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RESEARCH & INNOVATION (AND) AFTER NEOLIBERALISM

The case of Chinese smart e-mobility

David Tyfield

1 A cultural political economy of R&I as complex power/knowledge systems

Innovation matters in the twenty-first century. We need more and radical innovation to tackle unprecedented global challenges. But, conversely, many frontiers of innovation seem the very source of new existential insecurities. Meanwhile, innovation itself is a focus of intense political economic debate regarding its dwindling stagnation or its runaway acceleration, reflecting the prior two concerns respectively (Gordon, 2012; Brynjolfsson & McAfee, 2014). It seems, in short, that we cannot sidestep having to look anew at what ‘innovation’ really means as we explore where socio-technical change may lead next.

Here I introduce an approach that begins to do just that: a cultural political economy of research and innovation (R&I, altogether ‘CPERI’) that explores the co-production of R&I and socio-political regimes in terms of dynamic emergent systems of power/knowledge relations and technologies. This complex power/knowledge systems (CP/KS) perspective draws together cultural political economy (CPE) (Jessop & Sum, 2006), political ecology (Lawhon & Murphy, 2013), theories of socio-technical systems transition (Smith et al., 2010) and Foucauldian analysis of government, regarding the ‘conduct of conduct’ of polities and selves (Dean, 2010; Lemke, 2011), with a specific focus on issues of research and innovation (Tyfield, 2012).

CPERI can be read or reached in many ways, including as insights into the current ecological predicament, what (e.g. low-carbon) ‘system transition’ is and how it may be expedited and shaped (Tyfield, Ely et al., 2015). But it also leads to and emerges from exploration as to what ‘neoliberalism’ is and what its crisis is. Our primary interest here, though, is regarding how to think about R&I, and conversely how R&I is central to all of these prior issues and lenses, hence how all these are inter-related. Indeed, a CP/KS perspective not only helps us understand the present crisis but also offers insights into how we may get out of it… and the (political) questions, opportunities and limits this raises in turn.

Key to the CP/KS perspective is the reconceptualization of the process of system transition (and of innovation within it) through a CPE lens. This conception builds on Foucault’s discussion of power to explore “the total structure of actions brought to bear” by some on the actions of others’ (Hindess, 2006, 116, quoting Foucault, 2001, 336). Against contemporary common-sense understandings, therefore, power is not conceived as a zero-sum and brute capacity held
by the powerful over the powerless. Nor is power presumed to be normatively bad unless and until it is tamed by reasoned acceptance and legitimation. Instead, power – or power/knowledge – is dispersed, ubiquitous, strategic, relational, productive – of both larger ‘systems’ of government and of subjectivities – and normatively ambivalent. In particular, shifting from a structural account of power, as something possessed by some over others, to a relational and constitutive conception immediately loosens up and dynamizes concepts of system ‘lock-in’ and transition (Garvey et al., 2015; cf Unruh, 2000; Geels, 2014). Instead of an analytical and practical paralysis, therefore, in which those structurally enabled today seem immoveable, openings are presented to explore (and perhaps assist) emergent alternative regimes.

In other words, reframed in CPE terms, transition becomes a process in which power/knowledge relations mediate strategic agency that is, in turn, qualitatively shaping new power/knowledge relations and technologies (and hence power systems) (see Figure 7.1). Furthermore, with innovation itself conceived as a process of socio-technical power – i.e. as politics – it also becomes a privileged window into this process, precisely as the key reflexive moment of power/knowledge acting on itself.

The aim of this form of analysis – and especially in moments of system crisis, such as the present – is thus to draw on iteratively reinterpreted concrete evidence regarding contemporary processes of socio-technical innovation in order to trace possible emergent transitions in entire systems of power/knowledge relations. This involves searching for and testing embryonic glimmers of both: the dynamic, internally related and constitutive power ‘logics’ of such a system; and inseparably, the (power-saturated) process of how it could emerge from where we are, given the power–knowledge relations and technologies of the present, including, crucially, the specific dynamics of the ‘crises’ themselves.

This leads to three central claims that are taken in turn in the rest of this chapter.

- First, this approach reveals the aetiology of the present turbulence as the crisis of the incumbent dominant power/knowledge system, which I will call ‘neoliberalism’. The key question that emerges, for CPERI and the world, is thus ‘what comes after neoliberalism and how?’
Second, we turn precisely to this question, showing how a CP/KS approach illuminates innovation trajectories that, in 2016, are beginning to seed embryonic power transition. This hinges on how the crises together act as an urgence, conditioning dynamics of contemporary innovation that engender essentially contested but dynamic emergence of something else: a new (if still unquestionably capitalist) regime ‘after’ neoliberalism, including of R&I.

