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Regulation and regenerative eco-innovation: the case of extracted materials in the UK

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Overview

- What we know about regulation & eco-innovation
- What we don't know (what the gap is)
- How we are addressing this gap
- Discussion of insights from the case
- Why it matters

What we know about regulation and EI

- Consensus that *stringent, flexible and enforceable* regulation is most 'effective' (Dong *et al.*, 2014; Huber, 2008; Mickwitz *et al.*, 2008; Popp *et al.*, 2011; Kesidou & Demirel, 2012; Horbach *et al.*, 2012)
- But designing 'effective' regulation is not easy: ex-post evaluation reveals a high proportion of regulation leads to negative or mixed outcomes (Auld *et al.*, 2014)

What we know about regulation and EI

- Much empirical evidence that regulation can trigger the development and diffusion of different types of eco-innovation
- e.g. product, process and organisational EI (Horbach *et al.*, 2012; Triguero *et al.*, 2013; Hojnik & Ruzzier, 2016; Horbach, 2016; Penasco *et al.* 2016, Ramanathan *et al.* 2016; Castellacci & Lie 2017)

What we don't know (what the gap is)

- 'Regenerative' eco-innovations (REI) use the vitality of the eco-system to create added value for humans and nature (Hofstra & Huisingh, 2014)
- Hofstra & Huisingh (2014) position REI as the *most desirable* type of EI as they can "restore, renew [and] revitalise" natural systems
- Gap: effectiveness of the regulatory framework to support REI; further work on the 'roots' of REI (Hofstra & Huisingh, 2014; Hojnik & Ruzzier, 2016)

How we are addressing this gap

- Case studies capture the relevance of local institutional context (Del Rio, 2009; Blind, 2012)
- We selected the built environment (BE) as a close theoretical fit:
 - REI resonates with production/consumption of BE
 - REI in BE involves strategies that increase natural/social capital (van der Ryn and Cowen 2007; Du Pleiss, 2012)
 - Requires radical technical/organisational/ socio-cultural/political change (Mang & Reed, 2012; Cole, 2012)

How we are addressing this gap

- We focused on the use of extracted materials (EM) in the UK BE as a close empirical fit:
 - Rate of innovation is slow; Highly regulated
 - Largest consumer of natural resources, generates 25-30% of all waste
 - Historic reliance on landfill combined with recent regulatory focus on diversion, and surge of projects
- We triangulated secondary review with 32 expert interviews with the regulator, contractors, consultants, trade associations, clients....

Discussion - effectiveness of regulation

- Consensus in literature that *stringent, flexible* and *enforceable* regulation is most 'effective'
- In the case of EM, we see a stringent, multi-instrumental policy framework....
 - Environment Protection Act (1990), Environmental Permitting England and Wales Regulations (2010), Landfill Directive Regulations (2005); Landfill Tax, Aggregates Levy; Town and Country Planning Act (1990), Planning Act (2008); EU Waste Framework Directive (2008), Water Framework Directive (2000); CL:aire DOWCOP (2008), Aggregates Quality Protocol (2013)

Discussion - effectiveness of regulation

-but the implementation of the regulatory framework is characterised by stakeholders as inflexible and insufficiently enforced....
-and complex...and onerous

Discussion - effectiveness of regulation

- Auld *et al.* (2014) refer to the consequential 'effectiveness' of the regulatory framework
- The characteristics in this case undermine the potential effectiveness of the regulatory framework
- Reflects underlying limits to environmental regulation (Ribeiro and Kruglianskas, 2015) e.g. regulatory efficacy and economic efficiency

Findings – regulatory roots of regenerative EI

- Hojnik and Ruzzier (2016) evidence that regulations commonly stimulate eco-innovation
- Hofstra & Huisingh (2014) refer to REI as *restoring, renewing, revitalising* natural systems
- Whilst we found a few examples of inter-related REI in EM (e.g. Northala Fields Park, Wallasea Island)...
- ...Our analysis reveals a regulatory framework that currently hinders REI

Findings – other roots constraining REI

- EI is a social process (Boons and Wagner, 2009), especially in the 'archetypal network' built environment sector (Miozzo and Dewick, 2002)
- And EI in EM is a multi-actor endeavour....
- But REI would require the multi-actor innovation process to include a wider integration of natural and social value into strategic decision making

Findings – other roots constraining REI

- Economic e.g. demand constraints, high costs
- Technical and organisational e.g. knowledge and understanding of waste/involvement of experts, quality of EM, space (momentum, volumes, storage)
- Socio-cultural e.g. mind set (sharing info within/between organisations in meaningful timeframe), nature of industry

Why it matters

- Understanding better the effectiveness of regulation to support REI, and the roots of inter-related REI allows us:
- To respond to the global challenge of closing material cycles and sending waste to landfill; and
- To support the transition to a circular economy and the wider UN SDG 9 for a “quality, reliable, sustainable and resilient infrastructure”