

Governing with health code: Standardising China's data network systems during COVID-19

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Abstract

Noting the infrastructural turn in platform studies, the article conceives China's health code system, Jian Kang Ma (JKM), deployed to manage the COVID-19 crisis as a new social infrastructure that manifests the symbolic and material power of the Party State. Using the platform walkthrough method and documentary inquiry, we unpack the structures of platform governance and identify actors of the power to appreciate the socio-political dynamics of platform algorithms. JKMs structural power is not monolithic in the name of the Party State but supports a process of structuration that operates across multiple actors, administrative bodies and, governing layers. JKMs centralised data systems through the building of a nationwide algorithmic standard of COVID-19 governance. JKMs typified the political dynamics of deterritorialisation, a reference to the state's governing mindset of eradicating local variants of policy implementation and governing autonomy in China. The removal of local power in pandemic administration has led to the production of a unified national subject. Such a comprehensive approach begs for greater nuance and sophisticated knowledge about those indigenous logics that platforms and algorithms operate and are embedded in, thus contributing to de-westernising platform studies.

KEYWORDS

algorithm, automation, China, data, digital infrastructure, health surveillance

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INTRODUCTION

In response to the COVID-19 outbreak in early 2020, Chinese governments adopted digital platforms to monitor citizens' movement and collect their health data to formulate lockdown and contact tracing policies to contain the spread of the virus. A new health code system, *Jian Kang Ma* (JKM), was created as a software extension on existing mobile applications (apps) that 'codes' Chinese people's health status by tracking their geo-locative movements. Amid the health and economic crises, local governments responded differently to facilitate the resumption of works and economic activities since March 2020. The local variants of public health response were evident through the fact that Zhejiang provincial government reached out to Alibaba, whose headquarter was in Hangzhou (the provincial capital of Zhejiang), to develop a digital solution (JKM) for the local public health management to re-start economic productions (Xu, 2020). Just 2 days earlier, Tencent launched the first JKM in Shenzhen, a major economic hub in southern Guangdong province, in response to the local government's request for COVID-19 management and attempt to resume local economy (Tencent Tech, 2020).

Local disparity in disease control has long been an issue in China since the Severe Acute Respiratory Syndrome (SARS) outbreaks in 2003 as local officials have been inconsistently implementing or even, resisting central government's decret in local jurisdictions (Thornton, 2009). Interregional inequality, which was due to the unequal distribution of wealth and resources since the reform era has led to the administrative discourse of 'self-protection' among local governments (Thornton, 2009, p. 46). Crisis provides an opportunity for the central government to mobilise its political power and centralise resources to tackle local variants.

In the digital era, technologies have offered the central government a new mode and means of socioeconomic and political governance. As Chen and Qiu (2019) put, China has transformed itself as an 'infrastructural state' that governments directly invest into the building of major national infrastructures to connect local regions. Digital infrastructures have become crucial to support and legitimise the national policymaking and regulatory framework and, the state's hegemonic power (Plantin & de Seta, 2019). Z. Zhang (2020) identifies that tech corporations have been actively co-opted to provide technological support and resources to build up digital governing infrastructures in China. These studies show that the political power now deeply resides in the materiality of digital infrastructure and is embedded within the social-material construction of technology. A new mode of social governance is emerging with the development of platforms. As JKM becomes a nationwide social infrastructure of COVID-19 governance, it is important to study how JKM enables the state's power in centralising local resources and governing practices to standardise the national approach of COVID-19 governance.

Drawing on the theoretical lens of digital infrastructuralisation which defines platform infrastructures as sociotechnical systems penetrating existing social sectors (Plantin & de Seto, 2019; Slota & Bowker, 2017; Williamson, 2019; Z. Zhang, 2020), we examine the creation and operation of JKM as a state-sponsored infrastructure (Liang et al., 2018, p. 426) that consolidated the state's centralising power in crisis management in China. In this article, we investigate those governing practices and strategies afforded by JKM to manage the COVID-19 pandemic. Our analysis is in direct dialogue with the 'infrastructural turn' in platform studies, which has advanced critical inquiry from describing platform's technical functions and material properties to interrogating their entanglement and indispensability in everyday life (Z. Zhang, 2020). Such an approach guides us to consider the relevant stakeholders, power dynamics and, multiple political and economic networks that define a JKM-centric COVID-19 governance in China. JKM is an intermediary that enacts the convergence of different data networks and actors (Hong, 2017). JKM has manifested not only the blurring interplays between the state and commercial sectors (Chen & Qiu, 2019;

Liang et al., 2018) but also the central state-sponsored attempt of data centralisation and governing standardisation. JKM, therefore, embeds the central government's ambition of building a national data infrastructure that enables new governing technique of the social everyday lives in China.