Finally, then, these dynamics are yielding futures that themselves threaten to be deeply troubling, but that also offer openings for strategic intervention, not least by a (critical) CPERI itself.

The key point throughout, then, is that innovation is not just needed to ‘solve’ these crises, as techno-economic problems ‘out there’, but as a crucial thread in the transformation of the broader socio-political conditions that prevent those problems being meaningfully addressed in the first place. And innovation is thus itself a key – still largely neglected – arena of twenty-first-century politics.

2 Neoliberalism, its crises, and R&I

What light can be shed on the present crisis conjuncture using this approach? The crisis is revealed to be one of a specific systemic regime of (liberal, capitalist) power/knowledge relations and technologies that may be called ‘neoliberalism’. This includes a specifically neoliberal model of innovation. Following the schema above, ‘neoliberal innovation’ should strictly be understood in the broad sense of the recursive introduction of power/knowledge technologies that can promote and constantly renew the neoliberal project. This would thus include policy and cultural developments, new financial products and forms of organization etc. So as not to extend this discussion too far beyond our focus on research & innovation (R&I), however, we focus on these more familiar senses of ‘innovation’ – which have, in any case, a heightened significance for neoliberalism as a system.

‘Neoliberalism’ is here defined as a dynamic and voracious power/knowledge system built upon a political project and ideology of epistemic market fundamentalism (Mirowski, 2011; Mirowski & Plehwe, 2009). This means that it elevates the ‘market’ from optimal mechanism of allocation, as in neo-classical economics or ‘classical liberal’ thought à la Adam Smith, to optimal and supra-human decision-maker. The key elements of neoliberalism follow immediately, in terms of its intrinsic and insatiable limitlessness regarding: the potential revolutionizing of all social institutions by their marketization; and neoliberalism’s particular thirst for rapid financialized economic growth and resource consumption, as these drive and are driven by growth of the ‘market’. It also follows immediately that neoliberalism is a political radicalism. For there can in principle be no compelling argument against further marketization as this is precisely to claim an epistemic superiority over the market that is no longer available. Together, then, these more concrete manifestations drive a process of relentless and insatiable marketization via recursive feedback loops (see Figure 7.2).

Research and innovation is crucial to this process in several respects (Tyfield, 2016). First, consider how the neoliberal project is premised upon the redefinition of the market as a primarily epistemic device, a ‘marketplace of ideas’ (see Nik-Khah, this volume). As such, ‘ideas’ or power/knowledges become the privileged medium of politically reconstructing societies around markets, particularly in two key forms: the novel mediation of social relations by profit-seeking socio-technological innovations (e.g. technologies to time-discipline, or simply replace, the home-visiting care worker); and/or market-supporting government regulation and
Transformation of institutions and identities and growth of new neoliberal-enabled power bloc

Progressive construction of (previously unthinkable) new ‘common sense’ need for (ever) more marketization

Assault of marketization on weakest link of existing social democratic settlement

Neoliberal system growth

Progressive construction of (previously unthinkable) new ‘common sense’ need for (ever) more marketization

Figure 7.2 The system dynamics of neoliberalism

legitimation (quintessentially privatizations and introduction of quasi-markets through novel forms of measurement, e.g. of the research and teaching ‘excellence’ of universities, then linking this to calculations of public funding). Moreover, ‘ideas’ themselves become a key sphere of social life to be subjected to marketization.

The result is, respectively, the construction of ever-greater systemic demands for, and fetishization of, ‘innovation’ together with the tendential conflation of science with (‘hi-tech’) commercialized innovation. This, in turn, involves the state-sponsored corporate enclosure of existing knowledge commons as well as a specific model of innovation that privileges innovation that:

- promises high, short-term returns, especially as financializable assets;
- focuses on products that service the market demands of corporate/individual consumers, as opposed to publics or states;
- supports projects of corporate enclosure of bodies of knowledge and so promises to maximize global corporate control of particular (technoscience-intensive) markets; and
- is constitutively dismissive of concerns about ontological limits and risks.

The quintessential example here of this broader neoliberal innovation model is GM agriculture (see Harrison et al., this volume).

But R&I is also crucial to the crisis of neoliberalism. This follows directly, in fact, from the intrinsically voracious nature of neoliberalism and the key role R&I plays in this regard. First, the permanent social revolution of marketization necessarily elicits endless and proliferating systems challenges (Pellegrini, 2011; Klein, 2007). These are, however, not crises in the first instance but precisely the opportunities for further neoliberal innovation by the Promethean entrepreneur. Such innovation is thus a socio-economic safety valve of sorts to the extent new consumer goods with significant market demand can emerge from the increasingly system-wide context of
instability. Innovation is thus crucial in neoliberal system maintenance because it is always and only the next round of neoliberal innovations that prevents the novel system challenges that neoliberal innovation itself produces from engendering broader system disintegration: an accelerating treadmill of innovation and novel risks (of growing scale and depth) that propels construction of a society and a dominant model of R&I of a specific, i.e. neoliberal, type.

