China's Artificial Intelligence Innovation:
A Top-Down National Command Approach?

Jinghan Zeng

01/12/2020

Abstract

China's open embracing of the age of artificial intelligence (AI) has attracted considerable academic and media attention. Many argue that China has taken advantage of its national approach to contest for AI supremacy and geopolitical dominance. The relevant analyses assume China's AI plans as being Beijing's coherent top-down geopolitically driven national strategy, reflecting Chinese leaders' global ambitions. This article argues that these views are mistaken. It argues that China's AI plans are primarily driven by contestation and the struggle for resources among domestic stakeholders who are economically motivated and have little awareness of the bigger geopolitical picture. Instead of a top-down command approach, China's national AI plan is an upgrade of existing local AI initiatives to the national level, reflecting a bottom-up development. This article suggests that the existing analyses vastly exaggerate (a) Beijing's capacity to coordinate domestic capital and actors towards a unified, specific strategic objective and (b) the extent of China's AI advancement and its geopolitical threat, triggering unnecessary anxiety among China's near competitors.

Introduction

The artificial intelligence (AI) revolution is likely to bring significant changes to human society for better or worse. Despite frightening warnings about an AI takeover, China has decided to embrace the age of AI and accelerate its arrival. In 2017, the Chinese government openly spoke about its global ambition to become a leading AI power by 2030 (China, 2015). In an era of great power politics, China's AI dream, led by its economic rise, has heated up tech competition on the global stage. To many, Beijing's bold AI plans represent a new area for US-China geopolitical competition (Klein, 2020; Allison, 2019; Castro, McLaughlin and Chivot, 2019; Allen, 2019; Kempe, 2019). The narrative of a so-called "AI race" or "AI cold war" has made for many headlines. With a few exceptions,[1] the Chinese approach towards AI development is frequently labelled as a "top-down" national strategy (Liu, 2019; Ramanathan, 2019; Ives and Holzmann, 2018; Jing, 2018; Yu, 2019; Lanier and Weyl, 2020; Lee, 2018). As Ives and Holzmann put it (Ives and Holzmann, 2018),

> "The current top-down approach in China's AI industry is thus in line with the country's overall industrial policy, in that it mobilizes massive amounts of capital and labor towards a specific target even at the risk of creating inefficiencies and wasting resources."

To many, this is some sort of "unified/integrated" "whole-of-nation/government/society" approach to drive AI innovation (Ding, 2018; Kania, 2017; Sayler, 2019). This "unique" Chinese approach and its underlying strategic thinking has led to a debate over whether China

is winning the AI race, causing considerable anxiety for China's near-peer competitors, especially the US (Allison, 2019; Allen, 2019; Kempe, 2019). As a US Congress report on AI and National Security points out,

> "Most analysts view China's unified, whole-of-government effort to develop AI as having a distinct advantage over the United States' AI efforts" (Sayler, 2019:23).

Here, the different approaches taken by Chinese and American governments have often been compared. The relevant analyses often consist of a simple dichotomy: China's top-down nationally coordinated approach versus the American market-oriented approach. As Amy Webb (2019) argues,

> "The future of AI is currently moving along two developmental tracks that are often at odds with what's best for humanity. China's AI push is part of a coordinated attempt to create a new world order led by President Xi, while market forces and consumerism are the primary drivers in America".[2]

In this regard, the Chinese approach is summarized as a geopolitically driven national strategy reflecting the ambition of Beijing and Chinese leaders to pursue a China-centred AI order, assuming a concerted national effort to achieve a unified central objective.

This article, however, argues that these views are mistaken. It argues that China's AI strategy is a loose slogan rather than a concrete policy plan. In order to mobilize domestic actors, the slogan is kept deliberately vague and broad to accommodate the interests of domestic stakeholders. Instead of unfolding according to Beijing's top-level design, China's AI development is primarily driven by powerful domestic stakeholders with diverse and competing interests. As economic growth is the most important goal of China's AI plans, the central state has restricted discretion, while local states have primary responsibility for boosting the AI economy in China. Although this division of authority provides institutional incentives for local states to promote the AI industry in their own jurisdictions, it creates additional difficulties of steering and coordination. As this article will show, the diverse interests among domestic actors have produced a high level of regional competition regarding the AI industry.

This game of contestation, and the struggle for resources, has been played by local, subnational and non-state actors who are economically motivated and have little awareness of diplomatic or geopolitical goals. This not only disproves the "coordinated" narrative in terms of Chinese AI strategy, but also shows that global geopolitical factors are largely irrelevant. In addition, local provinces and non-state actors had already made their AI plans long before the central government announced AI as a national strategy in 2017 (Ding, 2018:15). The latter was indeed a recognition and upgrade of existing successful initiatives at the local level, reflecting a bottom-up rather than a top-down development.[3] The rapid development of China's AI industry is largely thanks to China's market forces, especially proactive profit-driven private entrepreneurship, rather than the instructions of central agencies in Beijing.

This article points to a complex and multifaceted phenomenon of China's AI politics. In the relevant AI race analyses, the geopolitical ambition of China's AI strategy has often been highlighted. Using Cold War zero-sum thinking to analyse China's AI innovation, these arguments have inevitably triggered unnecessary anxiety for China's near-peer competitors. By arguing a distinct advantage of this "unified" Chinese masterplan, many analysts urge immediate policy actions – for example, the US government to adopt a similar approach in

order to maintain its AI supremacy (Corrigan, 2018). These arguments vastly exaggerate Beijing's capacity to coordinate domestic capital and actors towards a unified, specific strategic objective.

In this regard, China's AI innovation is much less threatening to China's near AI competitors in geopolitical terms than it is framed in the relevant analyses. Given China's important role in AI innovation, the exaggeration of a China threat is unhelpful to transnational cooperation in AI that the world can benefit from. For policy-makers of China's near AI competitors such as the US and Europe, it is critical to make evidence-informed decisions that take these complex and multifaceted domestic dynamics of China's AI development into consideration where comparisons are made.

This article draws on both open source Chinese material and fieldwork in China, and proceeds in four subsequent parts. The first part discusses the transformation of China's governance model over the past few decades, and why its operation mechanism is not a top-down command approach. The second part analyses how this transformed governance model operates regarding China's AI plans and how the state AI strategy follows a bottom-up development. It also shows that domestic (non-)state actors have taken advantage of the central government's AI plans to maximize their own interests, exposing the problems of steering and coordination. The third part explains why the Chinese central state chooses not to intervene to a larger extent and discusses its own coordination problems. The conclusion summarizes the relevant arguments and discusses the implications for China's AI development.

