Rapid Transit and Urban Recovery

How should towns and cities respond?

Discussion draft
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THE ACADEMY OF URBANISM

What rapid transit means

There can be considerable confusion between the various main forms of public transport, and the advances in technologies for many subsystems – body construction, traction power supply and storage, electronics, hydraulics, have added to this. Here the term rapid transit is used to mean any mode within a city or urban conurbation that offers defined and accessible routes of high efficiency, performance and capacity. They usually act as the core elements in the overall urban public transport network; and also for the urban transport provision as a whole, through provision of park-&-ride and bike-&-ride at key stops. These can operate on their own right of way (RoW) or along streets; where they operate on street, they are provided with reserved ways and priority at intersections.

The main forms of rapid transit are light metros (urban rail lines) running entirely on their own rights of way; tramways, running on own RoW and on streets; and in some cases buses. Trams running along roads do not need signals, being driven 'on sight' on the same basis as buses; though both trams and buses benefit from priorities at traffic lights and for turning across the highway. Laying tramway tracks in the street does bring the need to rebuild road surfaces and reroute underground services. Providing for bus operation at high quality and capacity requires reallocation of road space to buses. Tramways operating through main activity centres and residential areas generally prove attractive, and provide a valuable focus for development, being both visible (on the street) and reliable (fixed track).

Metros involve a high level of fixed infrastructure (own right of way, separate stations) and hence require a high density of activity to be viable; tramways, with less heavy fixed costs, can prove viable with less dense travel loads. There are variations; in the UK there is a focus on 'ultra light rail' (ULRT), based on a simpler vehicle and track designed to maximise use of current lightweight techniques; these may have a role in certain applications, though their economics are not necessarily beneficial for the higher density applications where most tramways operate.

While rapid transit systems offer significant benefits in suitable applications, they serve urban life and activities most effectively where they are incorporated in an integrated public transport system, with a variety of modes serving a conurbation and connected at a series of interchanges (hubs), with park-&-ride and bike-&-ride facilities. Transit-Oriented Development (TOD) involves intensifying development close to or within a set distance (generally seen as 800 metres or half a mile of transport nodes).

Cover image Aarhus
by News Oresund

On 19 May 2021, The Academy of Urbanism ran an online seminar aimed at drawing lessons from how rapid transit systems, such as trams and metros, can aid urban recovery in the light of declines in public transport usage and the need to cut congestion and meet carbon reduction targets.

This report sets out an overview for case studies on finance and delivery.

1. How far has rapid transit contributed to the city's growth or recovery in environmental, social and economic terms?
2. Why can rapid transit achieve more than using existing rail and road capacity to relieve congestion?
3. What methods were used to plan the project and overcome objections at the planning stage?
4. How much in broad terms did the scheme cost and how was it funded?
5. Where can lessons be found for reducing the costs, increasing the benefits, and reaching agreement, including public realm improvements?
6. Who is best placed to take the lead?

The report concludes with proposals for next steps including the setting up of a learning network.

A video of the event can be seen at https://www.theaou.org/resources/309-rapid-transit-and-urban-recovery

Speakers

Frank Allen
Chair, Iarnrod Eirann-Irish Rail

Tom Gifford
Head of Mass Transit, West Yorkshire Combined Authority

Dick Gleeson
former City Planner, Dublin

Dr George Hazel
Director, E-Rail

Pat O'Donaghue
former Chief Engineer, Dublin

Dr Luise Noring
Assistant Professor, Copenhagen Business School

Steve Tough
Head of Transport Operations, Nottingham

Ciaran Cuffe
MEP Dublin

Martin Tugwell
Programme Director, England's Economic Heartland, now CEO of Transport for the North

Stephen Willacy
former City Architect, Aarhus

The event was chaired by Andreas Markides, Director of The Academy of Urbanism.

