Digital Infrastructure in the Chinese Register

Fractal Art.
PC: Pixabay.com.

Hallam STEVENS

Science and technology studies now include a significant literature that examines the practices and meanings of ‘digital infrastructure’. This literature can help us to understand some of the importantly different aspects of digital infrastructure in China. In particular, it illuminates ways in which physical and digital infrastructures in China are tightly interwoven, and highlights the importance of examining the relationships between digital infrastructure, human bodies, and labour. These entanglements suggest that digital infrastructure in China is playing an increasingly important role in shaping the relationships between citizens, corporations, and the state.

There is now a large body of scholarship—broadly centred on the field of science and technology studies (STS)—concerning ‘digital’ or ‘information’ infrastructures. One strand of this intellectual genealogy leads back to the work of Langdon Winner in the early 1980s. Winner (1980) argued that ‘artefacts have politics’—that all technologies, from forks to nuclear power stations, have a ‘politics’ embedded into their physical forms. Winner’s key examples were New York City overpass bridges that instantiated racist politics by being built so low as to keep public buses (and therefore low-income, mostly African American commuters) from reaching beaches on Long Island. Current scholarship in this vein often uses the language

of ‘affordances’ to describe how technologies either reinforce or undermine particular views or practices (Davis and Chouinard 2017).

In the 1990s, scholars began to ask similar questions about the online, digital, and cyber realms: if a physical object could have a politics, what about a virtual one? Star and Ruhleder (1996) examined the development of the online ‘Worm Community System’—a digital infrastructure for coordinating biological information and communication. Building on this, Bowker and Star’s *Sorting Things Out* (1999) examines the role of classification systems (especially databases) in structuring our everyday lives. As such, this book forms an important basis for thinking about how data structures, file systems, databases, and other ‘digital infrastructures’ influence, undergird, and structure our doing and thinking.

The STS work on digital infrastructures (and ‘information infrastructures’) has now expanded in many directions (for example, Borgman 2007; Bowker, Baker, Millerand, et al. 2009; Edwards, Bowker, Baker, and Jackson 2009; Pollock and Williams 2010). One crucial development here is the increasing crossover between the concerns of infrastructure studies and ‘platform studies’ (Bogust and Montfort 2009; Plantin, Lagoze, Edwards, and Sandvig 2016). Platform studies emerged in response to the fact that much of our experience on the Web and on our phones is structured not by ‘computers’ or ‘the online’ in a general sense, but by ‘platforms’ (平台, *pingtai*) such as the iOS, JavaScript, Android, Windows, Atari (Montfort and Bogust 2009), the World Wide Web (Sandvig 2013), etc. As this (very partial) list already suggests, platforms can exist at many different levels—platforms can exist on platforms that are built on platforms. Nick Srnicek (2016) argues that the most widely used of such platforms—AirBnB and Uber or, in the Chinese context, WeChat and Didi—are now critical in structuring our economic and social worlds.

There are also important overlaps between infrastructure studies, critical algorithm studies, and critical data studies (Illiadis and

Russo 2016). As many scholars have noted, an increasing amount of our lives, online and offline, is dominated and structured by algorithms and flows of data, which are often hidden from view. Google’s PageRank algorithm, for instance, and the algorithms that determine what appears on our Facebook feed, are obscured by both trade secrecy and their technological complexity. Many such systems are referred to as a kind of ‘digital infrastructure’ that undergirds both our online and offline worlds. Recent critiques—such as those by Eubanks (2018), Noble (2018), O’Neil (2017), Pasquale (2016), and Zuboff (2019)—have shown how these algorithms and big data technologies reinforce discrimination, undermine democratic processes, and ultimately benefit corporations at the expense of the public.

China and Digital Infrastructure

What is digital infrastructure in China, why should we pay attention to it, and how might the STS literature help us to better understand it?

WeChat payment scanning code.

I want to begin with an object (see figure above) that can, in many ways, be thought of as emblematic of digital infrastructure in China. It is an image of a WeChat payment scanning code: in many parts of China one can pay for goods and services simply by scanning a QR code like this one with your smartphone. Money is transferred from the purchaser's 'Wechat wallet' to the vendor's. Such codes are ubiquitous in China as, significantly, this mode of payment is available not just at high-end stores or restaurants, but even for street vendors and itinerant workers.

The code is representative of China's digital infrastructure in several ways. First, this is a material object—it is part of the material infrastructure of shopping, banking, and consumerism in contemporary China. However, it is a material object that is a 'gateway' to the virtual or the digital. It is one of the materials of a massive system that involves both other material parts (smartphones, phone towers, cables, computers, banks) and digital parts (databases, algorithms, file structures, etc.). The code also works because it is supported by the infrastructures of standards, laws, and metrification.