Federalism with Chinese Characteristics

Within the literature of international relations, the analyses of China often assume that China/the Chinese state is a monolithic political entity. The Chinese authoritarian regime is simply considered a unified and "highly centralized" decision-making system, which Beijing can easily mobilize to achieve its goals (Hill, 2016). This simplified understanding inevitably neglects the nuanced development of China's domestic political economy and its impacts on China's foreign relations. In fact, decades of scholarship in China Studies have produced a sizeable literature that presents a fragmented and decentralized authoritarian system in China (Lieberthal and Oksenberg, 1988; Lieberthal, 1992; Lieberthal and Lampton, 1992; Schurmann, 1966).

Since the late 1970s, China's party state has been transformed by its market reforms. In contrast with public understanding, this transformation has led to a series of political reforms in China – despite not for the sake of democratization (Zeng, 2015b). Driven by a pragmatic and market-oriented approach, China's rapid economic changes have altered its central-local relations. These reform programmes have introduced a division of authority between central and local states (Montinola, Qian and Weingast, 1996; Xu, 2011). This has given local states primary responsibility for regional economic prosperity at the cost of the central government's monopoly control over the Chinese economy. Consequently, this has led to a high level of local autonomy and a restricted discretion of the central authority (Montinola, Qian and Weingast, 1996; Xu, 2011). As Shaun Breslin points out, market reform programmes have allowed local leaders not only the ability to "ignore central economic commands" but also "the desire to assert their independence" (Breslin, 1996).

This federalism without a separation of power and popular elections is known as "federalism, Chinese style" (Montinola, Qian and Weingast, 1996; Qian and Weingast, 1995), "de facto federalism" (Zheng, 2007) or federalism with Chinese characteristics. The benefits

of this fiscal decentralization are obvious. The most notable one is giving local actors institutional incentives to promote economic growth. Many consider this fiscal decentralization the key to China's economic miracles over the past decades (Qian and Weingast, 1995; Montinola, Qian and Weingast, 1996). This system gives local states the power and motivation to explore the most efficient economic policies and thus boost regional growth.

Restricted central authority and local independence, however, inevitably increase the problems of steering and coordination. This transformation has altered the power relations and the bureaucratic order by encouraging a high level of competition among regional actors (Montinola, Qian and Weingast, 1996; Xu, 2011). In addition to fighting for the central government's support, this competition extends to the struggle for factors of production including labour and capital (Montinola, Qian and Weingast, 1996). As a result, regional relations have become increasingly competitive. Local fiscal independence also means that local actors are primarily driven by their individual interests rather than China's geopolitical goals.

In addition, fiscal decentralization has fundamentally changed the way the central state attains its objectives. The decision-making process is no longer a simple top-down command approach imposed by a few top leaders in Beijing, if it ever was. It now involves "ongoing, multi-level, multi-agency bargaining, whereby apparently subordinate actors may influence, interpret or even ignore central policy" (Jones and Zeng, 2019:1416). In this regard, policy slogans are crucial for central-local interaction. In order to mobilize domestic actors, the central state has to rely on policy slogans that are often vague and loose to leave room for local actors to adapt them to local conditions (Zeng, 2020). The process of translating these vague slogans into practices will inevitably invite agendas and interests of local actors (Zeng, 2019; Zeng, 2020). When economic interests are involved, local actors will compete to jump on the bandwagon to fight for support from the central government, creating the illusion of a "whole-of-nation" approach to make concerted efforts towards achieving the central goals while hiding the high level of regional competition and the manipulation of policy slogans for individual/regional gains (Zeng, 2020).

This Chinese federalism also means that decision-making is not always a one-way process of a top-down translation. Instead, decentralized policy experimentation and bottom-up initiatives represent a key part of the central-local interaction (Zheng, 2007). This policy experimentation allows local states to test or explore novel policy ideas and thus promote policy innovation or institutional changes. When successful local policy initiatives are developed, the central government may choose to adopt those local initiatives at the national level. Thus, policy experimentation is a process of turning local initiatives into national policies. As Heilmann (2008b:21) argues, it has "minimized the risks and the cost to central policymakers by placing the burden on local governments and providing welcome scapegoats in cases of failure".

Indeed, many Chinese national policies are developed from local initiatives via this bottom-up manner (Heilmann, 2008b; Heilmann, 2018). This has developed a sizeable literature of policy experimentation (Heilmann, 2008b; Heilmann, 2018; Heilmann, 2008a; Heilmann, 2009; Zeng, 2015a; Wang, 2009; Parris, 1993). Take China's national talent policy as an example. It was developed from local talent policies in cities such as Wuxi that aimed to attract oversea talent to grow their business in Wuxi as returnee entrepreneurs to boost the city's innovation and economy (Xing, Liu and Cary, 2018). In order to maintain their regional competitiveness, other cities and provinces have emulated and developed this talent policy based on their local needs, leading to different forms of talent policies at the regional level. Given the policy success at the local level, the central government has recognized these local initiatives and institutionalized talent policies at the national level in order to promote China's innovation and national economy.

Unfortunately, the above "conventional wisdom" within the China scholarship has not changed the way that China is understood by the community of international relations despite efforts made by many China experts. To some extent, this is understandable given that China's rise is a recent phenomenon, and, after all, this knowledge is traditionally considered "domestic". Yet, the line between domestic and international Chinese politics has become increasingly blurred nowadays. The transformation of China's authoritarian system has been further deepened by globalization and China's economic integration with the world, granting domestic actors growing transnational interests and global influence. Provincial governments that previously had small international roles have now become powerful stakeholders managing transboundary economic and security matters (Su, 2015) and exerting their global influence via, for example, associated state-owned enterprises (Jones and Zou, 2017). As such, the Chinese authoritarian system has become not only increasingly fragmented and decentralized, but also "internationalized" (Jones and Zeng, 2019; Hameiri and Zeng, 2019; Hameiri and Jones, 2016; Jones, 2019; Hameiri, Jones and Heathershaw, 2019).