Innovation is thus a key process in the ‘normal’ government of a neoliberal(izing) system always on the cusp of crisis but productively balanced as such. Yet, conversely, it follows that where this process has proceeded to the extent it is beginning to destroy (perhaps unacknowledged but nonetheless) essential conditions for such innovation, the accelerating feedback loop flies apart in a crisis of crisis management: the very definition of a system crisis (Jessop, 2013). As several other chapters in this volume amply demonstrate, there are strong arguments that this is exactly what is unfolding right now (see e.g. chapters by Schiller & Yeo; Pagano & Rossi; Lazonick et al., this volume).

The key point for our purposes, however, is how a CPE understanding of the pivotal locus of innovation in the recursive dynamic cycles of power/knowledge system government illuminates both:

1. the specific – and apparently now self-destructive – dynamics of the neoliberal project, its transformation of social relations and selves, and the self-imposed constraints on its specific model of innovation as these together propel themselves into a deepening system crisis of crisis management, and, hence that;

2. the primary problem for R&I today is not stagnation nor acceleration of R&I per se but the looming limits of a particular regime of R&I (as political process). This thus also stimulates an empirical search for possible, existing alternatives.

3 After neoliberalism: ‘liberty’ and ‘security’ through innovation as political process

What can follow and emerge immanently out of neoliberalism, therefore, and how? Studying R&I within a CP/KS framework affords a key window into this question as well, but calling for a different tack. Our discussion in the last section could go directly to the abstract dynamics of the neoliberal system, since these are there for us to study and are clearly documented. But how can we trace the outlines of a new power/knowledge system, in which entirely different qualitative dynamics are forming, circulating and sedimenting?

In these circumstances, the existing tacit common senses regarding boundaries between different concepts and/or realities – themselves products of the incumbent constellation of power/knowledges – in which context the researcher is herself inextricably located no matter how critical her perspective, are likely a positive impediment. Yet grounds to differentiate one set of speculations about future trajectories from another are still needed. So we must start analysis of possible futures by working ‘up’ from the privileged window (described above) of existing concrete innovation cases and trajectories towards informed speculation about broader, if embryonic, social transformations.

One approach to such an analysis is first to acknowledge a meta-dynamic of the specific types of CP/KS that we are here thinking about, including neoliberalism, namely the broadly ‘liberal’ capitalist regimes that have ecologically dominated (Jessop, 2014) the modern period. Here, in keeping with the CP/KS perspective, ‘liberal’ connotes a power/knowledge regime characterized by government through maximal production and consumption of (individual negative) freedoms (Foucault, 2010, 63).
It is not, therefore, to be confused with ‘liberalism’ – vs. socialism or fascism, say – as a political philosophy and/or normative stance of individual human rights and equality before the law. Nor should it be misunderstood as synonym for (liberal) democracy. Liberal regimes do tend to deploy the former as a key hegemonic power/knowledge technology and have a contingent and contested correlation with the latter. But what is essential to such a regime of power/knowledge relations, however, is that it is constitutively dependent upon the continued exercise and expansion of new liberties. And ‘liberties’ in turn must be understood in CP/KS terms, connoting a strategic orientation and enablement of pursuit of the aspirations of concrete individuals and groups who are, in turn, themselves shaped and constituted by those liberties and their differential access to them.

Of course, a crucial medium and process for the expression and expansion of these liberties is innovation – including as innovation of liberties. Liberal regimes are thus dynamic constellations that generate cycles of innovation, asymmetrically empowering power/knowledge relations and (new) liberties, each of a specific concrete form that performs and manifests the particular system logic of that type of liberalism.

This form of power regime has proven exceptionally resilient and protean in the modern period, expanding over ever-increasing stretches of the Earth’s surface through a turbulent and crisis-punctuated process that nonetheless has overcome rival regimes, including those it has itself engendered (e.g. Arrighi, 1994). Crucial to its dynamism, however, is the combination of the positive feedback loops of liberties as power/knowledges begetting and innovating further liberties.

