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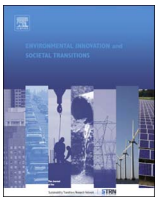

Original Research Paper

On the verge of change: Maverick innovation with mobility scooters

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ABSTRACT

Mobility scooter users provide a practical means through which to better understand socio-technical mobility and low-carbon transitions. The paper offers insights into how socio-technical low-carbon transitions can be influenced by peripheral, disruptive and unanticipated niche-innovations. The article reports on original empirical work conducted with mobility scooter users in a car dependent city, and the ways they negotiate a fossil-fuelled transport system designed for automobiles. Concepts from the multi-level perspective (MLP) are applied to better understand how the individual efforts of mobility scooter users conceived as 'mavericks' form a consensus of local practices (or 'practice-consensus') in early processes of 'niche' innovations. In doing so, insights are offered into how maverick experimentation and innovation within the automobile transport regime help understand different drivers of transition, specifically 'mobility justice', sustainability and commercial interests.

1. Introduction

Transport systems are a primary policy focus for low-carbon transitions (Geels et al., 2016). Prevalent in conceptualizations of future transport transitions is a vision of multi-modal, seamlessly integrated, low carbon technologies powering mobility for citizens. It is feasible that many short trips by combustion engine automobiles could be made instead by smaller electric battery vehicles fuelled by renewables in hybrid versions of present public and private transport systems (Royal Academy of Engineering, 2010). One such example currently available on the market is the 'mobility scooter' an assistive technology popular for a minority of users who experience age- or disability-related mobility disadvantage.

Our ambition in this paper is to understand the transformative potentials of mobility scooters in a car dependent city through the lens of the multi-level perspective (MLP). The MLP conceives socio-technical transitions across different scales from micro to macro: niches, regimes and landscapes. An MLP approach acknowledges how multi-dimensional interactions between industry, technology, markets, policy, culture and civil society may result in certain innovations coming to dominate some systems, for example the fossil-fueled automobile in transportation (Geels, 2012). According to socio-technical transitions thinking, niches may encounter 'friction' from incumbent systems and the competing, dominant technologies that are a part of them.

We suggest that dialogue on electric vehicles (EVs) is needed between communities of users, policymakers and planners (Wesseling, 2016). To do so, the paper offers insights to the potential role of 'mavericks' in early processes of socio-economic mobility transitions. A key contribution this paper makes is a detailed focus on processes and structures which are actually under that conceived as the 'niche level' within the MLP. Niches in the MLP-sense seem to refer to both categories of grassroots and market-based innovation. Seyfang and Smith (2007) understand 'grassroots innovation' as initiatives undertaken by committed activists within civil

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society arenas including 'mobility justice' and sustainability, in contrast to those driven by groups of pioneering consumers and risk-taking entrepreneurs and inventors (Hargreaves et al., 2013; Kirwan et al., 2013; Seyfang and Longhurst, 2013; Seyfang and Smith, 2007; Sheller, 2014; Smith et al., 2014). Hence, we conceive mobility scooters users as 'communities of users' that are linked by individual responses to a dominating system in what may be conceived within the socio-technical transitions literature as 'unprotected spaces', rather than 'communities with structure' within specific networks (such as those in grassroots innovations) and 'protective spaces' (Raven et al., 2016a).

A central concern of this paper is to consider the unprotected spaces below the level of niches where individuals undertaking embryonic practices must fend for themselves against unforgiving incumbent pressures. We suggest that before niches gain traction, users must first experiment and learn how to function effectively through trial and error with little support (and not too much resistance so as to trigger attrition) from the built environment and socio-cultural norms. These activities that operate below the niche domain are often omitted from discussions of socio-technical transitions because they operate outside networks of grassroots activists and organizations and include individual 'mavericks' who are often disconnected and isolated. Mavericks are conceived as people who are willing to experiment and adapt regular practices (Hoogma et al., 2002).

When considering sustainable transitions and environmental innovations in the light of policy, the role of maverick experimentation as a catalyst to system wide change is often overlooked (Sims et al., 2014). We position the mobility scooter, one of a handful of powered mobility devices, as a response to a window of opportunity for EVs more broadly (Faulks et al., 2013). We find that if EVs are to scale-up they will require an earlier phase of experimentation by an intrepid group of precursory users before a stable regime solidifies of car manufacturers, consumers, governments and providers of infrastructure (Bakker and Farla, 2015). The paper takes on board how electric battery powered mobility scooters hold important lessons for potentially less carbon intensive transport futures because they could reduce reliance on the fossil-fueled automobile, for short journeys particularly. Mobility scooters could be harbingers of a particular 'electric mobility trajectory' (Dijk et al., 2013) where EVs play a more prominent role than today, radically revising the geographies of petroleum powered motorcars. Hence, in the context of changing climates where demand for EVs is growing the mobility scooter (Image 1) is an example of a disruptive technology through both challenging current regulatory frameworks and serving as a site of everyday mobility experimentation.

Following this line of thinking, mobility scooters are arguably a type of 'green' technology (Knobloch and Mercure, 2016). In principle mobility scooters already achieve many of the goals of 'green cars' because they are privately owned; able to move from door-to-door (i.e., home to destination); safe, fast and convenient; and culturally important to the owner. In this regard, we consider mobility scooters to intimate a possible future where personal transport is more sustainable – in terms of using low carbon 'electric' batteries in tandem with 'clean' grid or off-grid energy – and more inclusive than the current regime dominated by fossil-fuel powered automobiles (Dennis and Urry, 2009).

The article is organized into four sections. In Section 2 we review the literature on the technical, legal and social aspects of mobility scooters. In Section 3 we specify the importance of the MLP to societal transition thinking, and move on to outline the importance of 'communities of users'; that is a social group made up of members who may not 'know' each other distinctly but have shared experiences from usage of a particular technology in 'unprotected spaces'. In Section 4, we discuss the methodology. In Section 5, we outline the utility of an MLP approach to help make sense of the practices of mavericks under three main themes: improvisation, capability and customization. In Section 6, we provide a conclusion which points to the implications of this work for further research related to societal transitions.

2. Literature review

2.1. What is a mobility scooter?

Ulrich (2005) describes the emergence in the 1990s of a variety of EVs and included mobility scooters as a 'frontier' technology for

Image 1. Mobility scooter user at the crossroads between pedestrian and road space, Albion Park, Australia (copyright authors 2014).