BUILDING THE 5G INVESTMENT CASE: PUBLIC TRANSPORT

UK 5G Innovation Network

INTRODUCTION

5G—and the digital technologies it powers—can be the key to unlocking a more efficient, sustainable future for public transport: amid evolving consumer demands and behaviours, rising costs and shrinking margins, transport authorities and providers need to become more resilient, agile and efficient to succeed and thrive.

A guide introducing the concept of stackable use cases & potential for civic community networks

But first, a compelling business case is required. This guide has been designed to provide insights, introducing the concept of stackable use cases and the potential for a civic network in communities, while considering some of the practical challenges you may encounter. It is important to note, however, that this forms only one part of a wider body of content and of course, each case is unique.

Still, this should act as an informative introduction to key commercial concepts, supporting transport authorities and kick-starting the notion that 5G is best approached using a broad frame of reference.

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STACKABLE USE CASES

What are they?

There has been much talk when it comes to 5G about "killer applications"—yet such technologies are unlikely to exist.

Instead, findings point to the need for stackable use cases. This term describes, or demonstrates all the ways 5G technology could be used, capturing the broader business opportunity. Put simply, instead of looking for one silver bullet, this concept involves layering multiple use cases and their combined ROI across the same 5G infrastructure investment.

These stackable use cases will often span multiple departments, jurisdictions and even other public sector organisations. This can mean use cases across different modes of public transport, in addition to broader transport infrastructure, and use cases tackling health and environmental issues.

Why are they needed?

As an enabler, 5G has the power to unlock more than just faster download speeds. But at this early stage in its lifecycle, deployments can be relatively costly. To develop compelling use cases in a time of increasing budgetary pressures, stackable use cases—when coordinated properly—can help to facilitate effective and commercially viable cases for investment by reducing the pressure on any single-use case to deliver outstanding results.

What's more, understanding and working towards stackable use cases can start to shift the way in which the sector thinks about 5G and infrastructure investment as a whole. Grouping together overlapping benefits and use cases encourages looking for additional value that could be extracted from a single deployment, identifying other use cases and issues that could benefit from 5G connectivity.

Stacking multiple use cases truly unlocks the transformative power of digital operations, delivering benefits for communities that go way beyond connectivity, and making the most of 5G's capabilities.

Most importantly, it can start to make real-world deployments at scale more commercially viable.

CIVIC NETWORKS

When it comes to the public transport space, the transformative benefits of 5G can only be truly delivered when we have ubiquity of coverage. Relying on public network coverage and assuming all people have access to that can exclude some in society and limit the ability to roll out solutions across the full transport network.

5G has the ability to deliver transport services more efficiently and effectively. But in order to do so, coverage must extend across the full geography in which those services are delivered. Private 5G networks—deployed by a local or transport authority, for example—can be a potential solution to deliver this ubiquity. And considering who can use these networks can play an important role in building a viable business case.

What are they?

Civic networks are private cellular networks that are deployed in place-based communities, from individual streets to a full city, designed to provide coverage to all those within that area. Most significantly, they can be accessed by all public sector services, broadening the potential use cases and applications beyond the sector to incorporate health and social care, education and much more.

Why might they be needed?

With increasing budgetary pressures and the need to develop Green Book compliant business cases, stackable use cases purely from within the transport sector may not be sufficient to develop a viable commercial case.

Indeed, this is the finding from the Smart Junctions 5G project, whose network is owned by the local authority. Sam Li, Senior Innovation Officer at Transport for Greater Manchester (TfGM) and project lead for Smart Junctions 5G, said: “It’s important to create a connectivity corridor that will set up opportunities for more and more use cases. Expanding on 5G’s ability to improve people’s overall general lifestyle not only benefits the greater public good but also strengthens the business case.”

He added: “We are transitioning to a fibre network that is owned by the local combined authority. This means 80% of public sector buildings and 90% of traffic infrastructure will be connected, without relying on the telecoms industry. In comparison to 4G, 5G allows us to access more consistent data due to its low latency. Cost is also a key factor of a publicly owned network.”

The net for use cases likely needs to be cast wider than the sector to therefore make private network deployments feasible. By extending to incorporate other public sector use cases in a community, a far more compelling business case can be developed with more use cases, benefits and returns to offset the deployment and running costs.

Beyond the commercial considerations, civic networks provide a hub for people to engage with all types of civic-related activities in their community.

Placing *individuals at the heart of the online engagement process* and offering a single point of contact for community members.

HOW CAN OTHER PUBLIC SERVICES BENEFIT FROM 5G?

To be able to consider and facilitate civic networks, it's important to appreciate how other services in the area could benefit from 5G. Below are some examples (this is not intended to be an exhaustive list but rather, to stimulate thinking), which explore how 5G can help to reduce costs, drive revenues or reduce risk across the public sector.

