GREATER MANCHESTER INDEPENDENT PROSPERITY REVIEW

CRITICAL ASSESSMENT OF APPRAISAL METHODOLOGY

A technical report for the research on
Infrastructure

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Infrastructure@ Manchester is a forum at Alliance Manchester Business School, which has been funded by Barclays Plc and Heathrow Ltd to research the development of the physical infrastructure required in the Northern Powerhouse and the UK more generally with particular reference to appraisal, financing, funding and delivery issues.

Alliance Manchester Business School (AMBS) was established in Manchester in 1965 as one of the UK's first two business schools. They are now the UK's largest campus-based business and management school. Research-led, theydeliver distinct industry-focused business and management education at all levels with the phrase 'Original Thinking Applied' at the heart of everything they do. With overseas centres in Dubai, Hong Kong, São Paolo, Shanghai and Singapore they open up a world of opportunities for students, researchers and clients. They aim to be responsive and flexible to the needs of stakeholders in the private, public and voluntary sectors., Within AMBS, a group of half a dozen scholars provides research and teaching in the management of major projects and programmes.

The views expressed in this report are those of the authors and, as usual, errors and omissions in this report remain the responsibility of the authors alone.

The Greater Manchester Independent Prosperity Review was commissioned to provide a detailed and rigorous assessment of the current state, and future potential, of Greater Manchester's economy. Ten years on from the path-breaking Manchester Independent Economic Review, it provides a fresh understanding of what needs to be done to improve productivity and drive prosperity across the city region.

Independent of local and national government, the Prosperity Review was carried out under the leadership of a Panel of six experts:

Professor Diane Coyle
Bennett Professor of Public Policy, University of Cambridge, and
Chair of the Greater Manchester Independent Prosperity Review

Stephanie Flanders
Head of Bloomberg Economics

Professor Ed Glaeser
Fred and Eleanor Glimp Professor of Economics, Harvard University

Professor Mariana Mazzucato
Professor in the Economics of Innovation & Public Value and Director of UCL Institute for Innovation and Public Purpose

Professor Henry Overman
Professor of Economic Geography, London School of Economics, and
Director of the What Works Centre for Local Economic Growth

Darra Singh
Government and Public Sector Lead at Ernst and Young (EY)

The Panel commissioned studies in four areas, providing a thorough and cutting edge analysis of key economic issues affecting the city region:

- Analysis of productivity, taking a deep-dive into labour productivity performance across Greater Manchester (GM), including a granular analysis of the 'long tail' of low-productivity firms and low pay;
- Analysis of education and skills transitions, reviewing the role of the entire education and skills system and how individuals pass through key transitions;
- Exploration of the city region's innovation ecosystems, national and international supply chains and trade linkages; and sources of global competitiveness, building on the 2016 Science and Innovation Audit; and
- Work to review the infrastructure needs of Greater Manchester for raising productivity, including the potential for new approaches to unlock additional investment.

A call for evidence and international comparative analysis, developed in collaboration with the Organisation for European Cooperation and Development (OECD) and European Commission, also supported this work.

All of the Greater Manchester Independent Prosperity Review outputs are available to download at **www.gmprosperityreview.co.uk**.

This technical report is one of a suite of Greater Manchester Independent Prosperity Review Background Reports.

Contents

Introduction and Scope

With Barclays support, Infrastructure@Manchester at Alliance Manchester Business School has developed a series of papers, three of which are summarised in this report for the Greater Manchester Independent Prosperity Review, which argue that the government's current appraisal tools are inappropriate for non-marginal, transformative projects. One of the key insights from this research is that such tools bias public spending against the North. Our research is timely given the shifting policy landscape towards rebalancing the economy. Moreover, in 2018 HM Treasury updated its Green Book which provides approved guidance, methods and recommended tools for comparing investment options across government. This update has spurred changes to the internal guides produced by other governmental departments which will have further implications for infrastructure development in the north.

Our research is in line with the consultation exercise published by the Department for Transport (DfT) in June 2018. The consultation aims to gather views on the scope and priorities for a new 'Appraisal and Modelling Strategy' which sets out the department's vision for developing appraisal and modelling tools over the next few years[1]. To that end, DfT is engaging with a range of stakeholders to ensure that its Web-based Transport Appraisal Guidance (WebTAG) remains best practice and addresses the likely future challenges facing practitioners and decision makers conducting transport appraisal.

Similarly, we contribute to the debate on Land Value Uplift as advanced by the Ministry of Housing, Communities and Local Government (MHCLG). The MHCLG's appraisal guidance was published in December 2016 with an acknowledgement of its limits, particularly as relates to valuing externalities. As such, MHCLG presents it guide as a 'living' document that will be regularly updated and that contains sections which are likely to change between updates. Moreover, MHCLG calls for evidence or feedback on any aspect of the guidance to improve the quality of appraisals[2].

Beyond government departments, the National Infrastructure Commission (NIC) is interested in understanding the limitations of existing appraisal and modelling methods and assessing where improvements could be made. To that end, the NIC has already engaged with a range of experts and interested stakeholders over the past year with a view to develop a more robust approach of assessing the costs and benefits of infrastructure projects.