But this process develops alongside an inextricable concomitant from a systems perspective: the dynamics of ‘security’ (Foucault, 2009) (see Figure 7.3). This denotes the emergence, shaping, (attempted) management and eventual overspill of existential ‘security’ threats to the integrity of that specific liberal system generated by the dynamics of its own particular model of (liberal) innovation. The comparatively unfettered proliferation of new liberties characteristic

\[\text{Figure 7.3 Liberty, security and innovation}\]
of a specific liberal regime necessarily produces and incubates new security threats to the integrity of the system. These arise as a matter of course from the very unregulated nature of the innovation that is the liberalism’s essential dynamic (Lemke, 2011; Dean, 2010). Indeed, the dynamic of neoliberal innovation and system growth/crisis management described above is evidently an instance of this dynamic.

Of course, liberties in turn beget further innovations, or counter-innovations, that attempt (more or less successfully) to domesticate and manage these innovation-generated security threats. Nonetheless, the parallel production of security threats with new liberties necessarily creates a specific dynamic and ‘mood’ to liberal regimes that adds a further aspect to the interaction of liberty and security. This concerns the inescapable construction of a deepening zeitgeist, and indeed reality, of multiple unsolved problems that are existentially challenging, both at system level and for individuals identified and shaped by that given system. Alongside the ‘liberty’ dynamics of innovation identified in essentially positive terms, therefore, there emerges a pervasive but largely unspeakable anxiety; a shadow-side that implacably compels ever greater innovation.

But this accelerating generation of liberties through innovation remains evermore deeply locked into the existing system logic. Hence, as unaddressed security risks accumulate with the very success of the specific model of liberal innovation (Biel, 2012) they increasingly cannot be addressed. For the existing and sedimenting common senses and institutions of that regime simply deepen the problems, while qualitatively novel problems also emerge that entirely exceed the capacities of existing power/knowledge technologies and their innovation. We see both of these factors at work today, not least in the barren conjunction of ‘innovation’ dominated by ‘Tech’ set against the unprecedented challenge of planetary ecocide. This eventually culminates in a definite overspill in which the security threats utterly overwhelm the existing liberal power regime: a system crisis (of crisis management), or in Foucauldian terms (1980, 195), an urgence.

Crucially, though, the emergence of an urgence, however, signals a renewed boost to the very dynamics of liberty and security not their collapse or transcendence. The urgence marks the incontrovertible emergence at system level of novel problems (including new ungovernable liberties) that are not amenable to the incumbent (liberal) CP/KS regime and its forms of innovation (out of problems). This thus stimulates systemic shifts in search of new orientations for actively pursued and liberalism-enabled strategic action.

This is a break with incumbent common-sense power/knowledges in terms of both: a newly earnest openness to both the ‘new’ itself and the potential for its qualitative, directional redefinition away from incumbent trajectories; and, conversely, a new openness and concern regarding the importance of ‘security threats’ that were previously blind spots. Together, these drive accelerated and pro-active adoption and development of innovations that both promise new ‘liberties’ and are newly ‘security’ conscious, drawing on what appears most ‘promising’ amongst the power/knowledge resources currently to hand.

In short, an urgence connotes a new public acceptance of both a new problem field for innovation (as political process) and, inseparably, demand for a new set of ‘solutions’ from that innovation, generating the accelerated self-interested strategic pursuit of individualized ‘liberty’ in flight from the new threats to ‘security’ respectively. These innovations, however, are not just new ‘hi-tech’ gadgetry, but the new power/knowledge technologies that develop and then constitute a new regime of system government.

These dynamics not only illuminate the current global predicament in the abstract, regarding the present crises as the urgence marking the end of the neoliberal regime. They also do so in terms of supporting a more concrete and empirical investigation into the key question of ‘what
follows neoliberalism? This involves exploration of contemporary and/or emergent dynamics of liberty/security that are profoundly transforming neoliberalism from within, through socio-political processes of innovation/counter-innovation.

Returning to the CP/KS schema above, therefore, specific arenas of socio-technical and techno-scientific innovation act as multiple empirical windows with privileged perspective concerning the necessary whole-system transformation immanent in the overflow and terminal crises of the incumbent power/knowledge system (of neoliberalism in this case). This analysis can also proceed in ways that, crucially, do not analytically need to take the existing dominant forms of any of the multiple system elements – institutions, agents and subjectivities, socio-cultural common senses, social ‘structures’ (cf Mirowski & Sent, 2008) – as ‘given’, even for heuristic purposes.

Instead, analysis of a given domain of innovation from a CP/KS perspective affords imaginative but empirically-informed speculation, as a genealogy of the emerging present. This approach studies how forms of innovation may specifically enable and disable particular socio-political constituencies, that in turn further pursue and promote those innovations, generating positive feedback loops of growing and self-sustaining ‘power momentum’ that can, over time, change what otherwise seem currently unshakeable and locked-in manifestations of institutional and structural logics (Tyfield, Ely et al., 2015).