Health & Social Care:

This vital sector that employs over 1.3m people and cares for tens of millions more is under mounting pressure. 5G – and the digital technologies it enables – can support the desire to realise more people-centric care, a transition from a reactive to preventative model, and move the delivery of care from clinics to communities.

All while unlocking the efficiency, resilience and flexibility required to meet the UK's ever-growing health and social care needs.

The West Midlands 5G programme used 5G to enable remote monitoring of care home residents, while the Liverpool 5G Create project deployed sensors under care home beds to monitor the vital signs of residents. Using Artificial Intelligence (AI), staff were then notified to assist; enabling more personalised, tailored care and is expected to reduce the number of accidents.

From remote care monitoring of vulnerable individuals to help them stay in their homes for longer, to connected ambulances enabling paramedics to be assisted remotely to perform more complex procedures in the field, 5G is already demonstrating its potential to support health and social care provision and deliver better outcomes.

Education:

As with many public services, the pandemic demonstrated the importance of connectivity for the education sector. A civic private 5G network can provide connectivity in educational settings, in addition to communities at scale—ensuring all children have equal access to digital solutions.

While the Liverpool 5G Create project was created to focus on health and social care use cases the project expanded to look at how it could also support local education provision.

One resulting use case was the Chill Panda application featuring a panda that expresses the user's emotions based on their heart rate and mood ratings, with an AI-driven recommendation engine creating personalised anxiety reduction content. It was designed based on paediatric studies and is expected to improve child mental health, alongside helping remove damaging stigmas.

Such use cases can facilitate happier children and create better environments for learning, as well as deliver long-term health benefits.

Blue Light Services:

Multiple trials have demonstrated the value that 5G can offer to paramedics in connected ambulance solutions, empowering first responders to conduct more complex procedures in the field, with the benefit of remote assistance. However, the value to first responders can extend beyond Ambulance Services.

In the 5G Barcelona project, trials have explored how remote assistance can be provided to other first responders, such as police officers. Using 5G connectivity and video wearables, doctors are able to provide real-time, remote assistance and guidance to first responders. In the UK, working with other blue light services could broaden this successful trial—perhaps also offering guidance to police officers when interacting with people experiencing mental health crises.

Beyond first responder scenarios, 5G connected CCTV can provide real-time ultra-high-definition video feeds, while drones can be flown with 5G beyond the line of sight, helping to safely monitor and manage large crowds for instance at sporting events or concerts.

Social Housing:

The government wants every home in the country to have high-speed connectivity by 2025 and with social landlords owning around a fifth of all housing stock in the UK, housing and local associations will have a significant role to play here. However, a survey conducted by Insight Housing publication showed that only 14% of respondents stated that all or most of their homes had the full-fibre capability, with nearly 15% going completely without. In addition to this, of course, the affordability of public fibre can be a key barrier to adoption even when it is available to houses.

5G private networks can be deployed to cover social housing developments, ensuring all residents have reliable, ultra-fast connectivity that can provide social benefits (tackling social isolation, improving digital skills)—as well as ensuring they can access public services which are increasingly only available online (such as DVLA and Universal Credit).

For landlords themselves, sensor networks can help support better management of their assets and buildings, not just for their benefit, but with their agreement, the benefit of tenants too. Understanding if a resident is not, for instance, managing the temperature of their accommodation efficiently, provides the opportunity to avoid unnecessary health issues and help people stay in their homes for longer, whilst potentially reducing cost and delivering environmental benefits.

Local Authority Estate & Asset Management:

5G enables a far greater density of sensors and devices to be connected in a space or area, opening up possibilities to monitor and track the utilisation of local authority properties, land and assets. Such sensors can be used to enable predictive maintenance for instance, of lifts, helping to save costs; servicing only happens when it needs to rather than on a set schedule, and before the point of failure. For Highways Authorities, surveys and asset monitoring of road signs, line marking, condition of the highway and integrity of structures such as lighting columns, bridges and culverts can help save costs, improve response time to issues and be a part of future planning for connected autonomous vehicles and an increase in semi-autonomous vehicles on our roads.

With rising energy costs, sensors deployed throughout buildings can monitor and manage energy consumption, helping to avoid scenarios such as lighting or heating rooms or even buildings that are not in use. Looking beyond local authority-owned property, broader energy monitoring could also take place across neighbourhoods, helping communities understand how they can all work to reduce energy consumption and meet Net Zero targets. Such an approach is being trialled in Cologne, Germany.

Local industry:

While civic networks primarily encompass public sector services, it may also be helpful to consider key businesses and industries in the community. A large industrial partner, such as a manufacturer, could gain significant value from 5G connectivity—helping to drive efficiencies and productivity, as well as reduce waste and energy consumption. And in a neutral host model, such an organisation could deliver you an anchor tenant, again, taking some of the pressure off your business case development.