We, therefore, proceed in a similar spirit by developing a series of thought leadership papers that speak to project appraisal tools and techniques, the changes presented in the 2018 HM Treasury Green Book, and how these changes can influence departmental appraisal guides. Crucially, we do this with a particular focus on issues that are of pressing concern to the Northern Powerhouse agenda. The overarching purpose of this research series is to support the development of economic infrastructure for the Northern Powerhouse by providing original analysis and ideas, thereby challenging preconceptions about infrastructure development policy.

[1] DfT (2018) Appraisal and Modelling Strategy: Informing Future Investment Decisions. DfT.
[2] https://www.gov.uk/government/publications/department-for-communities-and-local-government-appraisal-guide

Paper 1: How do we boost infrastructure investment in Northern England?

Infrastructure is the cornerstone of modern economies and productive societies. Fundamentally, infrastructure is what enables the modern economy and society to function. According to the World Bank, it is infrastructure services rather than physical infrastructure assets which contribute to economic development by both increasing productivity and by providing amenities which enhance the quality of life[3]. Furthermore, complex and interconnected infrastructure services are required to address the more systemic development challenges of today's world — from social stability, to rapid urbanisation, climate change and technological changes and globalised issues such as food and energy crises[4].

In this paper we show that the UK has an infrastructure deficit compared to its principal competitor countries, and economic growth is generally modest with little expectation of an early improvement. Crucially, the conditions apply even more strongly to the Northern Powerhouse region than the south-east region.

We make a distinction between enabling infrastructure and transformative infrastructure. Enabling infrastructure supports growth on the existing trajectory. Transformative infrastructure, on the other hand, increases the potential productivity growth rate above the current trajectory. Transformative infrastructure investment therefore shifts regional economies to a dynamic new level in multiple ways[5]. We argue that there is largely an equitable share of *enabling* infrastructure investment across the UK – but the North does have a legitimate complaint on receiving its share of *transformative* infrastructure.

As we will show in paper 2, while we have good tools for deciding which enabling infrastructure to build, we are much less well endowed with tools for transformative infrastructure. There is therefore a huge opportunity for policymakers at all levels across the UK to fully unlock the benefits of infrastructure investment, if a number of appraisal methods of infrastructure spending decisions are reformed. Such a modernisation of appraisal methods will, we believe, be crucial in realising the ambition of rebalancing the UK economy and ensuring all areas of the UK benefit equally from infrastructure investment. This way, every pound spent will contribute to greater levels of national productivity, further strong levels of employment, and greater prosperity for people's lives up and down the UK.

The case for transformative investment in Northern Powerhouse infrastructure is clear. Compared to the South East, the region lacks transformative infrastructure. Increased local investment in transportation, digital and energy will improve productivity, regional economic growth and the national economic balance – and financing is available for investment in these areas. The means to justify increased investment lies, as we will cover in the next papers, in an adjustment of the appraisal methods that inform investment decisions. The UK also needs to improve its capability for project delivery so that the investment case is delivered – the topic of the fourth and fifth papers. There are still challenges in infrastructure

[3] Kessides, C. (1993) The Contributions of Infrastructure to Economic Development: A Review of Experience and Policy Implications. Washington DC, World Bank.
[4] World Bank Group (2015) Infrastructure Strategy Update FY 2012-2015: Transformation through Infrastructure. World Bank Group.
[5] World Bank (2011) Transformation through Infrastructure, Washington DC, World Bank.

project delivery – even on projects that are widely recognised to be using best practice. Crossrail is a recent case in point[6].

Financing and Funding

Infrastructure *financing* is the process of raising the capital to invest in the infrastructure asset either from the public or private sector. Regardless of the source of infrastructure financing, it is always tied to repayment obligations of principal and interest. Public capital comes mainly from governments, principally via taxation but also via public borrowing. Public finance for infrastructure projects therefore contributes to public sector net debt (PSND). The cost of this debt financing is significantly lower relative to the private sector due largely to taxes and other public assets that effectively serve as collateral on the debt. An alternative public-sector financing mechanism is the national or multinational development bank[7]. A major advantage of such financing is that the loans are off the PSND, while the effective public-sector guarantee enjoyed by such banks tends to make the loans cheaper.

Internationally, the proportion of GDP devoted to infrastructure investment by the public sector has dropped as governments struggle with public deficits. However, new research by the International Monetary Fund[8] suggests that government borrowing to invest in infrastructure development can *reduce* PSND, under certain conditions, through two separate processes. First, the construction of an asset itself can increase short term economic growth. Second, new infrastructure services can both *enable* existing economic activity (e.g. by reducing commuting time) and *transform* new types of activity (e.g. by allowing new forms of digital industry). These are medium to long-term benefits and reduce PSND through increased tax and associated revenues for government.

In general, pubic investment in infrastructure will be positive for PSND if:

1. There are robust project selection procedures in place.
2. Project delivery capability is well-developed.
3. There is an infrastructure deficit which creates the opportunity for investments with good returns.
4. Economic activity is sufficiently moderate so that inflationary effects are mitigated.

We will discuss the first of these conditions in papers 2 and 3[9]. For now though, as we have shown, the four conditions above apply particularly strongly to the Northern Powerhouse region. Therefore, we suggest that the public investment of £100m in infrastructure would provide a greater benefit to the UK economy if invested in the North than the South East: it would likely provide a greater economic boost relative to current activity and would likely be less inflationary, particularly at the prevailing level of interest rates.