In this context, the domestic technocratic problems of steering and coordination have produced wider and deeper global consequences. The knowledge gap between International Relations and China Studies has become increasingly negatively impactful. The Belt and Road Initiative (BRI) is a recent notable example. The expansion of China's BRI has received extensive academic and public attention given the enormous resources involved. Following a traditional top-down monolithic approach, many argue that the BRI is Beijing's "well-thought-out" and "clearly defined" grand strategy to reshape global order and achieve geopolitical dominance (Callahan, 2016; Miller, 2017; Leverett and Wu, 2017). Yet, as Jones and Zeng argue, the design and implementation of the BRI is actually shaped by a bottom-up manner driven by local, subnational actors who struggle for resources with little awareness of diplomatic and geopolitical goals (Jones and Zeng, 2019). Driven by the diverse and competing interests of powerful domestic and international stakeholders, the BRI has been unfolding in an incoherent and fragmented fashion rather than as some grand strategic masterplan designed in Beijing (Jones and Zeng, 2019). This means that it may depart significantly from the top-level plan made by the Chinese central government (Jones and Zeng, 2019).

Similarly, the diverse and competing domestic interests have led to contradictory Chinese engagement on the global stage from the South China Sea (Group, 2012; Hameiri and Jones, 2016) to even within the hardest security arenas, such as nuclear governance (Hameiri and Zeng, 2019). Instead of shaping the world on Beijing's terms, the outcomes of these domestic dynamics sometimes undermine Chinese foreign policy objectives (Jones and Zeng, 2019). So, how will this transformed party-state system inform our understanding of China's AI development? The following section answers this question.

China's AI Advancement: A Top-Down Command Approach?

China's AI plans started to attract global attention mainly during the period of from 2016 to 2017 when the Chinese central government announced a series of AI strategy papers. In May 2016, the "'Internet +' AI three years implementation plan" was jointly put forward by the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Industry and Information Technology and the then Central Leading Group for Cyberspace Affairs. In July 2017, the Chinese State Council put a further national focus on AI and issued the "New Generation AI Development Plan".

This document specified China's three-step AI plan with quantitative targets (China, 2015). The first step in China's overall AI strategy is to reach the same level as leading countries such as the US and develop an AI industry worth more than 150-billion-yuan by 2020, followed by the second step of making major breakthroughs in some parts of AI technology and developing an industry worth more than 400-billion-yuan by 2025. The third and last step

is to become the leading AI power with an industry worth more than 1000-billion-yuan by 2030 (China, 2015). Following this, in October 2017, the 19th Chinese Communist Party (CCP) report emphasized the importance of promoting the development of AI in order to accelerate the process of making China a major manufacturing power (Xi, 2017). Afterwards, the concept of AI frequently appeared in various governmental plans and reports.

As mentioned previously, the high-profile Chinese state announcement of AI as a national strategy has produced many international analyses focusing on Beijing's strategic thinking regarding the AI race and its geopolitical goals. Many of these arguments are valid. As Xi Jinping points out, "accelerating the development of a new generation of AI is an important strategic handhold for China to gain the initiative in global science and technology competition ... we need to ensure that the core AI technologies are firmly in our own hands" (China, 2019). This has clearly demonstrated the mindset of great power competition when introducing China's bold AI initiatives. However, this is only part of the story. Over-emphasis on strategic and geopolitical thinking often produces misunderstandings.

Purely focusing on the geopolitical aspect of China's AI plans misses the bigger picture and often assumes a natural top-down translation of these grand words into concrete local practices. Indeed, the local actors' immediate responses to the central state's plans appear to support this top-down observation. In the name of responding to and implementing the central state's AI announcements, over 15 provincial units – including 11 announced between 2017 and 2018 – put forward their own local AI policies (Qianzhan, 2018). The Shanghai government, for example, introduced its own AI plans, in which it aspires to become a national leading AI city, with some parts of its AI innovation reaching the level of the world leaders by 2020, a world leading AI centre and an excellent global city by 2030 (Shanghai, 2017). Similarly, Jiangsu Province, Beijing City, Zhejiang Province and Liaoning Province set out a series of government policies to foster AI development in their respective regions (Iyiou, 2018). The above central-local interaction has created the illusion of a "whole-of-nation" "coordinated" Chinese approach to AI in that all Chinese state actors selflessly echo in concert the central call for and work to advance China's national interests – a classic top-down national command approach.

Nonetheless, the enthusiastic responses from local states to the AI policy slogan should be critically examined as they are often a political performance, reflecting the art of political correctness (Zeng, 2020). In practice, the central-local interaction is far more complicated than a top-down approach. The top-down logic assumes that the central government is the pioneer and leader deciding the strategic direction for China's AI advancement in 2017, followed by local and subnational leaders. If anything, the opposite is true. Instead of simply following the central state's instructions, local and subnational actors actively deployed their own AI plans way ahead of the central state's announcement in July 2017 (Ding, 2018). The province of Guangdong, for example, had planned its AI policies for years and announced its "2015-2020 Intelligent Manufacturing Development Plan" in February 2016.

Yiou's report shows that in 2015, 11 AI plans were introduced by 10 provincial units, and that in 2016, 9 plans were introduced by 7 provinces (Iyiou, 2018). Put another way, a year before the State Council's AI plans were issued in 2017, 14 provinces had already announced 20 AI plans (Iyiou, 2018). All of these 14 provinces have introduced additional AI plans since the State Council's AI announcement in 2017. When only observing their policies from 2017 onward, they do appear to be a response to the central government's mobilization. However, many of their new AI plans from 2017 onward were a simple continuation and modification of their previous plans. To some extent, some local states were re-branding their existing plans to make these plans look new and a follow-up to the central call. By using this "old wine in a new

bottle" tactic, they could gain economic benefits from the central state to conduct their existing plans.

The local states were ahead of not only the State Council's AI paper in 2017 but also almost all Beijing's central agencies' AI plans. The earliest provincial AI plans can be traced back to as early as 2009 with a steady number of plans published afterwards; many were published before 2012 when the central government put forward its internet of things policy (CISTP, 2018). In this regard, the central actors were neither the pioneers who discovered AI's potential nor the commanders who ordered local actors to develop AI. Driven by the benefits of an AI economy, the local and subnational actors had already introduced their AI agendas in advance of Beijing's call. The central state, at most, formalized the existing grassroots AI initiatives at the national level. In short, the local AI initiatives were already there, and the central government recognized their importance and upgraded them into a national plan. This development suggests more of a bottom-up rather than a top-down manner.

This bottom-up manner is reflected not only in the sequence of policy announcements among state actors but also in the success of private entrepreneurship in China's high-tech industry. Privately owned tech companies – such as Alibaba, Tencent and Baidu – are the key drivers of China's booming internet economy rather than the state instruction from Beijing (Jing, 2018). These privately owned internet giants are also the leading forces behind China's AI innovation. China's leading technologies, such as bike-sharing and digital payments, were created neither by Beijing's instruction nor state funding, but by market entrepreneurship (Jing, 2018). These market forces are primarily driven by business profits, not strategic geopolitical interests imposed by a few leaders in Beijing. All of these reflect the success of bottom-up innovation rather than top-down command.

