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iBUILDer @ the Department for Transport

In September 2014 the Adaptation and Resilience in the Context of Change (ARCC) Network funded a secondment for Dr David Dawson to join the Department for Transport (DfT) two days a week for three months. The secondment enabled David to engage with a wide range of stakeholders within the transport sector whilst challenging their response to improving their resilience to extreme weather & climate change. As well as gaining experience in producing a policy response (published 27 November), valuable insight into operational and policy level responses to changing weather and climate was gained and dialogue based on emerging iBUILD research was opened and cited in the policy response. Mutual research & policy challenges to resilience recorded during the secondment have been identified through knowledge exchange and a plan for collaboration & engagement around these challenges has been agreed with the various units within the Department including the Scientific Advisory Team. For more details please contact: d.a.dawson@leeds.ac.uk.

iBUILD Manifesto Launch

An alignment of the general election and mid-point of the iBUILD Infrastructure Research Centre's current research programme will see the team launch a manifesto of their key findings to date. The manifesto draws upon the team's research to deliver a series of recommendations to unlock innovative business models for practitioners, local and national government. These include:

1: Have a broader, integrated appreciation of infrastructure;

2: Enable action at the local scale that connects with the national

3: Capture long-term value of every kind

4: Deliver more efficient planning, procurement and delivery

5: Accelerate the uptake of innovations through practical action and demonstration

The manifesto will be launched on Thursday 26 March at 4pm, at the Institution of Mechanical Engineers in London. The launch will be followed by a panel discussion and drinks reception.

To register for the event please complete the following form:

Cost of street works

Nicole Metje

University of Birmingham

The UK has a vast network of utility and local authority infrastructure buried beneath highways and footpaths. The combined network of water, sewer, gas and electricity services extends to over 1.5 million km. The equivalent figures for telecommunications cables and local authority infrastructure (e.g. cabling for street lighting and traffic lights, highway drains, etc.) are less widely known, but it is estimated that when included the total length of the UK's buried infrastructure is in excess of 4 million km, which is over ten times longer than the country's road network (ICE Geospatial Board Position Paper, 2015).

Regulatory and commercial pressures on those providing utility services mean that they are often incentivised to focus on minimising the direct costs, not always considering the impacts on other utilities and potentially conflicting with initiatives to reduce the social costs arising from street works. One important aspect is related to 'third party damage' to adjacent buried utilities during street works, with electricity and telecommunications cables being the most frequently damaged assets in the UK (Metje et al., 2015). This is the result of their often intense physical colocation and their common dependence on the ground that supports them.

Within iBUILD this work which has recently been published (Metje et al., 2015) will be further developed as an iBUILD case study. The case study will attempt to quantify both the direct and indirect costs of utility strikes (physical third party damage caused during street works) using a number of site case histories. Repair costs, calculated in the form of an average damage repair cost per utility, have been quantified (e.g. Electricity: £970; Gas: £485; Telecoms: £400; Fibre optic: £2800; Water: £300-980). A better understanding of both direct and indirect costs will allow more informed decision making when planning new utility provision or repairing/refurbishing existing pipelines and cables, and the introduction of business models that better serve the customers who benefit both from the utility services and the transport infrastructures that are disrupted by the street works.

New iBUILD Team Members

Christof Knoeri is a Research Fellow at the Sustainability Research Institute at the University of Leeds and a Guest Lecturer at the Chair for Human-Environment Relations at the University of Munich, Germany. Prior to this he was a Research Associate at the Life-Cycle Assessment and Modelling Group at Empa Materials Science & Technology, Switzerland where he also did his PhD. His research interests are sustainable transitions in socio-technical systems and the application of modelling techniques like agent-based modelling in particular. Christof will be working on Scaling Infrastructure Business Models.

Fiona Raje is a Research Fellow at University of Birmingham School of Civil Engineering. She works on research into step change in transport, sustainable futures and walking and cycling. She has experience of transport policy and practice, as well as academia, having worked in local government and consultancy and carried out a range of research on the lived experience of transport. With iBUILD, she is looking at the value of walking and cycling infrastructure.

