demand-responsive transport returns to milton keynes—lessons for a bus industry in crisis?

With green transport alternatives being needed more than ever, and with the ending of pandemic emergency funding for bus services likely to lead to big cuts, Stephen Potter, Marcus Enoch, Miguel Valdez and Matthew Cook suggest that the innovative approach taken in Milton Keynes, in which demand-responsive transport is integrated with conventional bus routes, shows that a better way forward is possible.

In March 2022 a number of bus operators and transport authorities said that, with the upcoming withdrawal of emergency Covid funding, a large number of bus routes faced closure; indeed, in some cases, entire bus networks are under threat. The Campaign for Better Transport reported in July that in the year 2020-21, despite emergency funding, English bus services had declined by 16%. Subsequent cuts to routes have taken place, affecting both urban and rural areas and, with the temporary pandemic support for bus services ending in October, further cuts to bus routes are anticipated.

In 2019 bus passenger journeys in England stood at 4.5 billion per annum, dropping to 1.4 billion during the pandemic, but recovering by March 2022 to rate of around 3.2 billion. Allowing for changes in work and shopping behaviours, the sector expects to return to only about 80% of pre-pandemic journeys. This may be the immediate crisis, but the jolt of the pandemic has brought to the surface a long-term creeping trend in Britain’s bus services: despite various government initiatives, bus passenger numbers in Britain have steadily declined. In the 10 years from 2009/10 to 2019/20 (i.e. before the pandemic hit), bus patronage fell by 13.5%, from 5.2 billion journeys to 4.5 billion, with a 10.5% decline in revenue and over a quarter of bus routes cut. Add in the pandemic impacts, and it looks like we could be approaching a tipping point; before long, outside of major conurbations, buses could become largely absent from many town and country areas.
Behind the decline in bus use is a core long-term structural problem of the scheduled bus service model. Fixed routes and schedules operate well along high-density travel corridors, but, as noted in the report *All Change?*, 4 the major areas of travel growth are now for social and leisure-related purposes. Geographically, the strongest growth has not been along major corridors into city and town centres but in cross-suburban journeys, within the urban fringe (‘peri-urban’), and in rural areas. 5 The nature of our urban environments has changed, and consequently so too have our travel patterns.

The local bus model of scheduled corridor services is increasingly unable to accommodate this long-term shift in travel behaviour. 6 Consequently, bus services have concentrated on markets that conform to their operating model, with a particular emphasis on commuting (which makes up 44% of bus trips, compared with 15% of all trips) and shopping journeys, both of which are in decline—a trend that the pandemic has accelerated, with the growth in home and hybrid working, plus online shopping.

The longer-term effects of the pandemic shock on top of already declining bus use are now beginning to emerge. With the end of special pandemic support for bus services, bus operators are facing serious financial difficulties. Equally, local authorities are experiencing an increase in financial demands as some commercial bus services cease to be economically viable—plus a rise in subsidies is needed for their own supported services. Even before the pandemic, local authorities were facing difficulties in financing essential bus services. 7 With post-pandemic public sector finance cuts in prospect, funds to support buses are set to be reduced even further. This comes just as the economic impact of the pandemic results in many people needing to find new employment and make other adjustments to their travel behaviour. Even were emergency funding extended, this core systemic problem remains.
During the 2021 lockdown, the UK government issued the new National Bus Strategy for England, *Bus Back Better.* This displayed no awareness of the long-term impact that the pandemic would have on bus services and implicitly assumed that things would return to roughly a pre-pandemic ‘normal’ world. As such, the *Strategy* was about local authorities entering into franchising and proactive partnerships with bus operators, seeing this as the way to substantially improve services and develop more environmentally sustainable travel behaviour. Sustainability also featured prominently in discussions and agreed actions emerging from the 2021 Glasgow COP26 climate change meeting, with one related study indicating that transit use needs to double by 2030 as part of seeking to limit global warming to an increase of 1.5°C.