Moreover, the top-down command narrative misguidedly assumes a high level of coordination among domestic actors and a chain of command through a hierarchical bureaucracy to operate the AI economy. The Chinese style of federalism determines that this is not the case. As previously mentioned, China's economy is not centrally planned but heavily reliant on a division of responsibilities between central and local states, giving the latter primary economic responsibility in their jurisdictions. Under this high level of local autonomy and the central government's restricted discretion, it is about not only what the central government wants but also what local states want.

It is true that local governments do share overlapping interests with the central government, i.e. economic growth via boosting the AI economy, which explains why local actors actively jumped on the bandwagon to echo the central call. However, there is also a critical difference in their interests. The central government, with its strategic thinking in terms of making China a leading power, is after the geopolitical interests of China as a whole. The ideal scenario is a concerted national effort to deliver this singular goal, assuming complementary rather than competitive relations among domestic local actors. For local states, however, they are not always driven by the bigger picture of China's national interests but by the desire to maximize their own economic interests. This means that conventional economic competition over factors of production, such as labour and capital, under China's federalism applies in the case of China's AI development.

Indeed, Chinese provinces never try to hide their competitive mindsets. Almost all the Chinese provinces chose a high-profile approach to announce their subsidies policies to boost the AI economy. They put forward similar policies including competing deals on tax benefits, rent concessions and funding subsidies, and they were fighting for the same AI resources: AI talent, AI investment and AI companies. The shortage in resource supply makes this competition very intense. Estimation shows that, for example, there is a shortfall of over 5 million qualified workers in China's AI industry (Hou, Jiang and Zhu, 2018); this is hardly surprising given that the shortage of AI talent is a global phenomenon. After 18 years of

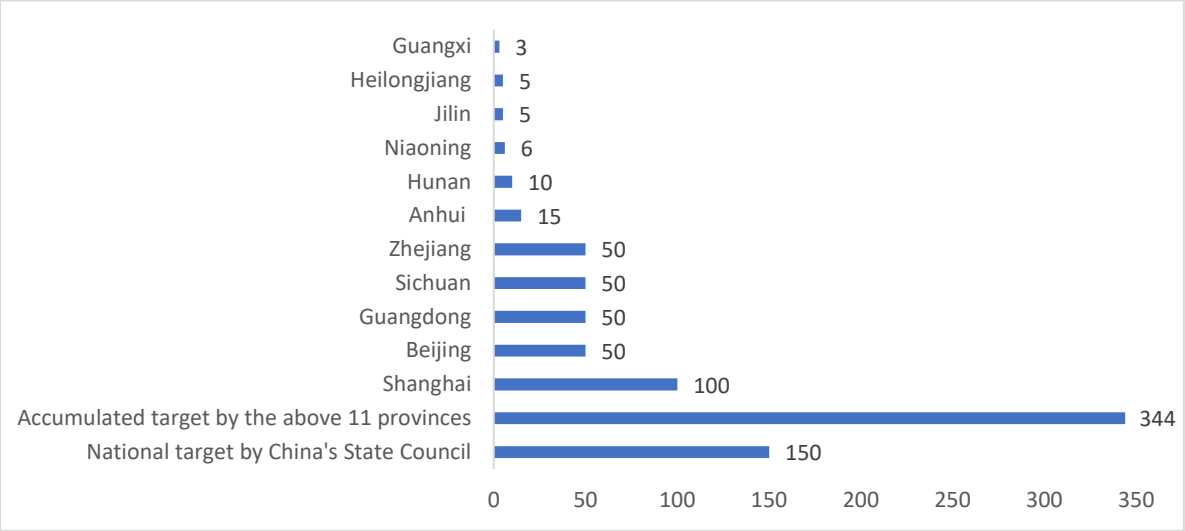
explosive growth, the total financing of China's AI industry met its first decline in 2019, dropping from 148.453 billion yuan in 2018 to 96.727 billion yuan in 2019 – a decrease of 34.8 percent (CheetahGlobalLab, 2020). Following this downward trend, 336 Chinese start-up tech companies shut down their operations in 2019. The year 2019 is widely called "capital winter" in the industry (Wang, 2019). It remains to be seen how the pandemic has affected China's AI industry.

Many local governments also used the same strategy to build momentum for their AI industries: high-profile AI conferences. This was chosen by many local governments as the first major step after they announced their AI policies. For example, in 2018, more than 8 local provinces or municipalities under the central government including Tianjing, Guizhou, Guangdong, Sichuan, Beijing, Chongqing, Shanghai and Nanjing organized AI conferences. Needless to say, so many conferences in a year kept China's leading internet entrepreneurs, such as Jack Ma, Robin Li and Ma Huateng, very busy. Again, local governments competed to invite these leading figures to boost the influence and profile of their conferences. So, the point to emphasize here is that despite the central planning at the top level, there is a high level of regional competition. As one of my interviewees points out,

> "the national planning is relatively important and can help to prevent disorderly and competitive development. However, whether it is implemented at the local level is related to the local governments' ability and awareness. Most of the times, there are irrational competition driven by GDP targets. There are also disorderly competitions like using land and policy resources and financial support to seize the opportunity of AI development."[4]

The disorderly regional competition is further demonstrated by local actors' response to the central government. As previously mentioned, in 2017, the State Council announced the national strategy of AI with the hope of building up a more than 150-billion-yuan AI core-industry and a more than 1000-billion-yuan AI-related industry by 2020. Following this, many provinces also announced their ambitious quantitative targets. Figure 1 summarizes their quantitative targets for the AI core industry by 2020.

