

State of the Art Review

Future innovation for rural public transport

Authors: Bryonny Goodwin-Hawkins, Countryside and Community Research Institute, and Andrew Callard, Rural Technologies Ltd

NICRE SOTA Review No 2: August 2021

Contacts: bgoodwinhawkins@glos.ac.uk, andrew@ruraltechs.co.uk

Non-technical abstract

The ways we live, work and move are changing. Vibrant rural communities need flexible, quality transport choices that are sustainable and fit for the future. Meeting these needs calls for radical transformation in rural public transport. Without action, the risk is that inequalities are entrenched between the 'transport rich' and 'transport poor'. New national policy directions offer opportunities for change, and both local authorities and rural enterprises have important roles to play in driving innovation. This NICRE *State of the Art Review* draws on research evidence to identify routes forward. First, rural transport innovation needs to be place-based, but not place-bound. Second, flexible local choices need to connect with integrated rural, regional and national travel networks. Third, fostering change requires realigning transport supply and demand within rural areas. Fourth, forward-looking transport innovation should respond to wider societal trends. Finally, transport innovation should embed societal benefits.

Summary

Flexible, quality transport choices are crucial for rural communities and economies. Making transport more sustainable is also essential for achieving net zero ambitions. Yet the COVID-19 pandemic has seen dramatic declines in public transport use, and **the ways we live, work and move are changing**.

Meeting these challenges calls for **radical transformation in rural public transport**. With new policy directions emerging, there is real potential to design and deliver innovative solutions that are fit for purpose and future proofed. Both local authorities and rural enterprise have important roles to play in realising the possibilities.

This NICRE *State of the Art Review* draws on research evidence to set out the key parameters for transformative change in rural public transport:

- Without addressing the challenges for rural transport, we risk entrenching inequalities between the 'transport rich' and 'transport poor'.
- Transport innovation needs to be place-based – but not place-bound.
- Flexible local transport choices need to connect with integrated regional and national travel networks.
- Change will require realigning transport supply and demand within rural areas.
- Routes to innovation lie in responding to wider societal trends.
- Future proofing is key.

Background

Transport connects people, places and services. Effective transport connectivity is crucial for rural communities and economies. Flexible, quality transport choices help improve rural access to services and employment, and combat loneliness and social isolation. Enabling these choices requires innovative responses to longstanding challenges for rural transport, including long distances and limited economies of scale.

Meeting these challenges is now more critical than ever. Reducing fossil fuel consumption and achieving net zero ambitions will mean transforming private travel through more sustainable, shared alternatives. Yet the COVID-19 pandemic has seen dramatic declines in public transport use and overcoming reluctance to get back on board is now a new hurdle for providers.

Fortunately, the outlook is far from bleak. In recent years, new models for leasing and sharing vehicles, technologies from electric charging to mobile ticketing, and the growing uptake of active travel and micromobility options have begun to change consumer expectations and created new possibilities for innovation. These possibilities could be transformative for rural transport.

Opportunities for radical transformation are already here. *Bus Back Better*, the Department for Transport's new national bus strategy for England, calls for replacing uneconomic fixed bus routes with transport choices that are frequent, reliable and affordable. The strategy also introduces plans to overhaul the current Bus Services Operators Grant (BSOG). Changes to subsidies will open up changes to service models, giving local authorities real opportunities to be forward-looking.

The long-awaited Williams Rail Review has set out similar plans for more integrated, efficient services across the rail network. The accompanying White Paper lists ten key points for change, including a modern passenger service and greater control for local people and places. The White Paper also promises new opportunities for small, local businesses to be partners in innovation.

These encouraging policy directions together create a timely window to re-design rural transport around flexibility and choice, and to foster innovation fit for future needs. This *NICRE State of the Art Review* draws on research evidence to identify routes towards transformative change in rural transport.