Road to nowhere? Bridging values

Arthur Affleck

Workstream 2 as carried out based desk research into the failure and rebuilding of Workington's bridges after flooding in 2009. The research explores different forms of value associated with the bridges. The next stage of the research was to find a current case study of severance to build on Workington's findings.

Ovingham Bridge was to be closed for refurbishment and was identified as a case study that would develop the findings on the impacts of severance from the Workington research. The bridge is situated in the Tyne Valley approximately twelve miles from Newcastle upon Tyne. It was built in 1883 as a single lane toll bridge until the 1940s when Northumberland County Council took it over. The bridge was closed in June 2014 for a twelve month refurbishment programme. The adjacent pedestrian bridge was built in 1974 and has remained open supplying a connection between Ovingham Village and the town of Prudhoe. The refurbishment has been funded by the Department for Transport's Local Pinch Point Fund and the local authority.

The case study has involved desk based research, meeting attendance and a web based questionnaire to assess the effect of bridge closure on residents. A follow up questionnaire will be issued after the bridge reopens during 2014 and results will be used to assess the broader value of the bridge to the community.

It's the little things…

Fiona Rajé, University of Birmingham

In a recent piece for The Conversation (http://theconversation.com/uk/topics/cycling-lanes), Miles Tight reminded us that it isn't always necessary, or appropriate, to focus on large scale infrastructure ideas for cycling. Instead, we should begin by considering demand and by talking to people who would use new or improved infrastructure. After all, if we don't know who may use the facility, how can we design it to meet current and potential cyclists' needs and, as a corollary, how will we later be able to assess whether it has been successful in encouraging more people to cycle?

Too often we can be guilty, in the practitioner and academic communities, of looking for the next big solution – the bridge to straddle the dual-carriageway which causes severance of a community or the off-road network of dedicated routes to link city to suburb. Alternatively, what may actually be needed and may work best for local people and communities is provision of a small, segregated link to connect into a more extensive cycle network, a relatively small investment in bike parking at a station to enable people to access the train or metro or provision of a small, readily-available piece of information to fill the gap in a potential cyclist's knowledge of the local network which would help them see that they can actually make a journey by bike.

A recent review of value for money of walking and cycling schemes (Davis, 2014) highlights that investment in these modes is likely to result in low-cost, high value options for local communities. In this context, there would seem to be even greater likelihood of large scale benefits accruing from small scale projects, resulting in greater value for communities and more gains in opportunities for participation and access for individuals.

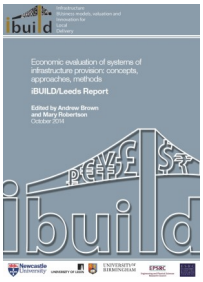
I'm not suggesting we forget about thinking big. What I am putting forward is that we all try to see the small things that can make that little difference in people's lives: by thinking about the little steps, we can work towards the bigger picture of more active people in vibrant communities. Sometimes, it is the little things that can make the real difference.

Davis, A. (2014) Claiming the Health Dividend: A summary and discussion of value for money estimates from studies of investment in walking and cycling DfT, London @ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/371096/claiming_the_health_dividend.pdf

Tight, M. (2014) Floating cycleway plan more of a tourist attraction than real commuter lane The Conversation, Oct 14 2014 @ **http://theconversation.com/floating-cycleway-plan-more-of-a-tourist-attraction-than-real-commuter-lane-32827**

Economic evaluation of systems of infrastructure provision: concepts, approaches, methods

Edited by Andrew Brown and Mary Robertson



Launched in October 2014, the iBUILD Leeds team have been working with Infrastructure UK on a report to inform policy makers and other stakeholders about research on economic evaluation of systems of provision.

The report is available to download at: www.ibuild.ac.uk/outputs or contact Lynn.Patterson@ncl.ac.uk if you would like to receive a printed copy.