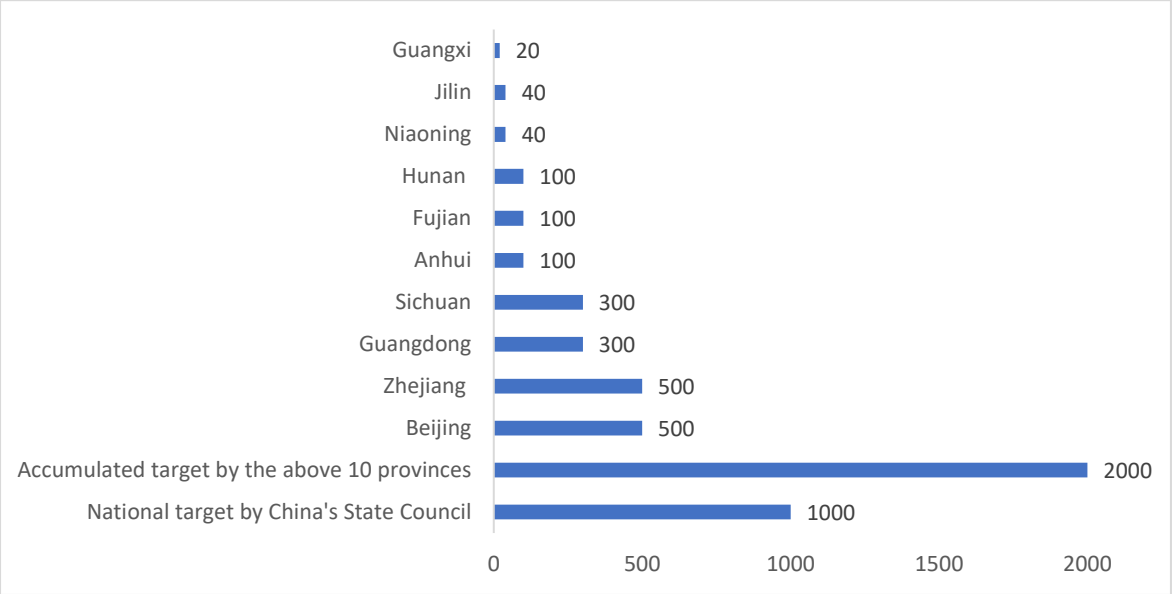
Figure 1: Summary of Chinese Provincial-Level Unit Target Values for the AI Core Industry by 2020 (unit: 1 billion yuan) [5]



As Figure 1 shows, the City of Shanghai and Sichuan Province expected to develop AI core industries worth more than 100- and 50-billion-yuan by 2020, respectively. Should these goals be achieved, together these two would be sufficient to meet the national target, i.e. the 150-billion-yuan goal set by the State Council. Adding the targets of these 11 provinces together, the total value of the AI core industry would be 344 billion yuan – more than double the national target.

This inflation is also reflected in the target value of AI-related industry. Figure 2 summarizes the quantitative targets of AI-related industry by 2020. As Figure 2 shows, these 10 provincial units' accumulated target value of AI-related industry reaches 2,000 billion yuan – twice that of the national target set by the State Council. Notably, the above accumulated provincial target only covers 10-11 provinces, while the State Council's national target was supposed to cover the whole of mainland China, i.e. 31 provincial units. Besides these 10-11 provinces, there were some provincial units that had not put forward their AI plans but were still interested in developing an AI economy, or others who had their AI industry plans but did not specify their quantitative targets for 2020. Had they given a figure, the accumulated provincial target would be even higher.

Figure 2: Summary of Chinese Provincial-Level Unit Target Values of AI-Related Industry by 2020 (unit: 1 billion yuan) [6]



In addition, the national target of 150 billion yuan is not a moderate target. The widely cited Zhongkegaofu Report estimated only a 57-billion-yuan AI core industry in 2019 (Zhao, 2019; Zhongkegaofu, 2019). Estimations of China's AI industrial value in 2020 ranged from 40 to 160 billion yuan, with most institutes putting forward a number way lower than 150 billion (Qianzhan, 2019: Section 5-1).[7] In this context, the grossly inflated regional targets are quite unrealistic.[8] Notably, this phenomenon is far from unique. The accumulated regional GDP figures, for example, are always unreliable as China's local actors tend to fake their economic data. The reported local GDP figures often inflate revenues and downplay debts, and the Chinese central government does not always know what is going on (Koch-Weser, 2013; Wallace, 2016).

Needless to say, this tendency for data manipulation has affected statistics on the AI industry. Indeed, plenty of room was left for this data manipulation. The target numbers in Figures 1 and 2 refer to the value of the AI core and the related industries, respectively.

However, the line between the AI core industry and AI-related industry is very blurred, leaving room and flexibility for different interpretations (Ding, 2018). The fundamental concept of "AI" is very difficult to define. This umbrella term – referring to a set of digital technology with the ability "to perform tasks that would usually require human intelligence" (Oxford, 2005) – has made related concepts, including "AI technology", "AI strategy" and "AI industry", very fuzzy. As Ding (2019a) points out, "the concept of AI, which encompasses anything from fuzzy mathematics to drone swarms, becomes so slippery that it is no longer analytically coherent or useful." This lack of clarity regarding these AI concepts and the central government's AI plans has been exploited by some market forces as an opportunity for profits.

Some market actors view China's national AI plans as a rare marketing opportunity to hype AI business. They have contributed to a national AI boom carnival in China, leading to unreasonably high salaries, expectations of investment returns and the valuation of unicorns in China's AI industry (Chen, 2017). Consequently, there are increasing concerns over an AI bubble in China (Chen, 2017; Stars, 2019). Although the AI hype is a global phenomenon, the one in China is perhaps the biggest thanks to China's high-profile state AI plans. For some, the current AI bubble in China is "insane" (Stars, 2019). Many Chinese AI companies took advantage of AI's fuzzy definition to brand their products with an AI label in order to make more profits and attract more investments (Wang, 2018). According to Li Yizeng, Principal Fellow at Shanghai Academy of Social Sciences' Internet Studies Centre, 90 percent of the current AI business products on the Chinese market, such as smart speakers and robots, are not "real" AI technology (Wang, 2018). According to Wei Zhe, Founder of Jiayu Fund, 90% of those products are "fake AI" (Wang, 2018). This has contributed to a very unhealthy AI market, lacking in genuine innovation.

In addition, some market actors have manipulated the fuzzy definition of an AI company to cheat state funding. According to a Deloitte report, "90% or even 99%" of China's AI companies are fake AI companies (Deloitte, 2018). These companies have used their fake AI cover to deceive the government and obtain state subsidies (Deloitte, 2018) - a problem that commonly exists in China's other high-tech industries as well. Generally, it exposes the efficiency and quality problems of China's tech policy. While it boosts sector growth by providing more incentives for the private and research sectors and allocating more resources in high-tech industry, it inevitably poses the challenges of over-capacity, wasteful investment and quality innovation. In this regard, China's national AI plan is further distorting the already unhealthy Chinese AI market. When dealing with the flow of state funding, the commercialization of new AI technologies remains a critical challenge for Chinese AI start-ups (Dai, 2018). Without finding the real market demand, the current industrial prosperity and growth is neither sustainable nor helpful to its global competitiveness in the long run.