Evidence

Public transport in rural areas has long been under strain. Service use continues to decline and provision often depends on subsidies (National Audit Office 2020). Between 2009 and 2018, rural bus service funding from local authorities declined by 43%, and by 13% from central government (CPRE 2020). Ticket prices increased 63% across the same period (CPRE 2020). As research on rural services has repeatedly shown, falling demand and disinvestment produce downward spirals of further decline (Bock 2016, Skerratt 2018). The costs are not only economic, but social, too. Inadequate public transport reduces accessibility, with disproportionate effects on those without alternatives (Preston & Rajé 2007, Smith et al. 2012) – including younger people, who face restricted access to education and employment, and older people, for whom reduced mobility can contribute to loneliness and social isolation (Powell et al. 2018). **Without addressing the challenges for rural transport, we risk entrenching inequalities between the 'transport rich' and 'transport poor'.**

The answer is clearly not more of the same. Traditional fixed route models are neither economically feasible for many rural areas, nor adequately reflect contemporary mobility needs (Mounce et al. 2020). Innovation in rural transport is essential. The concept of Mobility as a Service, or MaaS (Heikkila 2014), offers promising ideas for change. MaaS models vary (Jittrapirom et al. 2017, Sochor et al. 2018), but common elements include:

- Integrating multimodal services and multiple service providers.
- Using digital technology and GPS for real-time information and simplified payment.
- Taking a user-centric approach that enables choice, flexibility and seamless service.

MaaS was initially developed for urban mobility, and rural implementations should not be seen as simply re-scaling the model (Bosworth et al. 2020, Pangbourne 2020). **Innovation in rural transport needs to be place-based.** This means tailoring transport to the geographies, material conditions and socio-economic needs within each unique locality (Bosworth et al. 2020, House of Lords 2019). But place-based does not mean place-bound – after all, transport aims to connect people and places. Effectively nesting localised services within integrated rural, regional and national networks is therefore essential (Mounce et al. 2020). It is equally important to recognise that changes in place have knock-on effects for wider systems and to realistically manage the trade-offs.

Both the recent rail review and national bus strategy criticise fragmented transport services. Fragmentation cannot facilitate a user-centric transport system. Yet, as the MaaS emphasis on multimodality suggests, the solutions do not lie in integrating rail or bus alone. **There is a need to connect rural transport through an integrated, flexible network.** For most rural areas, buses will remain the simplest and most effective means of moving passenger volume (Department for Transport 2021). But trunk routes are only one part of a wider mobility ecosystem, ranging from community transport to active travel. Facilitating individual journeys requires integrating options that are demand-responsive, cut across inflexible fixed routes, and serve the 'last mile' (Bauchinger et al. 2021). Such integration requires, at a minimum, reliable real-time travel information (Velaga et al. 2012). More needs to be done to tackle rural digital 'hotspots' (Rural Services Network 2021), but local authorities can still take practical steps to improve how transport information is provided, displayed and updated.

Flexible transport enables choice for passengers and allows new services to evolve. As work and travel patterns continue to change, decisions that enable flexibility and improve accessibility are increasingly urgent. Rural areas are already innovators in demand-responsive transport (Goodwin-Hawkins 2020, Reichenberger & Bauchinger 2020), offering scope to build from experience. Crucially, **future innovation must realign transport supply and demand in rural areas**. MaaS innovation in cities, like Whim in Helsinki (Ramboll 2019), works by 'bundling' a wide choice of existing transport supply. Although rural areas have less evident supply, there is untapped potential for bundling demand instead (Bosworth et al. 2020). This might include exploiting underutilised assets and capacities, such as school transport and ride or car sharing, and generating synergies between passenger transport, freight and last mile logistics (Eckhardt et al. 2018).

Realising possibilities for change in transport will be critical to meeting the UK's net zero ambitions. The environmental impacts of automotive transport have been known for decades (Schiller & Kenworthy 2017), but mobility's significance for everyday lives has made reducing emissions and energy difficult to achieve (Banister 2011). Recently, the proportion of the UK population deeming a car a necessity reached a record high (Mattioli 2016), and research suggests that rural residents see change as less urgent because transportation pollution and congestion are less visible (Gross-Fengels & Fromhild-Eisebith 2018, Vitale Brovarone & Cotella 2020). But relying on mass uptake of electric vehicles to reduce emissions will not be enough, because many uncertainties about infrastructure and consumer behaviour remain (Hirst et al. 2021). Rather than magic bullets, **rural transport solutions need to respond to wider societal trends**. This will include bridging expectations for individual convenience with growing engagement with shared assets and digitally enabled models like subscription services. Emerging research on how people perceive accessibility (Lättman et al. 2016, Rural Technologies MERGeS Feasibility Project) could help plan practical actions to improve services and sustainable choices alike.