4 Chinese smart e-mobility beyond neoliberalism

Here, there is only space to illustrate briefly what such an investigation reveals, at least on one reading that focuses on a key locus of contemporary global system change. Two overwhelmingly important trends emergent from the crisis of neoliberalism, and now pushing beyond it, are the rise of China and the emergence of Web 2.0-based informationalization. Both are clearly amongst the most important developments over the last twenty years regarding global political economy, socio-technical change and the dependence of both on changing power/knowledge systems; and both are unquestionable products of neoliberalism while also deeply problematic to a neoliberal project built upon an unrivalled US global dominance and supremely proprietary models of R&I.

Together, though, these point to the particular importance of an example of contemporary innovation that draws these two major themes together, as well as the broader perspective of ecological crisis: namely low-carbon urban ‘smart’ mobility transition in China. Examining this case study from a CP/KS perspective reveals precisely the abstract dynamic above at work regarding innovation within and beyond the crises of neoliberalism. In particular, in this case complementary and mutually antagonistic, and hence self-propelling, dynamics of innovation (as political process) and essential contestation are indeed apparent regarding potent contemporary issues of the individualized pursuit of liberty and the flight from deepening security threats (see Figure 7.4) (Tyfield, Zuev et al., 2015).

China in the 2010s presents a sociotechnical context of titanic and rapid change seemingly without precedent or contemporary rival. Moreover, at the core of these turbulent dynamics are precisely the twin issues of the progressive individualization of Chinese lives – i.e. liberties, albeit systematically constrained to the socio-economic not political realm by the party-state regime – together with intense exposure and lived concern regarding global risks (Ren, 2013; Yan, 2010) – i.e. security threats. Urban mobility innovation today in China presents a vivid example of this conjuncture in terms of anxious pursuit of the multiple, proliferating and uncertain prospects for personal development alongside profound concerns about socio-technical risk.
Seeking new liberties and fleeing new security threats

Emerging ‘middle-class’ urban auto-mobility (starting from high-carbon, C20 US model) calling for ‘liveable urbanism’

Fearing being ‘left behind’ and exposed to intense global risks (including from ICE auto-mobility) in worsening positive feedback loops

Digitization and informationalization of mobility and mobile lives

Innovations auguring fully-tracked mobility, jobs destroyed, dangerous (autonomous) mobility, battery risks, etc.

Creating new liberties and new security threats

BUT ALSO new mitigation/escapes from security threats

Figure 7.4 System dynamism in Chinese e-mobility innovation

We may start by noting how important autonomous mobility (including urban mobility or circulation) is, both to the market societies of liberal regimes (Foucault, 2009; Rajan, 2006) and to the contemporary (neoliberal-conditioned) globalizing world (Urry, 2007). This is all the more so in contemporary China, given the utter political imperative of uninterrupted economic growth as the central, load-bearing pillar of the party-state regime. Expanding and improving autonomous mobility is thus a key economic necessity of this marketizing and individualizing economy and, conversely, a key outlet for expression of growing personal appetite for autonomy, against the constraints in the civic/political sphere.

Indeed, and crucially, the societal dynamism of attempts to negotiate these twin imperatives is compounded (not diminished) by the fact that there is no clear model as to what substantively constitutes either ‘liberties’ (that will newly enable you individually or the society and country more broadly) or the ‘security threats’, only profound and dynamic disagreement. For instance, on the one hand, the incumbent and deeply locked-in global model of urban auto-mobility based on (aspiration for) personal ownership of a large, internal combustion engine (ICE) and glamorous (hence, in China, foreign) branded car exacts an irresistible attraction on the contemporary Chinese imagination. The obvious default definition of the expansion and consumption of liberty is thus growing (foreign) car ownership. Yet, of equal weight is the ubiquitous (and deepening) anxiety about the outcomes of this model of mobility: gridlocked congestion; commuter stress and isolation in massive new cities built and/or redesigned for cars; national industrial and innovation weakness in a ‘pillar’ industry; and hazardous air pollution and ballooning greenhouse gas emissions.

Is the incumbent ICE model thus ‘liberty’ or ‘security threat’? The answer is that it is essentially contested. Seeking to seize this as an opportunity, the central government has thus
pinned its hopes (and RMB10bn, £1bn) on leading the world in transition to the electric car (EV), ‘overtaking around the corner’ in the words of Science and Technology Minister and former Audi executive Wan Gang. But the various forms of electro-mobility vehicles systems that are springing up in competition are also essentially contested, and precisely in terms of liberty and security.