Franchising and partnership approaches are appropriate incremental reforms, but it is notable that the Bus Strategy sees the role of innovation as largely applying greener vehicle technologies to buses. There is a fleeting reference to demand-responsive services, but these are presented (on page 13) as of marginal relevance—‘in lower-density, often rural areas’ and to ‘improve evening and Sunday services in places which currently lack them, integrated with conventional buses during the day’. As we falteringly emerge from the pandemic, last summer’s National Bus Strategy for England looks woefully inadequate, lacking in both fundamental understanding and vision.

**Milton Keynes—planning in the pandemic to reinvigorate bus services**

In the midst of the pandemic, Milton Keynes Council introduced a much more innovative and visionary approach than anything envisaged in the National Bus Strategy. The council’s approach seeks a bus business model to match 21st-century travel demands—not trying to get modern travel practices to conform to the early 20th-century bus model. This innovative approach introduces demand-responsive transport (DRT) to complement commercial bus routes, making the bus a viable option for a wider range of trip demands. It also reflects a recognition that introducing a different business model for buses could be the key to transforming local public transport services.

For many years it has been argued that DRT is well suited to modern patterns of travel demand. DRT is ‘an intermediate form of public transport, somewhere between a regular service route that uses small low floor buses and variably routed, highly personalised transport services offered by taxis’. But in practice DRT has remained a relatively niche activity because small vehicles struggle to generate sufficient revenue from the low number of passengers to cover the running costs (particularly the cost of the driver and back-office
systems). In addressing this, Enoch\textsuperscript{11} notes how surviving DRT operations have looked at several ways to raise revenue and cut costs.

A further issue is how a DRT service affects the public transport system as a whole. Sharmeen \textit{et al.}\textsuperscript{12} notes:

‘One of the major motivations to move towards FPT \textit{i.e.} DRT\textit{ systems is to address the gaps in both service delivery and market share, e.g. in solving the low-demand fixed transit line issue or offering last mile solutions. However, it is yet unknown how the advent of a new distribution channel \textit{i.e.} the platform provider would affect the traditional public transit supply chains? How would the stakes and revenues be re-arranged? General conjecture is that the public transport providers would be at the losing end of the bargain and end users would have to pay up – to what extent are these true?’

Overall, to date, in many areas establishing a scalable, sustainable business model for DRT remains elusive,\textsuperscript{12,13} as is shown by recent failed schemes such as Charriot, Slide, Kutsuplus, Breng Flex, PickMeUp, and Bridj.

The Milton Keynes DRT service addresses many of the issues summarised above. The arrival of technology-based cab operators, such as Uber, Lyft and Ola, with their app-based, automated algorithm booking systems, has been exploited through a partnership with one such technology company to deliver a public transport service that meets transport policy requirements. This is an important case of an enhanced bus partnership, but very different to that envisaged in the conventional service-constrained National Bus Strategy. Our research on the new DRT service in Milton Keynes, reported here, draws on operational and monitoring data gathered by the operator, Via, and Milton Keynes Council, together with in-depth interviews with key actors and informants involved in the DRT system and survey data on user responses.
DRT featured early in the development of Milton Keynes, when a ‘Dial-a-Bus’ service operated between 1975 and 1978, serving the developing estates in the Woughton area.\textsuperscript{13} This was popular but proved too expensive to continue. After bus deregulation in 1986, Milton Keynes Development Corporation and Milton Keynes Council were required to leave bus services to the private sector.\textsuperscript{14}

As the population of Milton Keynes grew, bus services expanded, but Milton Keynes’ low density and dispersed, car-oriented, urban design meant that bus service levels remained poor for the emerging city of 250,000 people. Broadly, a pattern developed that was fairly typical of medium-sized British provincial cities, with a commercial bus network run by a dominant operator (in Milton Keynes it is Arriva), coupled with smaller local companies tendering for council-supported services. By 2019, 85\% of bus trips were on the commercial services and 15\% on the supported services. The urban supported services typically ran at an hourly frequency, with rural services often two-hourly. By 2019 Milton Keynes had 10 commercial bus routes and 11 routes of supported services.

