

Transport Resilience Fellowship Success



iBUILD Centre Core Research Fellow Dr David Dawson (University of Leeds) has just been awarded a Leverhulme Early Career Fellowship to support his research for the next three years (starting 2015). The fellowship seeks to identify the sustainable/resilient pathways required to maintain transport infrastructure services under the uncertainty of climate/socio-economic futures. With the recent winter disruptions providing an impetus for this problem-orientated research, David hopes to develop a novel interdisciplinary approach to provide new insight into future transport failures, infrastructure value, and the role of society in resilient transport systems at multiple scales. As a Leverhulme Fellow David will be mentored by Prof. Phil Purnell and the research area he has chosen compliments that of iBUILD offering David the continued opportunity to engage with iBUILD members and contribute to research activities during the next three years.

Infrastructure Routemap: reflections on the first year

iBUILD team members Dr Rachel Sandham, Prof. Denise Bower and Dr Nancy Madter (University of Leeds), recently published an article for the Institute of Civil Engineers' Infrastructure Asset Management journal in which they reflected on the impact of the infrastructure procurement routemap, and consider its relevance to more intelligent asset management.

Infrastructure Routemap

The UK government's 'infrastructure procurement routemap' was launched in January 2013. The routemap brings together a set of assessment tools in an integrated process aimed at improving the capability of sponsors, clients and the supply chain to plan, execute and operate major infrastructure projects. The tools identify any misalignment between the capability of the delivery organisations and the areas of risk and opportunity, allowing sponsors and clients to make more informed decisions and establish a clear line of sight from target operating model to strategy. Having been applied to a range of projects and, following consultation, the routemap is being relaunched as the 'infrastructure routemap', and promises to enable public and private infrastructure providers to improve delivery and save money. Lord Deighton will launch the 'infrastructure routemap' at the Government Construction summit in London on the 2nd July.

Reflections from research

Reflections based on their research provides commentary that directly relates to iBUILD and its focus on value and innovative business models:

'The question of whether or not assets deliver value for money is a complex one. The need to deliver social and environmental, as well as economic, benefits can sometimes lead to a blurring of the overall vision, as demonstrated in some of the projects. Achieving excellence in asset management requires iteration of learning, applying, embedding, optimising and integrating the necessary processes, and the routemap has proven very helpful in identifying where enhancements are required. Organisational design, including culture, goals, values, vision and people, is equally important as the task-oriented aspects, such as work organisation and practices, procedures and processes, and technology and assets. Overlooking organisational design requirements and the time and management effort for transformational change is a common problem. Organisations also need to understand that supply chain capabilities and drivers are also key to whole life success.'

Progress to understandings

Rachel, Denise and Nancy plan to analyse the benefits of the routemap further with support from the iBUILD research centre, and in collaboration with ARUP. This will involve further cross-case thematic analysis on the routemapping done to date. Some organisations have now been 'routemapped' on a number of occasions, enabling further analysis of its impact on individual programmes and the management of assets.

The full article can be accessed here:

<http://www.icevirtuallibrary.com/content/article/10.1680/iasma.13.00007>

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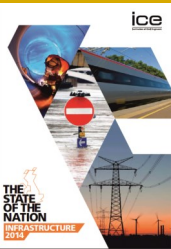
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UK Climate Change
Risk Assessment



iBUILD Director Richard Dawson has been appointed section lead of the infrastructure chapter for the Second UK Climate Change Risk Assessment which will be published in 2017.

ICE launches State of the Nation: Infrastructure



The Institute of Civil Engineers (ICE) *State of the Nation: Infrastructure* report was launched on the morning of 25 June 2014. Keith Clarke, ICE Vice-President presented the report's findings before senior politicians, Keith also chairs the report's Steering Group which includes iBUILD investigator Prof. Denise Bower (University of Leeds). The report provides a detailed assessment of the UK's key economic infrastructure sectors – transport, energy, water, flood defences and waste management.