Overview

The event was opened by Ciaran Cuffe, Member of the European Parliament for Dublin City and an urbanist himself. He started by saying: "Cities matter and transport is the glue that holds them together. Cities are places for commerce and learning, and if you live in a city, you know that." He went on to stress the importance of looking at transport and development together, as Dublin has done, and not in separate silos.

As towns and cities grapple with failing centres, falling incomes, and conflicting pressures, it is going to be even harder to make the case for large-scale and long-term projects such as rapid transit, which embraces trams and light rail, as well as high quality core bus routes (often termed bus rapid transit, BRT). This half day event offered glimpses of a greener road to recovery where The Academy of Urbanism could make a difference.

The event was initiated by Nicholas Falk, executive director of the URBED Trust. It followed up research on the trams in historic cities (see report Trams for Oxford www.oxfordfutures.org. Encouraged by Tony Reddy, at the time the Chair of the AoU, Nicholas forged links with Dublin and their exemplary LUAS system. A working group which included Anne Kiernan and Andreas Markides then drew in the experience of both Copenhagen and Aarhus. Danish cities have captured the uplift in land values from light rail systems, both tramway and light metro, and in the process produced some of the richest and happiest cities in the world. Sue Flack put us in touch with Nottingham who pioneered the use of the Workplace Parking Levy to get employers to contribute to the costs of upgrading their fine city centre and linking the major traffic generators with people living in the suburbs. Queries should be addressed to Nicholas Falk (nicholas@urbed.com) or Stephen Gallagher (sg@theaou.org).

The event was judged a great success for drawing together some 60 participants, including both Academicians and those in local authorities and transport bodies that are grappling with very difficult issues; two thirds stayed till the end which is a major test! As the person with the original idea, I am most grateful for the support from fellow Academician Anne Kiernan, as well the eight presenters and panellists, and especially to the AoU's Vice Chair Andreas Markides, who is a well-respected transport planner. My hope is this event, which was much more a symposium than a webinar, adds a new way of learning to the Academy's toolkit. It can help share what we have learned through awards and study tours, and broaden the AoU's reach, impact and membership.

How can urban recovery be achieved?

The hearts of many of our historic towns and great cities are in serious trouble. As well as the loss of activity resulting from lockdown, many people are less inclined to use public transport, and are using their cars, adding to congestion and pollution. Home working and home deliveries have become far more common, especially in urban areas. Fresh challenges include the loss of public revenue at the very time as towns and cities need to face up to climate change and gross inequalities by building more affordable and

Dublin
by kaysgeog

sustainable homes in locations served by public transport. Whatever the future may bring in terms of new technologies or forms of work, our centres cannot recover their former vitality and health unless they cut the impact of cars while attracting people who live and work in the suburbs. If they offer fewer attractions, due to the loss of retailers such as Debenhams and large multiples, they will need to improve both access and amenity to compensate. They have to become more like most cities in Continental Europe and avoid becoming like American ones with holes in their hearts.

In responding to the climate emergency integrated public transport systems, especially forms of rapid transit, have an important role to play. This applies to both historic cities where housing is quite unaffordable, such as Oxford, as well as to industrial cities searching for new life such as Bradford or Preston. The UK was not in a good state even before the lockdown. For decades there has been too little investment in infrastructure compared with other countries in Europe or the OECD. In recent years local authorities have taken the main hit through cut-backs in staffing and budgets. Yet cities throughout the world, and those that The Academy of Urbanism has recognised as great cities, have overcome the many obstacles to planning, organising and financing the delivery of better places. So how have they done it, and can the lessons be transferred? In particular, how can Core cities such as Bristol or Leeds compete internationally with places that make better offers to major employers, university students or tourists? While the new UK Infrastructure Bank being set up in Leeds may help, with its £22

billion of funds to lend out to local authorities, it will be of little use if there are not enough promising projects put forward or if there are not the delivery mechanisms to take systems steadily and soundly through the stages from initial concepts to routine operation, so controlling the costs and minimising the risks.