Since 2000, Milton Keynes Council has played a very active role in transport innovation (including electric vehicle charging infrastructure, a commercial e-bus, autonomous pod trials, autonomous vehicle deliveries, and city bike and e-scooter schemes). The council established a distinctive management structure that supports such initiatives, with a specialist transport innovation function separate from transport planning and close integration of its transport functions.

For many years, recognising the inadequacy of its supported services, Milton Keynes Council had been looking for ways to sustainably introduce a DRT system. It recognised that DRT supported by typical bus fares was not economically viable, but wished to avoid the short-term funded project model that had seen so many DRT schemes fold when project funds ended. Consequently, the council sought a partnership with providers that were establishing technology-led cab and DRT systems which could potentially run in Milton Keynes without depending on a new ongoing subsidy and could be funded from established sources.
Discussions opened with Simply Connect and Arriva Click, but neither provided a cost-effective basis for the sort of service desired.

When Via (then called Via Van) expressed interest in establishing a commercial DRT service in Milton Keynes, the council recognised that there was an opportunity to explore DRT concepts with them. Via’s own commercial DRT service became established from 2017, offering a fare midway between that of a cab and bus for its on-demand, smartphone app-booked, shared van service. It competed with both bus and cabs, offering shared trips between local neighbourhood pick-up and drop-off points. In 2018 Milton Keynes Council and Via ran a trial project to explore how the Via service could be integrated with concessionary fares. This was part of developing knowledge and understanding of how a commercial DRT model could be adapted to fulfil the requirements of a public transport system.

Financial constraints also played an important role in the re-emergence of DRT in Milton Keynes. Even before the pandemic, the cost of supported bus services was rising for what was an extremely basic set of both urban and rural routes. The supported services cost £2.8 million per annum, and it was clear that the cost of maintaining these scheduled bus services would rise substantially in the coming years—while council budgets were set to be increasingly squeezed. Practically, some subsidised routes would have to cease running.

Initial modelling suggested that if a partner operator could provide booking and back-office services, then DRT could substantially reduce cost while offering a better and more comprehensive service to users. A new concept emerged—of not just treating the supported services in isolation, but using an innovative approach to also strengthen conventional commercial bus routes and produce an overall system that enhanced greener transport options as a whole.

At the same time, Milton Keynes Council also progressed the electrification of public transport, having been part of the Arup/Arriva e-bus project that trialled inductive charged buses in 2013-18 on a commercial route to prove their technical and economic viability.14 Further funding had been secured from the Department of Transport to procure more e-buses, but the operator was unwilling to take part in running further electrified services.

With Department for Transport approval, the council re-purposed the e-bus monies to provide a useful capital injection for the conversion of supported bus services to DRT. Thus
the Milton Keynes scheme had both start-up funding to support initial capital costs and ongoing funding raised by tapping into the established supported-services budget. With DRT largely seen as a niche rural-areas measure, the idea that it could be cost effective for lightly used urban services was highly innovative.

**The DRT service in practice—MK Connect**

In 2020, just as the implementation plans were progressing to replace council-supported services with DRT, the Covid pandemic hit and government lockdown measures were imposed. Despite enhanced support being available, as bus patronage collapsed one supported-service operator withdrew. At very short notice, in October 2020, an initial DRT operation was introduced to the area previously served by the withdrawn scheduled service. This was run by Via and conveniently acted as a trial ahead of the April 2021 replacement of 11 conventional council-supported services. As is a legal requirement, this contract was the subject of a competitive public tender, which Via won. The DRT service is branded as MK Connect.

The Via MK Connect contract is for an initial three years, with reviews to allow the contract to be extended for a fourth and fifth year. It is a fixed-price contract which replaces all but two conventional low-cost subsidised services. The previous cost of all contracted services in 2020-21 was £2.8million. For the following year, 2021-22, the total cost for MK Connect and the other two low-cost contracted services was £1.9million. Had all the scheduled contracted bus services been renewed, the costs were projected to be well above the 2020-21 level, even without the pandemic effect. A realistic comparison would be that the cost of the Milton Keynes DRT service is something like 60% that of scheduled route services—possibly even less.