Second, this object plays an important role in structuring people's experiences of space and time. Dourish and Bell (2007) have argued that the experience of using mobile devices brings computing away from offices, homes, and desktops into everyday life and everyday experience; computation moves much more directly into the physical world, reshaping our experience of space. Many Chinese citizens have to interact with objects such as this code dozens of times a day. And they have to do so in a very specific and prescribed way—with embodied actions that make the system work: holding the phone up to the code, punching in the desired payment amount, and then displaying the screen to the vendor to show that you have successfully paid. These mundane physical actions tie together the physical world of phone and code to the digital worlds of algorithms and databases.

Third, the codes are a visible manifestation of the power of both the central government and China's largest corporations—in this case, Tencent, the owner of WeChat, the platform on which the 'digital wallet' is built. Alibaba, another of China's digital giants, has a similar system called Alipay. Such platforms are the means through which citizens' data are collected and forms of surveillance operate. *Pingtai*/platforms increasingly shape the relationships between individuals, corporations, and the state.

In what follows, I will expand on these three concepts—the materiality of digital infrastructure, the role of the body in digital infrastructure, and the role of the state and corporations in digital infrastructure—to suggest some of the unique (or at least importantly different) elements of digital infrastructure in China.

Digital Infrastructure and Physical Infrastructure

As I have already suggested, most infrastructures now have both physical and digital elements. In China, the relationship between the two is particularly strong. In many instances, it is hard to understand and appreciate the meanings of China's physical infrastructure without also understanding the digital infrastructures associated with it.

To take an example closely related to the one above, the success of Alibaba in China can be attributed not just to digital innovations, but to developing critical physical elements as well. According to Duncan Clark, one of the pillars of Jack Ma's success was creating logistics services that bypassed China Post for delivering the vast number of online orders placed by Alibaba customers each day (Clark 2016). Large investment in firms from Zhejiang province created a conglomerate known as China Smart Logistics (菜鸟, *Cainiao*), which

delivers over 30 million packages per day and employs over 1.5 million people. Express Delivery (快递, *kuaidi*) is a critical part of everyday language and experience in China and one that has dramatically reshaped China's domestic economy by connecting sellers to buyers via platforms with a high degree of convenience and efficiency. Although neither Alibaba nor Cainiao directly owns the delivery service companies, they collect and process the data that they generate. In contrast, Amazon and eBay have largely relied on the US Postal Service and other existing delivery services (FedEx, DHL, etc.) to deliver their products. Where fewer reliable and established services existed, Alibaba had to create the physical networks for delivering packages *alongside* the digital networks used to browse and purchase them.

The switch in China to mobile payments such as Alipay—skipping over credit cards—is another instance in which the relative *incapacity* of China (in this case in banking and finance) has meant that physical and digital infrastructures have been developed side-by-side. Additionally, traditional infrastructures—such as bridges, canals, and railways—are also now being developed with sensors and cameras that are integrated into digital networks (see, for example, Staedter 2018). As China moves towards the Internet of Things and 5G, this sort of integration of physical and digital is likely to become the norm. Indeed, the discourse of ‘smart cities’ in China revolves exactly around such integration of the digital into physical (urban) spaces. Of course, similar things are happening elsewhere. But China's recent and rapid scaling-up in many technological domains is allowing it to deploy digitally-enabled objects perhaps more widely than anywhere else. Increasingly, and especially in China, digital and physical infrastructures are becoming impossible to untangle.

Digital Infrastructure and Human Infrastructure

Second, in China digital infrastructures are playing a particularly powerful role in (re) shaping social lives. Digital infrastructures are usually thought about primarily in non-human terms, with discussions being dominated by a focus on machine learning and artificial intelligence. But, just as physical infrastructures are shaping how people live, digital infrastructures are increasingly part of human lives and work. This creates profound transformative possibilities.

Digital technologies are, for many urban dwellers at least, very much daily routines. Things like barcodes and online payments structure people's everyday lives in ways that are analogous to the ways roads and water systems do. They tie people together into various kinds of overlapping networks through the use of online payment systems or other apps, such as ride sharing, online marketplaces, etc. Likewise, they take on specific meanings—they are used (or not) for affective reasons (‘it's cool’) as well as for practical reasons. They also become objects of desire (or as Alessandro Rippa argues in his essay in this issue, following Deleuze and Guattari, self-propelling and self-fulfilling ‘desire machines’) that are connected to ideas about modernity, freedom, and progress in the way other infrastructures are.