For more details and links to a recording of the event visit: <http://www.ice.org.uk/State-of-the-Nation/State-of-the-Nation-2014>

The Value of Infrastructure and City Growth

Peter O'Brien

Peter O'Brien recently attended the launch, of the RSA City Growth Commission Report *Connected Cities: The Link to Growth*, the latest publication by the Commission that is investigating the growth potential of UK cities, chaired by the former Goldman Sachs Chief Economist, Jim O'Neill. The report, which cites the activity of iBUILD, claims that "high quality infrastructure is a critical driver of productivity and growth". Few would disagree with this statement, although economic geographers would also suggest that infrastructure is not the sole determinant of productive local and regional economies, as the OECD affirmed in its 2012 study, *Growing all Regions*. Rather, infrastructure is one component of successful development strategies, alongside human capital, innovation, enterprise and effective institutional governance. However, policy-makers and researchers are understandably seeking to acquire greater knowledge and understanding of how and where infrastructure drives particular forms of growth and development, and how public and private infrastructure investment decisions can be better informed by technical appraisal and assessment.

To read Peter's full report of this meeting please see: <https://blogs.ncl.ac.uk/ibuild>

Exploiting infrastructure interdependencies

Richard Dawson & Chris Bouch

Reducing costs, and increasing the value that is captured from infrastructure investments is essential for more effective delivery of infrastructure. iBUILD is exploring how new business models might leverage opportunities from interdependencies to improve the value/cost proposition for infrastructure. Interdependencies exist, and are increasing, between infrastructures for a number of reasons, including physical proximity (e.g. utilities beneath roads); sharing of resources (e.g. water for cooling power stations) and information (e.g. ICT command and control); or for social (e.g. shared points of demand for infrastructure services within buildings) and economic reasons (e.g. investment cycles, regulation of pricing). Interdependencies have typically been associated with risks, such as cascading failure, but every risk brings an opportunity. Work to date has focussed on interdependencies between the physical infrastructure networks. This includes consideration of cost-reduction opportunities such as co-location of services (cables and pipes sharing a trench) and dual-use of infrastructure, such as an electricity cable also carrying data. iBUILD is taking a much broader view and exploring a much wider set of interdependencies to provide an evidence basis for how their exploitation can create new business models. To do this we are developing three approaches: (i) Elicitation and visualisation of interdependencies through analysis of user policies, strategies and operational documents, (ii) Review of documented events that highlight how interdependencies mediate system outcomes (Figure 1), (iii) Use of network modelling tools to analyse interrelationship between physical and economic networks.

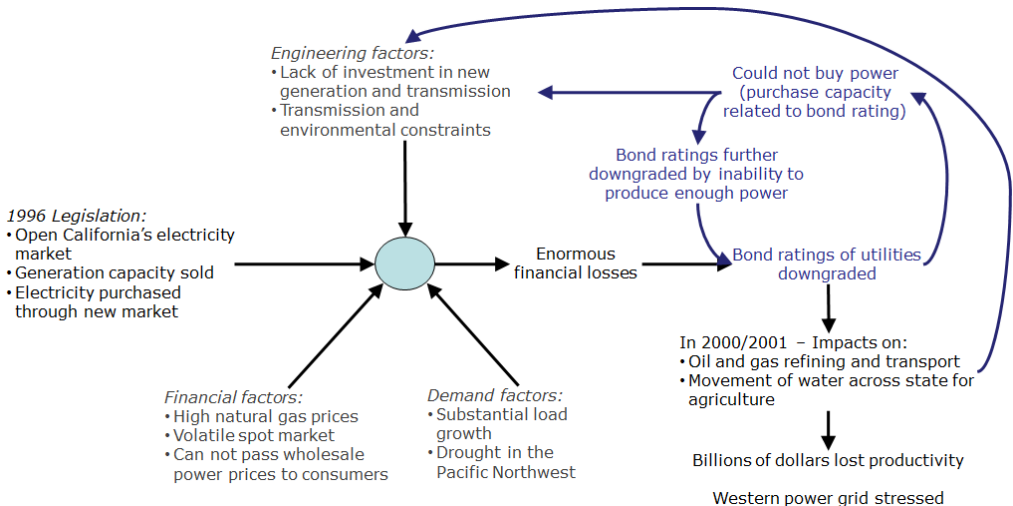


Figure 1. Interdependencies between engineering, finance and changes in regulation led to the prolonged power crisis in California.