In addition to the annual fee, Via keeps the farebox revenue and also receives a payment for reduced and free fares for youth and senior tickets. This is the same arrangement as for any other supported service bus operator in Milton Keynes.

The form of contract for a DRT service involves important differences compared with a contracted scheduled service. The MK Connect contract includes stringent key performance indicators (KPIs)—for example, 30 minutes maximum time between booking and pick-up for
urban areas, 60 minutes for rural; 95% of journeys pick up within 10 minutes of the booked time; 95% of journeys having a pick-up within 400 metres of the booking point, etc. The operator cannot reduce the quality of service if more vehicles and drivers are needed—they are contractually obliged to meet the KPIs.

The contractual mechanism in Milton Keynes that addresses demand growth is that Via retains the fare revenues and payments for concessionary fares. Thus, if demand rises, Via’s income also rises to fund more vehicles and drivers. Indeed, this happened quite rapidly. The initial fleet was 13 electric and five wheelchair-accessible diesel vehicles, which matched the pandemic lockdown demand when the service was launched in April 2021. By late May 2021, Via had added another two vehicles to the MK Connect fleet, and a further six were introduced in the summer as lockdown restrictions substantially eased. Further vehicles have subsequently been added to the service.

The service area for MK Connect is the whole of the unitary borough of Milton Keynes, serving both its urban and rural areas (covering about 300 square kilometres). The borough-wide service is available Monday-Saturday, 6am-11pm, and 9am-6pm on Sundays. This is a considerable improvement on the operating times of the conventional buses that the DRT replaces, which ran at an hourly frequency in urban areas (two-hourly in rural areas), with little by way of an evening service and no Sunday service at all. The service is therefore far more inclusive, covering the whole area and so making possible trips that simply could not have been made using the former scheduled routes, and operating at times and on days when previously there was no bus service at all. The result is that any trip between any two points in Milton Keynes can now be undertaken by public transport.
The service is booked by users logging their pick-up and drop-off addresses through a smartphone app or via web portal, or, for those without a smartphone, by phoning the contact centre. Payment is cashless to a registered credit/debit card or using the MK Move smart card (a stored-value smart card valid on all bus services in Milton Keynes). The user is directed to a pick-up point and told when the pick-up will be. For urban areas the pick-up is typically 15-20 minutes after the booking is made, at a point 150-250 metres from where they are, with both being longer for rural areas. The app allows the user to track their vehicle in real time, so that they know exactly when it will arrive.

A key feature of the booking system is that, should a request be for a trip that matches a scheduled commercial bus route, the customer is directed to use this instead, providing them with the location of the bus stop and the time that the scheduled bus will arrive. The booking system will accept a trip request when that route is not operating (for example, in evenings or on Sundays) and will also accept a booking if using the scheduled bus would require an excessive journey time (over an hour). Individuals can register special needs that inhibit them from using conventional buses; if this is done, the booking system allows any trip to be accepted from that particular user.

That MK Connect does not compete with the scheduled services is a central part of the service design. First, this is because it is illegal for council-supported services to compete with commercial services, but, more importantly, the strategic vision is that the introduction of MK Connect will strengthen public transport services as a whole. The expectation is that the DRT service will enhance the entire public transport system, which will eventually result in the sort of growth in use desired to achieve inclusive mobility and sustainable transport aims.