Using a mixed-method of the platform walkthrough method and documentary analysis, we develop insights into the infrastructuralisation of JKM and the platformisation of COVID-19 governing (Schwartz & Mahnke, 2020). Instead of conceiving JKM's structure and power as monolithic in the name of the Party State, we argue that there are multiple actors, various administrative bodies and, different governing layers that constitute JKM's development and operation. Besides the interplays between the state and the market and the state and the public, JKM embeds the interplays between the local and central authorities, whose interests do not always align with each other (Feuchtwang, 2004). In response to the ongoing call to 'bring back the state' (Jiang & Fu, 2018), our approach begs for greater nuance and sophisticated knowledge about those indigenous forces platform media are embedded in, thus responding to the ongoing call to de-westernise platform research (Davis & Xiao, 2021).

We take intellectual guidance from Chinese cultural geographers (Oakes, 2019; M. Wang, 1995; J. Wang, 2007) to establish two conceptual premises. First, the national project of digital infrastructure building is embedded in China's enduring administrative system of territorial hierarchy, which prioritises the political interest and ruling legitimacy of the central state (J. Wang, 2007). The process of deterritorialisation seeks to standardise governing practices and digital media has been deemed as a key vector to achieve this governing ambition (Hong, 2017; Keane & Su, 2019; Wang & Lobato, 2019). Second, such an approach works on containing and even, suppressing local variants to ensure policy decrees are uniformly implemented across the nation to produce a homogenised national subject (Bach, 2016). Shedding new light on the nature of platform media as an everyday technique of governing in China, we propose the concept of *digital deterritorialisation*. The building of digital infrastructures is to enable the containment of local variants and ensures legitimacy for the centralisation of political authorities in the age of platform society.

Our argument has three layers. First, JKM was built and launched as a new social infrastructure that connects existing data systems of health, national and social security, transportation, and telecommunication services in China. JKM produced a standardised algorithm that has repurposed those once locally administrated and managed systems for the centralisation of COVID-19 governance. Surveillance in the case of JKM is not simply about modifying individuals' behaviours but reconfiguring the spatial relations and power interplay between the central government and local authorities. Second and most crucially, JKM works on the principle of deterritorialisation, the socio-political process that the central government deploys to contain local power and cultural variants in China. As an infrastructure that penetrates into people's everyday lives and repurposes data systems, JKM ensures that the biopolitical governing practice and format of COVID-19 were executed uniformly across China. Third, JKM as a social infrastructure coordinates citizens' experiences with the state to produce a desired mode of citizenry for the state. Overall, our analysis of JKM's infrastructuralisation in China intends to capture the complex process of infrastructuralisation of platform media, which shapes the structural dynamics and experiences of living in a platform society.

INFRASTRUCTURALISATION OF PLATFORMS AND SOCIAL GOVERNANCE

The infrastructural turn of platform studies indicates the convergence of digital platform media and traditional infrastructures and the fact that platform media have now become indispensable to many aspects of social everyday life (Plantin et al., 2018). Media

infrastructures are traditionally defined as the configured sociotechnical systems that support the distribution of audio-visual signal traffics (Parks & Starosielski, 2015). In the age of big data, platforms are growing as important components of social and public infrastructures in our everyday life. The building of large-scale (global) digital infrastructures contributes to standardising and centralising the operationalisation of the internet, data traffic and communication (Parks & Starosielski, 2015). The connective and centralising properties defines the most prominent characteristics of digital infrastructure. Moreover, Parks and Starosielski (2015) also points out that the operation of digital infrastructures has been deeply shaped by the historical and political power relations. Importantly, the platformisation of infrastructures depends on the integration of platforms into existing administrative structures and organisational culture (Williamson, 2019). Since platforms are increasingly connecting once unrelated and dispersed data systems, they are 'hubs of command and control over production, consumption, and exchange' of data (Bigo et al., 2019, p. 13). The infrastructural optic pays particular attention to the technical, social, political and economic power involved in building large-scale data systems which have social, economic and political consequences (Slota & Bowker, 2017).

Current scholarly works of platform research have drawn on a critical political economy approach to examine the power relations and dynamics of the building, expansion and transformation of the platformisation of key social infrastructures. It is established that technological inventions and processes of platformisation of culture and society are driven by economic interests and business strategies of technology corporations (Nieborg & Poell, 2018) who have dominated the mode and means of productions and global economy (Srnicek, 2016). Crucially, Srnicek's intervention reminds us that despite the claim of novelty and creativity, platform capitalism extends and sustains the existing corporate power in our social, economic and cultural lives. Van Dijck (2021) goes further to suggest that the expanding power of platform 'has also undermined classic distinctions between state, market, and civil society' (p. 2802). Since a focus in platform research has been on the platform-corporate centralisation, especially in the market economy within Western countries (Plantin et al., 2018; van Dijck, 2021), critical inquiries have reflected on how platform can be effectively governed, scrutinised and kept-check without impeding the embedded democratic values and functions (Gillespie, 2018; Gorwa et al., 2020).

Chinese platforms are different as tech giants are subjected to the mercy of the State's political power (Keane & Su, 2019; van Dijck, 2020). In China, the development of platforms has been spearheaded by the State since early 1990s (Hong, 2017). Digital platforms have followed a nationalistic mode of development of economy, technology and, social lives (Plantin and de Seta, 2019). Instead of being 'disruptive', digital media has complemented traditional social infrastructure by offering uniformed algorithms to operate these infrastructures (Chen & Qiu, 2019). Even before digital media, building nationwide infrastructures has been a top policy priority of the central government to ensure that the State's decreeing can be uniformly implemented and to facilitate the formation of a unified sense of nationhood and citizenship (Bach, 2016). Digital media has been deemed as indispensable to achieve this political agenda, which is underpinned by the ideological manifestation of projects that aim to enhance spiritual civilisation among the Chinese population (see Keane & Su, 2019). For instance, research about China's Social Credit System (SCS) (Liang et al., 2018, p. 430) finds that Chinese government has been integrating distributed digital platforms into a centralised surveillance database that automates the mode of service delivery, policing and regulation. Similarly, Chen and Qiu's (2019) work on DiDi's platformisation of China's urban transportation reveals that DiDi's strategy and ambition to standardise taxi and car hire services through the use of algorithms to manage drivers, which helps local authorities to address problems such as illegal car-hailing service, underemployment and unemployment and, traffic congestion. The

nationwide digital transportation ecosystem is enabled by DiDi's algorithms, which has become a seamless mechanism of assembling local data networks. Platform algorithms have allowed the government to repurpose data systems and networks to achieve its governing objectives of resolving social and economic problems and, political ambition of power centralisation.

Unlike the techno-politics of infrastructure which are often invisible or displayed as apolitical in liberal countries (Joyce, 2003), political ideology is highly visible in China as there is a close collaborative relationship between platform providers and the Party-State (L. I. N. Zhang, 2020). The building of digital infrastructure is closely related to the government's dual-strategic emphasises of *modernisation* through scientific technologies (Hong, 2017) and *unification* through standardising social and political systems and cultural lives in China (Bach, 2016). Chinese geographers and historians have reminded us how local places (*di fang*) have been strategically deployed to serve the State's political ambitions (see Oakes, 2019; Vogel, 1989). Infrastructure affords the production of a nationwide political space where state power is protected from slipping away to the locals, a key governing mindset among Chinese rulers since ancient time (J. Wang, 2007).

The power interplay between the centre and peripheries, and the dialectic between the political and commercial players are vital to understand the digital political economy in China (Jiang & Fu, 2018). Platforms have become the new infrastructure of social, economic and cultural lives. As Z. Zhang (2020) puts, an infrastructural lens of platform research has three advantages. First, it allows critical inquiry to depart from the conventional critique of (private) ownership to understand the complex interaction between political power and economic interests. Second, the approach recognises the constant tension between platforms that are privately owned and the state's political desire to regulate and intervene platform's operations. Hence, third, there is a constant tendency for platform to present itself not only as a new technological infrastructure but the new social infrastructures by connecting itself with existing social infrastructural systems (such as utilities, see Chen & Qiu, 2019), cultural productions (see Nieborg & Poell, 2018), and ways of life (see Wang, 2021). Emphasising the infrastructural element in platform's political economy helps to foreground the socio-technical configurations, namely the interaction between technology and context, in the critical analysis of power dynamics. By applying this in-depth analytical perspective, the present study aims to examine the actors, practices and power relations that are embedded in platform structures, to understand the operations and meaning of infrastructural platforms in the context of everyday life.

During the COVID-19 pandemic, social lives across the world have been governed through digital platforms. Instead of deterring, digital technology uses an automated interventionist approach to detect the (potential) spread of the virus and regulate citizens' compliance to health ordering. The UK and some European countries like Italy and Germany have monitored mobile data to identify major exposure sites and to regulate self-isolation compliance (Leprince-Ringue, 2020; Pollina & Busvine, 2020). Other Asian jurisdictions like Singapore, South Korea and Taiwan also have respective contract tracing and compliance-monitoring technologies to combat the constant resurgence of COVID-19 outbreaks (Taylor, 2020). However, there are key differences between China's JKM and other tracing apps. First, China's JKM is not a standalone app but a software extension of existing apps, WeChat and Alipay, which are two of the most popular apps that have penetrated the lives of Chinese people (Liang, 2020). Embedding in existing apps has ensured the technical mode of COVID-19 governing to be uniformly implemented across China regardless the geolocate variants. Technologically, being a software extension also makes JKM more direct and intrusive as both WeChat and Alipay contains rich amount of personal data, which have now been centrally utilised for COVID-19 governing purposes (Liang, 2020). Further still, Chinese tech firms have less power in negotiating with the State over the control of the flow

of data comparing to their US counterparts like Google and Apple, which had refused to disclose any data collected from the Exposure Notification Systems to governments (Albergotti, 2020).

The Chinese government is a keen developer in the space of digital economy and platform ecosystems hence, the examination of JKM needs to consider the historical governing logics and ambitions of the state, which is occupied by the Chinese Communist Party (CCP). To understand how JKM operates within the techno-political landscape in China, we critically investigate JKM as a new social infrastructure of COVID-19 governance by asking:

RQ1

How has the JKM facilitated the central government to formulate a standardised, national approach of COVID-19 governance?

The building of Chinese platform and digital infrastructures is embedded in the state's strategy to adjust its administrative power (Chen & Qiu, 2019). JKM was no difference as Alibaba and Tencent, two of the largest technology corporations in China, which were co-opted by the state to strengthen its central decision-making mechanism. We hence ask:

RQ2

How has institutional power shaped the process of JKM's infrastructuralisation and thus the national standardisation of COVID-19 governance?

The building of digital infrastructure also creates new forms of state-public relations (Bach, 2016). Platform media as a new form of social infrastructure define the socio-material needs of everyday life. Thus, it draws our attention to the conditions of citizens' engagement with the state and the meaning of citizenship. We also ask:

RQ3

How has the centralised governing approach standardised users' everyday practices with JKM and redefined the meaning of being a responsible citizen in China?

RESEARCHING JKM DURING THE COVID-19 CRISIS

The present study employed a mixed-method approach of documentary inquiry and the platform walkthrough method. The research methods are chosen partly due to the nature of the inquiry about the platformisation of health governance and partly due to the health crisis of the COVID-19 pandemic, which made traditional instruments such as face-to-face interview and on-site observations undesirable. As the walkthrough method invites researchers to directly engage with JKM's interface to examine its technological arrangements and algorithmic operations, to understand how it shapes users' experience (Light et al., 2018), it is a useful and realistic method to examine the operations of a health surveillance technology during the pandemic. More importantly, walkthrough emphasises on the dialectic between technology (platform structure, interface layouts and content) and the political economy (corporate and political actors' interests and governance), it offers a viable framework to envisage the techno-social and techno-political functioning of JKM. As the walkthrough method requires both 'zooming in' to learn about the in-

apps, localised functions, content and layouts and ‘zooming out’ to attend to the broader vision, governance model and socio-political environments of using the app (Light et al., 2018), the two researchers divided their responsibility.

The author in Hangzhou of China was responsible walking through JKM's registration, installation, and usage of the app in everyday lives as the app is not available nor functionable outside China. The author documented their daily use of JKM through screenshot, research notes and, deliberately enacting different functions of the platform (Seaver, 2017) from April to June 2020. The author outside China focused on the relevant policy and industry documents, government announcements and, Chinese state media's news reports to map the broader social and political environment of JKM's development and enforcement. Documentary inquiry helped the authors to connect their respective observations of the locally specific JKM and the broader policy environment, political agenda and, the market dynamics in shaping China's COVID-19 governance. The collaboration not only ensured that critical analyses did not lose sight of the lived experience and operation of JKM (zooming in) but also ensured the relevance of the structural logics of JKM operation (zooming out). Such a collaborative arrangement also intended to respond to the ongoing conversation about the changing role of researcher from mere remote observer to a subject of the research (Seaver, 2017).

Table 1 summarises the critical steps we took to explore and reflect on JKM's operations throughout China's COVID-19 management. Since the author in China was living in Hangzhou, our walkthrough method and analyses of the in-app features focus on the JKM Alibaba first developed for the Hangzhou government, which has been replicated and deployed in more than 300 other cities, with more than 900 million users (Liang, 2020).

We also searched for government and industry documents that highlighted the rationale of JKM's initial development and launch, as well as the policy initiatives and corporate resources/power devoted into the early stage of development, to understand how JKM's technology and its framework offers the critical response to China's pandemic management at the time. We then queried about the actual operation and enforcement of the platform through analysing its in-app technical possibilities and, the authorities' enforcement techniques to ensure the centrality of JKM in Chinese people's lives throughout the pandemic. Of course, since walkthrough analysis also aims to understand the consequence of platform use (Light et al., 2018), we looked at the implementation of JKM not only in Hangzhou but across China to appreciate the political dynamics of JKM-mediated public health governance. The fourth step is not the final step. The asterisk highlights the dynamic nature of this step as it was observed throughout the other three analytical processes. While we tried to understand the technical connection and data systems JKM relied on to operate and make pre-emptive intervention, we also tried to understand how the technical connections of data system were made possible in China's data administrative environments. The documentary analyses involved official statements and policy briefs about the

TABLE 1 Analytical steps

Analytical steps	Walkthrough (in-app): author in China	Documentary (environments): author outside of China
1	Registration and installation	Platform development's vision and launch
2	In-app functions, operation and possibility	The operational governance and enforcement
3	The procedures of platform use	Nationwide intervention and implementation
4*	Data network connection	Infrastructural systems

future development and progression of JKM as a nationwide health tracking system for ongoing pandemic management. The discussions and analyses to come then, reflect on key findings across these four steps.

JKM AS THE ALGORITHMIC SOLUTION

The standardising technique of JKM relies on the internal connection with different JKMs and the external linkage of non-JKM data systems such as health, biometric, transportation and telecommunication services to develop a robust algorithmic process to determine one's health risks. Walking through JKM (Hangzhou version) associated with Alipay app, we find JKM supported the standardisation of bio-governance during COVID-19 by serving as an algorithmic tool for the government to curb the spread of the virus with its processes of datafication and automation.

Tracking and coding people's biometric data, travel history and close contacts works as the dividing and categorising practices of China's COVID-19 governance. The fastening operation of formats which are necessary for conducting a coding process is the key of the datafied dividing practices. Under the national public health policy, all Chinese citizens are required to fill in their personal information, including name, ID or passport number and mobile number in the input forms (left image in Figure 1). Then, they have to report their health status, travel history, and COVID-19 contact history (right image in Figure 1).

With the data input, a colour QR code will be generated, based on which citizens are divided by three colour codes. Green code means 'free to travel'; yellow code requires '7 days home quarantine' and red code requires '14 days home quarantine'. As Figure 2 shows, the Zhejiang health code does not only tell about the health status of a person but also supports electronic hospital registration with its connection to his/her social security information. While the categorisation of individuals according to the evaluation criteria of the three health codes is simplified, the health code as a dividing practice and a disciplinary gaze has been normalised as citizens internalise the state's public health policies facing the public health threat. Facilitating health surveillance, JKM operates as disciplinary tactics that coax users to conform to the norms of quarantine and lockdown.

As required by public health policies, every citizen needs to report their travel, contact and health information in the health code system. Implementing the policy demands, the digital reporting system guarantees the total data capture, which is the condition of automated health surveillance. Processing the collected data, JKM detects and predicts user's risk of being infectious via its algorithmic decision-making system. JKM's algorithms automatically pre-empt the possible spread of the virus by imposing quarantine requirements on users who have been exposed to an infection or high-risk areas. Consequently, the automated decision-making system has sped up the process of identifying people who were in risk of being infectious and needed to be quarantined. The automated assessment and decision making had reduced the workload for local Centre of Disease Control (CDCs), which relied on physical barricades and manual reporting to conduct contact tracing and control population movements Xinhua Net. (2020).

Moreover, our walkthrough analysis of JKM's in-app structures shows that the algorithmic power of the platform is layered with other modalities of power in Foucault's (1990) concepts of biopolitics: disciplinary power and also sovereign power. Primarily, the quotidian technique of formatting, boxes ticking and forms filling in our case is biopolitical in function because it is directly for the purpose of institutional interventions and regulatory control. Except from filling in the personal biometric information, users have to agree with the must-agree statements. Different from commercial platforms, the user agreements or terms

11:18 11:19

浙江健康码 浙江健康码

HangZhou Health Code

*Have you been in Zhejiang Province for the last 14 days? (Single Choice)

Yes

No

Pass Real Name Authentication

中文

English ✓

*Full Name

*Please select the ID type (Single Choice)

ID Card

*ID Number

Mobile Phone Number

*Do you have fever, dyspnea or other respiratory symptoms? (Single Choice)

Yes

No

Promise

To prevent the epidemic, I agree to submit the information above to the local epidemic prevention authority in accordance with the law.

I hereby declare that the information supplied by me is true, correct and complete. I shall take full responsibility for the information above. I hereby confirm that I will comply with the regulations and requirements concerned the epidemic prevention and control.

FIGURE 1 The registration form of Zhejiang health code (walkthrough step 1)

of service that are usually placed at the bottom of the user registration form are replaced with an official statement that informs citizens the policies that they must comply with. As demonstrated by Figure 1, users are required to tick the boxes to declare that they consent to the use of their personal data and mobile phone real-time location data by local CDCs to contain the spread of the coronavirus. In addition, users must declare solemnly the accuracy and the consistency of their input data and they must take legal responsibility for any inaccurate and missing data (right image in Figure 1). In concert with public health regulations and policies, the automating system of the platform serves as an instrument of sovereign power that delineates orders (what is prohibited and permitted for user) with different colour codes. The sovereign power is built into the platform's datafication and automation strategies as exemplified in Lessig's (2006, p. 1) claim that 'code is law'. As JKM made possible new forms of legal performance, it emerges as a platform reviving what Foucault (1990) coins as sovereign power, stopping citizens' behaviours of dissenting and circumventing rules of the authorities.



FIGURE 2 Health report and its use (walkthrough step 2)

STANDARDISING COVID-19 GOVERNANCE: THE STATE'S CO-OPTATION OF JKM

Standardising the governing of COVID-19 not only depends upon the platform's algorithmic power but also crucially, relies on the platform's institutional dependency and integration (Liang, 2020). Behind the process of platformisation, political orientations to centralise COVID-19 governing practices and market ambitions constitute the institutional relationships that shape the platform design and algorithmic operation of JKM. The health monitoring system developed by technology companies and then co-opted by the state, in our study, reinforces the 'symbiotic and collaborative platform-state relationship' (L. I. N. Zhang, 2020, p. 124).

For the central government, JKM is a national infrastructure that standardises local data systems. The standardisation has expanded the power of the central Party State by overcoming the inconsistencies in data policies among local governments and regulators. During the early stage of the pandemic, local versions of JKM, which relied on different local health data and tracking systems created inconsistency and confusion. Then, the central government launched a national platform, 'epidemic prevention code' on its social service platform (Figure 3), integrating multiple provincial health code systems into a national system with the support of Alibaba and Tencent to counter local variants during the early phase of the pandemic response (Tech Sina, 2020).

According to government announcements from Standardisation Administration of China (2020), the nationwide system unified the coding rules, formats of data content and its algorithmic representation and standardising data management policies across different administrative units. Moreover, a national database of confirmed and suspected cases and their travel and contact records were also uploaded to a centralised platform associated with



FIGURE 3 The national epidemic prevention health code (walkthrough step 3)

the national epidemic prevention code to guarantee that local governments can recognise the health codes through basic data sharing. In addition, another platform named 'Big Data Travel Card' (Figure 4) was developed and connected with the national health code system, tracking people's travel history, current location, and location history to help local governments determine one's health risks by using mobile phone real-time location data. JKM seems to follow the operational logic of Social Credit System (SCS), which connects multiple social, civic, financial, judiciary and mobility data systems (Liang et al., 2018).

Of course, the eventual broad application of JKM in Chinese cities was not only driven by the political needs to tackle the COVID-19 crisis but also determined by technology companies' business interests. As Jiang and Fu (2018) remind us that China's digital development is engineered by the 'Big Brother' (the State) as well as the 'Big profit' (the corporations). Innovating the health QR code was framed as part of technology giants' dual missions of providing social services and data extraction. For instance, applying big data technologies into COVID-19 prevention and control system, Alibaba strived to datify and digitise the public-health response system (Sina Tech, 2020). Its data capturing techniques and algorithmic analytics enable Alibaba to become an important component in the datified epidemic prevention and control, transforming the infrastructure of public health system. Articulating algorithms as technical innovations to provide solutions for the public health crisis, both Alibaba and Tencent enjoy the permission and protection from the government to capture user data as much as possible. The platformisation of JKM is essentially part of the state's political directive of COVID-19 management, and the market, which was spear-headed by Alibaba and Tencent, was responding to seek their economic opportunity from new policy directives (Wang, 2021).

Our analysis of the government's adoption of JKM embodies the complex platform-state dialectics that define the platform's design and operation, which in turn, shapes the social experience of platform governance. This platform-mediated state power was embedded in

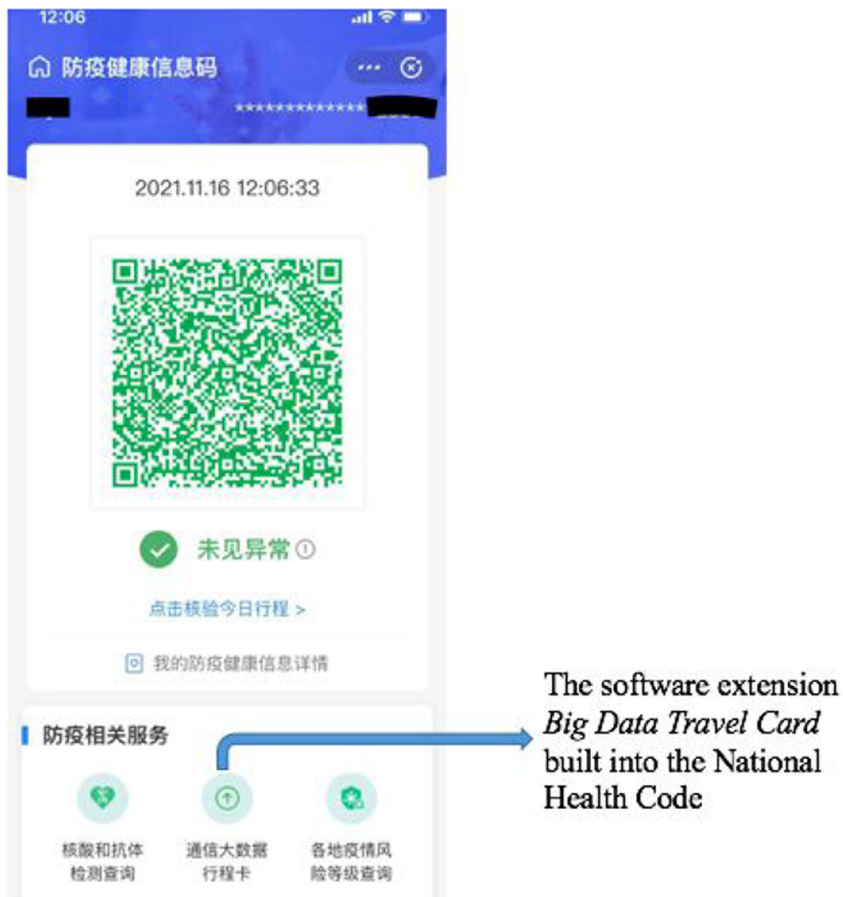


FIGURE 4 The National Health Code connected with travel data system (walkthrough step 4)

people's everyday lives, physical movements and social practices and has increased the efficiency and expanded boundary of COVID-19 control. The platformisation of bio-governance also legitimises the State's practices of information gathering and control. The fact that citizens can do the checking and self-monitoring more seamlessly, faster, and comprehensively, seems to suggest that JKM's infrastructuralisation has altered the spatial practices and temporal relations between its users and their social lives (see Z. Zhang, 2020). However, the discourse of convenience masks the power of the state to utilise JKM to achieve what Andrejcevic (2020) calls the 'total information capture'. Platformising biopolitical governance has enhanced JKM's surveillance and algorithmic operations in linking the once fragmented data network systems together.

The national deployment of JKM is of course, located in the ongoing process of the platformisation of Chinese society, which enables the state's uniformed governing approach, especially during a crisis. With the unified or consistent forms of standardisation, the (national) health code system has minimised interregional differences in the platformisation of Chinese public health system, deterritorialising the administrative boundaries at local levels. However, the process of deterritorialisation does not intend for total eradication of regional differences but to instead centralise the flow of local data for a national approach in pandemic management.

PRODUCING THE NATIONAL SUBJECT

The government's co-optation of the digital platforms during the COVID-19 is not merely an acute response to the public health crisis. As part of China's techno-nationalistic plan, platform media have become the state's agent for its governing legitimacy and political survival (Wang & Lobato, 2019). In our study, JKM allows the government to persist with its approach of using digital technology to build a centralised data infrastructure that supervises Chinese citizens' everyday lives and practices (Jiang & Fu, 2018). As a result, citizens' everyday engagement with JKM standardises the quality and unifies the experience of being a 'good citizen' (Keane & Su, 2019).

The national policy of epidemic prevention and control under which the health QR code was adopted uniformly regulates citizens' everyday uses and practices with JKM across different provinces. To support the standardisation of the governance of COVID-19, all citizens were required to follow similar steps to install JKM either through software extensions on Alipay app or WeChat app and sign up to obtain their health code (Buzhi.com, 2020). In everyday life, citizens are regulated by local authorities through the unified and standardised data system of the digital health code. For instance, Chinese citizens need to scan a QR code to get permission (green code) to enter public spaces such as schools, restaurants, malls, hospitals and public transportation stations, no matter which province they live in (Liu, 2020; Mozur et al., 2021; SHINE, 2021; Xinhua Net., 2020). The common user practices have generated a collective lived experience that are shared among 0.6 billion of citizens living in different regions across China (CNNIC, 2020).

As JKM operates closely with the state's sovereign power, the automated health surveillance system leaves very little space for citizens to resist against the use of the platform. JKM deters citizens from violating lockdown policies via formatting individuals into different categories, which carries different outcomes in life. The bio-power undergirded by the power of platform penetrates into citizens' everyday sphere. The body of a JKM user becomes a site that carries the institutional power which subjugates them into governed objects and biopolitical citizens of regulations, laws and algorithms. The requirements to scan and produce the green colour code have enacted a form of data-driven bio-power that left Chinese citizens in 'a state of visibility' (Liang, 2020, p. 3). Human bodies become trackable and thus, automatically governable. Using the national digital health code system, citizens are turned into 'infrastructural publics' (Bach, 2016) and become the *preferred subject* of the state. The deterritorialised governing system contributes to the formation of a unified national citizenship based on their standardised uses of JKM and homogenised experience with COVID-19.

Living in the regime of JKM, citizens have become governed subjects who are being monitored, judged, and regulated by China's expansive surveillance systems (Liang et al., 2018). The discourse of 'digital civilization' (to borrow Keane and Su's term) is about collective citizenry behaviours and supported by platform media's affordances of connecting and centralising data systems of different sectors (Chen & Qiu, 2019; Liang et al., 2018). As demonstrated in the case of JKM, the national epidemic prevention code system determines one's health and social quality through the centralised assessment and decision-making procedures, which was empowered by the interconnected social data networks. JKM has demonstrated that the platformisation of Chinese society rests on platform's technological ability to connect and integrate with existing and emerging national infrastructure building projects. Platform media are playing a crucial role in defining all facets of life in China: from banking and finance, credit information exchange, to public transportation, public health records, and bodily movements. Platforms not only emerge as a new form of technological infrastructure but a new set of social institutions that shape the state-citizen relations.

CONCLUSION

Seeing digital platforms as a vital part of the overarching infrastructural networks in China, this article has analysed the governing practices, strategies and user experiences around JKM, the health code system deployed to support the government's biopolitical governance during the COVID-19 outbreaks. Through the combined approach of platform walkthrough and documentary inquiry, our analyses show that JKM has connected internal and external data networks to repurpose them to produce a national algorithm that standardised and automated the form of health tracking, monitoring and disciplinary approach. By centralising the flow of data from different jurisdictions and sectors, JKM has deterritorialised local administrative autonomy and authority, producing a nationwide space of political administration and thus expanding the central government's power.

In the regime of JKM, the process of digital deterritorialisation has been achieved through the building and implementation of a nationwide infrastructure that connects multiple databases. As JKM automates the decision making by pre-empting the health status (chance of being infectious) and level of mobility (to quarantine or proceed with lives) of Chinese citizens, it also remaps the administrative boundaries of data management and social governance in China. Moreover, COVID-19 governance through and with JKM shows the multiple actors and multi-layered processes involved in shaping the development and implementation of this automated governing technique. Capturing the flows of power relations, digital deterritorialisation can be understood as a fluid network of interactions spanning across users, platform companies, local governments and the central government and different hierarchical layers of behaviours among them. JKM has not only intensified and expanded the scale, modality, and speed of deterritorialisation, it has automated this process of political governing and administration, producing what Mark Andrejevic (2020) calls the 'automation of subjectivity' during the health crisis.

Since automation is informational (Andrejevic, 2020), it is also spatially defined in its operation. Our case study of JKM implies that the process of automation and the algorithmic power of platforms is shaped by and, in turn, shapes the spatial politics of Chinese administrative system. The infrastructural process of JKM embodies the logic of digital deterritorialisation, revealing how JKM taking the advantage of the centralising technology centralises COVID-19 governance through deterritorialising the governing strategies at local levels. Digital deterritorialisation describes how platform infrastructures and its organisational or contextual implications are formed concurrently through interaction rather than a consequential relationship. Thus, the concept of digital deterritorialisation refers to the structures of the structure and the actors of the power that shape the socio-political dynamics of platform algorithms, not merely the relational outcomes between algorithms and users' agency and experience. As illustrated in the case of JKM, digital deterritorialisation relies on the structuration of algorithms that standardises homogeneous digital formats, thus contributing to standardising governing practices and producing a homogenised national subject. We argue that the logics of deterritorialisation explains the nature, politics, and strategic approach of the platformisation of the Chinese society (de Kloet et al., 2019).

With JKM's total utilisation of social, industry and administrative data networks, its real-time tracking of citizens' movements and automated pre-emptive decision-making mechanism, JKM has transformed digital data into new political capital that manifest the State's ideology during a time of crisis. Through the process of deterritorialisation, the state has centralised the political power in the public health administration system and enhanced its governing efficiency to cope with future crisis and ongoing social governance. However, the platform-mediated bio-governance has also been questioned. The privacy issue has become the biggest public concern as JKM captures important personal information which

can be exploited and used for commercial purposes. Moreover, the production of unified bio-citizenship might lead to citizenship deprivation, weakening citizens' access to civil rights.

Future research can pay more attention to the influences of digital infrastructure on social practices and construction of subjectivities in everyday life on the one hand and, how the decision-making and operation of the digital infrastructure is embedded in the specific historical contexts on the other. Moreover, more critical reflections on the drawbacks of platformised social and health governance are needed.

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