Leeds Heating Plan Tool

iBUILD researchers at Leeds University launch the Leeds Heat Planning Tool, a district heating planning tool for England and Wales, that can help local energy planners reduce fuel poverty. The tool can help promote district heating and could help councils cut household fuel bills.

District heating can reduce household fuel bills by as much as 40% under the right business models. It makes use of highly efficient generation technologies such as combined heat and power plants or heat that would otherwise go to waste.

District heating has been highlighted as an important energy technology for the UK's future low-carbon energy system. The Leeds Heat Planning Tool, developed by researchers Ruth Bush and Dr Catherine Bale, offers energy planners a quick and simple way to include social considerations, such as fuel poverty, right from the early stages of planning a district heating development.

"Many local authorities are keen to use the opportunity that district heating presents to reduce carbon emissions and fuel poverty at the same time," said Ruth Bush. "This tool offers an evidence base for planners to build a strong business case to ensure this can happen."

Free online tool , accompanying report and video: <http://sure-infrastructure.leeds.ac.uk/leedsheatplanningtool/>

Workington Case Study: A Value Briefing Paper

Arthur Affleck introduces analysis of the Green Book and a case study on the Workington bridges following the 2009 flooding events

iBUILD Work Stream 2: Re-thinking infrastructure value will be putting out a briefing paper exploring different types of value. Work Stream 2 looks at approaches to measure economic, social, technical and environmental values. The briefing paper examines current understandings and approaches to valuing infrastructure including HM Treasury's Green Book, social accounting and value engineering. Firstly, it provides a baseline understanding of these current approaches to calculating value for infrastructure projects and then, secondly, it applies them to the case study of the floods on Workington in order to identify strengths and weakness.

The Green Book is not a standalone document and provides a gateway to other governmental assessment guides, tools and data files. This methodology involves creating options and identifying value through cost benefit analyses. Social accounting identifies social impacts, but does not attempt to monetise outcomes. Whilst value within an engineering context will be found in lifecycle costs, positive and negative impacts or recycling materials. The briefing paper discusses the similarities and differences between these approaches. Although all the methodologies identify stakeholders, both the Green Book and value engineering assess different options and contain a financial element to assess value. Social accounting gathers information to demonstrate the benefits of a project.

The second part of the paper uses Workington's recovery after a major flood destroyed and damaged three bridges in 2009 to retrospectively apply the different methodologies to the case study. Over a three year period the town repaired and replaced two road bridges and a pedestrian bridge. In analysing the case study it was found that the Green Book would not have been fully utilised nor the recovery process benefited from public consultation. The application of different methodologies to a given scenario is an important for further work.

The upcoming paper is an interdisciplinary collaboration between Newcastle University Business School and , School of Civil Engineering and Geosciences and the School of Civil Engineering at Leeds University.

Grant Success



Phil Purnell (Leeds) has won a three year research grant jointly supported by NERC and

ESRC. The grant which also includes Andy Brown ,adds to the growing portfolio of interdisciplinary research affiliated with the iBUILD Centre. The Complex Value Optimisation for Resource Recovery from Waste project builds on a successful Catalyst award and will produce a methodology for systems analysis of waste-producing processes that combines micro and macro approaches to measuring flows with methods to assess the value of these flows.

New iBUILD Team Members



**Rachel
Mulhall**

Rachel is a Research Fellow at University of Birmingham

Business School, where she is currently working on a research study examining the functioning economic geography of the West Midlands economy. Rachel has a background in economic geography and is particularly interested in firm competitiveness, manufacturing and commercial energy management.