There is a flat fare for MK Connect trips—£3.50 during peak hours and £2.50 at other times; All in 1 MK (youth and student) card-holders are charged £1; and the service is free for older person’s and disabled person’s bus pass holders after 9.30am on weekdays and all day on weekends. These are comparable to existing single bus fares, but there are currently no discounted daily, weekly or monthly tickets. The bus fare levels and the various concessionary passes are crucial to MK Connect being a real public transport service. There were some concerns within the council that the service would be swamped by concessionary fare users, but in practice the split in fare types has settled down to a financially viable mix of around 50% of trips at full fare, 25% at the youth concessionary rate, and 25% using senior free passes.
The services are operated with eight-seater vehicles under a private hire vehicle licence. The vehicles have a large boot that can take shopping bags, luggage, child buggies, smaller mobility scooters, and folding bicycles. Passengers can phone the call centre to request a flag on their account for additional support on the basis of mobility, hearing, or cognitive issues. Those using a wheelchair will always be matched with a fully accessible vehicle, and the service is accessible to passengers with vision and hearing impairments, as well as those with other additional needs. A door-to-door service is offered to those who register substantial mobility limitations, and (as noted above) if the impairment inhibits them from using scheduled services, their trip requests will be accepted even along an existing bus route.

In the first month of operation (April 2021), MK Connect undertook 7,400 rides, with 65% of trips in the electric vehicles. The average wait time was 15.7 minutes from booking, and the average walking distance to join the bus was 150 metres. In rural areas the walking distance was higher, but, even so, 97% of all trips were within a 400 metre walking distance of the rider’s starting point. Ridership subsequently grew to 14,000 rides in May, 21,000 in September, 28,000 in December 2021 and over 32,000 by March 2022. The service started when lockdown measures were still in place, but by July social and economic activity was resuming. By March 2022, bus use as a whole in Milton Keynes had recovered to 80% of pre-pandemic levels, with the DRT service representing 5% of total bus trips undertaken.

Pre-Covid trips on the supported network were around 90,000 a month. Allowing for the overall drop in bus use due to Covid, about 60,000 trips per month is a more valid comparison. MK Connect is running at just over half that level but, as well as MK Connect, two supported routes are still running and carry a substantial ridership; further to this, the commercial services have also changed so that some bus trips previously taken on the supported services have shifted to the commercial services. So much has changed that a comparison of ridership with the pre-Covid situation is difficult. However, the DRT service does appear to be strengthening local public transport as a whole, but the ridership pattern and types of user are (as is intended) different from those of the old supported-service routes.
Glitches, adjustments, and user responses

The introduction and user reception of MK Connect has not been without some problems and issues. Some have been glitches and transitional matters, but others reflect more structural issues about the suitability of DRT for some users and trip types.

In the late summer of 2021 the service suffered driver shortages as it expanded. This was not unique to MK Connect, but was part of a nationwide issue of driver and labour shortages that caused problems in service deliveries (as attested by the September panic-buying of fuel by motorists). The driver shortage resulted in MK Connect trip requests that could not be fulfilled rising from 9% in May to over 20% in August and September, denting user confidence in the service.\textsuperscript{16} Driver recruitment has since improved the situation, but it did result in a general falling in KPIs (for example wait and walk times increased). There were further driver shortage issues later in the year and longer wait times continued to be a problem, averaging just over 30 minutes by September 2021, which continued into 2022. The driver shortage also meant that a proportion of trip requests could not be accommodated. This has been at around 10% of requests, but by March 2022, 17% of valid trip requests could not be accommodated\textsuperscript{16}, leading to media criticisms of the service.

In the autumn of 2021, after MK Connect had been operating for over six months, Via undertook an MK Connect rider survey,\textsuperscript{17} which drew responses from 415 MK Connect users. The mix of users indicated that MK Connect was attracting a range of demographic and income groups—51% of the respondents were women, 47% men and 2% non-binary; 54% were in work, 18% students, 9% not working, 9% retired, and 10% others. The ages of users were somewhat clustered towards younger age groups (see the chart below). However, although only 9% of survey respondents were aged over 65, ticketing data shows that 25% of rides used the senior free passes, which suggests that the survey had a low response rate among older people.
Of those who provided the information, 44% lived in households with an income under £20,000 per annum, 32% in a household with an income of £20,000-£40,000, and 24% in households earning over £40,000. The average disposable household income in Milton Keynes was £20,040 in 2019 for a quarter of trips to be made by those in high-income households is unusual for a provincial bus service. A further finding on the diversity of users was that about 23% of those in the survey had some condition that affected their mobility, ranging across physical and mental conditions.