Private sector financing focuses on the "bankability" of the project. This is typically determined during the investment appraisal phase. At the simplest level, bankability means

[6] Crossrail delay overshadows project's overall success, Financial Times, 17th September 2018.
[7] Such as the European Investment Bank (EIB) which is a significant player in financing the Northern Powerhouse. The National Infrastructure Commission has proposed a National Investment Bank which has the potential to replace the EIB following Brexit but would take significant time to set up.
[8] International Monetary Fund (2014) World Economic Outlook: Legacies, Clouds, Uncertainties. Washington, IMF.
[9] To note that points 3 and 4 are covered in papers 4 and 5 which are forthcoming as part of the wider work

that a project provides clear incentives for lenders to consider financing it. Thus, a project can be said to be bankable if it can, at the time of financial close, attract the so-called capital investment stack which includes various forms of debt and equity. Success in this regard communicates that equity and loan commitments are adequate to service the capital and operational requirements of the project. Assessments of a project's bankability will draw heavily on future income and expenditure estimates so it is important that Northern Powerhouse stakeholders and policymakers encourage the development of projects with predictable future costs and benefits; we will address the benefits side in papers 2 and 3[10].

It is important to differentiate between finance and funding. The former gets a project off the ground, while the latter is the subsequent income stream which provides the ability to repay the initial capital. In other words, *funding* is the income stream generated by the infrastructure services which provides the ability to repay the financing capital. We argue that the principal challenge for the Northern Powerhouse is funding rather than financing[11]. Issues around PSND notwithstanding, finance is readily available for good quality infrastructure investments; the challenge is how to repay that investment.

Funding streams take a variety of forms from direct consumer payment by mechanisms such as road tolls and water rates, through availability charges, to repayment from general taxation. Whichever is the case, households ultimately fund all new infrastructure[12] through directly payable user charges, prices for the goods and services they consume, and various forms of taxation. This generates some very important issues around affordability for consumers of infrastructure services[13] which has been a particular issue for some NHS trusts with PFI financed infrastructure.

The success of the Northern Powerhouse relies on creating an environment that supports investment in infrastructure. Do that, and you unlock jobs, growth and prosperity. But how do you create that environment in the first place? According to the McKinsey Global Institute[14], consensus is building regarding the determinants of a successful infrastructure policy. These fall into two different groupings.

The first, finance, relates to the institutional environment which facilitates the flow of public and private finance into infrastructure investment. Important factors for private finance include:

- Developing a pipeline of bankable infrastructure projects.
- Agreeing an appropriate regulatory framework.
- Developing standardised approaches to infrastructure as an asset class.

Regional actors cannot really affect factors two and three, although it should be noted that the UK already has a world class regulatory and institutional framework for infrastructure[15]. The first point highlights the importance of the establishment of Transport for the North as a sub-national transport authority in April 2018 and the National Infrastructure Commission nationally.

[10] To note that the costs side are discussed in papers 4 and 5 which are forthcoming as part of the wider work.
[11] KPMG (2018) Transport for the North Long Term Investment Programme. Transport for the North.
[12] National Infrastructure Commission (2018) National Infrastructure Assessment, NIC.
[13] National Audit Office (2013) Infrastructure investment: the impact on consumer bills. London, NAO.
[14] McKinsey Global Institute (2016) Bridging Global Infrastructure Gaps. McKinsey & Company.
[15] Global Infrastructure Hub (2018) Infracompass UK Overview, GIH.

Important factors for public investment include:

- Deciding who should benefit from tolls and land value uplifts – the public or private sector
- Potential changes in public accounting which would allow infrastructure investments to be amortized rather than being booked as a cost at the time of investment
- Relaxing requirements for Public Sector Net Debt, allowing the public sector to borrow for investment in productive assets

The second grouping, affordability, relates to the opportunity to reduce the cost of investment. A study by the McKinsey Global Institute[16] concluded that international infrastructure projects could save up to 38% from their current costs: 8% from "fact-based project selection", 15% from "streamlined delivery", and 15% from "making the most of existing infrastructure". The first of these savings, fact-based project selection, will be the focus of our second paper, while our fourth and fifth papers will investigate aspects of streamlined delivery.

It is the view of the authors that the case for transformative investment in Northern Powerhouse infrastructure is clear – particularly in the area of transportation, but also digital and energy. An increased level of investment in all three areas will have consequent positive impacts on productivity, regional economic growth, and national economic rebalancing. The means to justify this increased investment lies, as we will cover in the next papers, in an adjustment of the appraisal methods that inform investment decisions. Thanks to developments over the past decade, the UK has world class institutional arrangements in place to ensure that money is well spent, and these are now being replicated at the Northern Powerhouse level. The UK also needs to improve its capability for project delivery so that the investment case is delivered[17].

Recommendations and Next Steps

At this stage of our programme, we make two overarching recommendations:

1. **A new pan-Northern coordinating body should be set up for infrastructure development and resilience.** This body should advise national and local government, as well as business and third-party stakeholders, on the opportunities, networks and barriers between infrastructure sectors, and deliver an integrated pipeline of infrastructure investments.
2. **A new comparative economic modelling analysis should be commissioned**. This analysis should look at the return on investment in the North and the South East in transformational infrastructure, including multiplier and inflationary effects.

