Stasis, dynamism and emergence of the e-mobility system in China: A power relational perspective

David Tyfield[a,*], Dennis Zuev[b]

[a] Lancaster Environment Center, Lancaster University, UK
[b] Centre for Research and Studies in Sociology, CIES-ISCTE, Lisbon, Portugal; Nürtingen-Geislingen University, Germany

ARTICLE INFO

ABSTRACT

Efforts at urban e-mobility transition in China are of crucial global significance. Exploring these developments, however, demands significant reframing of dominant theories of socio-technical system transition to accommodate the strikingly different socio-political context of China to that of the global North where these theories have been developed. In particular, greater attention must be paid to issues of power, conceptualized as dynamic power/knowledge relations constitutive of social formations and evolving in interactive parallel with specific innovation trajectories. We illustrate such a productive reframing focusing on complex processes of empowerment and highlight that there remains relative stasis in the grand plan of a rapid transition to electric *cars* (EVs) in China's growing cities, with the EV still widely regarded as "risky" mobility. At the same time the EV in China is becoming a constituent of a new kind of digitized and smart mobility, as Chinese ICT companies emerge as globally powerful players establishing alliances with traditional automobile companies.

1. Introduction

Transportation accounts for approximately one quarter of global greenhouse gas emissions (GHGs) (IEA, 2015) and is key to efforts to mitigate climate change. Multiple transitions around the world are necessary to sustainable development (Kemp et al., 2007; Rock et al., 2009). While there is embryonic evidence of 'peak car' in the 'global North', especially amongst younger people (Cohen, 2012; Lyons and Goodwin, 2014), mobility-related emissions are rising fast in populous countries like China and India (Schwanen et al., 2011). These trends are particularly striking in China, rendering it globally central to low-carbon mobility transition.

Cars in China increased more than six times between 2002 and 2013 to 137 million (OICA, 2013). The 'car-ing' of Chinese society constructs China as a test-case in the challenges of decarbonizing urban mobility that face established 'car' societies in the global North, not just those of rapidly developing countries. Yet decarbonizing the currently car-based urban mobility is not merely pressing but is also a 'wicked' set of intractable, huge and *system* problems (Marletto, 2014).

The dominant policy narrative in China today, dominating plans for future city mobility at all tiers of government, focuses on decarbonising *car transport through electrification*, specifically in the form of a *Chinese* system of New Energy Vehicles (usually treated synonymously with electric vehicles, 'EVs', specifically electric cars) (Teng et al., 2015). The

EV thus represents a necessary starting point for analysis of current low-carbon mobility innovation in China.

Yet how are we to understand and/or expedite and shape urban e-mobility transition in China? This paper argues that literatures and theories dominating study of low-carbon system transition to date, and emergent from research focusing on case studies in the Global North, struggle with illuminating the radically different context – socio-political, economic and cultural – of China. Conversely, revisiting and developing a perspective on socio-technical system transition through reflection on the Chinese case presents a new power relational perspective that promises not only to illuminate this crucial global case more fully, but also to motivate a broader reframing of such work. Accordingly, our aims in this paper are two-fold: to present and demonstrate this power relational perspective at work in insightful analysis of the case of Chinese urban e-mobility innovation; and to highlight the theoretical insights regarding how this perspective is of broader relevance to addressing some of the persistent criticisms of systems transitions literature.

Central to this argument is that the issue of power has not been adequately integrated into the socio-technical analysis of sustainability transitions, yet is key to understand the transition to sustainable urban mobility, especially in China. We demonstrate the importance of analysis of innovation initiatives that focuses directly on the interplay between novel socio-technical interventions and existing relations of

power/knowledge (Flyvbjerg, 2004).

In particular, we show how shifting to a power relational perspective both broadens the relevant sociotechnical system under analysis from that of the (electric) 'car' to dynamic and emerging *systems of mobility*; and presents evidence, which is otherwise overlooked, of considerable system dynamism (section 5), challenging the stasis of continued techno-economic lock-in and innovation weakness (section 4). Finally, returning to the significance of our findings we highlight that the key future challenges for e-mobility transition in China are likely to become increasingly political and cultural; the dimensions that the socio-technical systems literature has tended, to date, to downplay. First, however, we explore the specific challenges China poses to existing Western-formulated theories of socio-technical system transition and articulate the necessity of a different approach to these questions that grapples directly with dynamic systems of power/knowledge relations.

2. Theoretical and conceptual issues: low-carbon transition in China as power transition

There is a distinct body of literature that focuses on transitions towards more sustainable socio-technical systems and which considers the dynamics of sustainable technological change in some depth (Smith and Stirling, 2008). This includes a socio-technical approach, along with the complex systems view and governance perspectives that were nurtured by the Dutch Knowledge Network on System Innovation and Transitions (Grin et al., 2010). The socio-technical transition perspective situates technologies in the contexts that enable them to work (ibid.) and focuses not only on artefacts (technologies) but the structures, agents and processes that reproduce a 'socio-technical practice' (Rip and Kemp, 1998).