In terms of journey purpose, respondents were asked to state their most usual type of destination when using MK Connect. Commuting came out as the largest individual category (37%), followed by leisure (19%), daily errands (including shopping) (17%), education (10%), and healthcare (5%). A mix of other uses covered the remaining 12%. When asked what benefits MK Connect provided, more than one response could be registered: 60% identified saving money, 50% said it reduced travel times, and 26% said they could travel more often. Only 4% said there were no benefits. Affordability and convenience also featured strongly in response to the question concerning what people liked about MK Connect.

Users were also asked how they would have made their most recent trip were MK Connect not available: 40% would have used a taxi (hence they gained a considerable cost saving), 35% would have taken a bus (most needing transfers), and 10% would have travelled by car—12% would have been unable to make the trip at all. This suggests that some 60% of MK Connect trips were for situations in which public transport was not previously viable, indicating that the DRT service has opened up trips for public transport that were not previously feasible by fixed-route buses.

Overall, the survey and other user data indicate that those using MK Connect are highly satisfied with the service. However, the survey misses out those who previously used the scheduled services but find the DRT design awkward or difficult to use. Indeed, some people lobbied for the supported-service routes to be reinstated, but, as has happened elsewhere in Britain, the increased funding needed could not be justified for bus routes that, even pre-pandemic, were carrying very few people.

However, there are other user groups that provide important lessons for a replacement DRT service. One example is that residents of a retirement village felt isolated when the hourly schedule bus was withdrawn, and many either felt unable to use MK Connect or considered it insufficiently reliable for them to attend appointments. There was also a wide misconception that MK Connect could only be accessed via the app, and awareness of the alternative of phone booking line was low. Their case was taken up by local councillors, and
in January 2022 Milton Keynes Council reintroduced an hourly daytime supported bus serving the village. This single-driver/vehicle service involves a low subsidy and can be funded from within the cost savings that the overall system produces.

This example highlights the that, although there is the option of booking by phone, the app-based booking and payment system is more acceptable to the IT-savvy than the traditional practice of simply walking to a bus stop to catch a scheduled bus. The concern over whether MK Connect would get people to an appointment on time affected a range of users, from an elderly person’s medical appointment to a sixth-former needing to get to their school lessons on time. The driver shortages did not help this, with wait times varying greatly for the same trip from one day to the next.

However, behind this more transitional issue, there is the strategic service design issue that scheduled buses and DRT suit different trip purposes and people. The DRT service certainly opens up a much wider set of trip possibilities, as the rider survey showed, but both user practice and understanding involved in accessing MK Connect are very different from those involved in using conventional bus services. However, even when user understanding and practice adjust, there will remain some trips and people for whom accessing DRT will remain difficult.

In summary, the user-related information to date suggests that there are three sets of issues:

- operational;
- transitional; and
- core service design.

These three categories are not discrete: there are overlaps and they may influence each other.

Operational issues include aspects such as experiences of poor reliability caused by driver shortages, but could also relate to the clarity of service information; there is a lesson here that a DRT service requires resources to be devoted to engaging with and understanding users. The usual ‘service changing’ announcements and approaches are inadequate. Different skills and understanding are needed in introducing a DRT service when compared with a conventional route bus service.

Transitional issues are about people developing an understanding of the service and developing practices around how it is used. Again, this relates to effective user engagement methods.
The response of Milton Keynes Council to service feedback has concentrated on these first two categories. It is clear that very thorough user engagement methods are needed so that people understand the nature of the service, how to access it, and the differences that they need to accommodate. Some refining of service features could also be seen as part of transitional issues. Given the pioneering nature of MK Connect and the fact that it was introduced in the context of pandemic restrictions, it is perhaps not surprising that these sorts of issue arose. The high satisfaction of the service’s users and its growth suggests that its essential features are sound, but there are a number of important issues affecting user understanding and participation, as well as issues of service quality and reliability.

Core service design issues are about factors in the service design that structurally suit it better to some types of user and trip purposes than others. It is here that the long-term positive impacts of the service opening up mobility benefits are found, but also where intrinsic aspects of the service design may make it, for some people, difficult, costly, or unreliable.