On the one hand, EVs as electric ‘cars’ have significantly struggled (for over a decade) to attract buyers, notwithstanding significant government perks including subsidized purchase and privileged access to hard-to-get licence plates and parking spaces. In short, set within a system (including infrastructures) of use and recharging that remains highly underdeveloped – and indeed a grid that would largely substitute tailpipe emissions with those of coal-generated electricity – the attractions of the new ‘liberties’ afforded by the EV do not in general trump the dis-incentives of exposing oneself to their unknown risks: of immobility (as in a dead-battery breakdown in predictable heavy traffic), financial (given high upfront expense but low resale value) and health (e.g. a widespread fear of ‘radiation’ from the battery, as well as of high-profile cases of battery explosions and fires).

Moreover, there is a ubiquitous example of indigenous e-mobility success in China that also elicits intense political contestation in terms of the liberty/security dichotomy: the electric two-wheeler (E2W). Against the paltry (if growing) sales of electric cars, the E2W is everywhere, with over 200 million on China’s roads, almost all of which are Chinese brands. And all of these have been bought with no government subsidy but on the basis that they have expanded the owner’s liberty. The E2W is thus an essential form of demotic auto-mobility in China’s marketizing society, and one that, unlike the EV, already has clear environmental advantages over the ICE car. It is thus potentially a key element of a new Chinese system of urban automobility, were its endogenous momentum harnessed. Yet for many in China, including the government, the E2W is also the epitome of contemporary security threats regarding urban mobility, as these nippy but silent – and often heavily overloaded – vehicles weave their unruly, wayward paths on and off pavements, against the traffic and ignoring all road signs and red lights.

Explicitly citing their ‘security’ dangers, therefore, the E2W has been officially banned in many major cities, including a recent clampdown across the country in April 2016 on sellers and owners. In short, whether regarding the incumbent (and still growing, in China) ICE car system, the government flagship but struggling EV or the budding mushrooms of the E2W, therefore, in this key social issue of socio-technical and low-carbon change we find an essentially contested landscape of recrimination and counter-accusation regarding the ‘liberty’ and ‘security’ aspects of each model.

How could this all play out? It is at this point that we must note two key dimensions of these processes and the formation of a new CP/KS to which they are contributing. First, at the heart of this contestation in all three cases is the key constituency and potential Gramscian historic bloc of the emergent Chinese urban ‘middle-class’[es] (Arrighi, 2009; Goodman, 2014). For this still-forming class is not just best-resourced to consider car ownership or not, and to experiment with new socio-technical alternatives; but also the constituency most enabled to make their demands – and their socio-economic and/or environmental demands in particular – heard, given their increasingly pivotal role in supporting (or not) the incumbent party-state regime and its economic growth-based legitimacy (Goodman, 2014; Geall, 2013).

Moreover, similar dynamics also pertain to the second key issue of the emergence of the digitization and informationalization of mobility, a parallel but inseparable aspect of system innovation in urban mobility, not least given the manifest incompatibility of electric cars with incumbent models of personal ownership and use. By contrast, digitization of mobility is likely both essential for e-mobility (via the ‘sharing economy’) and itself uncertainly evolving on multiple
fronts, including ride-sharing apps (of which China has its own in Kuaidi/Didi), car-sharing platforms, automated driving, real-time information about available parking and charging, etc.

On the one hand, this innovation is being embraced across China by start-ups, massive Chinese hi-tech companies (e.g. Alibaba, Tencent, Baidu) and even incumbent and powerful state-owned enterprises (SOEs) in electricity and telecoms, taking on the powerful automotive SOEs. In this respect, the comparative global weakness of Chinese car majors is arguably a strategic advantage regarding Chinese innovation of new urban mobility systems that shift the locus of primary industrial leverage from the mechanical vehicle to the ICT infrastructure. Moreover, while demand for an electric-powered ‘car’ is slight, demand for ICT-integrated gadgetry and networked individuality (Yu, 2014) amongst the urban middle class is both seemingly insatiable and, arguably already, technologically amongst the most advanced in the world. Yet, on the other, these novel forms of mobility are also generating contestation and counter-innovation, akin to the global controversial-ness of Uber, but where this must be understood to signal not innovation gridlock but its very opposite of significant systemic socio-technical and political dynamism.

This is generating new socio-technical innovations, but also, inseparably and no less importantly, new power/knowledge relations: hence institutions, common-senses, social groupings and self-policing subjectivities in a process that is essentially contested at every step. And it is driven by productive experiments of wrestling with the dynamic impulses of (networked) individualized (urban, ‘middle class’) Chinese striving both for new self-assertive autonomy, opportunity and aspiration and for security from both novel and familiar existential threats, including to these very freedoms.