The half day event was sponsored by Irish Rail, and included illustrated presentations by our four exemplar cities. Breakout workshops on organisation, planning and finance provided the chance to explore the options. Conclusions were discussed with a panel representing England's Economic Heartland (which stretches through the South Midlands from beyond Oxford to the other side of Cambridge), from the Leeds and West Yorkshire conurbation, Scotland and finally the Republic of Ireland.

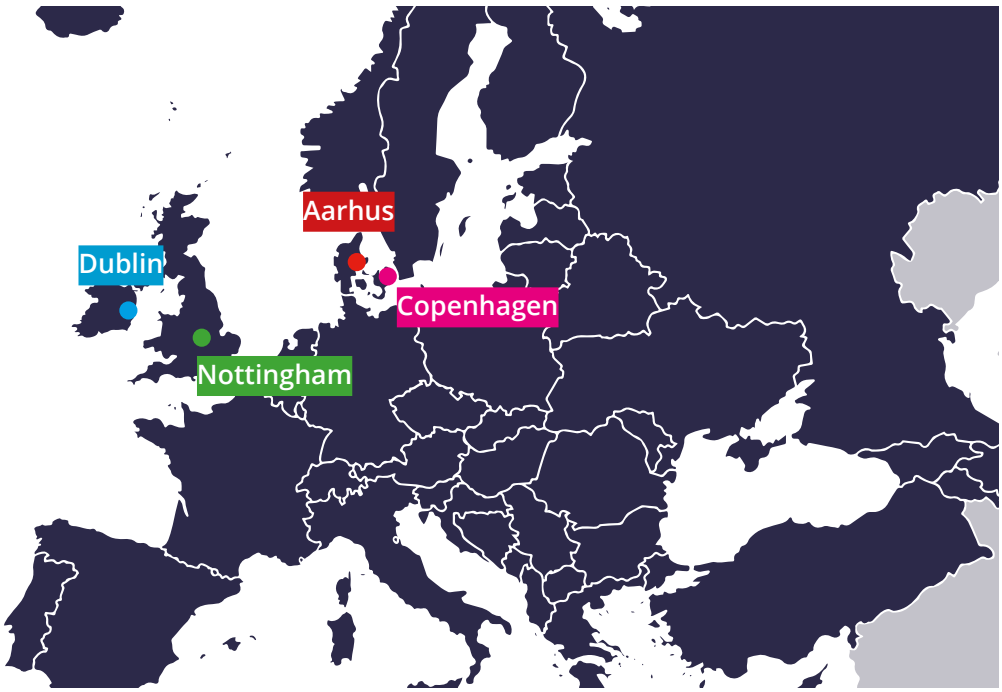
The case studies: financing and delivery

While the systems are each quite different, they all help stitch urban conurbations together, using different financing and delivery methods:

Dublin started with the Dublin Area Rapid Transit (DART) using existing railway lines to connect up suburbs along the coast. It has since opened the two lines of the LUAS in 2004 which is being extended further out of the city through the Strategic Transport Plan. Luas is the Irish word for speed, and the tramway lines run over 42 kilometres (26 miles) with 67 stations providing a reliable and quality service that integrates different parts of the city. The scheme was funded by the Irish government and the European Investment Bank.

Copenhagen opened its first line in 2002, which now has 39 stations on four lines. The first Metro line, at 20 km long, was funded through Land Value Capture from the new town of Orestad built on former military land. The city and government established a Public Asset Corporation called Port and City to fund infrastructure by pooling public land, and then rezoning it as the basis for raising debt. It has gone on to develop former port land on a second line.

Aarhus the second city in Denmark, opened its first tramway line of 12km in 2017 to connect the centre with innovation clusters and traffic generators. It then extended out to rural areas reusing a disused railway line, which was integrated with buses and bicycles. The lead was taken by the City of Aarhus, working with neighbouring authorities who each contributed part of the capital cost.