Rachel will be joining the iBUILD team to help support John Bryson and his work on alternative business models in infrastructure. Rachel will be drawing together a compendium of infrastructure, and infrastructure relevant, business models that can be used to inform the wider iBUILD project as well as specifically supporting WP1.3.

New iBUILD Team Members



Shifeng Wang

I will be working on WP 1.5 on integrated infrastructure modelling.

I obtained my PhD in Environmental Remote Sensing and Energy Modelling from the University of Freiburg in 2010. My expertise is environmental modelling and remote sensing. Before joining Newcastle University I worked for the University of Cambridge on monitoring and evaluating recovery following disasters using remote sensing, GIS and machine learning, and also worked for University of Aberdeen on energy-economic-environment modelling.

Mary Robertson

Mary is currently a post doc researcher at Leeds University Business School working on the iBUILD and EU FESSUD projects.



She is completing a PhD in economics at SOAS University, which uses the systems of provision approach to investigate the financialisation of the contemporary British housing system. Mary has previously obtained Masters degrees in Development Economics (MSc) from SOAS and Philosophy and Economics (MA) from the Erasmus Institute of Philosophy and Economics, Rotterdam. She obtained her BA in Philosophy, Politics and Economics from Oxford University. Mary formerly worked as a Senior Policy Officer for Emerging Markets at the Greater London Authority.

Upcoming Events

iBUILD National Stakeholder Event

The third iBUILD stakeholder event will take place on Wednesday 12 November in Leeds. The day will comprise of an update of the programme in the form of presentations, a choice of afternoon workshops to attend and participate in, followed by a panel debate. *Further details including the programme for the day and how to register will be available on the website in due course:* <http://www.ibuild.ac.uk/>

Recent or forthcoming iBUILD outputs

- Briefing papers on recently completed case studies: 'low carbon technologies: heat networks and smart grids' and 'urban retrofit'.
- Refined infrastructure business model framework and briefing paper.

International Symposium for Next Generation Infrastructure

BUILD team members Chris Bouch, Catherine Bale, Jonathan Busch and Katy Roelich will be presenting at the International Symposium for Next Generation Infrastructure being held in Vienna, Austria, 30 September to 1 October, 2014.

- Katy Roelich and Catherine Bale, 'Municipal energy companies in the UK: motivations and barriers'
- Chris Bouch, Chris Rogers, Chris Baker, Richard Dawson, Andrew Quinn, Claire Walsh 'Approach to the identification of user/infrastructure opportunities to improve infrastructure interdependencies as a precursor to identifying opportunities to improve infrastructure project value/cost ratios'
- Jonathan Busch, Catherine Bale, Christof Knoeri, Katy Roelich, 'Emergence of district-heating networks; barriers and enablers in the development process'

Abstracts for all the above presentations can be found at: <http://www.ucl.ac.uk/steapp/isngi/programme/presentations>

International Council on Systems Engineering (UK Chapter)

Chris Bouch will be presenting a poster at the Annual Systems Engineering Conference in November 2014, 'Developing New Business Models for Infrastructure: A Model Based Systems Engineering (MBSE) Methodology'.

International Conference on Sustainable Infrastructure

Josey Wardle (iBUILD PhD student at Newcastle University) will be presenting a paper at this event being held in Long Beach, California in November 2014. Josey will be presenting a paper on how changes in electric vehicle charging mechanisms may affect drivers' behavior.

Towards Integrated Modelling of Urban Systems

Richard Dawson (iBUILD Director) will be delivering a keynote address at this event being held in Lyon, France, 15-17 October.

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 or contact: Centre Director: Richard Dawson. Tel: 0191 208 6618. Email: richard.dawson@ncl.ac.uk Centre Manager: Claire Walsh. Tel: 0191 208 6447 Email: claire.walsh@ncl.ac.uk