[16]McKinsey Global Institute (2016) Bridging Global Infrastructure Gaps. McKinsey & Company.
[17] To note that this topic is discussed in papers 4 and 5 which are forthcoming as part of the wider work.

Case Study: Financing Manchester Metrolink: A Northern Infrastructure Success Story and Beyond

Manchester Metrolink is the oldest and largest urban tramway in the UK, mixing off and on-street running. It was able to cover its operating costs for 2016/17, although the shift to a new operational contract with higher operational benefits led to a net loss in 2017/2018. Opened in 1992, it has expanded through a number of phases of redevelopment to a six-line network of 99 stops, with plans for further expansion. While the details have changed over the years, the principles of its success have remained much the same. In essence, these are mixed finance in order to construct the network; funding from the farebox; and private sector operation of the network. Government revenue grants also helped with funding costs in the earlier phases. These are all in the context of strong institutional governance in the greater Manchester area and a focus on increases in Gross Value Added in investment appraisal.

Phase 1 (Bury to Altrincham) was financed by a mixture of borrowings by the (then) Greater Manchester Passenger Transport Executive (GMPTE), borrowing from the European Investment Bank, and grants from both UK central government and The European Regional Development Fund. A Design, Build, Operate and Maintain (DBOM) contract was then let to a private sector joint venture transferring operational risk to the contractor which also paid a £5m concession fee towards construction costs. This arrangement meant that Metrolink had the lowest proportional central government contribution of all light rail investments of the period except the Docklands Light Railway in London. Phase 2 (to Eccles) saw a major contribution from the new operational contractor, the use of reserves by GMTPE and a small amount of additional borrowing.

Phase 3 was a major expansion of the network to Ashton-under-Lyne, East Didsbury, Manchester Airport, and Rochdale via Oldham. The Rochdale line was financed from a government grant and borrowings by the GMPTE, repayable from the farebox. In order to finance the other lines from the Transport Innovation Fund, a local referendum was held on introducing congestion charging within the M60 in order to generate a funding stream. This was overwhelmingly rejected by residents, and so the business cases for other lines were re-evaluated. This led to the establishment of the Greater Manchester Transport Fund (GMTF). The GMTF forms a single pot of government grants, local borrowings and private sector contributions to finance a variety of transport initiatives. Funding came from a Greater Manchester-wide increase in Council Tax orchestrated through the Association of Greater Manchester Authorities (AGMA) and Manchester Airport, yielding £279.20 million in 2018/19.

The Greater Manchester Combined Authority (GMCA) was formed in 2011 and GMPTE renamed Transport for Greater Manchester (TfGM) to own Metrolink and further its development. TfGM re-let the operational contract for Metrolink in 2017. Financing for the next extension of the network to Trafford Park combined government grants with contributions from owners of much of the land accessed by the line, Peel, and Section 106 deals for other developments along the route. In addition to farebox and council tax, funding comes from the new “Earn Back” facility under the 2014 Greater Manchester Devolution Deal which gives Greater Manchester extra money for the region's infrastructure if certain levels of economic growth are reached.

Technical Note: Infrastructure Services

Taken from: Kessides, C. 1993. The Contributions of Infrastructure to Economic Development: A Review of Experience and Policy Implications. Washington DC, World Bank.

According to the World Bank, the primary measure of economic benefits from infrastructure derives from the operation and the value of the services generated by the physical asset, rather than the asset itself. To that end, infrastructure services contribute to economic development both by increasing productivity and by providing amenities which enhance the quality of life.

As relates to productivity, infrastructure services stimulate aggregate supply and demand through at least two channels. First, transport, water, and electricity, for example, serve as intermediate inputs to production, and any reduction in their costs raises the profitability of production, thus permitting higher levels of output, income, and/or employment; second, the availability of infrastructure services raises productivity for other capital and labour, such as through a reduction in workers' commuting time.

Regarding quality of life, infrastructural services are linked to both personal welfare and the environment. These impacts are realised in three broad respects: first, reductions in the cost and improvements in infrastructure services to households can have beneficial effects on increasing their real income and consumption; second, infrastructure affects labour productivity and access to employment, and thus the capacity to earn future income; and third, it affects real wealth. Infrastructure services are, therefore, valued as essential for health and the creation of environmental amenities (e.g. water and sanitation); or as items of consumption in their own right (e.g. recreational transport, residential telecommunications). Moreover, infrastructure services provide access to jobs, education, and opportunities for the consumption of other goods.

Reducing the cost of infrastructure services and improving service provision can, therefore, have far-reaching implications. Realising the benefit of the efficient generation of infrastructure services can allow enterprises to lower their costs with favourable impacts on profits and the level of production achieved. In addition, increased accessibility to reliable and quality infrastructure services for households can positively impact their quality of life by increasing their real income and consumption, raising the productivity of their labour, and freeing time of individuals for higher-value activities-analogously to the benefits realised by firms.

