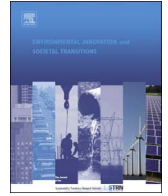




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Original Research Paper

Creating innovative zero carbon homes in the United Kingdom — Intermediaries and champions in building projects

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ABSTRACT

A transition to zero carbon buildings is needed for mitigating climate change. Yet, it is far from gaining sufficient momentum in many countries, particularly the United Kingdom. This article focuses on actors and platforms facilitating change towards zero carbon residential buildings by integrating the concepts of innovation intermediaries and champions. Drawing on interview data and building on the literatures of innovation intermediaries, champions and Strategic Niche Management, the article analyses actor configurations in three new build housing projects. The findings show that actors and platforms acting as innovation intermediaries advance zero carbon buildings at different stages of project development, with varying intensity, influence and longevity. Some intermediaries take also championing roles, while also other actors champion projects when intermediation is absent. At a time of limited policy support for zero carbon housing innovations, intermediation and championing activities become especially important in the transition towards zero carbon buildings.

1. Introduction

Actions driving zero carbon buildings are pertinent in the broader transition towards more sustainable energy systems. Such transitions provide an opportunity for the built environment to contribute to emissions reduction (e.g. Nykamp, 2017). It has been argued that to improve the energy performance of buildings, the building sector needs system innovation (Mlecnik, 2013). This means the integration of several independent innovations (e.g. technical products, applications, services) to work together to perform new functions or improve performance as a whole (Cainarca et al., 1989). The large scale adoption of system innovations, such as zero carbon buildings, suffers from complexities of the concept (Jain et al., in press) and the slow renewal rate of the building stock in general (Meeus et al., 2012). However, the myriad of actors involved in transitions (e.g. Wittmayer et al., 2017) such as intermediaries, could potentially be performing crucial activities that support the uptake of system innovations.

In the context of building new zero carbon homes, system innovation implies novel configurations of solutions relating to building fabric, insulation, ventilation, heat recovery, on-site renewable energy generation, and demand response. While many of the components already exist globally, a specific configuration may be a completely new kind of combination (i.e. system innovation) at least in the context of the United Kingdom (UK), where the building sector is locked into incremental innovation (Lees and Sexton, 2014), and low impact building solutions remain limited (Heffernan et al., 2015).

This article focuses on three case studies falling into the category of system innovation in zero carbon buildings, that have

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received less focus on innovation and transition studies than modular solutions, such as heat pumps (Caird et al., 2012; Hyysalo et al., 2013) and solar PV (Heiskanen et al., 2014; Smith et al., 2014). While system innovation may face more generic innovation barriers, due to its path breaking nature, system innovation may also require more support than modular innovation from intermediating agents to connect different innovations and actors, particularly in the diffusion (Van Hal, 2000) phase.

In this article, we draw on Strategic Niche Management (SNM), and the processes of niche protection (Schot and Geels, 2008; Smith and Raven, 2012) to analyse three innovation cases of zero carbon new build in the UK, paying particular attention to how intermediation and championing (defined in Section 2) have supported and facilitated the building processes. Different phases of niche development have been illustrated in the SNM literature: starting with the development of concrete local projects, where actors work together to connect, network, share experience and replicate, eventually forming a ‘cosmopolitan’ or global niche (Geels and Deuten, 2006; Geels and Raven, 2006; Seyfang et al., 2014). This niche is described as an abstract or imagined wider community within a field that consolidates, through intermediation, the experiences and learning from multiple local projects (Geels and Deuten, 2006; Geels and Raven, 2006; Seyfang et al., 2014).

We extend the emerging literature on intermediation in SNM by analysing intermediation from the perspective of specific niche projects, rather than from the perspective of specific intermediary actors; which much of previous research has focused on (e.g. Hargreaves et al., 2013; Seyfang et al., 2014; Kivimaa, 2014; Fischer and Newig, 2016; Bush et al., 2017). In doing so, we add a new layer to intermediation in SNM by focusing attention on who – besides those that operate on the ‘cosmopolitan’ niche level or as ‘global carriers’ of best practice (Seyfang and Longhurst, 2013; Seyfang et al., 2014) – are important in facilitating transition in specific projects. Thus, we complement studies on broader niche development (Hargreaves et al., 2013; Seyfang et al., 2014), paying attention to local projects, and their connections with the wider niche through intermediating actors or platforms. Championing tends to focus on supporting specific innovation projects (Klerkx and Aarts, 2013), and can, therefore, complement niche intermediation, which we analyse by focusing on the overlaps between intermediation and championing.

Previous literature lacks attention to the potential of intermediation and championing in local projects in a phase, when a cosmopolitan niche has already developed, and in particular in the domain of zero carbon buildings. We address this gap by examining case studies of specific building projects, shaped by the cosmopolitan niche. Although our main focus is on the building projects, we make a connection to the cosmopolitan niche by showing how intermediation and championing in this broader context influence the set-up of new projects and the transfer of learning from these projects to the niche. Our case study context is the zero carbon building niche that reached a take-off phase in the UK in early 2000 s but has not yet accelerated.¹ The niche has been significantly hindered by policy changes since 2010 (cf. Kivimaa and Martiskainen, 2017), particularly the removal of the ‘Zero Carbon Homes Target’ in 2015 (see Rosenow and Eyre, 2016; Ares, 2016). The niche incorporates system innovation as described above and shares a drive to develop, diffuse and mainstream zero carbon construction to address the old and inefficient building stock that contributes approximately 25% of the UK’s greenhouse gas (GHG) emissions (Palmer and Cooper, 2013).

Focusing on the specific building projects located in the City of Brighton and Hove, UK, we answer the research question: *How do innovation intermediation and/or championing manifest and evolve in the development of zero carbon building projects?* The research examines specifically:

- 1.) What kinds of actors take on intermediation and championing in the studied cases?
- 2.) What activities are associated with intermediation and championing in different phases of the building projects, and how are these connected with each other and to SNM?
- 3.) What is the relevance of intermediation and championing in the studied cases?

The article is arranged as follows. Section 2 discusses the conceptual framework used in the article, drawing on literature on SNM, innovation intermediaries and innovation champions. Section 3 explains the research method. Section 4 presents findings from the three case studies of innovative building projects. Section 5 discusses the findings, while Section 6 concludes.

2. Conceptual framework: strategic niche management, intermediaries and champions

2.1. Strategic niche management (SNM)

The literature on sustainability transitions claims that new technological and social innovations are needed to deal with the mounting challenges such as resource scarcity and climate change (e.g. Hoogma et al., 2002; Geels et al., 2008). While incremental innovation is typically supported by established socio-technical regimes, more disruptive innovations develop in niches; spaces in which they can seek momentum to emerge and diffuse (Schot and Geels, 2008). SNM was developed to better understand technological change in connection with economic and social changes, simultaneously, aiming to build more constructive relationships to progress the adoption of new technology to social contexts (Hoogma et al., 2002). Niches can be seen as protective spaces for innovations otherwise likely to be unsuccessful in the selection environments of dominant regimes (Smith and Raven, 2012). In this protective space, three intertwined processes nurture innovations (Hoogma et al., 2002; Schot and Geels, 2008):

¹ The key database for low energy housing in the UK, the Low Energy Building Database, lists less than 90 completed new built projects that were designed to be nearly zero carbon: <http://www.lowenergybuildings.org.uk/projectbrowser.php?fs=Private%20Residential&fes=PassivHaus> [Accessed 09.06.2017]

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