Regional Competition and Central Coordination: Strategic Thinking vs Economic Development

Previous sections have shown that China's AI development suffers from problems of disorderly regional competition, poor national coordination and market manipulation. Why does the central government not intervene to a larger extent and make a nationally concerted AI push? To understand this, it is important to clarify China's goal of AI advancement. While geopolitical thinking has clearly shaped China's AI strategy, the growth of the AI economy is the most important rationale driving China's AI initiatives. Since China's market reforms in the late 1970s, economic growth has become a key pillar of the CCP's legitimacy. Many in China view technological innovation as the key to maintaining China's economic growth as technological advancement will improve overall labour productivity and thus create social wealth (Feng, 2018). The intention to boost national wealth through the AI industry is clearly indicated in the aforementioned Chinese State Council's AI plan, in which the quantitative

goals of developing a 150-billion-yuan AI industry in 2020, a 400-billion-yuan AI industry in 2025 and a 1000-billion-yuan AI industry in 2030 are clearly set out. Apparently, only when the AI economy has a strong foundation can China deliver Beijing's geopolitical vision of becoming a leading AI powerhouse. In other words, the AI economy is the primary goal, and geopolitical leverage is the add-on.

When it comes to promoting economic growth, a painful lesson that China learnt from Mao Zedong's era is that a centrally planned approach does not work, leading the way for the subsequent pragmatic, market-oriented approach. As previously mentioned, this Chinese style of federalism has been successful in boosting the Chinese economy despite the problems caused, such as declining central authority and regional competition. A higher level of state intervention is usually not good for the market. In fact, the current level of state intervention in AI development has already led to various problems including the previously mentioned waste of state funding and low efficiency. As long as economic incentives drive China's AI plan, its success relies on market competition and not top-down state intervention.

It may also be worth mentioning that, even for authoritarian regimes like China's, coordination and central planning are not as straightforward as many would expect. Even within the central government in Beijing, bureaucratic politics is everywhere. As far as AI is concerned, jurisdiction among the central state's different departments over China's AI policy is anything but straightforward. Four central agencies, including the National Development Reform Commission, the Ministry of Science and Technology, the Ministry of Industry and Information Technology and the Cyberspace Administration of China, fought to assert their power in deciding and managing China's AI policy (Ding, 2018:15). Different national AI policy papers indicate remarkably interesting conflicts over which agencies have the mandate to command China's AI policy (Ding, 2018:15).

In other words, central agencies in Beijing are not pursing a single unified goal – let alone the whole national attempt to advance AI in China. As Ding rightly points out, "although the central government plays an important guiding role, bureaucratic agencies, private companies, academic labs, and subnational governments are all pursuing their own interests to stake out their claims to China's AI dream" (Ding, 2018:15). According to one commenter, for example, the introduction of the State Council's "New Generation AI Development Plan" is China's Ministry of Science and Technology's attempt to assert its power in China's high-tech developments. As the Plan establishes a "AI Implementation Office" located in Ministry of Science and Technology to promote the implementation of AI plans, it gives the Ministry considerable influence to steer China's AI research agenda that were previously driven by other ministries or scientists from Chinese Academy of Science and Chinese Academy of Engineering (Laskai, 2017). Thus, some consider this additional bureaucratic layer as a negatively impact on China's AI innovation and technological development (Laskai, 2017; Ding, 2019b).

Conclusion

As this article shows, "to develop AI" is a broad and vague political slogan to mobilize Chinese domestic actors. Far from being a specific plan, the State Council's "New Generation AI Development Plan" is a "manifesto about the future" (Laskai, 2017) or a "wish list" of AI technology that the central state would like to develop with little concrete ideas about how to get it done (Sheehan, 2018). Its implementation heavily relies on local and subnational actors to interpret the AI slogan and find their own ways to motivate the private sector and accelerate AI activities in their respective jurisdictions. This process often supports local agendas and interests as the mechanism allows a high level of discretion for local actors to decide local AI

activities. This slogan mobilization process means that local and subnational actors play an important role in shaping AI politics.

In this regard, China's AI innovation does not simply follow a top-down command approach, which makes it distinctly different from that in the US and Europe. While strategic thinking and national planning mindsets are clearly there backing the Chinese central state's AI plans, these top-level grand masterplans are not completely unfolded into concrete practices at the local level. The nature of China's economic circumstances means that its AI industry is primarily driven by a range of local, subnational and non-state actors who have diverse – and sometimes competing – interests and little diplomatic and geopolitical awareness. Their struggle for resources has shaped the development of China's AI industry. Instead of a top-down command model, the development of China's AI policies largely follows a bottom-up manner in that existing local AI initiatives successfully won recognition from Beijing and were upgraded to become a national focus.

Rather than a concerted national effort to boost the AI industry, the Chinese approach faces the problems of coordination and manipulation. Similar to the US and Europe, China's market forces and entrepreneurs play a key role in boosting the AI industry, and they are pursuing individual commercial interests not the country's national interests. Notably, this article only examines the domestic struggle for AI resources within China. There is also an international dimension. As previously discussed, China's political system has become increasingly internationalized due to globalization. With China's integration into the world, it has been increasingly exposed to foreign influence and influenced by its transitional interest. So is its AI industry. China's AI advancement has largely benefited from international collaboration and access to foreign technology (O'Meara, 2019; Hannas and Chang, 2019). Many leading Chinese internet companies are partly owned by foreign capital. Not surprisingly, US-China conflicts have led to considerable concerns among Chinese AI scientists and entrepreneurs about their potential negative impact on China's AI innovation. Given that transnational interests play an important role in China's AI innovation, it is misguided to assume highly unified and coherent efforts are made by China's AI sector to advance Beijing's AI plans and thus China's national interests.

Above all, purely focusing on the great power competition aspect of China's AI development would inevitably neglect the nuanced development on the ground and thus vastly exaggerate (a) Beijing's capacity to mobilize domestic actors to achieve a unified strategic objective and (b) the advancement of China's AI programmes and its threat in geopolitical terms. All of these have (un)intentionally contributed to China's near-peer competitors' – especially the US's and Europe's – unnecessary anxiety regarding China's AI plans. Nowadays, AI innovation has been increasingly exposed to geopolitics, especially between China and the US. The rise of the AI race narrative has implicitly and explicitly promoted a zero-sum view into the understanding of AI innovation. The narrative's priority on competition over cooperation and destruction over creation has the potential to turn AI in a more nationalistic and inward-looking direction. This is helpful to neither national nor global common interests.

Reference

Allen, G. (2019) *Understanding China's AI Strategy*, available at https://www.cnas.org/publications/reports/understanding-chinas-ai-strategy accessed on 28 Feburary 2020: Center for a New American Security.

