Part 3: Innovations for Low Carbon Mobility

11 The Constrained Governance of Socio-technical Transitions: Evidence from electric mobility in Scotland

Craig Morton

Institute for Transport Studies, University of Leeds, UK.

David Beeton

Urban Foresight, Newcastle, UK.

Introduction

The everyday use of cars to service the mobility requirements of citizens in most economically developed nations represents a firmly embedded social phenomenon. In 2013, 83.2% of all passenger kilometres were conducted in cars in the European Union, with little variation away from this statistic across the different member states (Eurostat, 2015). Whilst strategies to encourage multimodal behaviour by promoting the wider utilisation of public and active transport may assist in rebalancing the provision of transport (Graham-Rowe *et al.*, 2011; Santos *et al.*, 2010), the car is likely to remain the dominant form of mobility for the foreseeable future. Consequently, developing strategies through which to shift car based mobility onto a sustainable trajectory represents a prominent transport policy issue.

In an effort to address the considerable environmental externalities associated with the current mobility system, including the emission of greenhouse gases and local pollutants, focus has been on the development and deployment of technical innovations which may offer partial solutions to these problems (King, 2007, 2008; Schwanen *et al.*, 2011; The Committee on Climate Change, 2015). Most apparent in the technical innovations put forward involve alternative vehicle propulsion systems. Electric vehicles (EVs) are considered to be the most realistic alternative propulsion system and are currently entering the mainstream automotive market (Offer *et al.*, 2010). EVs have zero tailpipe emissions, allowing them to respond to the growing concerns around air quality, and they have the potential to offer low carbon mobility as a growing proportion of renewable energy generation comes online. With these benefits in mind, fostering an electric mobility (e-mobility) socio-technical transition has established itself as the primarily mechanism through which a sustainable future for the transport system in most economically developed nations will be achieved (Dijk *et al.*, 2013).

Due to the highly competitive nature of the mainstream automotive market combined with the current deficiencies of EVs regarding a number of key vehicle performance attributes (such as vehicle range and cost premiums), a natural introduction of EVs into the market will likely be ineffective (Steinhilber *et al.*, 2013). The continuity of the status quo in the automotive market is further supported by the high level of resilience displayed by the existing internal combustion engine regime (Wells & Nieuwenhuis, 2012). Governments are becoming increasingly aware of the need to assist and steer the purposive transition towards e-mobility. With this in mind, the government of Scotland has established a transition strategy aimed at promoting the adoption of EVs (Transport Scotland, 2013).

The specific circumstance of the Scottish Government, which represents a devolved administration of the United Kingdom (UK) with restricted authority, offers an interesting case through which to consider the governance of the e-mobility transition. It is the purpose of this chapter to consider this governance strategy by charting its development, implementation and evaluation. To assist in structuring the analysis, Loorbach's (2010) governance framework is employed which categorises aspects of transition policy into four different types of governance activity. Specific attention is paid in the analysis to ways in which governance activity is constrained as a result of the particular circumstances of the Scottish Government. These constraints cover issues related to restrictions in the Scottish Government's agency in certain areas due to powers reserved by the UK Government, the transference of regulatory authorities to the European Commission and the local conditions which exist within Scotland.

This chapter proceeds with an overview of socio-technical transition theory and the literature which discusses the governance of transition before outlining the strategy developed and so far implemented by the Scottish Government in an effort to support the transition to e-mobility.

