The need for new business models to maintain UK infrastructure resilience

iBUILD Working Paper 14

February 2014

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This winter the news headlines have been overrun with stories of transport problems on the rail network due to coastal flooding and rising river levels, and this has prompted national debate over resilience of our infrastructure along with the response of local communities to the impacts of flooding. One of the headline stories has been the collapse of the London-Penzance railway line at Dawlish in Devon, leaving the region without a main railway connection to the rest of the UK. These storms have highlighted the urgent need for new business models.

The assault on British coastlines by storm, flood and sea this winter is a taste of things to come. Rising sea levels and a greater risk of coastal flooding are a significant threat. Britain is an island nation, and a great deal of important and expensive infrastructure, from ports and harbours to power stations and industry, lies along the coast. Roads and railway links are also vital—some entire coastal regions' economies depend on key highways or rail links.

Exposed infrastructure

The coastal section of the London-Penzance railway line that runs between Dawlish and Teignmouth in Devon is a perfect example and exemplifies many of the challenges that iBUILD is seeking to address. As the main railway connection for the southwest of England to the rest of Great Britain, it is a vital transport link for the Devon and Cornwall economy – and thus a particularly acute example of the economic and infrastructure interdependence that iBUILD is researching. Several sections of railway embankment have just been destroyed by storms, leaving tracks hanging suspended in space over the waves and may not reopen until mid-April.

Just a few metres above mean sea level, the line has been susceptible to frequent closure during high seas and storms ever since it opened in 1846. The past 30 years have seen the problem worsen, coinciding with rising sea levels, but the current damage is the most severe in its entire 178 years of service. It is currently estimated that the sea-level will rise 5-7cm between 2010-2020, which by my calculations could double the amount of disruption on the line. By 2050 services could be affected for several months of each year.

Rising tides

With sea levels set to rise over the next century, these extremes could become more severe and frequent. Around 1200km of UK coastline, around a third of the total coastline of England and Wales, is protected by sea defences such as sea walls, rock amour, and breakwaters to protect coastal communities and the services upon which they depend.

It is not a case of if, but when, the railway will be lost completely to the sea. It is vital that the region prepares for this eventuality, and although Dawlish is arguably the most iconic coastal railway, others in North Wales, northwest England and in Scotland already face similar challenges (for example in 1990 the British Rail embankment and sea defences failed inundating Towyn).

Living with change

Flood defence investment, like many other public infrastructures, has been reduced and further cuts are expected – although the recent event may reverse this trend. In the Southwest, plans to re-route the line have been dismissed as too costly. Taken from a purely transport economics or engineering perspective this may well be correct, but this evaluation does not take into account the wider socio-economic and environmental benefits of transport connectivity, such as access to employment, productivity gains, increased business opportunities and improved quality of life.

Improving how the wider socio-economic values of transport, flood risk management strategies, and other infrastructure can be captured in terms that are meaningful to decision-makers is a major theme of iBUILD. Without investment, the future of Britain's transport infrastructure services are at risk of failure and collapse, just as surely as the Dawlish-Teignmouth stretch of railway. The cost of clawing back from that eventuality will far outweigh the high costs of early intervention and adaptation – yet current business models fail to capture these longer term benefits. A key objective of iBUILD is to propose a range of new business models that may help unlock these benefits and identify potential financing and funding mechanisms to deliver infrastructure.

High profile and costly infrastructure such as HS2 and Crossrail often steal the limelight. However, as we are doing in iBUILD we must take a wider systems perspective of our transport infrastructure across a range of scales –recognizing the importance of local and regional infrastructure and the service it provides locally and to the wider UK economy, health and wellbeing.