Map or Europe from freedesignfile.com

Nottingham in the East Midlands completed the first line of its 32 km tramway system in 2004, with a second phase opening in 2015, linking up the universities with more disadvantaged areas on the edge. The Nottingham Express Transit has been developed as a public private partnership with a contribution of a third of the capital costs from the City. Council.This includes £10 million p.a. from a Workplace Parking Levy, the first in the UK.

The speakers were carefully briefed to focus on issues known to delay progress in the UK including:

1. How much of impact on recovery have they had?
2. Why does light rail offer more than cheaper options?
3. How were objections overcome so that a consensus could be reached?
4. How were they funded and risks reduced?
5. What can be done to reduce costs or increase the benefits?
6. Who should take the lead?

Clockwise from top left:

Aarhus
by Lav Ulv

Dublin
by William Murphy

Nottingham
by Dave Hitchborne

Copenhagen
by Naotake Murayama

1. Impacts

All the schemes have had a transformative effect on their cities, attracting additional investment, raising land values and narrowing inequalities such as isolation and pollution. The process from start to finish can be very prolonged: typically, a period of 15-20 years to develop the system from initial concepts through to final design, establish fully the funding and regulatory basis, to obtain the necessary decisions and powers, and to ensure that contributions and opinions from all parts of the community have been received and addressed.

This could be accelerated with a wider and deeper understanding of all the benefits, so that the tramway or metro is seen as much more than just a form of transport. However, inevitably there is usually a period of disruption during construction while infrastructure and equipment works take place and services are moved, which can leads to objections from businesses affected, especially shopkeepers. Here are some of the messages from the presentations:

Dublin known as far away as Indonesia for its tramway, which has helped created an image of being a vibrant European capital. The system has catalysed the regeneration of waste land in the docklands. It also attracted residents in the suburbs to make greater use of public transport rather than their cars; an aspect where a tramway scores over buses. The LUAS followed on from the Dublin Area Rapid Transit (DART), which uses existing railway lines along the coast, and also forms part of a growing system.

Copenhagen went from a bankrupt and car-centric city with unemployment of 17.5% in the 1980s to becoming the third richest city in the world by 2009. Major new mixed developments on former military land and an old port have extended the city's area and cater for a fast-growing population. The city had already enabled a third of trips to be undertaken by bike and the Metro has extended the city's catchment area.

Dublin's recent past and the legacy that has been established through schemes such as the LUAS

Copenhagen's path from economic ruin to prosperity

Aarhus rated in some surveys as the second happiest city in the world (after Helsinki), perhaps because, as visitors to the AoU Congress discovered, it is so pleasant to walk around. The city used the new tram as the 'backbone of its future collective infrastructure', linking new housing with the hospital and university. The city has grown three-fold since the 1950s and now residents manage with one car not two, after some initial scepticism. Buildings are made of reusable materials so that the city becomes truly sustainable.

Nottingham one of the few British cities to build a modern tramway system which now reaches 30% of its population. The city has seen major regeneration around all the stops, and offers a model for how to control costs and share risks through various forms of partnership.

The discussions raised a number of points that relate to urbanism. Light rail undoubtedly affects the image that a city presents; for example, all features on Manchester tend to show one of their trams. Dick Gleeson, the former Dublin city planner, spoke of the 'magic of trams'. What will work will depend on the type of place as well as the scale of investment or growth that can be expected.

Most British conurbations, especially Milton Keyes and similar modern car-based cities, are too spread out to benefit readily from conventional rail based systems, and bus based public transport systems may work better in providing better access to retail and activity centres and an alternative to the private car. Electric scooters and bikes also have a role to play in suburban areas, especially if they can be parked at key stops of stations.

Though Britain has left the European Union, there would be value in cities learning from each other as they do on the Continent to plan for a future that could be very different after COVID-19. Cities who want to get to Zero Carbon will be considering a range of various options, and better ways are needed to measure and assess the diverse impacts.