Allison, G. (2019) 'Is China Beating America to AI Supremacy?', *The National Interest,* available at https://nationalinterest.org/feature/china-beating-america-ai-supremacy-106861 accessed on 28 Feburary 2020.

Breslin, S. (1996) *China in the 1980s: Centre-Province Relations in a Reforming Socialist State.* Basingstoke: Palgrave Macmillan.

Callahan, W. (2016) *China's Belt and Road Initiative and the New Eurasian Order*, Oslo: Norwegian Institute of International Affairs.

Castro, D., McLaughlin, M. and Chivot, E. (2019) *Who Is Winning the AI Race: China, the EU or the United States?* , available at https://www.datainnovation.org/2019/08/who-is-winning-the-ai-race-china-the-eu-or-the-united-states/ accessed on 28 Feburary 2020: Center for Data Innovation.

CheetahGlobalLab (2020) *泡沫挤压：AI 行业热度骤降，基础层投资被忽视 (Bubble squeeze: AI industry plummets and infrastructure investment is ignored)*, available at https://36kr.com/p/5282642 accessed on 29 Feburary 2020: 猎豹全球智库 (Cheetah Global Lab).

Chen, C. (2017) *China's artificial intelligence sector in danger of becoming a 'bubble', experts warn*, available at https://www.scmp.com/tech/innovation/article/2082217/chinas-artificial-intelligence-sector-danger-becoming-bubble-experts accessed on 29 Feburary 2020: South China Morning Post.

China (2015) '国务院关于印发促进大数据发展行动纲要的通知 (State Council's decision on promoting the development of big data)', available at http://www.gov.cn/zhengce/content/2015-09/05/content_10137.htm accessed on 20 November 2015.

China (2019) *人工智能具有很强的"头雁"效应 (Artificial intelligence has a strong "head goose" effect)*, available at http://paper.people.com.cn/rmrbhwb/html/2019-07/26/content_1938122.htm accessed on 28 Feburary 2020.

CISTP (2018) *中国人工智能发展报告 2018 (2018 report on China's AI development)*, Beijing: China Institute for Science and Technology Policy at Tsinghua University (CISTP).

Corrigan, J. (2018) 'U.S. Needs a National Strategy for Artificial Intelligence, Lawmakers and Experts Say', *Defense One*.

Dai, S. (2018) 'Investor warns of day of reckoning for 90 per cent of Chinese AI start-ups as funding dries up', *South China Morning Post*.

Deloitte (2018) *中国人工智能产业白皮书 (White Paper on China's AI Industry)*: Deloitte.

Ding, J. (2018) *Deciphering China's AI Dream*, available at https://www.fhi.ox.ac.uk/deciphering-chinas-ai-dream/ accessed on 28 Feburary 2020: Future of Humanity Institute, University of Oxford.

Ding, J. (2019a) *"China's Current Capabilities, Policies, and Industrial Ecosystem in AI" Testimony before the U.S.-China Economic and Security Review Commission Hearing on Technology, Trade, and Military-Civil Fusion: China's Pursuit of Artificial Intelligence, New Materials, and New Energy*.

Ding, J. (2019b) 'The Interests behind China's Artificial Intelligence Dream', in Wright, N. (ed.) *Artificial Intelligence, China, Russia, and the Global Order: Technological, Political, Global, and Creative Perspectives*: Air University Press, pp. 43-47.

Feng, S. (2018) '人工智能时代的国际关系:走向变革且不平等的世界 (International relations in the age of AI: moving towards shifting and unequal world)', *外交评论 (Foreign Affairs Review),* 1, pp. 128-156.
Group, I. C. (2012) 'Stirring up the South China Sea (I)', *Asia Report,* No. 223.
Hameiri, S. and Jones, L. (2016) 'Rising Powers and State Transformation: The Case of China', *European Journal of International Relations,* 22(1), pp. 72-98.
Hameiri, S., Jones, L. and Heathershaw, J. (2019) 'Reframing the Rising Powers Debate: State Transformation and Foreign Policy', *Third World Quarterly,* 40(8), pp. 1397-1414.
Hameiri, S. and Zeng, J. (2019) 'State Transformation and China's Engagement in Global Governance: The Case of Nuclear Technologies', *The Pacific Review,* published online first.
Hannas, W. C. and Chang, H.-m. (2019) *China's Access to Foreign AI Technology: An Assessment*: Center for Security and

Emerging Technology.
Heilmann, S. (2008a) 'From Local Experiments to National Policy: The Origins of China's Distinctive Policy Process', *The China Journal,* 59, pp. 1-30.
Heilmann, S. (2008b) 'Policy Experimentation in China's Economic Rise', *Studies in Comparative International Development,* 43, pp. 1-26.
Heilmann, S. (2009) 'Maximum Tinkering under Uncertainty, Unorthodox Lessons from China', *Modern China,* 35(4), pp. 450-462.
Heilmann, S. (2018) *Red Swan: How Unorthodox Policy-Making Facilitated China's Rise.* Hong Kong: The Chinese University of Hong Kong Press.
Hill, C. (2016) *Foreign Policy in the Twenty-First Century.* Basingstoke: Palgrave Macmillan.
Hou, L., Jiang, C. and Zhu, F. (2018) *Competition for talent intensifies as China's AI industry develops*, available at http://europe.chinadaily.com.cn/a/201802/05/WS5a77b4aca3106e7dcc13aba2.html accesse d on 29 Feburary 2020: China Daily.
Ives, J. and Holzmann, A. (2018) *Local governments power up to advance China's national AI agenda*, available at https://www.merics.org/en/blog/local-governments-power-advance-chinas-national-ai-agenda accessed on 28 Feburary 2020: Mercator Institute for China Studies.
Iyiou (2018) *19 省、市人工智能相关政策研究(上) (Studies on the relevant AI policies of 19 provinces)*, available at https://www.iyiou.com/intelligence/insight65899.html accessed on 29 Feburary 2020: Iyiou.
Jing, M. (2018) *Is Xi Jinping's iron grip better than Adam Smith's invisible hand for technology innovation?* , available at https://www.scmp.com/tech/article/2173128/xi-jinpings-iron-grip-better-adam-smiths-invisible-hand-technology-innovation accessed on 28 Feburary 2020.
Jones, L. (2019) 'Theorizing Foreign and Security Policy in an Era of State Transformation: A New Framework and Case Study of China', *Journal of Global Security Studies,* 4(4

), pp. 579–597.
Jones, L. and Zeng, J. (2019) 'Understanding China's 'Belt and Road Initiative': beyond 'grand strategy' to a state transformation analysis', *Third World Quarterly,* 40(8), pp. 1415-1439.
Jones, L. and Zou, Y. (2017) 'Rethinking the Role of State-owned Enterprises in China's Rise', *New Political Economy,* 22(6), pp. 743-760.
Kania, E. (2017) 'China's Artificial Intelligence Revolution: A new AI development plan calls for China to become the world leader in the field by 2030', *The Diplomat*.
Kempe, F. (2019) *The US is falling behind China in crucial race for AI dominance*, available at https://www.cnbc.com/2019/01/25/chinas-upper-hand-in-ai-race-could-be-a-devastating-blow-to-the-west.html accessed on 28 Feburary 2020: CNBC.
Kewalramani, M. (2018) *China's Quest for AI Leadership: Prospects and Challenges* Takshashila Institution.