The governance of socio-technical transition

The field of socio-technical transitions examines the processes of long-term structural change which involve transformations in technologies and shifts in the configurations of social activities within and between major sectors such as energy generation (Foxon *et al.*, 2010) and transportation (Cohen, 2012). Transition research pays specific attention to how these shifts and transformations lead to technological innovations progressing from niche applications to attaining a mainstream presence in the established socio-technical regime. These processes are often illustrated through the Multi-Level Perspective (MLP: Geels, 2002, 2005) which is displayed in Figure 11.1 and utilises three analytical levels to chart system evolution. These analytical levels cover technological niches, which encompass laboratories of variation and innovation, socio-technical regimes, which represent semi-coherent and established systems, and the socio-technical landscape, which represents deep structures that govern system operation.
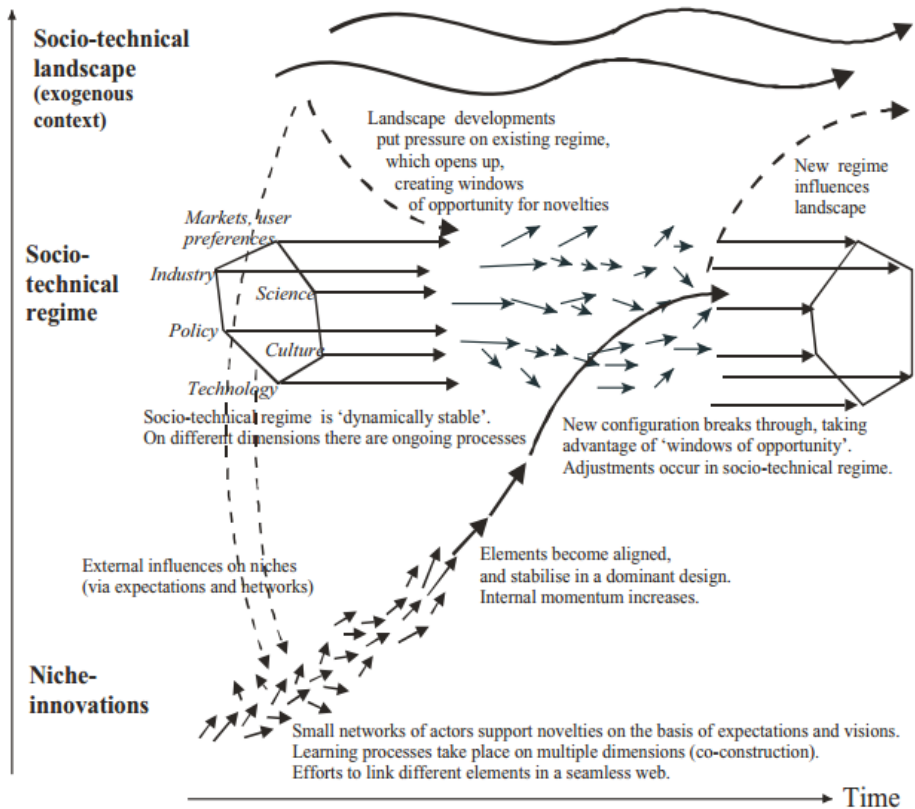

Figure 11.1: Multi-Level Perspective of the process of socio-technical transition. Source: Geels (2002).

Transitions can be generated by a mixture of emerging conditions and issues which produce selection pressures on the incumbent regime that induce change. Smith *et al*. (2005) suggest that the context which defines the nature of a transition can be mapped by considering the juncture of two dimensions. The first of these dimensions relates to the *level of coordination* displayed by regime actors and transition managers in their response to the changing selection pressures. The second dimension concerns the *locus of resources* required to respond to the changing selection pressures and whether these resources are internal to the regime or exist externally. Geels and Schot (2007) propose an alternative classification of transitions which makes use of the MLP to format a series of transition pathways which socio-technical transitions may follow. Their classification first acknowledges that selection pressures are highly varied, generating diverse responses from the regime actors and niche innovators. Moreover, both the *timing of the interactions* which occur in socio-technical transitions and the *nature of these interactions* will likely foster different types of transition.

Whilst the transition classification systems proposed by both Smith *et al*. (2005) and Geels and Schot (2007) use different approaches, they both recognise the role of *agency* in transition. Smith *et al*. (2005) argues that the ability of agency to make an appreciable difference in the transition process necessitates the exercise of political, economic and institutional power. The political expression of agency in the transition process is often referred to as transition management (Meadowcroft, 2009), which involves active governance that aims to guide transitions along desirable pathways. with increasing attention being paid to the facilitation of transitions towards sustainability (Markland, 2012).

The application of governance to facilitate desirable socio-technical transitions represents an intricate web of expressed visions, policy frameworks and intervening actions. In an effort to bound transition management into a series of issues, Loorbach (2010) put forward a governance framework which outlines the cycle which transition management tends to follow and classifies transition management into four types of activity. Frantzeskaki *et al*. (2012: 26) describe these categories as:

1   *Strategic*: activities at the level of a societal system that take into account a long time horizon, relate to structuring a complex societal problem and creating alternative futures often through opinion making, visioning and politics.

2   *Tactical:* activities at the level of sub-systems that relate to build-up and break-down of system structures (institutions, regulation, physical infrastructures, financial infrastructures and so on), often through negotiation, collaboration and lobbying.

3   *Operational:* activities that relate to short-term and everyday decisions and action. At this level actors either recreate or change system structures.

4   *Reflexive:* activities that relate to the evaluation of the existing situation at various levels and their interrelation or misfit. Through debate, structured evaluation, assessment and research, societal issues are continuously structured, reframed and dealt with.