And it's not just large private sector organisations that could be considered here. Exploring industries that contribute to local growth and prosperity can help to ease your business case development and further support the local economy and community. Slices of a private network can be granted to say local tourist organisations, who could develop augmented and virtual reality experiences such as those trialled in the 5G Connected Forest project, which showed tourists engaging with a mixed reality experience spent considerably longer visiting Sherwood Forest. They can also be used for local business access for trials and innovation endeavours, helping to drive a vibrant, local ecosystem.

Public-private relationships can be difficult to facilitate but securing an anchor customer for a civic network will help significantly to take the strain off the return required on your use cases.

Improving Public Mobile Connectivity:

Depending on the approach taken by the local area and their partners in planning and building the Civic Network, it may be possible to re-use or take a neutral host model to assets, enabling public mobile network operators to provide services to infill connectivity black-spots.

HOW CAN YOU FACILITATE A CIVIC NETWORK?

Business case development should now, hopefully, be an easier proposition. However, collaborative working across teams, departments and different organisations can be complex. We have therefore gathered insights from the UK's transport authorities and numerous local authorities on how best to approach a collaborative endeavour such as funding and running a civic network. Though specific use cases will face different challenges, this should provide starting considerations for your own planning.

1/ Identify an organisation that can take the lead in coordinating and bringing together different teams and departments. This could be a transport authority or local authority. Similarly, with Integrated Care Systems now in effect across England providing an opportunity to start transforming health and social care service delivery, they may be well placed to adopt this leadership role.

2/ A central strategy and vision are paramount and can be used by senior leaders, officials and politicians to empower teams, secure buy-in from the public and private stakeholders, and keep projects on track.

3/ Identify a political lead, executive sponsor (CEO or Deputy CEO of a Council or Chair of a Transport Authority), and a senior-level Digital Lead, who is specifically tasked and empowered to deliver the digital agenda; they can actively drive the initiative forward, maintain momentum and help overcome obstacles

4/ There can be a tension between a top-down strategy and a bottom-up approach; the latter has the potential to deliver faster results but can lead to a longer-term disjointedness and greater difficulties in the long run. Take the time to consider how a investing in a civic network could support longer-term strategies and objectives. This will ensure you are aligned to the bigger picture and may identify additional, future use cases to factor into your business case.

5/ Having desired outcomes—clearly articulated and regularly reviewed—keeps initiatives focused and provides a valuable framework for ensuring the right partners are engaged

6/ Consider how active a role the public sector wants to be in these plans: do you want to build and manage the civic network yourself or have a provider deliver this for you? Consideration of preferred models upfront will enable more efficient and effective deployment, facilitating reviews of internal skills gaps and allowing for more meaningful conversations with potential suppliers.

7/ In counties with multiple administrations, or in places with complex local government structures, formalising intentions through a joint MoU can ensure the expectations and needs of all parties are identified upfront

8/ Clear governance is critical for successful coordination, especially over large-scale deployments and should continue beyond go-live to ensure value is fully realised. A successful model is a dedicated board to set strategy and direction, supported by a leadership team focused on delivering outcomes. A clear decision-making framework will ensure you have the confidence to make the right decisions and understand your liabilities.

9/ Organisational structures may need to be amended and adapted to break down silos, ensuring teams are set up for success.

10/ Formalised communication and access channels for partners are crucial to enable strong working relationships and quick resolution of issues. A dedicated civic network lead and/or 5G specialist in each organisation, with this clearly defined and formalised in their job remit, will also help to increase digital knowledge, overcome barriers and facilitate effective engagement between partners and in turn, with external suppliers.

11/ Knowledge sharing between peers and regular engagement with other transport and local authorities can avoid the repeating of mistakes and quicker resolution of challenges. Re-using and re-purposing data, templates, approaches or activities can help to minimise the burden on individual local authorities.

Ste Ashton, Digital Infrastructure and Connectivity Manager at Worcestershire County Council and Project Lead at West Mercia Rural 5G (WMR5G), recognises the potential for civic networks:

“Through WMR5G we have recognised a number of opportunities across health and social care. I feel the most likely way we will recognise many of these opportunities is through a private network or a heterogeneous network where private networks augment the public cellular network and other technologies will play their part.

I don’t believe the business case will be realised from health and social care applications alone initially at least; a wide range of services and applications from across the public sector will make up the ‘place-case’. But from experience to date, I am confident that the number of use cases will only grow as technology continues to develop, the capabilities of the standards are implemented and the ethical concerns and governance around data management and connected digital solutions evolve.”

“Create a programme that facilitates a specific focus and a suitable environment to advocate for use cases and bring people together. Increasingly, it’s about making sure the partners you bring to the room see your wider vision and are able to benefit from it.

Utilising different stakeholders for their unique strengths is also important and accepting failure is, of course, vital.”

Sam Li, Senior Innovation Officer
Transport for Greater Manchester (TfGM)
& Project lead for Smart Junctions 5G

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