Paper 2: Infrastructure Project Appraisal

As set out in the Industrial Strategy White Paper, infrastructure is one of the five foundations of productivity, yet, as demonstrated in our first paper of this series, the UK has a relatively low rate (as a proportion of GDP) of investment in infrastructure and is an outlier amongst developed nations in the perceived low quality of its current infrastructure provision. Within the UK, this problem is compounded by regional disparities in investment. While, as we argued in paper 1, the north of England is not particularly disadvantaged in the enabling infrastructure that supports current levels of economic activity, it has, to date, completely missed out on the types of transformative infrastructure investment such as HS1, Crossrail, and Heathrow redevelopment that stimulate economic growth to higher levels through agglomeration and international connectivity.

We argue that the current toolset for the analysis which underpins the Economic Case of the Five Case Model inherently follows rather than stimulates economic activity. It is important to realise that this is a technical bias that is inherent in the present best practice. It can either be corrected or reinforced by political biases within the development of the Strategic Case of the Model.

We recognise that capturing the full benefits of infrastructure investments is challenging. Moving beyond infrastructure investment appraisal methods designed for incremental improvements in enabling infrastructure at "pinch points" in capacity will require large amounts of spatially detailed data across many factors. However, proceeding in this way allows for very strong evidence-based analysis and can inform judgements about whether project impacts are additional (to a particular area and the country as a whole); whether they displace other activity; and how they interact with market imperfections thereby creating social value[18]. Given the uncertainty that underpins forecasts, it is also important that models are tested for the sensitivities of estimates to different assumptions[19]. Moreover, when presenting results, it is important that analysts are transparent about the robustness of the underlying evidence base and the appraisal values used.

In the National Infrastructure Assessment (2018), the National Infrastructure Commission recommends that all public bodies taking decisions on strategic economic infrastructure should publish the forecast costs and benefits of their major infrastructure projects at each appraisal stage and at a suitable point after completion, by the end of 2019. By carrying out a similar exercise, undertaking robust analysis of the performance of existing infrastructure and recognising the value of good design in infrastructure, the Northern Powerhouse can also improve its decision-making. The exercise calls for a multidisciplinary, collaborative approach and the use of a large diversity of financial, strategic and risk assessment models. This also calls for good quality data on infrastructure costs and performance as well as micro and macro level data from a variety of sources.

Potential investors who see evidence of credible cost benefit analyses are more likely to consider tendering for government projects. However, especially in the context of the Northern Powerhouse, there is a greater need for appraisal approaches that capture

[18] A. Venables, J.J. Laird, & H.G. Overman (2014). Transport investment and economic performance: Implications for project appraisal.

[19] S. Dietz & C. Hepburn (2013) Benefit–cost analysis of non-marginal climate and energy projects. Energy Economics. 40: 61-71.

projects' transformational potential as relates to economic growth and social welfare. Increasingly, infrastructure is emphasising reliability and resilience, it is moving towards electricity and away from fossil fuel dependence, towards the city regions and away from the national network, and towards a more integrated economic development approach. Hence, project appraisal will need to evolve to serve these changing needs.

Recommendations

We develop from this argument two recommendations for further development:

1. **That we need to put greater resource into developing cost-benefit analysis for transformative infrastructure investments.** The present CBA tool-set available to decision-makers (in the UK this is principally the BCR tool) who allocate resources to projects inherently favours areas with higher incomes and faster rates of economic growth. For this reason, if it is used without adjustment it will re-inforce regional disparities rather than reduce them. Therefore, we need to 1) develop more acute analysis of the social and economic benefits of agglomeration; 2) develop better equity ratings to offset the willingness to pay bias; and 3) move beyond seeing the multiplier as an aggregate effect by taking into account regional differences in inflationary effects. In doing this work, the new data sources available from positioning infrastructure (e.g. GPS feeds) and smart ticketing and metering should be fully explored.
2. **That we should evaluate multi-criteria analysis approaches to infrastructure investment for the Northern Powerhouse.** That is, we should start with the presumption of making transformative (as opposed to enabling) infrastructure investments and then evaluate how the investment pipeline would be ordered. This approach would provide a way of "triangulating" against the improved CBA approach proposed in recommendation one, and might make it easier to include new sources of data in the analysis.

At present, there is no Northern Powerhouse agency that could undertake this work, with the exception of Transport for the North. This provides an additional rationale for setting up the infrastructure liaison body suggested in recommendation 1 of Paper 1.

Case Study: Transport for the North, A Transformational Growth Catalyst

A central part of the argument across this series of papers is the need to change the way in which we tackle investment appraisal for transformative infrastructure. Such changes need to be sponsored and promoted by an appropriate agency. TfN is actively pursuing this agenda by working as a pan-Northern partnership of civic and business leaders working closely with Highways England, Network Rail, High Speed 2 (HS2) and the Department for Transport. TfN is currently building an evidence base and toolset that can reflect a detailed northern view of how changes in connectivity can lead to transformative changes in the regional economy.

TfN commissioned the Northern Powerhouse Independent Economic Review (NPIER) in 2016[20] and now supports the aims of the NPIER through its Transport Analysis, Modelling

[20] SQW (2016) The Northern Powerhouse Independent Economic Review. TfN.

and Economics (TAME) work[21]. TAME supports the TfN Strategic Transport Plan[22] and engages nationally with debates on best practice in transport investment appraisal[23]. TfN is creating an Analytical Framework for the North which will promote 'one voice' for data; forecasting; and investment decisions. The 'one voice' theme is at the heart of TFN's strategy, encompassing the development of a consistent framework and dataset. Together these will enable data interoperability and the development of off-the shelf tools which can be adapted to different purposes such as refining the service options for Northern Powerhouse Rail and synergies with HS2. Adopting 'one voice' will also allow the development of monitoring tools which will improve how the benefits of transport interventions are realised. For example, TfN will be able to monitor the impact of large investments in the Northern and Transpennine rail franchises. Ultimately, the goal is to develop a full modelling and appraisal system for transport investment business cases, and a more efficient operating model for the North's transport system.