2. Benefits

While the investment is considerable, light rail as part of an integrated public transport system achieves what buses cannot on their own, at least in major provincial and historic cities. This is because steel wheels on steel rails have major health benefits as rubber tyres can do more harm than vehicle exhausts (the 'Oslo effect'). Also trams either on reservations or on street almost invariably take precedence and hence are more reliable than other forms of transport. (It is possible to run high frequency bus services very reliably through almost continuous bus lanes and priorities at junctions but this can actually be more wasteful of road space.)

Dublin footfall in the centre went up by 30% and land values close to the line by 20%, while different parts of the city were 'stitched together'. Undoubtedly the LUAS has helped in attracting major employers such as financial institutions.

Copenhagen the light rail metro network complements measures to give the centre over to pedestrians and cyclists. The new lines have facilitated the city's planned growth, and have been funded by new development in what are effectively two new towns. The spoil from excavating a new tunnel under the city has been used to reclaim land for urban expansion.

Aarhus a car free centre helps to make the people of the city the second happiest in the world, The tramway line has supported some stunning contemporary architecture in which public art has been incorporated into new stops.

Nottingham

Land value increase along light rail stops in Aarhus

Nottingham the public transport system has been integrated and offers a flexible and attractive alternative to using your car with Park and Ride facilities at the edge.

Light rail or metros are only applicable in certain areas and have been shown to work before others will follow. This makes the process of implementation slower, and it is essential to implement the scheme in stages, as with the Docklands Light Railway in East London. Areas that have been developed at relatively low densities, such as Milton Keynes, may be difficult to link by a tramway line; they can still be well served by bus services but to build these requires planning and commitment that may be lacking in the British context.

There is an issue of how far technology can be expected to change through 'autonomous cars'. Cambridge's proposed Autonomous Metro was promoted by the Mayor of the Combined Authority, but lost out at the last election, possibly because it would have been too expensive. Though innovations like the Ultra Light Weight Tram being piloted in Coventry appear to reduce the costs of replacing utilities, the British market is very small in world terms, which is likely to make innovation economically unviable. A more realistic approach is to buy proven technology 'off the shelf'.

3. Agreement

Light rail systems need to form part of strategic plans for urban conurbations so that development and transport are considered simultaneously. Planning takes a long while in every instance, as spatial growth plans are inevitably controversial, with lots of different interests to engage.

Messaging is a huge issue both internally and externally in order to carry everyone with you. As many people are now used to driving wherever they want, considerable efforts must be made early on to establish widely the benefits that a light rail system will bring and to counter concerns over likely restraints on car use, for example through ample Park and Ride facilities at the edge of the city. The transport system should form part of a 'shared vision' for the city that is truly integrated and sustainable:

Dublin Movement is one of six themes in the development plan, which maps character areas and activities. Light rail was first suggested in 1981 and then taken up in the National Transport Initiative 2000-2016.

Aarhus The challenge was reshaping a city that has expanded in the 60s, and so was car based. Regeneration of the old port area has taken 20 years with new ideas emerging every five. Light rail has been skilfully integrated with the public realm, with cycle parking at stops. As well as the 12km of new line, light rail links together a series of settlements by reusing a former heavy rail line.

Copenhagen A cross party alliance was set up, and the government then entered into a partnership, by establishing a company (like a development corporation) that could act like a private company but with a public purpose. 25% of all the housing was for those on lower incomes.

Nottingham The city relied on sticking with the same strong team over a 15 year period, a champion who could explain all the benefits and ensure there were no surprises. In England there is a more adversarial culture than elsewhere in Northern Europe, so it is essential that the local authorities are driving the project forward.

Achieving consensus in the UK is made harder by the fragmented nature of local authorities, as many of the potential beneficiaries lie outside the central area, and by political shifts. The Joint Spatial Plan and the Growth Board in Oxfordshire offers a potential model along with the government's commitment to the East West Rail as part of a plan to build 100,000 homes between Oxford and Cambridge, which may necessitate changes to the transport systems within towns along the route if the promised benefits are to be realised.

Grants from sources such as the Shared Growth Fund may offer a further incentive, though the loss of European funding and support from the European Investment Bank will make progress harder.

