China: Time For a green revolution

By
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China's Communist leaders are going to have to think radically outside the political box if the enormous population is to convert to the car without choking the country.

I'm going to talk about greening China's cars. The greatest challenge for contemporary mobilities research is how – or rather, if – a socio-technical transition to 'sustainable transport' is possible. Transportation accounts for about a quarter of global greenhouse gas emissions, and it is key to efforts to mitigate 'climate change'. In this respect, perhaps the most significant single development is the transformation in recent years in mobility in China. China is obviously now central to the world economy. But in 20 years it's also gone from a society dominated by slow means of travel – walking, cart, donkey, even – to one based upon fast modes, especially cars. And although its greenhouse gas emissions remain, on a per-person basis, only about a seventh of the Americans', for instance, in 2005, it's already the world's largest overall emitter and of course, still growing.

The world's largest car market

Cars in China have increased massively, even in the last decade. There were about 9 million cars in 2004, 40 million by 2010. And growth is expected to continue at around 7 or 8 per cent over the next 20-30 years. So there are varying forecasts but they could be as many as 100 million as early as 2015. The size of its population and the increasing income of Chinese households have already made China the world's largest car market. But car intensity in China remains relatively low, despite all this growth, especially compared with somewhere like the US. So, this suggests further dramatic growth, but also enormous problems. In short, American car intensity, which would seem to be the obvious extrapolation, is simply impossible in China. This would involve something like 970 million cars, 50% more than the entire worldwide car fleet in 2003, and consumption of over 100 per cent of all world oil outputs.

Transition from one sociotechnical system to another

So, the 'greening' of China's urban mobility is an urgent and global issue, and it's also a hugely difficult, complex and multi-layered challenge: the challenge basically of transition from one system to another one, a newly constructed system. But what do I mean by a 'system'? There is increasing recognition that innovation is not simply a matter of introducing new technologies. Rather, new technologies are developed, adopted, only to the extent that they are shaped to fit the specific social, economic, cultural circumstances. And, of course, in turn that process shapes those social circumstances. So since causation between these various 'factors' is complex, it's in multiple

directions, it's not linear and simple, it doesn't make sense to analyse each one in isolation. Instead, together they constitute a system and this system is both social and technological – a 'socio-technical system'. And amongst the most entrenched and important of these systems in modern life today is that of 'the car' – 'automobility', as it's called. So there is a growing body of excellent work in the social sciences concerning low-carbon and mobility transitions based on the recognition about this transitions systems innovation. But the problem is that much of it struggles still to deliver on the promise, which is its primary source of its appeal, not least to policy-makers, who want to try and do something: that is, of course, to try and spot, to seed, to support these urgent low-carbon systems transitions.

How does the power transition happen?

A key gap that, I would argue, in this framework is associated with the absence, or inadequate conception, of power. Power is conventionally understood as that which is held by one party such that they can make another do something against their will. So this conception of power is basically negative: it hinges on illegitimate coercion and is primarily a matter of preventing others from doing what they otherwise would like to do. The problem with this conception is that it becomes impossible to explain how transitions in power ever happen. How did those with power come to lose it when they were previously 'in charge', and how did others gain power when they previously had none? Clearly, this is a major problem for analysis of system transition, including automobility, where incumbent systems include many powerful players, and of course the automobility system includes many powerful players – car industries, oil industries, etc. The key question about power, in other words, is 'how?' 'How did those who are now powerful come to be in that position? How do they maintain that position? And how do others acquiesce to, support or resist that situation of not being powerful? So to answer these questions we need a more insightful conception of power. This sees power as a matter of relations, power relations, and relations that are mediated by specific technologies, in a broad sense. So this would include discourses, forms of measurement or reasoning. Power is thus productive, in that it constitutes particular socio-technical systems. And power is normatively ambiguous, not just negative, in that it is an empirical question whether it involves coercion or consent, and most likely a complex mix of the two. In other words, then, power is what makes a system transition happen – or rather a system transition is inseparable from a power transition. A socio-technical system change in mobility, therefore, must also be studied in terms of the key question: what are the changing political coalitions and identities that could drive an emerging system transition? And, crucially, how are these enabled by emerging technologies – that these newly powerful coalitions themselves have a major stake in shaping and driving forward?