TfN's work pushes the boundaries of existing appraisal methodologies designed around enabling investment and incremental change rather than the transformational investment and growth to which the North aspires. By moving beyond calculating benefits using the value of time measure, TfN also considers key factors impacting economic growth at the regional level such as transport efficiency, reliability and resilience. The tools that TfN is developing complement the norms of transport investment appraisal with models that capture market creation and market shaping.

TfN has therefore developed the Northern Transport Demand Model (NTDM), a rail market demand and revenue model which uses dynamic multi-modal simulation to estimate how changes in population and employment resulting from the economic growth envisaged by the NPIER will affect travel patterns across the North. Moreover, modelling within the Analytical Framework is an iterative process between two key tools. The first is the Northern Economy and Land-Use Model (NELUM), a Land Use Transport Interaction (LUTI) model which shows how transformational travel markets are generated. NELUM captures re-distributed travel markets by assessing the impact of economic connectivity on population growth, GVA and increases in employment in the north. Once generated, the transformative travel markets are then downloaded into the second tool, Northern Transport Models (NTMs). NTMs provide detailed representation, optioneering and design that complement the generated network and service capacity restraints in Northern freight, highways assignment and rail. In turn, this is reloaded into NELUM. The iterative process between NELUM and the NTMs informs the Northern Investment Programme, a sequential list of strategic multimodal interventions for design, development and delivery[24]. In addition, TfN uses a foresighting approach to consider several different future scenarios given the uncertainty surrounding future outcomes.

By taking a more holistic, causal and dynamic 'systems' view, TfN's work reflects the insight that transport impacts much more widely on the economy, society and the environment than

[21] Transport for the North (2018) It's about TAME! Our exciting programme to build the evidence base for transformational change. TFN.
[22] Transport for the North (2019) Strategic Transport Plan. TfN.
[23] Transport for the North (2018) DfT Appraisal and Modelling Strategy: Transport for the North Coordinated Northern Response. TfN
[24] Transport for the North (2019). Investment Program. TfN

is currently captured in BCRs, and that scenarios and scheme variants can be adopted to support transformational infrastructure development. Moreover, in modelling and appraisal, TfN is developing robust new tools and techniques for the North that are applicable beyond the North. To that end, it is unsurprising that TfN has already seen partners outside of the North, such as Midland Connect, Transport for London and the National Infrastructure Commission, express an interest in what they are doing.

Paper 3: Land Value Uplift / Capture

Infrastructure investments have important "spillover effects" – that is, they have implications outside the economic scope of the investment. Environmental impacts are one source of important negative spillover effects, while a very important positive one is the effect of the investment on the value of land and property within its catchment area. While these property effects apply to most types of infrastructure investment, including digital, it is most important for transportation, and so this paper, the third in the Infrastructure@Manchester at Alliance Manchester Business School series, will focus on land value uplift for transportation projects and the associated question of who captures that uplift. We will see that, from the perspective of the Northern Powerhouse, this issue is again symptomatic of a crucial underlying issue in infrastructure investment appraisal – the way in which cost-benefit analysis follows rather than stimulates economic growth.

In the Department for Transport's (DfT) Web-based Transport Appraisal Guidance (WebTAG), the calculation of transport user benefits is based on conventional consumer surplus theory as discussed in the second paper in this series. As such, the benefits from transport interventions are primarily derived from the growth in demand as incomes and population increase, which leads to growth in the value of travel time saved because of the infrastructure investment. According to DfT, assessments of the consumer surplus reflected in the value of travel time savings should incorporate changes to the following components of perceived cost:

- changes in travel time;
- changes in user charges, including fares, tariffs and tolls; and
- changes in vehicle operating costs met by the user (i.e. for private transport).

To that end, the value of savings in travel time is typically quantified in pounds per hour which represents the amount of money a traveller is willing to pay to save time relative to a reference case or baseline when the investment takes place. This value also reflects other important benefits of transport infrastructure investment and policy-making that improve journey characteristics, such as travel time reliability (i.e. improved punctuality) and congestion relief.

In the context of transport investment, land value uplift is based on the well-established understanding that proximity to public transit influences property prices. Transport users are often willing to pay a 'transport premium' to acquire property on land near transport links and will typically compete with each other (and with non-transport users) to do so. The ensuing 'consumer surplus' is capitalised into the value of land around the access points to the transport network, which triggers higher land values.

We can identify at least two concerns with the use of land value uplift as a proxy for the economic benefits of a transport investment appraisal. The first is that employment-led developments may perform less well under this approach because development impacts are restricted to a one-off increase in land value. Thus, there is no provision for benefits that

build slowly over a specified period as in the Jubilee line case. Under the traditional approach, in contrast, employment impacts could be valued over a five-year period[25].