The relationship between culture and such digital technologies was neatly demonstrated in the use of virtual ‘red envelopes’ (红包, *hongbao*)—WeChat pay used this innovation (released just in time for Spring Festival) to (almost) leapfrog over its competitor and to open up virtual currency to millions of their users almost overnight (Shu 2016). This gives corporations like Alibaba and Tencent immense power, not only economically, but also socially. These apps entail the ability to shape how, when, where, and among whom such

Facial recognition system on a mobile phone. PC: SCMP.

transactions can occur. WeChat here mobilised an existing cultural practice to their advantage; but in the process it also fundamentally changed its meanings and possibilities (e.g. adding the possibility of giving *hongbao* at a distance).

All these are systems that very much involve bodies; it is important to think of humans (or, to use a different term, users) as very much a part of these digital systems. I am thinking here of both the bodily actions necessary to participate in systems—scanning barcodes, gestures associated with payment, etc.—but also the forms of labour that are required to provide almost ubiquitous access to digital devices, labour that is also largely taking places in factories in China. There is a ‘human infrastructure’ (Simone 2004) and human labour here that is necessary to establish and maintain the infrastructures of the digital. Even some of the work that appears to be digital or automatic is actually based on invisible labour (for example, Facebook moderators who screen content for pornography). There is an

intertwining of the digital with human labour in ways that are often difficult to untangle. We might simply call this ‘production’. But the fact that much of it is directed towards creating and maintaining ‘platforms’ on which we can work, play, and live suggests that it has important infrastructural features.

Much attention has been given to the significance of Chinese *physical* infrastructure projects overseas, especially those initiated through the Belt and Road Initiative (BRI). But as Chinese *digital* products move overseas too, they may also bring with them modes of doing, thinking, and interacting that have the power to reshape social relations in other countries. Such digital–physical formations are already taking ugly shape in Xinjiang, where facial recognition and other digital technologies are combining with police and prisons to create what Darren Byler (2019) has called ‘terror capitalism’. Ultimately, this human or social dimension of digital infrastructure may have the most significant impact beyond China.

Digital Infrastructure and the State

Finally, it is difficult to talk about the significance of digital infrastructure in China without thinking about the role of the entanglement of corporate infrastructures with the state. This appears to be an aspect of the digital that is quite different to the concerns we might have about Facebook, Google, and Amazon. In those cases, worries have largely focussed on the failures of the state to properly regulate their activities (especially their collection and use of data; see Pasquale 2016, for example). In China, on the other hand, worries emerge *because* of the close relationships between digital infrastructure providers and the state.

Some of these digital technologies discussed here emerge due to the insufficiencies or shortcomings of the state and state-linked institutions. For example, a lack of access to bank accounts or others forms of financial systems, a lack of adequate public transport, or a lack of access to other kinds of services. Corporations have found opportunities ‘in the cracks’, so to speak, providing for people’s needs. The shortcomings of the state or state-related institutions create opportunities in digital spaces.

However, as the recent concerns about Huawei suggest, China’s largest technology companies appear to be closely connected to the Communist Party and the government (Magnus 2018). Perhaps the most troubling example of this is the links between Alibaba’s credit system, ‘Sesame credit’ (芝麻), and the wider social credit system now being rolled out by the state (Loubere and Brehm 2018). Although these systems are not by any means identical, it seems likely that data collected by online tech giants will form part of the government’s own system.

If online behaviour, including data from online purchases, will be used as part of the state’s surveillance apparatus, this creates for users a fundamentally different relationship

with digital infrastructure than that which currently exists in the liberal West. In China, digital infrastructure becomes a lens through which citizens are watched and through which behaviour (on- and offline) is policed. The power of this system lies partly in its potential to link online behaviour (shopping, surfing the Web) to offline transgressions (e.g. jaywalking) to create a totalising view of individuals. Again, it is impossible to disconnect the physical surveillance infrastructure of the state (e.g. cameras) from its digital parts.

What Difference Does Digital Infrastructure Make?

In the recent book by Thomas Mullaney (2017) on the history of the Chinese typewriter, he recounts how the machine *did not* travel from alphabetic to non-alphabetic systems but rather had to be reimagined for China and Chinese. This is an important reminder of the naïveté of simple diffusionist models of technological transfer. Chinese versions of technologies are not simple replications or translations of their western counterparts. As with physical technologies in China, digital technologies—and the digital infrastructure that supports them—will likewise not have the same characteristics as American and European platforms, databases, and algorithms. I have suggested here some of the ways in which I think Chinese digital infrastructure already seems importantly different. As China takes a more active role in building and maintaining infrastructure—not just in China but around the world—these characteristics are going to become increasingly important. What are the affordances of a 5G network built by Huawei rather than Cisco? It is going to take a lot of work to answer that question. ■