The flop of EV despite the industrial policy

OK, background: let's briefly think about mobility transition in China from this perspective. Despite the shock of bankruptcies and increasing acceptance by car transnationals in recent years of the need to decarbonize vehicles, in fact there has been no significant transformation in the industry. The preference for producing and improving internal combustion engine cars remains completely unaltered and there are no disruptive new players that have emerged. The most noticeable exception to this industrial strategy, however, is in China. There, the electric vehicle has been seized upon by government and by companies alike as the break they need to construct globally competitive brands. So China now has the most aggressively supportive industrial policy for electric vehicles anywhere in the world. Despite all this, electric vehicles – I'll say EVs – have proved a singular flop in recent years in China. Government targets for EV sales in government-selected pilot cities have been significantly missed. And what few purchases have been made are largely concentrated in municipal government-controlled taxi fleets. Private sales are almost totally absent. The key issue here is the sheer expense of the up-front costs of buying an EV, due to the price of the battery.

Electric two-wheelers as a disruptive innovation

But an alternative, and more hopeful, story can be told by focusing on the disruptive innovation of electric two-wheelers. A disruptive innovation may, in the first instance, afford lower functionality than existing products according to what are the existing social definitions of what the product is or does. But by offering them at lower cost and possibly with new combinations of functions, a new market is opened up that may – in the course of time, as that disruptive innovation itself improves – entirely disrupt the market. The classic case here would be something like the digital camera. A consistent insight of innovation studies is that transition may well originate in innovations that appear at the time peripheral, small or otherwise unpromising from the perspective of the incumbent system. This is exactly what disruptive innovation is. Moreover, Chinese businesses have been noted in the literature to have particular strengths in disruptive innovation, rather than in cutting-edge, high-tech, high patent innovation. And particularly, a key example of this is the electric two-wheelers. These companies have been built in China on offering consumers hugely popular variations of existing products, and this in turn actually establishes a momentum, a source of revenue that, in turn, seeds increased Research and Development expenditure and which allows for innovation, further growth, further improvement, etc .

Redesigning the idea of car against the authorities view

So this presents a striking contrast with the utter failure to date of the hi-tech, proprietary EV model that is supported by government. EVs have struggled to make any sales at all and remain much more expensive than conventional internal combustion engine cars. So they're utterly dependent upon government subsidies. Conversely, electric two-wheelers are now effectively ubiquitous in China. There are 120 million by 2010; they have appeal as low-cost, speedy (perhaps they can go 40-50 kilometers an hour); they're nimble, they're able to weave through congested streets, onto and off pavements. And the electric two-wheelers that are the bestsellers in China, in this huge spontaneous market are themselves Chinese brands. On top of that, as electric, as smaller and lighter and more mobile, they are also more energy efficient, even than an electric vehicle, obviously much more so than a conventional car. And finally, this success has been not only in the absence of any government support but rather, against attempts across China to actually ban these kinds of vehicles. So the most important consideration regarding these electric two-wheelers is their potential for the social redefinition of the very idea of the car. The form of these larger vehicles is open to radical redesign, since an electric drive train removes the engine and transmission of an internal combustion engine around which the rest of the conventional car has to be built. Developing electric vehicles from electric two-wheelers particularly enables innovators to explore disruptive possibilities for the form, the very design of the car. This is particularly clear when set against what is a growing and widespread practice across China of shanzhai or 'knock-off brands'. This is the tinkering of small garages with existing vehicles to convert them into electric vehicles, and it's widespread across China, often turning them into three-wheelers. So, this 'game-changing' innovation is also attracting attention of established car companies. For instance, at the Shanghai Expo in 2010, the joint venture between General Motors and Shanghai Auto [GM-SAIC] displayed an electric bubble car, which is not easily classified as either an electric vehicle or an electric two-wheeler because it sits two people but side-by-side on two parallel wheels, and these gyroscopically raise the vehicle up into a balanced position – something that is futuristic and 'wow'.