Certainly, some projects are likely to identify the greatest economic benefits using the new approach such as conversions from agricultural to residential uses, through investment which unlocks agricultural land for a housing development. In such cases, the difference in land values between agricultural and residential uses is significant and will almost always overshadow any uplift associated with schemes that simply secure more intensive or higher productivity employment. However, this is exactly the kind of scheme which is discouraged in the new National Planning Policy Framework where it concerns the greenbelt.

The second concern raised about the use of land value uplift in the MHCLG appraisal guide is that there is significant variation in residential and commercial land values across England[26]. Given this variation, schemes in the South East are likely to present more favourable value-for-money estimations and by implication, to be more favourably assessed when it comes to the allocation of public funds. In those parts of the country where there is greater demand for land, but supply is constrained, residential values are higher while in parts of the country where the demand for land is limited, residential land values are lower. When the MHCLG methodology is consistently applied across regions, London and the South East will have a higher Benefit Cost Ratio (BCR) than the rest of England.

Thus, the use of land value uplift is another mechanism that favours the South East over the Northern Powerhouse region where land values are significantly lower. For a given percentage uplift in land values, a smaller quantum of benefits from the investment is available where the original land value is lower. As infrastructure investment costs are much less variable around the country than land prices, this produces an unintended bias against Northern Powerhouse projects. Again, the use of best practice project selection methods follow economic growth rather than stimulate it when they incorporate land value uplift on the benefits side.

Recommendations

We make five recommendations from this analysis:

1. **That both GVA and land value uplift be used as complements in infrastructure investment appraisal.** We further recommend that land value uplift and travel time savings are supplemented with accounts of the wider benefits of infrastructure investments reflected in the spatial reorganisation effects of an investment. Promisingly, MHCLG recognises the limits of the current guidance and the difficulties of valuing externalities and its Appraisal Guide is presented as a 'living' document that will be regularly updated. MHCLG has also committed to the continued review and development of the evidence base on externalities and welcomes views and potential evidence that could help with this. Similarly, DfT[27] recognises the need to improve the links between the evidence of change from completed investments and the validity of appraisal methodologies, both to inform key assumptions and to identify where appraisal tools may be systematically and materially mis-forecasting investment outcomes.

[25] Lindsay (2017). The New Appraisal Guide What Does It All Mean? Regeneris.

[27] DfT (2016) Strengthening the Links between Appraisal and Evaluation. DfT.

2. **That TfL's Development Rights Auction Model (DRAM) methodology[28] be evaluated for use in the Northern Powerhouse region**. Notwithstanding the requirements for modifications, we consider this to be an innovative and sophisticated approach to the development-based financing of infrastructure investments which appears to favour the lower baseline land values in the Northern Powerhouse.

3. **That the Northern Powerhouse continue to lobby for the full devolution of business rates.** Tax Increment Financing is a particularly attractive method for funding infrastructure investment, where carefully used. It can also be complemented by betterment levies such as Business Rates Supplements as used on Crossrail.

4. **Use the Five Cases Model to provide more rounded investment appraisal of infrastructure projects**. Much of this paper has focused on the Financial Case, while Paper Two focused on the Economic Case, but we argue that the most important Case is the Strategic because this is where the longer-term ambitions of the Northern Powerhouse can be articulated and the inherent biases in the tools used for the Economic and Financial Cases can be mitigated.

5. **Develop Tax Increment Funding tools that can capture agglomeration effects.** An opportunity exists for the Northern Powerhouse to highlight additional factors for consideration in project appraisal frameworks. These include agglomeration and accessibility, and the sub-national and distributional impacts of infrastructure projects as well as dynamic effects. A significant limitation of our present suite of TIF tools is that they are limited to specific tax districts, while agglomeration effects will bestow their benefits across city-regions and between city-regions across the Northern Powerhouse. Robust TIF tools could be especially beneficial with the introduction of the Strategic Infrastructure Tariff.

Land value uplift is a potentially important source of benefits to support the economic case, and if it is captured by means that are robust and equitable, LVU can make a significant contribution to the Financial Case of investment projects. The importance of land value capture (LVC) funding in this regard is based on the notion that transport accessibility, by forging close ties with land development planning, can create and increase economic, social and environmental spillover benefits. To that end, using LVC to engage private land owners is often seen as an additional method of revenue generation, particularly for urban transport systems.

However, the use of land value uplift on the benefits side of the BCR equation in the economic case and land value capture as a source of funding to support the Financial Case are, as we have shown, inherently biased against the Northern Powerhouse in comparison to the South East. This is principally because the higher the economic base from which uplift is calculated, the greater the quantum of benefit for a given value of infrastructure investment. We need additional tools to a reliance on land value uplift and capture alone if we are to rebalance the English economy as desired by policy-makers.

Overall, the LVC concept is still very much a work-in-progress with varied success. Global experiences demonstrate that beyond being simply a funding tool, the viability of LVC

[28] TfL (2017). Land Value Capture. TfL.

mechanisms have to be considered from the perspective of policy, administrative capacity and legislative feasibility. While LVC is often viewed as a tax tool in the hands of public investors to fund infrastructure investment, it is equally important that there is greater clarity on the redistribution of the "captured" gains beyond recovering the infrastructure investment. This includes providing the needed support investments for infrastructure integration and the sustainable community aspects. Indeed, as set out in the National Planning Policy Framework, LVC mechanisms can contribute to accommodating objectively assessed needs, in a way that makes as much use as possible of 'brownfield' land.

