be a rebalancing with greater emphasis upon land-use planning that promotes spatial proximity (and in turn active travel modes) allied to greater emphasis upon access through digital connectivity.

Future of mobility

The future of mobility, as noted previously, is strongly bound to the future of society. Some in the transport sector have sought to characterise the future of mobility with the shorthand ‘ACES’ – Autonomous, Connected (vehicle-to-vehicle, vehicle-to-infrastructure and vehicle-to-people communication), Electric, and Shared. Currie (2018) offers a refreshing rebuke to the ‘swirl of hype’ surrounding new mobility developments centred upon driverless cars (see their further consideration subsequently) and misleading references to a future of shared mobility, allied to an implication that public transport is set to be out-moded. He makes clear that what matters for ever-more-populated urban areas is *efficient movement of people*, which means improvement in vehicle occupancy levels. Evidence, such as it exists, points to persistently low, if not deteriorating, vehicle occupancy levels in cars – with driverless cars set to potentially exacerbate this further.

Ridehailing (notably offered by Uber [and Lyft in the United States]) has been a prominent example of technology-enabled innovation in mobility, introducing a convenient app-based service for users accessing and paying for mobility. While providing an apparent technology-enabled boost to the convenience of individual urban travellers, the phenomenon has been shrouded in controversy. Hype from its proponents is now being caught up by insights into the reality. The headline from a recent (pre-COVID-19 New York lockdown) *Wall Street Journal* article captures this succinctly: “The Ride-Hail Utopia Got Stuck in Traffic – Uber and Lyft promised to ease congestion. Instead they made it worse” (Brown, 2020). Proponents of ridehailing saw its potential to be part of a shared mobility future. This does not yet seem to be the case in practice: “[m]ost users take their own private Lyfts and Ubers, shunning pooling [shared rides] even though it costs them more” (Brown, 2020). Ridehailing does not spell good news for public transport in cities where it has taken root. “Multiple studies show that Uber and Lyft have pulled people away from buses, subways and walking, and that the apps add to the amount of driving in the US” (Brown, 2020). Ridehailing is not so much – at present at least – a complement to public transport but rather a threat, hence the importance of governance and regulation in shaping future developments (see also Enoch et al., 2020).

There is a risk of becoming blinded by a technologically deterministic outlook. What is technologically possible is not necessarily the same as what is desirable (especially through a triple access planning lens). Terms such as ‘smart’ and ‘intelligent’ mobility (intentionally or not) tend to glorify technological sophistication – with a risk of being focused upon the means rather than the ends or the outcomes that are sought. As a result, ‘boring’ or ‘dull’ solutions can be (implicitly) downgraded in importance in terms of helping deliver outcomes (Lyons, 2020a). Walking and cycling, along with public transport, have been adversely affected by this.

The future of mobility will be significantly shaped by the players involved. These include the travelling public. However, members of the public are consumers, not producers. Players involved in the production of transport supply are key. Private sector players can have very different motives to public sector players. The former have an interest in selling *their* mobility – more of their mobility is good for their shareholders and hence profits. The latter have an interest (one hopes) in a configuration of supply that best supports society and its economic, social and environmental sustainability. The important governance role of the public sector cannot be overstated.

Smith et al. (2018) consider different scenarios for public and private sector involvement in the shaping of Mobility as a Service (MaaS) – the mobility system beyond the private car (Lyons et al., 2019). MaaS has been the subject of considerable recent attention, expectation and hype. It is centred upon an app-based service platform through which the user can conveniently plan, procure and pay for journeys using one or more of the available modes that form part of the MaaS ecosystem (which could include public transport, bike/scooter sharing, ridehailing and car hire). Smith et al. (2018) consider three scenarios for MaaS: market driven, public-controlled development and public-private development. A key tension explored is that between public and private sector objectives from MaaS and the importance of “finding a regulatory ‘sweet spot’ that drives innovation and secures public benefits” (Smith et al., 2018, p. 592). Outside of this sweet spot is a risk that the public sector stifles innovation in its efforts to ensure public benefits or that the private sector’s pursuit of profit in the absence of sufficient regulation could lead to “cannibalization of the current PT [public transport] share” (Smith et al., 2018, p. 597). While MaaS may have seized the attention of a growing number of players in the transport sector, Smith et al. note that as a nascent phenomenon, MaaS has seen few pilots or trials around the world and robust empirical insights remain limited.

It is important to involve multiple perspectives in examining and shaping the future of mobility. A recent piece of work brought together the ‘lovers’ and the ‘haters’ of driverless cars to constructively explore – through creating plausible utopian and dystopian scenarios for future mobility – whether driverless cars represent a great opportunity for society (Lyons, 2020b). The workshop process converged upon developing a set of ten principles to ensure driverless cars would contribute positively in the future if they are indeed to become a mainstream feature of mobility. What became very apparent was that the principles for driverless cars were largely focused upon creating the type of mobility system we want overall to support society (outcomes focused). The work concluded that

DCs [driverless cars] could improve mobility, but the work to be done to meet the ten principles is challenging, to say the least, especially in a resource-constrained environment. To address them all effectively will require a new strength of public sector governance that surpasses much to date.

(Lyons, 2020b, p. 4)

As society evolves and further technological possibilities emerge, it will be the willingness of the public sector (in partnership with the private sector) to adopt and deliver a vision-led approach to shaping future mobility that avoids technological hype becoming ‘irresponsible innovation’.