4. Funding

Light rail schemes are, like all projects involving significant infrastructure construction, intrinsically expensive. All those covered have required major commitments from the local authorities with limited support from the European Investment Bank (who in the case of Bordeaux helped fund improvements to the public realm). Hence approaches such as Land Value Capture form a crucial part of funding systems. Costs can be reduced where they reuse existing railway rights of way or where the land is in public ownership. Risks will also be reduced, perhaps significantly, by eliminating or reducing uncertainties before bids are sought for construction:

Dublin Initial funding came from the Irish government plus a loan from the European Investment Bank. Once the lines went outside the centre, developers funded 50% of the capital cost through a Planning Levy, whereby the funds are earmarked for transport improvements in the city. The system makes an operating profit

Copenhagen The funding came from loans raised by the City and Port Company, which were secured against the increased value of the land after it had been rezoned. Serviced sites were then sold for maximum value but the revenue ploughed back in infrastructure.

Aarhus The funding came largely from the city council with other authorities sharing a quarter of the costs. In some cases developers have funded a new station and section of line.

Nottingham Central government provided 65% of the funding and local sources 35%. The Workplace Parking

Funding of Nottingham's tram

Levy (the first in the country) brings in £10 million a year, which is paid by every employer with more than ten staff.

While most discussion tends to focus on technical aspects, such as whether to use catenaries (overhead lines), batteries or even hydrogen, the area for greatest potential innovation is in design and appraisal (especially identification of the full range of benefits), funding and clear decision structures. In the UK the WebTAG system used by the Department of Transport favours road schemes by focusing narrowly on existing travel patterns as the basis of attributing benefits. Hence other sources of funding are needed. For example, Oxfordshire is proposing to follow Nottingham by introducing a workplace parking levy.

The experience of negotiating with property owners and developers in areas around new stations on a line in Northumberland has proved positive and consultants are working with some seven local authorities. There is growing interest in the idea of Land Value Capture (LVC), and testing out approaches that have worked elsewhere. However, LVC seems to depend on incorporating areas of undeveloped land and compulsorily purchase at close to existing use value to avoid speculation. Development Corporations, as in London Docklands and now Cambridgeshire, are one possible mechanism, while another could involve established private landowners.

5. Value for money

Half the costs in city centres are bound up with relaying underground utilities and upgrading the public realm, and are therefore not strictly transport costs.

Many of the benefits go to other than the transport users, such as the owners of property along the line; in the UK approach to urban transport schemes these can be intangible and hard to account for, but generally people have been surprised by how popular they have become, for example transforming the appeal of central Croydon and the peripheral Council estate of Addiscombe. Solutions include:

Dublin makes an operating profit, and was highly popular from the very start, helping to attract international companies such as Google to invest in previously isolated locations in the Docklands.

Copenhagen a public development agency, City and Port, was set up to pool all the publicly owned land before planning permission. Economies can then be made in procurement. All development is entirely self-financing through Land Value Capture. Over 60% of public expenditure is made through local authorities, who can therefore be visionary so that Copenhagen will be carbon neutral by 2025, the first in the world.

Aarhus has concentrated urban growth along the light rail line, which helps generate passengers. The city acquires land on the edge long in advance of development and therefore benefits from urban growth.

Copenhagen's new neighbourhood, connected by light rail

North Harbour

Nottingham has undertaken studies to show the benefits, and has produced several videos that communicate the benefits very well.

These videos can be seen on YouTube at the following address:
https://youtu.be/a2ZzCFQcaWI
https://youtu.be/7NsMWUEsO4w

It is hard to reduce costs, though economies can be made by buying systems off-the-shelf, e.g. ticketing. It should be possible to anticipate costs before holes are dug, and coordinating utilities to avoid repeatedly digging up the same piece of road.

The land for rail should cost less to acquire than for roads. It is crucial to measure and capture all the benefits. Getting land owners to agree to conditional contracts so that payments are made when a station is built, which according to Prof George Hazel in the case of Northumberland, contributed some ten times what is conventionally raised.