There is no blueprint for selecting LVC mechanisms and they are often tailored to specific contexts around accounting for factors such as the size and growth rates of population, income, employment, educational attainment, and national economic conditions and trends as well as others like transportation network characteristics. Furthermore, LVC mechanisms will vary depending on the targeted infrastructure; opportunities will therefore vary significantly due to context. In the context of rail infrastructure, for example, unique characteristics of each transit line and station area will influence the potential for value creation and capture, and different value capture strategies may be appropriate along the same transit line within a single jurisdiction. It is therefore important that LVC be approached in a thoughtful and context-sensitive manner.

In exploring how to fund transport investments in the region, Northern Powerhouse policymakers and stakeholders should explore mechanisms that support the effective collection of developer contributions, which are particularly valuable. In addition to contributing to reducing the north-south divide, more effective LVC mechanisms can support the delivery of new homes which the National Infrastructure Commission describes as the "greatest infrastructure capacity challenge of all". This will also require that the Northern Powerhouse investigate how it can make improvements in data, technology and research methods to isolate and capture the transport-induced value uplift in a more targeted and effective manner.

The Relocation of Chester Bus Interchange: Paving the Way for Transformational Regeneration

The Northgate area in Chester is a substantial area of 1960s office blocks, which once housed Cheshire County Council. In 2009, the council split into two and downsized, which left the office blocks dormant in what resembled a ghost town. Concurrently, Chester fell in the UK retail rankings as cities such as Liverpool and Manchester invested in new shopping facilities.

To curb the decline of the City and to take Chester back into the UK's top 50 retail attractions, Chester decided to redevelop Northgate. A major investment of £300 million was announced with a view to transform Chester's leisure and retail space – a cross-party ambition of the council for many years. The Northgate project aims to deliver 500,000 sq. ft. of retail, restaurant and leisure facilities including a new six-screen cinema plus markets and restaurants in the existing Chester Library building. Not only is the project hugely significant for reversing the decline in retail spend, but it is also crucial for the growth and future prosperity of the local and wider Cheshire and Warrington economy with the potential to create 1,800 direct jobs and 850 indirect jobs.

Chester's One City Plan, developed by Chester Renaissance and Cheshire West and Chester Council, proposed a review of the bus strategy for the City ahead of the

redevelopment at Northgate and other regeneration proposals. Especially important was the relocation of Chester Bus Exchange, which was located right in the middle of the development space. Mott MacDonald was therefore appointed to produce a prefeasibility study in relation to its relocation and to explore bus facility provision and utility more generally. In line with DfT's WebTAG, Mott MacDonald adopted an optioneering approach in considering multiple options including a main option to "do-nothing". From the identified options, the team determined that it was most suitable to relocate the bus Interchange to Gorse Stacks, a large 300-space car park north of the city. Despite being a major gateway into the city centre, Gorse Stacks was disconnected from the city's historic core and not well-maintained. Thus, the relocation of the bus interchange to Gorse Stacks could give momentum and bring critical mass to the area in addition to paving the way for the Northgate project.

The relocation of the bus interchange was consistently put forward to the government office and the old regional funding allocation process. It was also put forward to the Local Enterprise Partnership. However, beyond ambience, congestion and pollution benefits, the BCR did not demonstrate many traditional transport benefits in terms of time savings. The relocation project was therefore ranked lowly by the Cheshire and Warrington LEP. The project subsequently went through several rounds of growth deal funding, before eventually rising to the top of the LEP priorities list. Ultimately, the project was supported by the Cheshire and Warrington LEP through a £13.5 million Local Growth Deal investment, as well as funding for public realm improvements to surrounding streets to improve connections to the city centre.

This change in fortune was largely due to the interdisciplinary approach that Mott MacDonald took to develop a transport business case that tackled regeneration issues. On the one hand, the transport planning team developed the transport component of the case in terms of bus network, redesign with highway modelling and air quality modelling. On the other hand, the economic and social development team added the regeneration and development benefits from the relocation allowing Northgate, as a major development site, to come forward. The employment benefits (jobs and gross value added) were sufficient to bring the scheme to the top of the LEP's ranking and to secure funding.

The relocation of Chester Bus Interchange predates the MHCLG online guidance, thus it was not required that land value uplift be included in the business case for the project. Given the change from vacant buildings to the retail and leisure-based development outlined in the One City Plan, however, Mott Macdonald estimates that land value uplift would have been substantial. Indeed, the relocation of the bus interchange preserved the benefits of the City and arguably served as a catalyst for major regeneration including the £37 million Storyhouse development which has significantly boosted the city's arts offering. The relocation has also spurred some unintended benefits such as new shopping streets with vibrant bars and restaurants.

It is an open question whether attempts to capture the land value uplift by the Chester authorities would have been successful. If this were pursued, there is a very real danger that the project would not have happened, thereby losing an important stream of local tax income. Mott MacDonald therefore cautions against rolling out an approach to land value capture that works in London to less economically vibrant places like Chester. While Chester is a buoyant, affluent town, the town centre is still struggling to get development underway. In this case, as across the North, land value capture is very sensitive and has the

potential to reduce incentives for developers to invest in the city with adverse implications for the northern economy overall.