Future of public transport

The future of public transport must be considered in relation to the three previous futures. This creates a complex picture of interdependencies to understand and respond to. Some aspects will be clearer and foundational to public transport’s existence and prospects in the future of mobility, while others will be uncertain.

There certainly seems to be a widely held view that public transport’s place in that future is assured. Currie (2018, p. 28) asserts that “as long as cities and urban densities grow, public transit is likely to be at the heart of successful city futures forever”. The UK government appears to agree. In its recent strategy for the future of urban mobility, one of the nine underpinning principles is that “[m]ass transit must remain fundamental to an efficient transport system”

(Department for Transport, 2019, p. 8). Indeed, the case for public transport can be seen as a perennial one. Over 20 years ago, the UK government's view was that

[t]he bus can offer an almost universal form of public transport: flexible, adaptable, straightforward, able to meet a wide range of transport needs. It can offer choice, both as an alternative to the car, and as an opportunity for those who do not have a car.

(Department of the Environment, Transport and the Regions, 1999, p. 2)

Comfort (2020) has highlighted, from experience in US cities, three pragmatic 'silver bullets' to enhance quality of service, bus ridership and hence ongoing future prospects: (i) reconfiguring the bus route network to align with present rather than historical demand, (ii) adding frequency to the most heavily used routes and (iii) reducing the friction that slows buses down (adding bus lanes and signal priority as well as speeding up boarding times through improved payment methods).

Alongside such principles and practice is a much broader array of factors that need accounting for in planning for the future of public transport – factors which individually and in combination lead to a sense of deep uncertainty, as noted earlier. Boyle (2018) contemplates two contrasting outlooks for public transport, namely that it will look nothing like it does today or will look just like it does today. In a recent exploration of the future of public transport in 2045 involving scenario planning informed by 50 expert interviews, Enoch et al. (2020) observe a distinct lack of consensus over the 2045 outlook amongst the experts.

Even with a vision-led 'decide and provide' approach rather than a forecast-led 'predict and provide' approach (Lyons & Davidson, 2016), such uncertainty must be handled (rather than concealed). The challenge is to chart an outcomes-based course forwards for public transport that is resilient to the uncertainties. This is where scenario planning has an important part to play. Those in positions of influence over strategies for, and investment in, the future of public transport have some control over shaping the future they believe is appropriate. However, that future is subject to uncertain external forces beyond their control. This can be addressed by developing plausible scenarios that are representative of such uncertainty and then using those as future contexts for public transport with which to test the prospective effectiveness of different candidate measures and investments. The aim is to better understand whether a measure or investment performs well in each of these scenarios in terms of being able to positively work towards delivering the outcomes sought. Scenario planning itself should be informed where possible by trend analysis and horizon scanning (see Le Vine and White [2020] for an empirical analysis of the dynamics of demand for bus travel).

As noted previously, there is a high level of confidence that public transport can and should continue to serve corridors of high movement; it should be a backbone of urban and interurban mobility. However, existing corridors of high movement may or may not remain so. Strengthening those corridors could see land-use planning (Transit Oriented Development) reinforcing such corridors. Meanwhile, some corridors of high movement may become corridors of *former* high movement in future due to changes in the triple access system and its use. Likewise, new corridors of high movement could emerge that could and should best be served by public transport.

Part of taking a triple access planning approach is recognising the *interdependencies* between transport, land use and telecommunications. For example, people now expect to connect digitally while on the move – to be virtually proximate to others. Public transport needs to continue to respond to this in terms of how it competes with other mobility providers. Changing from

point-to-point journeys to door-to-door journeys will be key to public transport's success in supporting society and the planet through behaviour change away from (private) car use. This involves understanding how the rest of the mobility system is changing. It can be suggested, for example, that we need to change our thinking from first/last-mile options at either end of public transport journeys to first/last *five*-mile options in the face of developments such as electric bikes.

There is now heightened need for research to understand the four futures of public transport: changing planet, society, mobility systems and public transport systems. Such research must span all four futures. It will need to concern itself with supply and demand – for example, the pursuit of better understanding of future determinants of demand for public transport use and understanding of the profiles of (prospective) public transport users. Such understanding will involve examining people's changing lifestyles, social practices and business practices, as well as the evolving nature of the triple access system that supports these. Supply-side research is needed into different options for public transport operations and business models which are resilient and adaptive in the face of future uncertainty – particularly uncertainty in terms of how other parts of the mobility system are evolving. There is also a need to consider how research can be more rapidly progressed and disseminated such that it can support and influence industry developments in a timely manner. This is particularly important given the state of flux in which planning for the future is taking place.

All of this calls for a creative, vision-led approach to public transport planning for an uncertain world. As the French philosopher Voltaire (1694–1778) said, “uncertainty is an uncomfortable position but certainty is an absurd one”. There are likely to be uncomfortable times ahead but also exciting ones, because uncertainty can be turned into an opportunity to shape the future. This has been seen in the wake of the shock of COVID-19 with so-called tactical urbanism: the (temporary) reallocation of roadspace away from the car to support and encourage new patterns of mobility. There is now a golden opportunity for public transport to shine, provided that the players involved have open minds, determination, resources and agency to influence.

Notes

- 1 https://en.wikipedia.org/wiki/Greta_Thunberg
- 2 (www.thefreedictionary.com/)

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