A 'nudge' approach may work, for example introducing busways first and then converting to light rail transit, but experience from both Cambridge and Luton suggests Bus Rapid Transit can end up costing almost as much as light rail even where the route uses a former railway line.

6. Leadership

Success, as in most aspects of human activity, depends on the right champion, plus luck and a lot of persistence. Instead of concentrating on the worst problems, an opportunistic approach is needed to raise everyone's sights or ambition. Implementing rapid transit is especially difficult in the UK because 'planning is fragmented and reactive', government is centralised, and there are few professionals with knowledge of all the different systems.

In all cases the planning and financing of the first projects takes many years, typically 15 years from the initial study to opening. Hence it is vital, once there is some agreement on the objectives and scope, to set up a trusted development agency or partnership that is committed to the city's growth or recovery.

As governments tend to change over the life of the project is it essential to secure the support of politicians across parties, as well as to bring different departments and authorities together. Once the basic or known risks are overcome, private operators can join a partnership which then needs to operate independently, with variants to suit local circumstances:

Dublin set up a dedicated organisation to deliver the LUAS, the Railway Procurement Agency, with the fixed assets owned by the state with Working Groups on utilities and the public realm. Success was due to integrating transport and land use in the strategic planning process, inter-disciplinary working, and citizen involvement throughout.

Copenhagen in the 1980s, was economically depressed, with a $750 million deficit, so a cross party alliance was forged. Bikes are used for almost 50% of trips to school or work, so the challenge was to use new towns to fund a first class light rail system initially linking the city centre with the airport. Success was helped by the need to rescue the capital city from bankruptcy.

Nottingham

Aarhus the City Council led the project but secured the support of five neighbouring local authorities. The key to success was building up trust with a combination of measures to change attitudes and behaviour, for example cycle parking at tram stops. All the options were considered, and for example bus rapid transit is a possibility in the next stage.

Nottingham the City Council took the lead throughout, supported by the same group of consultants, and in partnership with transport operators, who formed a company to take on the risks of operating the system.

7. Next steps

The breadth and depth of experience within The Academy of Urbanism suggests that there is a role to play in supporting the creation of alliances to tackle complex issues, such as urban recovery or growth, and in overcoming the hostilities between different professions, sectors, and voluntary groups. This is about much more than engineering, as it involves urban design and economics as well as human behaviour, in other words 'urbanism'!

While each place is different, and therefore requires a particular solution, all could learn from the difficult and lengthy process of planning, development and finance, as these are common to towns and cities. There seem to be five stages which might form the basis for further work if there was enough interest in sharing and documenting experience (possibly in collaboration with researchers or other professional bodies):

1. Start by clarifying the challenges for urban recovery or growth and how they are interrelated.
2. Identify the best opportunities for making impacts in the short, medium and longer terms through a mix of transport interventions.
3. Bring together the main stakeholders in some form of partnership to plan how improvements can be resourced.
4. Raise the finance from different sources for each stage and for each element.
5. Deliver and promote improvements in ways that win ongoing community support from property owners and employers as well as residents.

The most important lessons of all are how good ideas can be turned into reality over both space and time. This half day e-symposium, which combined presentations, workshops and a panel, filled a gap, in the urbanists' tool kit, judged by holding a high-level audience together over half a day.

Zoom made it much easier to bring people together from different countries, with time for discussion as well as listening to a range of experts. Consideration should therefore be given to how to use the knowledge and relationships of the AoU's members to making 'learning from place' even more effective – and fun!

Given the importance of both reviving urban economies and also reducing carbon emissions, major initiatives such as in Bristol and Leeds need all the help they can get, perhaps by the AoU working with other partners involved in transport planning or local government finance.

This report was written by Dr Nicholas Falk and published on 19 August 2021.

For more information on the Rapid Transit and Urban Recovery initiative, please contact Stephen Gallagher on sg@theaou.org.

Please visit https://theaou.org for more information.

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