The safety of pedestrians, cyclists and motor vehicles in highly turbulent urban wind flows

Chris Baker and Andrew Quinn, University of Birmingham

have been awarded EPSRC funding to assess the wind conditions in terms of pedestrian safety in high winds, and the safety of cyclists and light high sided vehicles. The project will look to establish a robust methodology for calculating the risk of a pedestrian, cyclist or high sided vehicle accident in high wind conditions around high rise building. Full scale measurements will be carried out around a high rise building on the University of Birmingham campus to measure the turbulent nature of the flow around such buildings; it is these highly turbulent flows that are of relevance to the issue of safety rather than the mean wind flows.

David and Goliath: Questioning the financialisation of infrastructure

Members of the iBUILD team at Leeds met on the 17th February to hold a small workshop on alternatives to financialisation of infrastructure led by Dr Duncan Lindo. The principal idea was to identify the dominant frameworks of financialisation / big finance solutions which can be observed in infrastructure and, as the main focus, explore alternatives to it. Presentations from iBUILD members included: *Towards an abstract theory of financialisaiton (Duncan Lindo); The Economics of Infrastructure: From Market Failure to Financialisation (Mary Robertson); Models for financing energy efficient retrofit (Niall Kerr); Financialisation and infrastructure adaptation: large finance vs local value (Katy Roelich); and Local finance for infrastructure, case studies in Scotland and Germany (Steve Hall).* The event provided an excellent open forum for challenge and discussion in this area, and helped to focus the groups' research ideas by enabling in-depth discussion without the formalities and constraints of typical workshops. It was agreed the day should be used as a pilot to build upon for future iBUILD events.

Future of Infrastructure Performance Metrics

iBUILD and sister project ICIF are working alongside Infrastructure UK to consider whether the Infrastructure Performance Indicators reported each year in the UK National Infrastructure Plan are fit for purpose. There is a particular interest in whether the choice of indicators and the means of reporting them offer value to the relevant stakeholders in terms of their decision making. Furthermore, there is a need for the data sources and analysis to be logical and robust over the medium term in order to reveal meaningful trends regarding the performance of UK infrastructure.

An initial workshop was held with industry experts and academics on " March in London to start exploring these issues. A full report from the workshop will be available on the iBUILD website shortly.

New iBUILD Team Members

Lewis Makana is a Post-Doctoral Research Fellow at the University Of Birmingham - School Of Civil Engineering, where he is currently working on case study research with industrial partners examining the indirect and social costs that result from cable/ utility strikes in urban, peri-urban and rural areas.

Meng Song is a research fellow at University of Birmingham Business School. Meng, who joined the team in September 2014 will be looking at alternative business models in infrastructure in order to find out innovative ways to provide infrastructure services. Meng completed her MSc programme in International Business and PhD in Management at Aston Business School. Her expertise includes managing and linking large datasets, and conducting state-of-the art quantitative analysis in the area of economics and international business.

New iBUILD Team Members

Ian Bartle based at University of Birmingham s working on the case study investigating the potential for user-led provision of infrastructure in the redevelopment of the creative industry area of Digbeth near the centre of Birmingham. This is part of a larger area planned for redevelopment around a new railway station at Curzon Street for HS2.

He is a political scientist who has undertaken research on public policy, governance and regulation in relation to the energy, transport and telecommunications Recently his work has been on the governance of local transport in the UK in the context of the need to reduce carbon emissions.