5 Contesting the emergence of Liberalism 2.0

How, then, do these dynamics of liberty and security, innovation and counter-innovation, address neoliberalism’s deepening system-dysfunctional twin dynamics of deceleration to stagnation and acceleration to collapse? What new regime of government emerges? The answer, of course, is far from settled – it is constitutively contested! Yet, generalizing from the case study of urban mobility transition in ways that are indeed also evident in other domains, such as agri-food or renewable energy, we can still find a core dynamic. This involves:

- the parallel formation of both new socio-technical systems and the substantive meaning and identity of the Chinese ‘middle class’ (as historic bloc), and its constitutive aspirations (i.e. liberties) and fears (viz. securities);
- by way of emergence and shaping of digitized, informationalized and inter-connected socio-technical systems that are constitutively shaped by contestations over the new forms of enablement (i.e. liberty) and the new forms of danger and risk they themselves give rise to (i.e. security);
- and the coming together and mutual shaping of these two processes, in terms of 2.0 systems (including of ‘smart’ mobility) that specifically service this class and its growth and, conversely, substantive meanings of the Chinese ‘middle class’ that specifically support development of these digital innovations, in positive feedback loops (see Figure 7.4).

Against the stagnation/runaway dynamic of neoliberal innovation, therefore, this signals the potential embryonic emergence of growing demand for, and achievement of, substantive socio-technical change (e.g. in urban mobility systems) in concert with the shift in (and/or constitution of new) socio-political power relations necessary for transition beyond neoliberalism. Moreover,
foundationally shaped by profound contestation regarding the new security threats, this new CP/KS regime and its model of innovation will be intrinsically attuned to tackling and mitigating the ‘over-spilt’ global system threats of neoliberalism, at least as regards the exposure of this newly dominant hegemonic political constituency (if certainly not humanity as a whole – see below).

This power momentum generates and is fed by a proliferation of new market entrants and productive businesses that are (genuinely! (see Breznitz & Murphree, 2011; Zeng & Williamson, 2007)) ‘disruptive’ corporate competition in new markets and newly defined hybrid industrial sectors; hence furnishing new opportunities for productive capital investment, including new B2B (not just consumer) services and infrastructures, potentially involving China’s massive programmes of state funding. It also therefore feeds progressively into the formation and growth of new partnerships, forms of intellectual property, institutions and lobbies. Finally, as successful models take shape – an intrinsically uncertain and experimental process – and platforms open for further activity and innovation, a positive feedback loop emerges.

In this way, then, the key issue of socio-political change regarding the power/knowledge relations conditioning innovation such that it can, in turn, escape its current crises can begin to take place, and through a dynamic that is both immanent within the existing system and yet also intrinsically challenging to it. Indeed, from this central motor of system emergence progressive transformation of a whole host of other key systems dimensions can begin to be imagined. At the crucial global scale, for instance, this motor may drive the shifts in power/knowledge relations that lead to shifting geopolitics and global regulatory institutions and architectures, including of intellectual property, as well as a changing international division of labour of innovation and distribution its super-rent spoils.

In short, neoliberalism is actively replaced (its ‘non-dead’ zombie state (Crouch, 2011) allowed to die) because, in part, new self-sustaining, rather than self-destructive, models of (smart, low-carbon) urban mobility have emerged together with and through the emergence of the Chinese urban middle classes as the global historic bloc of the age – just as the motorcar, oil, inter-state highways, suburbs and out-of-town malls and the American consumerist middle and working classes were so central to the mid-twentieth century emergence of post-war Keynesianism from the ashes of nineteenth-century liberalism.

6 R&I politics as the key strategic arena of the twenty-first century

We must end any such analysis, however, by critically assessing the qualitative system dynamics of this emergent system in turn, including in comparison with neoliberalism. Certainly, the argument above offers no cause for complacency, as if all our problems are therefore solved. To the contrary, assessment of the tendential shape of the emergent system – as a ‘liberalism 2.0’ or ‘complexity liberalism’ – now becomes the key issue and responsibility, but also opportunity, for engaged scholarship of the political economy of R&I, a project taken up at length elsewhere (Tyfield, forthcoming).