Final overview

This *State of the Art Review* suggests that innovation in rural public transport is essential – and possible. Although cities have claimed much of the focus on sustainable transport, there is nothing uniquely urban about transport innovation. Rural areas also need new transport solutions – and truly innovative transformations must go further than simply adapting urban models to rural contexts. Ultimately, innovating in rural transport means tackling rural challenges to meet rural communities' needs.

Currently, there are opportunities for radical change in the ways we think about rural transport and design integrated systems. As COVID-19 continues to affect travel and work patterns – likely for good – failing to take innovative action for rural transport risks losing remaining services.

By advocating demand-responsive solutions and ushering in a new subsidy model, the Government's *Bus Back Better* strategy gives local authorities real opportunities to be forward-looking. Rather than looking back to old, inflexible models that no longer meet user needs will not work, there is a need to re-design rural mobility services that are fit for purpose and future proofed.

Reducing transport emissions will be critical to achieving net zero. But innovation in rural transport can create social value and contribute to Levelling Up (NICRE SOTA Review No 1). Enhancing accessibility to employment, education and services supports vibrant rural communities and improves quality of life, especially for those on low incomes. Few MaaS models have yet attempted to incorporate wider societal goals (Netherlands Institute for Transport Policy Analysis 2018). Rural transport could – and should – lead the way.

- With thanks to John Powell and Théo Lenormand at the Countryside and Community Research Institute for their contributions to this review.

References

- Banister, D. (2011). Cities, mobility and climate change. *Journal of Transport Geography*, 19(6), pp. 1538-1546.
- Bauchinger, L., A. Reichenberger, B. Goodwin-Hawkins, J. Kobal, M. Hrabar & T. Oedl-Wieser. (2021). Developing sustainable and flexible rural-urban connectivity through complementary mobility services, *Sustainability*, 13(3) pp. 1280.
- Bock, B.B. (2016). Rural Marginalisation and the Role of Social Innovation; A Turn Towards Nexogenous Development and Rural Reconnection. *Sociologia Ruralis*, 56(4): 552-573.
- Bosworth, G., L. Price, M. Collison & C. Fox. (2020). Unequal futures of rural mobility: Challenges for a "Smart Countryside". *Local Economy*, 35(6) pp. 586-608.
- CPRE (2020). *Transport Deserts: The absence of transport choice in England's small towns*. Campaign for Better Transport. Available at: <https://www.cpre.org.uk/resources/transport-deserts-report/>
- Department for Transport (2021). *Bus Back Better*. National Bus Strategy for England. Available at: <https://www.gov.uk/government/publications/bus-back-better>
- Eckhardt, J., L. Nykänen, A. Aapaoja & P. Niemi. (2018). MaaS in rural areas - Case Finland. *Research in Transportation Business & Management*, 27, pp. 75-83.
- Goodwin-Hawkins, B. (2020). *Demand Responsive Transport (DRT) in rural areas*. ROBUST project good practice report. Available at: <https://rural-urban.eu/publications/good-practice-demand-responsive-transport-rural-areas>
- Gross-Fengels, S and Fromhold-Eisebith, M. (2018). Adapting transport related innovations to rural needs: Smart Mobility and the example of the Heinsberg region, Germany. *Advances in Transport Policy and Planning*, 2, pp.125-162.
- Heikkila, S. (2014). *Mobility as a Service - A Proposal for Action for the Public Administration, Case Helsinki*. Master's thesis. Available at: <https://aaltodoc.aalto.fi/handle/123456789/13133>
- Hirst, D., J. Winnett & S. Hinson (2021). *Electric vehicles and infrastructure*. House of Commons Library. Available at: <https://researchbriefings.files.parliament.uk/documents/CBP-7480/CBP-7480.pdf>
- House of Lords (2019). *Time for a Strategy for the Rural Economy*. Select Committee on the Rural Economy. Available at: <https://publications.parliament.uk/pa/ld201719/ldselect/ldrurecon/330/330.pdf>
- Jittrapirom, P., Caiati, V., Feneri, A., Ebrahimigharehbaghi, S., Alonso-González, M., and Narayan, J. (2017). Mobility as a Service: A Critical Review of Definitions, Assessments of Schemes, and Key Challenges. *Urban Planning*, 2(2), pp. 13-25.
- Lättman, K., Friman M., Olsson L.E. (2016). Perceived Accessibility of Public Transport as a Potential Indicator of Social Inclusion. *Social Inclusion*, 4(3), pp. 36-45.
- Mattioli, G. (2016). Transport needs in a climate-constrained world. A novel framework to reconcile social and environmental sustainability in transport. *Energy Research & Social Science*, 18, 118-128.
- Mounce, R., M. Beecroft., J.D. Nelson (2020). On the role of frameworks and smart mobility in addressing the rural mobility problem. *Research in Transportation Economics*, 83.