The positive impacts include considerably better public transport availability compared with the services it replaced (in terms of coverage, operating hours, and flexibility to travel needs). For some users there are substantial cost savings if they would otherwise use a minicab (for example for evening travel, to places off of bus routes, and wheelchair accessible cabs).

For certain trip purposes and users, as previously noted, the DRT service design can be unsettling. This is not just an issue of some people being less tech-savvy; for example, the diversion of trip requests from MK Connect onto fixed-route services can be problematic when appointments or linking to trains, etc. are concerned. There can be an unsettling uncertainty as to whether the trip is accepted on MK Connect or the request is diverted onto a longer multi-route trip via scheduled bus routes.

The fare structure adopted also favours some users and trip purposes more than others. There are no tickets covering both bus and MK Connect services, so using both services incurs a double fare. In addition, the MK Connect fare system has no discounted daily, weekly or monthly passes, which results in regular full-fare users facing a 50%-100%+ increase in cost compared with the previous fixed-route services.
Core service design lessons from MK Connect

The technology for a viable DRT service has largely emerged from tech-based IT companies working for or within the taxi and private-hire sector, and this can now be considered as established and reliable. A crucial element of the contract was that, as part of the annual fixed fee, the operator provides the entire service, including the booking and scheduling software and its vehicle operations.

The contract also specifies that the software should be adapted to include key features for MK Connect to operate as part of the city’s public transport system. This has included algorithms to direct requests to scheduled services when appropriate, to allow users with special needs to register them, and to enable those with special needs to customise trip bookings (for example so that a registered user can be allocated to a wheelchair-accessible vehicle). The contract design is something that should be of particular interest to other local authorities.

Taking and modifying an existing commercial online system was crucial to making MK Connect economically viable. Specifying key performance indicators, and requiring their reporting to the council, is also a crucial feature. This ensures that minimum standards are maintained and that the operator cannot reduce service quality in order to cut costs. The revenue retention mechanism to fund service expansion is also an important contract feature, and to date this business model appears to be working well.

There are a series of ticketing issues that could have important transport policy implications. The MK Connect fare system offers only single trips, and no day, week or monthly tickets are available. This contrasts with the existing bus service fare structure in the Milton Keynes area (and elsewhere in the country), where such tickets are available, considerably reducing the cost to regular and frequent users. The interviewees from Milton Keynes Council are aware that this ticketing structure means that, while MK Connect offers comparably priced tickets for single or day return trips, for frequent users (for example commuters) MK Connect could be considerably more expensive than the conventional bus services it replaced. This issue is recognised by the council, which intends to introduce weekly/monthly tickets; but these may have restrictions so as not to substantially cut fare income.

This difficulty in providing weekly/monthly tickets stems from the fact that the retention of fare income by the operator is an essential part of the MK Connect business model: discounted weekly and monthly passes would reduce income. There is a dilemma here. To have an impact on car use, and for people to make a lifestyle choice to rely more on
public transport services, there will probably need to be some form of loyalty reward— traditionally provided through discounted weekly and monthly passes. However, the MK Connect business model depends on a high proportion of full-fare users providing a healthy revenue stream.

It is notable that the Via rider survey did not pick up a concern about the cost of regularly using MK Connect. Indeed, in the survey affordability featured strongly, and a reduction in fares was suggested by only a few users. Some online comments did pick up this point, both for commuters and students, which may mean that those most affected by the higher cost of regular use may have quickly decided to make other arrangements for their travel.

**Regulatory structures and DRT**

The issue of how DRT relates to bus service regulation is one that produced contrasting responses from our interviewees. Some felt that this was less of a concern than in the past, while others considered that it remains deeply problematic.