PhD Studentships

Newcastle University are pleased to announce two funded iBUILD studentships. Two of the following projects will be funded: *Evaluation and funding of green infrastructure in urban areas; Innovative business models from smart infrastructure systems; Valuing infrastructure resilience.*

University of Leeds have a studentship available that is co-sponsored ESRC and BT on new organisational models for response to climate change and emerging new ICT infrastructures

For further details: www.ibuild.ac.uk/workwithus

Upcoming Events

Launch of LWEC Infrastructure Report Card

The Living With Environmental Change partnership, which includes EPSRC, ESRC, DEFRA and the Environment Agency, will launch the Infrastructure Report Card before the end of March. Production of the card was chaired by Richard Dawson and it provides an overview of the physical impacts of climate change on the UK's infrastructure. The card will soon be available from: http://www.lwec.org.uk/resources/report-cards

Joint iBUILD/ICIF/ITRC/CIRIA/ARCC Event

iBUILD is teaming up with ICIF, ITRC, CIRIA and ARCC to host an event on 2 July in London on 'infrastructure resilience in an interdependent world'. More details soon.

Association of American Geographers Annual Meeting

iBUILD are convening two sessions: Peter O'Brien, Phil O'Neill and Andy Pike are convening a session on Governance and Finance. John Bryson is co-convening a session on Practice and Performance of Economic Geography. The event takes place in Chicago, 21-25 April.

Fourth Global Conference on Economic Geography

University of Oxford will host the Fourth Global Conference on Economic Geography, 19-23 August 2015. iBUILD team members will be presenting papers (John Bryson, Peter O'Brien, Andy Pike). The abstract submission process is still open at: http://www.gceg2015.org/

Recent Publications

Roelich K; Knoeri C; Steinberger JK; Varga L; Blythe PT; Butler D; Gupta R; Harrison GP; Martin C; Purnell P (2015) Towards resource-efficient and service-oriented integrated infrastructure operation, *Technological Forecasting and Social Change*, **92**, 40-52. doi: 10.1016/j.techfore.2014.11.008

Walsh CL; Glendinning S; Dewberry E; Castán Broto V; Powell M. 2015. Are wildcard events on infrastructure systems opportunities for transformational change? *Futures* **67**, 1-10. doi.: 10.1016/j.futures.2015.01.005

Busch J; Steinberger JK; Dawson DA; Purnell P; Roelich K (2014) Managing Critical Materials with a Technology-Specific Stocks and Flows Model, *Environmental Science and Technology*, **48**, 1298-1305. doi: 10.1021/es404877u

Roelich K; Dawson DA; Purnell P; Knoeri C; Revell R; Busch J; Steinberger JK (2014) Assessing the dynamic material criticality of infrastructure transitions: A case of low carbon electricity, *Applied Energy*, **123**, 378-386. doi: 10.1016/j.apenergy.2014.01.052

Hall S, Foxon TJ, (2014) Values in the Smart Grid: the co-evolving political economy of smart distribution, *Energy Policy,* **74**, 600-609. doi 10.1016/j.enpol.2014.08.018

Wardle J, Huebner Y, Blythe PT & Gibbon J (2014) The provision of public recharging infrastructure for Electric Vehicles in North East England – is there life after subsidies?, in *Proc. ASCE International Conference on Sustainable Infrastructure*, Long Beach, California, USA, November 2014.

Dawson DA, Purnell P, Roelich K, Busch J & Steinberger JK (2014) Low Carbon Technology Performance vs Infrastructure Vulnerability: Analysis through the Local and Global Properties Space, *Environmental Science & Technology,* **48**(21):12970-12977. doi: 10.1021/es500902b

About iBUILD

iBUILD is developing new business models to improve the delivery of infrastructure systems and the services they provide. These new business models will better exploit the technical and market opportunities that emerge from the increased interdependence of modern infrastructure systems. iBUILD focuses on infrastructure at the scale of neighbourhoods, towns and cities where infrastructure is most dense and interdependencies between infrastructures, economies and society are most profound. As cities, local authorities and local enterprise partnerships are given more powers for infrastructure delivery and to raise finances it is crucial to develop robust new business models that develop infrastructure related business and growth locally - to the benefit of the nation.

For further information about the iBUILD programme visit our website: www.ibuild.ac.uk

EPSRC Engineering and Physical Sciences Research Council · ESRC Economic & Social Research Council · Newcastle University · University of Birmingham · University of Leeds