- National Audit Office (2020). *Improving local bus services in England outside London*. Report by the Comptroller and Auditor General. Available at: <https://www.nao.org.uk/wp-content/uploads/2020/10/Improving-local-bus-services-in-England-outside-London.pdf>
- Netherlands Institute for Transport Policy Analysis (KiM). (2018). *Exploring mobility-as-a-service: insights from literature and focus group meetings*. Ministry of Infrastructure and Water Management. Available at: <https://english.kimnet.nl/publications/leaflets/2018/11/14/exploring-mobility-as-a-service-insights-from-literature-and-focus-group-meetings>
- Pangbourne, K. (2020). Challenge, coordination and collaboration for effective rural mobility solutions. In A.M. Amaral, L. Barreto, S. Baltazar, J.P. Silva & L. Goncalves (eds), *Implications of Mobility as a Service (MaaS) in Urban and Rural Environments: Emerging Research and Opportunities*. IGI Global.
- Powell, J., D. Keech & M. Reed (2018). *What Works in Tackling Rural Poverty: An evidence review of interventions to improve transport in rural areas*. Wales Centre for Public Policy. Available at: <https://www.wcpp.org.uk/wp-content/uploads/2018/06/An-evidence-review-of-interventions-to-improve-transport-in-rural-areas.pdf>
- Preston, J and Rajé, F. (2007). Accessibility, mobility and transport-related social exclusion. *Journal of Transport Geography*, 15(3) pp. 151-160.
- Ramboll. (2019). *WHIMPACT: Insights from the world's first Mobility-as-a-Service (MaaS) system*. Available at https://ramboll.com/-/media/files/rfi/publications/Ramboll_whimpact-2019.pdf
- Reichenberger, A. & L. Bauchinger (2020). *GUSTmobil – a regional micro-public transport system*. ROBUST project good practice report. Available at: <https://rural-urban.eu/publications/good-practice-gustmobil---regional-micro-public-transport-system>
- Rural Services Network (2021). *Rural Lens Review: Bus Back Better*. Available at: <https://www.rsonline.org.uk/bus-back-better-rural-lens>
- Schiller, P.L. & J. Kenworthy (2017). *An Introduction to Sustainable Transportation: Policy, Planning and Implementation*. 2nd ed.; Routledge: London.
- Skerratt, S. (2018) *Recharging Rural: Creating Sustainable Communities to 2030 and Beyond*. The Prince's Countryside Fund. Available at: <https://www.princescountrysidefund.org.uk/our-impact/our-research/recharging-rural/>
- Smith, N., Hirsch D. and Davis; A. (2012). Accessibility and capability: the minimum transport needs and costs of rural households. *Journal of Transport Geography*, 21, pp. 93-101.
- Sochor, J., Arby, H., Karlsson, I.C.M and Sarasini, S. (2018). A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals. *Research in Transportation Business & Management* 27, pp. 3-14.
- Velaga, N.R., Beecroft M., Nelson J.D., Corsar D and Edwards P. (2012). Transport poverty meets the digital divide: accessibility and connectivity in rural communities. *Journal of Transport Geography*, 21, pp. 102-112.
- Vitale Brovarone, E. and G. Cotella (2020). Improving Rural Accessibility: A Multilayer Approach. *Sustainability*, 12(7) pp. 2876.

Other SOTA Reviews are available on the NICRE website www.ncl.ac.uk/nicre/research/publications The views expressed in this review represent those of the authors and are not necessarily those of NICRE or its funders.

For further information about NICRE:

Email: nicre@newcastle.ac.uk

Visit: www.ncl.ac.uk/nicre

Twitter: [@NICRErural](https://twitter.com/NICRErural)

LinkedIn: [National Innovation Centre for Rural Enterprise](https://www.linkedin.com/company/nicre)

Facebook: [National Innovation Centre for Rural Enterprise](https://www.facebook.com/nicre)

Founding research partners:



Funded in partnership with:



Founding business partners:

