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China's digital transformation: Data-empowered state capitalism and social governmentality

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Abstract
The article scrutinises the trajectory of China's establishment of a digital state, rooted in a "whole-of-nation" system—or aptly termed (party–)state capitalism. The author illustrates the path of formulating and enforcing strategies to digitalise public services—including, importantly, the digital identity infrastructure—via institutional concentration that exemplifies both the positive and the exclusionary nature of social big data in streamlining administrative procedures. Two catalysts are spotlighted in China's digital transformation: quasi-neoliberal market processes, and technology's social change spillover effects. The author points to the fact that, since its inception, the contemporary Chinese state has created a cybernetic justification for "social governmentality", as a means to redress potential informational imbalances in the process of ruling the state polity. For the Chinese administrative hierarchy, data provides the means to execute a top-down correctivist paradigm for steering societal conduct, a paradigm integrated into (but also to some extent in tension with) data-empowered state capitalism.

Keywords
China, state capitalism, data silos, digital government, identity infrastructure, social big data

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1 See https://cyberbrics.info. The BRICS countries are Brazil, Russia, India, China, and South Africa.

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1. Introduction

A core component of socialism with Chinese characteristics is the term "modernisation" (*xian dai hua*, 现代化), which was ideologically embedded in the earliest-phase Four Modernisations (四个现代化) national strategy and would continue to be central to the Chinese economic and political agenda on poverty reduction and the growth of the economy.[2] Among the Four Modernisations, Scientific and Technological (S&T) Modernisation was central. Then-Paramount-Leader Deng Xiaoping stated that the mastery of S&T was imperative for socialist modernisation (Schneider, 1981). This signalled the embryonic form of Chinese cybernetics in the national innovation system and the institutional intention of Marxism to include technology under political authority (Cong & Thumfart, 2022, p. 4). The terminology "Fifth Modernisation", namely Modernising the State Governance System and Capacity, was coined in 2013 (Central Committee of the Chinese Communist Party (CCP), 2013), and focused on enabling the adjustment of the state–government–market relationship so as to improve Chinese statecraft. In the years since, technology has gradually evolved from being an innovative element driving economic growth to being a governance tool that rules society, thus transforming the bureaucratic structure of China's public administration.

The article probes the impetus propelling China to cultivate its digital state, embodying a form of digital sovereignty that distinctly diverges from the perceived "Western Path" of postcolonial datafication, also claimed as digital colonialism (Cong & Thumfart, 2022, p. 2). Through tracing the genealogy of Chinese law and policy reforms in support of digital transformation, this article shows how China has arrived at its "whole-of-nation" system ("举国体制")—or, more precisely, its system of (party–)state capitalism (Hsueh, 2016; Y. Huang, 2008; Milhaupt & Zheng, 2014; Pearson et al., 2021)This system underlies the development of numerous strategies to digitise public services—particularly through the digital identity infrastructure—as an institutional concentration that illustrates both the positive and the exclusionary nature of social big data. Using social big data can enable governments to improve weak areas of public administration (e.g., shifting from inefficient and neglectful administration to efficient and targeted administration). However, it can also

2 Before establishing the long-term "Reform and Opening-up" tactic, Deng furthered the Four Modernisations, first proposed by Zhou Enlai in 1954, as an economic means of strengthening China's agriculture, industry, defence, and science and technology sectors.

advance the use of digital state infrastructure as a form of observation or social governmentality (Foucault, 2001, p. 201, on the concept of "governmentality"), with a high degree of data granularity.

2. Driving forces in digitalisation of public services

In 2001, when the United Nations first released the e-Government Index, China was classified as having "minimal e-gov capacity", with a relatively low ranking of 1.04 compared to the then global average of 1.62, while the 2022 UN E-Government Survey found that China now has a "very high" E-Government Development Index (EGDI) of 0.8119 (out of 1.0) (UN, 2022, p. 214)—a major shift over a period of 20 years. I now turn to documenting how China has completed its substantial and phased digital transformation at a pace that is described by some as a Schumpeterian industrial policy model of technological leapfrogging and catching-up (Lee, 2022).

Stage one: State informatisation (the 1990s)

The Chinese government first employed state informatisation—state-directed IT-facilitated modernisation (Zou, 1997, p. 6)—to establish a top-down telecommunications network across all levels of government, with the aim of managing economic databases and improving administrative efficiency. For example, the Golden Projects (三金工程) of the 1990s, all e-government focused, included the Golden Bridge Project (金桥工程) focused on internet provision, the Golden Customs Project (金关工程) linking customs entities, and the Golden Card Project (金卡工程) that established a national bank card network (Zhao, 1995). In 1999, China began the Government Internet Access Project (政府上网工程) as an e-government incubator.

Although these IT systems of the 1990s empowered a government-centric, bureaucratic, confidential state, with office automation only in the internal administration and without IT embedded in general governmentality, the state informatisation established the model of "state-directed co-developed standardised interconnection" (Zou, 1997, p. 6) to underpin all levels of the administration's more statistics-informed, macro-control capabilities.

Stage two: E-government data silos (2000–2014)

The Chinese E-Government Guidance and Framework were released in 2002 and 2006, respectively, to accelerate institutional changes and improve the service quality and efficiency of central and local governments (National Informatisation Leading Group, 2006; Office of the Central Committee of the CCP, 2002), resulting in the expansion of informatisation architecture from the Golden Projects to Two Nets, One Website, Four Databases, and Twelve Golden Projects (两网，一站，四库，十二金工程). The "two nets" were the government intranet and the government extranet; the "one website" was the gov.cn domain; the "four databases" were the Population, Legal Entity, Macro-Economy, and Spatial Geography and Natural

Resources databases; and the "twelve Golden Projects" were focused on e-government in numerous sectors, including Finance, Social Welfare, and Agriculture.[3]

Accordingly, the conventional information asymmetry of power in Chinese hierarchical systems was somewhat reduced. However, the hierarchy's organisational structure resulted in different parts of government forming data silos because both vertical and horizontal administrative departments built and maintained data pools independently, without standardising inter-unit data sharing protocols (Zheng, 2007, p. 119). Meanwhile, the increase in civic participation in (new) social media—facilitated by, for example, the launch in 2009 of the Sina Weibo microblogging Gov Account (Yu, 2016)—sparked demand for increased public access to information, and, at the same time, increased state interest in responding to public sentiments to enhance the credibility of the government.

Stage three: Towards Digital China (since 2014)

The deployment of e-government continued in conjunction with the 13th five-year plan (2016–20), through the adjustment and integration of national databases on demography, legal entities, natural resources, spatial geography, macroeconomics, cultural content, and social credits (H. Huang, 2020b, p. 12). Some databases, including the macroeconomic database, were scrapped during construction, while some, like the demographic database, were merged with a more centralised system (H. Huang, 2020a, pp. 50–51). Due to the lack of audits and evaluations of government websites, the Chinese government's efforts to expand e-services and bridge the digital divide between rural and urban areas were largely unsuccessful (H. Huang, 2020a, pp. 51–52). In response, there were administrative campaigns to build a New Media Matrix for Government Affairs and palmtop services (Office of the State Council, 2018a), by developing multidirectional channels, including gov.cn, WeChat public accounts, Weibo public accounts, and WeChat mini programmes and administrative mobile apps.[4]

In 2015, China adopted the Internet Plus initiative focused on using the internet as an empowering infrastructure to enhance mass productivity and galvanise state innovation and entrepreneurship (State Council, 2015b). As part of the initiative, the national Internet + Public Services plan was devised and implemented in accordance

3 See http://www.e-gov.org.cn/article-166340.html

4 See the New Media Matrix for Government Affairs at https://app.www.gov.cn/govdata/zwxmtjz.html. (Government-operated accounts—*zheng wu hao*, 政务号—authenticated and managed in the name of primary government departments, function as media accounts, such as those verified for governmental interaction with the public on Weibo. Analogously, WeChat Public Accounts serve as a distinctive feature within the WeChat application, empowering individuals or organisations to disseminate content, cultivate a following, and sell their goods and services. Complementarily, WeChat Mini Programmes, intrinsically mobile applications that operate within the WeChat ecosystem, offer accessibility without necessitating separate downloads or installations.)

with the procedural design model employed by user-friendly e-commerce platforms (Office of the State Council, 2018b). A quintessential example is China's Internet courts, which have essentially platformised electronic litigation for the parties involved, online case filing by the courts, and online court hearings presided over by judges.[5] At the same time, the central government introduced the national Internet + Regulations System (the National Integrated Online Regulatory Platform).[6] This system, enabled in part by Alibaba's cloud computing services (Aliyun), provided *ex ante* regulatory prediction, regulatory effectiveness assessment, credit modelling, and user interface (UI) design.[7] One example is Hangzhou's City Brain that adopts Aliyun's Super Artificial Intelligence, automatically deploying public resources and correcting bugs in the city's operation.[8] It marked a significant shift in the way the Chinese government reshaped bureaucratic governance, from office automation to automated-decision-making-assisted administration, by utilising emerging technological tools and market-driven mechanisms.

In 2021, Section Five of China's 14th five-year plan (2021–25) emphasised the importance of accelerating digital growth and creating a Digital China (*Xinhua News Agency*, 2021). This call for a Digital China had been preceded by a series of policy documents promoting the development of a national integrated online government service platform,[9] an "all-in-one" portal,[10] and a cross-provincial digital public service platform.[11] The Digital China strategy primarily hinges upon the fortification of digital infrastructure and data resource systems, with digital governance serving as a corollary facet within this overarching agenda. This is predicated upon a symbiotic public–private collaboration, leveraging user-centric amenities, such as accessibility—a salient attribute previously associated predominantly with private platform business models in China. In 2022, the 14th Five-Year Plan's ancillary schemes concerning State Informatisation and Public Services amplified the provision of accessibility

5 See Beijing Internet Court at https://www.bjinternetcourt.gov.cn/; Guangzhou Internet Court at https://ols.gzinternetcourt.gov.cn/; and Hangzhou Internet Court at https://www.netcourt.gov.cn/

6 See the National Integrated Online Regulatory Platform portal at http://www.jianguan.gov.cn/

7 See the overview of the solution demo for the Aliyun-powered Internet + Regulations model at https://cn.aliyun.com/solution/govcloud/intetregulation?from_alibabacloud=

8 See the Hangzhou City Brain Co. LTD. at https://www.cityos.com

9 See the 2018 Guiding Opinions of the State Council on Speeding up the Construction of the National Integrated Online Government Service Platform (国务院关于加快推进全国一体化在线政务服务平台建设的指导意见), the 2019 Provisions of the State Council on Online Government Service (国务院关于在线政务服务的若干规定), and the 2021 Guide to the Construction of the Mobile End of the National Integrated Government Service Platform (全国一体化政务服务平台移动端建设指南).

10 See the 2018 Implementation Plan on Deepening "Internet + Government/Public Service" and Promoting the Reform of "one Web Portal, one Door and one Time" of the Government Affairs Service (进一步深化"互联网+政务服务"推进政务服务"一网、一门、一次"改革实施方案).

11 See the 2020 Guidance of the General Office of the State Council on Accelerating the "Cross-provincial" Government Services (国务院办公厅关于加快推进政务服务"跨省通办"的指导意见).

for the disabled and marginalised demographics. This enhancement was previously evaluated via the recalibration of web and application. The private sector also follows the trend. A typical example is the "Caring Mode" (*guan huai mo shi*, 关怀模式) of WeChat, particularly prototyped for the elderly and visually impaired groups.

Hence, originating from state informatisation and progressing through inter-departmental data silos, all while pioneering user-friendliness, China has accomplished a rapid and phased digital transition in the public sector over the past few decades, utilising a resource-concentration industrial economic model. Particularly, the spillover effects of platformisation—including incorporating super apps like WeChat—have prompted the societal implications of digital technology to embed into administrative hierarchies, thereby acting as the impetus for the digital transformation of public services.

3. Streamlining of government data stewardship

A power-concentrated body, the National Informatisation Leading Group, was created in 1996 with the goal of overseeing China's transition to digital technology (Office of the State Council, 1996). The Ministry of Industry and Information Technology (MIIT) absorbed the Informatisation Office of the State Council in 2008 (Wang, 2014). It was decided in 2014 to reclassify MIIT's Informatisation Promotion Department as the Cyberspace Administration of China (CAC), signalling that one of the CAC's major responsibilities (especially in its Information Development Bureau) would be to coordinate China's e-government initiatives, in concert with other agencies playing a variety of roles in digitising public services (H. Huang, 2020a, p. 50).

The 2018 Plan for Deepening the Reform of Party and State Institutions specified that the Central Cyberspace Affairs Commission (CCAC), a CCP body, would oversee the CAC and the country's cybersecurity and informatisation (Central Committee of the CCP, 2018).

The determination of critical information infrastructure in China has had a gradual evolution from the Cybersecurity Law of 2016 to a complex system of rules involving the Personal Information Protection Law (PIPL), the Data Security Law (DSL), and Regulations on Critical Information Infrastructure (CII) Security Protection (CII Regulation), all of which were put in place in 2021. These laws demonstrate that the national security involved in data management is regarded as more relevant than the advantages to be gained from market-based data.

A broad variety of other government organisations, each with a particular role to play in the process, have also been included in the digitisation of public/government services. The National Development and Reform Commission, more precisely the State Information Centre, makes plans that primarily reflect sharing information resources at the national level (H. Huang, 2020a, p. 51). At the same time, the General Office of the State Council is responsible for overseeing the disclosure of government information (i.e., the Operational Centre for gov.cn) (Office of the State Council, 2008). The Ministry of Industry and Information Technology continues to collaboratively coordinate the development of telecommunications, the internet, and private communication networks, in accordance with the 2018 Plan for Deepening the Reform of Party and State Institutions (Central Committee of the Chinese Communist Party (CCP), 2018).

As the examples above demonstrate, the central government and the CCP have taken numerous steps to streamline government data stewardship. Yet because traditional Chinese administration paid little attention to cross-departmental collaboration, information and/or data ramparts continue to exist. Traditionally, administrations did not simply perceive power divisions as the rationale for a physical separation of data, but instead as an inherently different model of data structures, whose tightness could reduce risks of accountability.

China's digital transformation has, in recent years, undergone a transition from governing society with data to regulating data for society. Data was traditionally viewed as a catalyst for emerging technologies such as big data analytics, artificial intelligence, and blockchain technology in the context of the national innovation system. In 2015, the State Council issued the Action Plan for Promoting the Development of Big Data (State Council, 2015a), which clearly stated that data is a "fundamental strategic state resource". In March 2020, the CCP Central Committee and the State Council released Opinions on Strengthening the Institutional Mechanism for Market-Based Allocation of Elements (Central Committee of the Chinese Communist Party (CCP) & State Council, 2020), which defined data as a key market element. In a sense, the Chinese bureaucracy sees data as both a source of bottom-up information feedback and a complement to its top-down state-dominated capitalism—and, as never before, as a productivity material that can be subject to state-drawn ownership rules and thus constructed as a data market.

Following the Internet Plus initiative, the First Research Institute of the Ministry of Public Security piloted Version 1.0 of the Cyber Trusted Identity (CTID) system in 2016.[12] With the original aspiration of privacy-enhanced technology at its core,

12 See the brief history of the CTID platform at http://www.anicert.cn/platform.html?md=2

the CTID platform desensitises and de-identifies the personal identifiers in the legal identity files, generates an irreversible data file devoid of plaintext information, and maps the documents to the legal identity files one by one.[13] The CTID uses SIM card digital identity, blockchain, two-dimensional code, cryptography, and facial recognition to enable online identification without requiring the user to disclose written and plaintext personal information (Bao & Wu, 2020, p. 117; Gao et al., 2021, p. 91), allegedly resulting in reduced breaches of sensitive personal data.

During the COVID epidemic, China's Health Code system with a three-colour dynamic interface, which was developed based on the underlying CTID technology in 2020, further strengthened the process of using digital identity for social governance. The former constitutes a derivative technological advancement predicated upon the latter (CTID, 2021). Since it is connected to the National Integrated Big Data Platform and relies on widely used payment apps like Alipay and WeChat Pay (Liang, 2020, p. 1), it has a federal character in use. Health codes go beyond identification, and their combination of personal information, health status, residence, travel history, exposure history, and other supporting data plays a socio-technical role in epidemic risk ranking and migration control in epidemic prevention (Cong, 2021, p. 4).

According to the latest policy document (Office of the State Council, 2022), China's extensive collection of big data is focused on two main categories: basic databases and thematic databases. The basic databases are expected to contain data on dimensions such as population, legal persons, natural resources, economy, and electronic certificates.[14] The thematic databases are expected to cover dimensions such as health care, government services, social security, ecological and environmental protection, the credit system, emergency management, and supervision of state-owned assets. The process of centralised data collection and cleansing is known as fusion and aggregation (*gui ji*, 归集). Governmental data integration attempts to facilitate transformative data fusion by distinguishing at the policy level between narrowly defined government data (data generated and collected in the course of government operations), industrial data (sectoral data collected by official units), public data (data collected and generated by public utilities), and social big data (data collected and generated by third-party internet platforms).[15]

13 See the definition of the CTID platform at http://www.anicert.cn/identity.html

14 In China, Electronic Certificates (*dian zi zheng zhao*, 电子证照) typically refer to all kinds of licences, certificates, approvals, appraisal reports, office results, and other documents issued by various units in accordance with the law and with legal effect. For example, there are ID cards, marriage certificates, bank repayment flow certificates, business licences, etc.

15 The aforementioned initiative, commonly referred to as "Internet + Regulations", compelled certain platforms to disclose specific operational data, including, for instance, the identifying information and tax-related particulars of platform operators, in accordance with Article 28 of the 2018 Chinese E-Commerce Law.

4. Conclusions

This article has identified two driving forces behind the Chinese digital transformation: applying quasi-neoliberal market mechanisms, and using technology's spillover effects to influence governmentality. The modern Chinese state has developed a distinct cybernetic rationale for social governmentality since the age of Four Modernisations—with cybernetic social governmentality tools used as a means to redress a potential imbalance of information in the process of ruling the state polity (where local administrators once disregarded the upward institutional feedback of data and statistics pertinent to governance).

To a certain degree, a discernible absence of normative congruence can be observed across the aforementioned approaches of improving public administration, transforming towards digital government, and exercising social governmentality, stemming from the inherent tension between utilising big data for social governmentality and monetising said data. This tension has also manifested geographically in the perception of data sovereignty within China. Data sovereignty with Chinese characteristics signifies a conceptual fusion between preserving the political fabric and invigorating economic growth, which, in turn, accentuates an inherent dichotomy/tension that exists between cybersecurity and digital economy.

As a result of using social big data for platformising public administration, Chinese state capitalism has been invigorated, whereby data gained from grassroots civic participation in e-government services provides real-time information feedback loops, as well as data that can be monetised. Technology assumes a compulsory intermediary role, facilitating the administrative ability to extract and cultivate governance capabilities centred around efficiency, directly derived from evidence-based behavioural data.

Technology is perceived by the state as serving as: a probative catalyst for ideology; a geopolitical symbol of sovereign independence; an economic element of innovation; and, most frequently, a normative instrument of government.

In the case of the public sector's digital transformation, data is frequently more than just data; it represents a top-down correctivist paradigm of social relations. The state's constitutional foundations and, as a result, citizens' rights, may be somewhat vulnerable as a result of the digital non-scarcity that develops when the state gathers large amounts of data on individuals—through, for example, decentralised/federalist abuse of digital technology (Horwitz, 2022). This dichotomy between positive and exclusionary use of social big data—between culturally and economically reimagined monitoring—thus deserves further normative and empirical investigation so that it can be understood and remedied at a micro level, at a behavioural level, at a cognitive level, and, most significantly, at an institutional level beyond socio-technical imagination.

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