Government is increasingly aware that regulations need to reflect innovative public transport models, although little relating to this appears in the 2021 National Bus Strategy. However, there is an additional regulatory issue in that DRT schemes operating outside of the public service vehicle (PSV) licence structure are excluded from bus financing systems. The Milton Keynes DRT service operates under private hire vehicle (PHV) regulations. PHV regulations are intended for pre-booked cab services and, although these permit shared bookings, they are not envisaged as a system under which public transport services operate.

Using PHV-licensed vehicles has operational advantages, but it also results in the MK Connect service being ineligible for the Bus Service Operators’ Grant (BSOG). It would also appear to be outside the scope of the emerging system set out in the 2021 National Bus Strategy. The guidance to date indicates that DRT operating with a PHV licence will not qualify as part of a Bus Service Improvement Plan (BSIP). This needs some clarification but, if that is so, it is a major barrier, as BSIP will be the major government funding stream for bus services (£3billion per annum). A PHV demand-responsive scheme may also fail to qualify for the new bus partnership funding if that also is restricted to PSV-licensed services. Regulation has yet to reflect changes in more innovative public transport service designs, technology, and operations.

Whereas there used to be a clear distinction between bus services (PSV) and PHV cab operations, DRT can take place under either licensing regime. A way to allow appropriate
PHV services to qualify is needed. One possibility would be to accept PHV operations that are part of a local authority franchise/contract as being within an approved bus partnership. The additional funding that such an arrangement would unlock could then help to ease the finance dilemma around discounted tickets for regular users and other demand management public policy initiatives.

A successful economic model for DRT

These regulatory aspects lead into issues around the economic model for DRT. Introducing a fully commercially viable DRT is difficult, and it looks like the most feasible approach is through partnerships between the new IT service companies, operators, and local authorities (hence the importance of such partnerships receiving policy recognition). But that still leaves the issue of achieving an economically viable mass, which has been a fundamental long-standing challenge for DRT.

MK Connect is Britain’s largest DRT service. A key feature of its design is that it builds upon an existing service base and income stream. In Milton Keynes this has involved the conversion of subsidised services to DRT, but other existing local authority-funded transport services could form a viable base from which to develop a DRT scheme. Many DRT projects have tried to build a new user base around policy ideals that would take many years to develop. Such DRT services rarely managed to survive. A key lesson from Milton Keynes is that DRT is best introduced to transform an existing funded service. It can then become established and develop to address wider policy goals. Other local authority-subsidised services could form the user and financial base from which DRT is developed.

In the commercial sector, Arriva Click is developing DRT that represents another pathway—in which using DRT to reconfigure commercial services enhances the profitability of that operator’s system as a whole.

A crucial lesson is to avoid ‘project’ funding. That may work for a controlled trial to develop systems and build knowledge, understanding, and confidence, but it is not the basis for rolling out a permanent service. Projects rarely manage to build up sufficient patronage and long-term funding to ‘kick start’ a viable new service.
These various pathways outlined above suggest a potential major change in the local public transport regime. An integration of DRT into local bus services can yield a considerable improvement in the quality provided, but it does require users to learn and understand how it works. With its use of a real-time booking app, MK Connect has many of the features of the more integrated MaaS (mobility as a service) vision frequently espoused as representing the public transport future. In this respect, MK Connect could be seen as a practice/behaviour stepping-stone towards that vision. The changes in understanding and practice in accessing public transport for Milton Keynes users are therefore of particular research interest. It is a situation that could (with variations) be repeated around different implementation models in many other places.

Overall, MK Connect is an important approach to implementing DRT, which has simultaneously achieved cost efficiency and transformed service quality to make bus travel a viable option for a large segment of society. This financially viable service represents an important contribution to enhancing the role of bus services in Britain—and could be viewed as an internationally significant exemplar.

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**Notes**

1. *Bus services cut by 16 per cent in a year*. Campaign for Better Transport, July, 2022. Available at: bettertransport.org.uk/blog/buses/bus-services-cut-16-cent-year


P Hall: ‘Refreshing the parts that other transport cannot reach’. *Town & Country Planning*, 2013, Vol. 82, Mar., 121-32


*MK Connect Rider Survey*. Via, 2021 (Unpublished report, kindly provided to our research team)