The lack of attention to power and politics in transition studies has recently emerged as an important point of critique on early transition research (Avelino and Grin, 2016). There has been ongoing debate on the questions of agency, power struggle and politics in some of the theories of middle range, such as the multi-level perspective (MLP) (Kern, 2011; Kern et al., 2014; Lockwood, 2013; Smith et al., 2014). The MLP perspective, a heuristic which aims at explaining the process of substitution of a technological paradigm as new 'niches' of innovation grow to the point of discontinuity at system level, has been criticized for underplaying the role of agency – and cognate concepts such as politics, power, practices and daily habits, and culture – in transitions (Genus and Coles, 2008; Meadowcroft, 2009; Shove and Walker, 2007; Smith et al., 2010). Conversely, proponents have argued that the perspective accommodates issues of agency but has not developed analysis of some particular types of agency (Geels, 2011).

Nonetheless, responding to such criticisms there have been numerous attempts to include various types of agency and incorporate insights on power from political science (Grin et al., 2010), social movement studies (Elzen et al., 2011) and by developing a cultural dimension (Geels, 2014; Geels and Verhees, 2011). Grin et al. (2010) have developed a governance approach that aims to address the pivotal issue of agency, shedding light on its distributed nature and the multiplicity of agents that exert influence on a transition (Grin et al., 2011). The questions of strategic agency and ability of competent agents to connect are crucial in understanding the interactional dynamics between four institutions of market, government, science and technology and the outcomes. This perspective in understanding the politics of transition emphasizes that the regime embodies power and some of the practices of the regime will be preferred over the others. Hence the incumbent regime generates resistance to new, rising niches, including through the significant effects of its dominant discourses on struggles for legitimacy of the new innovations (Grin et al., 2011).

Other studies emergent from this tradition conceptualize power within a complex systems approach (Avelino and Rotmans, 2009; Rotmans and Loorbach, 2010). Avelino and Rotmans propose an interdisciplinary framework to study power in relation to structural change. In particular, they address the issue of "innovative power" as a "capacity of actors to create or discover new resources" (Avelino and Rotmans, 2009: 552) and stress the need to address empirically the exercise of innovative power in a micro-level, local context.

While taking seriously the neglect of the role of power in transition studies, however, these studies have continued to focus overwhelmingly on corporate, manufacturing and policy actors, leaving out the user or demand side (Shove, 2003; Spaargaren, 2003). At the same time many studies of politics in sustainability transitions draw on case studies in north and western Europe and have limited applicability to other geographic cases, including the majority world or potentially globally-significant ones, such as China. For instance, important studies of coalition politics (in the US - Hess, 2014) and advocacy coalitions (in Switzerland - Markard et al., 2016) have highlighted the need to consider the political circumstances that make adoption of policies possible or likely, yet these contexts are significantly different in China to western Europe.

Of perhaps greatest importance, however, is how even the most sophisticated literature (Geels, 2012; Smith et al., 2010; Van Bree et al., 2010) – while going beyond the persistent and inadequate techno-centric policy orthodoxy that characterizes policy in China – continues to deal insufficiently with the central role of power in the *construction, constitution, shaping, and driving* of such low-carbon transitions (Tyfield et al., 2015). To stress, therefore, the primary shortcoming of this literature is not that it must, nor even that it does, neglect issues of power, politics and culture, but that it continues to conceptualize these key dimensions – constrained by its ready-made multi-level framework – in ways that are unable properly to accommodate them.

Symptomatically, most studies thus focus on issues of power in terms of their ongoing difficulties as system "lock-in" (Geels, 2014; Marletto, 2014; Cf Unruh, 2000), rather than offering ways of productively conceptualizing possible discontinuities and 'break-out'. 'Power' is thus understood as a purely negative consideration, frustrating transitions that are understood to be desirable *ex ante* (on the normative dimension of MLP studies, see Smith et al., 2010), and often framed in thin, binary terms of 'good, 'green' innovation constrained by 'bad', 'high-carbon' socio-technical regimes.

This approach, thus, not only sets a research agenda overwhelmingly focused on the *quantitative* challenge of maximally expediting low-carbon transition, to the relative exclusion of the all-important and omnipresent *qualitative* and sociological considerations of *which* transition, benefitting whom and where. By conceptualizing power as that which is held by incumbent regime actors (perhaps 'over' weaker niche actors), it also presents an analytical framework in which regimes are dynamically locked-in almost by definition. The role of power analysis in this case, then, is to explicate the networks and interactions of the incumbently empowered, thereby explaining the ongoing tribulations of various desired low-carbon niches in effecting the discontinuity at regime level. This approach thus tends to privilege a certain resignation regarding the persistent intransigence of 'power' to resist socio-technical system change, together with an empirical gaze firmly directed to these constraints. And, conversely, it legitimates a particular Western political common-sense in which the apparent solution to this problem is explicit political resistance and/or social movement-building of various sorts.

Conversely, we elaborate the centrality of the political dimension in sociotechnical transition by proposing that politics and power relations cannot be something that is a mere sociocultural 'context' for innovation, nor something that enters the analytical gaze at a later stage. In placing politics as central, we are thus concerned more broadly with the transformation and (re-)constitution of and *by* power – or, on this conceptualisation, *power/knowledge relations* (Foucault, 2010; Dean, 2010; see Tyfield et al., 2015), so that power and knowledge are treated as two sides of the same coin –, as evidenced in the transformations and reconstitution of nexuses of social practices (McMeekin and Southerton,