Disruptive innovation as a political game-changer

So it's at this point that we must return to what I was saying about power, because such disruptive innovation, for all its potential, will remain a niche, however big, unless it is capable of transforming the existing politics of the automobility system. The political reorganization was relatively simple in paradigm cases of disruptive innovation, such as the digital camera. In these cases the technologies and power relations involved were such that an individual consumer choice was relatively free to

migrate from old to new technologies. For instance, consider just the low costs and low inconvenience of replacing your camera or your Polaroid for the camera in your phone. This is evidently not the case for the system – the system, the system of systems – automobility. From this perspective we can also consider anew why electric two-wheelers have been so penalized and excluded by current Chinese regulation. The 35-year process of 'reform and opening up' in China has been carefully managed by the Communist Party in order to maintain its monopoly of state power. This process, of course, has not been without major crisis, especially the events of 1989. This resulted in an even deeper commitment by the Communist Party to economic growth as the key to the regime's continued political legitimacy and the effective abandonment of all socialist discourse. The result has been the spectacular – even unhinged – economic growth of the past two decades. This includes the construction of a market economy and, with this, the historically unprecedented processes of urbanization, 'automobilization' of society that are continuing today.

Automobility, the focus of strident political demands

Evidently, continuation of such growth in turn depends upon the deepening of these processes. But this not only expands powerful demands for personal autonomy in Chinese society. It also exacerbates problems of the automobility system, thus engendering popular discontent. So the result is that the politics of automobility are increasingly pivotal issues in Chinese domestic politics, even at the level of explicit political discourse (notwithstanding constraints on freedom of speech). Congestion, pollution, road safety, road-building and land acquisition, new hi-tech mobility risks and even parking are now major sources of increasingly strident political demands. So we have here a trilemma; a dynamic of increasingly fundamental challenge to the current political regime: increasing automobility is both antithetical to the totalitarian, authoritarian logic of government constitutive of the Communist Party's one-party state, but it also engenders significant political unrest; and yet on the other hand, increasing automobility is a commitment to which the Communist Party's own survival is increasingly wed.

Electric two wheelers: an uncontrollable automobility

So while the CCP – the Communist Party – is thus ever more fundamentally committed to automobility, electric two-wheelers are not merely a useful demotic spread of automobility. Rather they are technologies that afford a particularly dangerous or uncontrollable automobility, existential threats to the current political system. Hence the ubiquitous justification that you see in official discourse of measures against these vehicles in terms of 'public security'. This is a matter of, for instance, the cause of traffic accidents, collisions with pedestrians, theft – they're obviously silent, they can creep up behind people, apparently – and even, paradoxically, causing congestion. So how then can this circle be squared? Focusing on power as a productive, dispersed, technologically-mediated set of changing relations is crucial in helping us think through this question. For this perspective directs us to the possibility that the key technological issue for a mobility transition may well not be in the technologies, that is, the machines, of mobility per se. Rather the key issue may be how these mobility technologies interact and coordinate amongst themselves and the technologies that they must integrate for this to be possible.

Who will benefit from the merging transition?

From this perspective, the current 'uncontrollability' of electric two-wheelers points to a set of complementary technological developments in automobility innovation that could be key sites for exploration of emerging transition. This is, namely, the increasing incorporation of information and communication technologies, web 2.0, etc, into vehicles, as the car shifts from a predominantly mechanical to electronic device. Combined with a disruptive model of the vehicle itself, one can then readily imagine a productive and positive feedback loop between the ICT-based and vehicle-focused redefinition of the 'car'. So what are the key questions for the future of low-carbon mobility that we take

from this analysis of the Chinese situation? First, how are ICTs integrated into vehicles and what are the political implications of these new technologies? Secondly, how do consumers respond to, actively accept or resist and thus shape these emerging technologies? And finally, and arguably of greatest importance, which power relations are enabled – and which people benefit and who loses out – as a result as new social definitions of inclusion and exclusion take shape with the emerging socio-technical – and, of course, political – system?

Mobility

For the Mobile Lives Forum, mobility is understood as the process of how individuals travel across distances in order to deploy through time and space the activities that make up their lifestyles. These travel practices are embedded in socio-technical systems, produced by transport and communication industries and techniques, and by normative discourses on these practices, with considerable social, environmental and spatial impacts.

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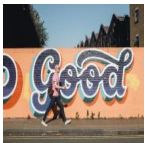Video by David Tyfield

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