Here, however, let us make just a few notes of outline. Let’s start on a positive note, through comparison with neoliberalism. Constitutively focused on intense complex system security threats, this emergent system would surely repudiate – actively and directly – the core tenet of neoliberalism, namely its epistemic market fundamentalism and its consequent ontological agnosticism and Promethean limitlessness. Hence through dynamics of emerging successful low-carbon innovation alongside socio-political change, this new regime should likely be characterized by a quantum improvement in efforts to address climate change, since the very dynamism and socio-political hegemony of its new historic bloc will be founded precisely on that success (at least on some definition).
But this is hardly to augur some kind of new Golden Age (cf Perez, 2009). For, while marking a definitive step back from neoliberalism’s politically neutralizing epistemic market fundamentalism, this remains a regime that is still constituted, politically, by the feedback loops of individualized liberties and security fears. And the outlines of this novel political spectrum can already be imagined, thereby revealing another way in which R&I will attain even greater political centrality. For the combination of digitization and a Chinese middle class suggests a socio-political order built not just on a revitalized rate of (2.0 informational-based) R&I, but also one in which these power/knowledge technologies are increasingly entrusted with ‘normal’ government, likely using complex systems that are not amenable to individual human cognition, oversight or accountability (cf Amoore, 2006). In these circumstances, therefore, recognizing that R&I is not only central to socio-political systems but also that it is itself thoroughly, if not primarily, political – not the neutral process of ‘technological progress’ that remains the orthodoxy in discussion of ‘innovation’ – is thus a key element of any prospect of a meaningful and contestable, and hence possibly ‘democratic’, politics in the twenty-first century.

Meanwhile, the mutually reinforcing and policing dynamics of liberty and security as strategic orientations of (networked) individual power/knowledge agency are necessarily enabling of specific groups and their liberties (in positive feedback loops), but in ways that thereby construct this view of the world as quasi-universal power/knowledges of growing legitimation and enablement. Conversely, this process also constructs the new and mutually constitutive common senses regarding the form, identity and best means of dealing with security threats to and states of exception from normal system of liberal autonomous (self-)government. Yet, as Foucault and other scholars of (nineteenth-century) liberalism have shown (Losurdo, 2011), this tends to active construction of groups subaltern to the newly enabled and ascendant groups of the historic bloc as themselves (new) security threats.

This is so even as the original growth and emergence of the new regime will likely in the first instance effect demonstrable progress in tackling the intense clear-and-present security threats of the urgence that catalyzed their very emergence. Indeed, such initial ‘success’ is a key dimension of that very dynamism, furnishing compelling if limited grounds for its claims to universal legitimacy. The more enabled, productive, self-confident and self-righteous the historic bloc becomes by way of specific power/knowledges, however, the more it also constructs parallel system-constitutive blindnesses, denials and aporia – the sources of considerable tensions that will likely, in turn, come to challenge its ecological dominance as a regime in time.

In short, while the Chinese urban middle classes and their global hegemony may be co-produced with a stunning and ecologically essential efflorescence of low-carbon and ‘cleantech’ innovation and systems transition, it is highly likely, in a country already so profoundly unequal and formally divided into two nations of urban and rural residents (Whyte, 2010) and with such poorly developed mechanisms for political protest, to take a specific form that greatly improves the livelihoods of the former (and their international cognates) while, at best, ignoring and, at worst, directly and significantly intensifying exploitation of the latter; and, at every step of its success, rendering the growing grievances of the latter increasingly ‘illegitimate’, ‘unreasonable’ and invisible. As I have detailed elsewhere, these embryonic dynamics are already visible regarding low-carbon mobility in China (Tyfield, Zuev et al., 2015), regarding issues of personal quality (or suzhi) (Anagnost, 2004).

This leads us to the final key point about a CP/KS analysis: that this projected future is, of course, not a prediction, aiming to get the answer right and/or motivate a ‘scientific’ revolutionary movement. Instead it is an informed speculative meso-level extrapolation of existing system-productive power/knowledge dynamics, done primarily with a view to strategic illumination: of both relatively locked-in political trajectories and, equally, political openings
and opportunities. Indeed, since (i) innovation is a political/knowledge process, amenable to shaping by diverse power/knowledge interventions and (ii) CPERI research is itself a power/knowledge process within that system change (and, importantly, amenable to self-conscious conceptualization of itself as such), together these spell the possibility and necessity for the latter to intervene directly in the former.

The tendential emergence of liberalism 2.0 should be interpreted in just this way. This points to a new direction and role for CPERI itself in socio-political life, as a key practice of situated, strategic and power-aware wisdom – a phronesis (Flyvbjerg et al., 2013) – regarding the heightened and qualitatively novel importance of R&I as political process in the government of twenty-first-century global socio-technical systems. This would involve stimulating broad-based publics to engaged in strategic reflection and reflexivity regarding both specific emerging issues of R&I and sociotechnical change (again as political processes); and, crucially, meso-level tendencies of system dynamics as a whole, as in this chapter.

References

Research and innovation after neoliberalism