Klein, A. O. (2020) *The U.S.-China Race and the Fate of Transatlantic Relations Part 1: Tech, Values, and Competition*, available at https://www.csis.org/analysis/us-china-race-and-fate-transatlantic-relations accessed on 28 Feburary 2020: The Center for Strategic and International Studies (CSIS).
Koch-Weser, I. (2013) *The Reliability of China's Economic Data: An Analysis of National Output*, available at https://www.uscc.gov/sites/default/files/Research/TheReliabilityofChina'sEconomicData.pdf accessed on 29 Feburary 2020: The U.S.-China

Economic and Security Review Commission.
Lanier, J. and Weyl, E. G. (2020) 'How Civic Technology Can Help Stop a Pandemic', *Foreign Affairs,* available at https://www.foreignaffairs.com/articles/asia/2020-03-20/how-civic-technology-can-help-stop-pandemic accessed on 20 March 2020.
Laskai, L. (2017) 'Beijing's AI Strategy: Old-School Central Planning with a Futuristic Twist', *Council on Foreign Relations*.
Lee, K. (2018) *AI Superpowers: China, Silicon Valley, and the New World Order.* Houghton Mifflin Harcourt.
Leverett, F. and Wu, B. (2017) 'The New Silk Road and China's Evolving Grand Strategy', *The China Journal,* 77(1), pp. 110-132.
Lieberthal, K. (1992) 'Introduction: the 'Fragmented Authoritarianism' Model and its Limitations', in Lieberthal, K. and Lampton, D. (eds.) *Bureaucracy, Politics and Decision Making in Post-Mao China*. Berkeley; London: University of California Press, pp. 1-31.
Lieberthal, K. and Lampton, D. (1992) *Bureaucracy, Politics, and Decision Making in Post-Mao China.* University of California Press.
Lieberthal, K. and Oksenberg, M. (1988) *Policy making in China.* Princeton University Press.
Liu, Y. (2019) 'China's AI Dreams Aren't for Everyone', *Foreign Policy,* available at https://foreignpolicy.com/2019/08/13/china-artificial-intelligence-dreams-arent-for-everyone-data-privacy-economic-inequality/ accessed on 28 Feburary 2020.
Miller, T. (2017) *China's Asian Dream: Quiet Empire Building along the New Silk Road.* London: Zed Books.
Montinola, G., Qian, Y. and Weingast, B. (1996) 'Federalism, Chinese Style: The Political Basis for Economic Success', *World Politics,* 48(1), pp. 50-81.
Oxford (2005) 'The Oxford Dictionary of Phrase and Fable', *artificial intelligence.* available at https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095426960 accesse d on 18 June 2020: Oxford University Press.
O'Meara, S. (2019) 'AI researchers in China want to keep the global-sharing culture alive', *Nature,* 569.
Parris, K. (1993) 'Local Initative and National Reform: The Wenzhou Model of Development', *The China Quarterly,* 134, pp. 242-263.
Qian, Y. and Weingast, B. (1995) 'China's Transition to Markets: Market-Preserving Federalism, Chinese Style', *Journal of Policy Reform,* (2), pp. 149-185.
Qianzhan (2018) *一文带你了解2018年全国各地人工智能行业最新政策！(One article to help you to know latest regional AI policies)*, available at https://www.qianzhan.com/analyst/detail/220/180329-8cef9d2f.html accessed on 29 Feburary 2020: Qianzhan Industry Institute.
Qianzhan (2019) *2019年人工智能行业现状与发展趋势报告(2019 report on industry status and development trends of AI)*, available at https://bg.qianzhan.com/report/detail/1910081709070618.html accessed on 29 Feburary 2020: Qianzhan Institute.

Ramanathan, S. (2019) *China's Booming AI industry: what you need to know* available at https://www.luxresearchinc.com/blog/chinas-booming-ai-industry-what-you-need-to-know accessed on 28 Feburary 2020: Lux Research.
Sayler, K. (2019) *Artificial Intelligence and National Security*: Congressional Research Service Report.
Schurmann, F. (1966) *Ideology and Organization in Communist China.* Berkeley and Los Angeles: University of California Press.
Shanghai (2017) *关于本市推动新一代人工智能发展的实施意见 (Opinions on the implementation of this city's new generation of AI development)*, available at http://www.shanghai.gov.cn/nw2/nw2314/nw2319/nw12344/u26aw54186.html accessed on 29 Feburary 2020: Shanghai Government.
Sheehan, M. (2018) 'How China's Massive AI Plan Actually Works', *Macro Polo*.
Stars (2019) *The Chinese Bubble in Artificial Intelligence is Insane*, available at https://www.the-stars.ch/wp-content/uploads/2019/07/HUANG-Yuanpu_The-Chinese-Bubble-in-Artificial-Intelligence-is-Insane.pdf accessed on 29 Feburary 2020: Stars Insights.
Su, X. (2015) 'Nontraditional security and China's transnational narcotics control in northern Laos and Myanmar', *Political Geography,* 48, pp. 72-82.
Wallace, J. (2016) 'Juking the Stats? Authoritarian Information Problems in China', *British Journal of Political Science,* 46(1), pp. 11-29.
Wang, S. (2009) '学习机制，适应能力与中国模式[Learning Mechanism, Adaptability, and Chinese Model]', *开放时代 （Open Times）* (7).
Wang, X. (2018) *伪概念泛滥，认知模糊，AI 营销或需一场再教育 (Pseudo-concepts are proliferated and cognition is fuzzy, AI marketing may need a re-education)*, available at https://www.iyiou.com/p/80682.html accessed on 29 Feburary 2020: Iyiou.
Wang, Y. (2019) *面对技术与市场"双瓶颈"，中国人工智能企业准备迎接寒冬 (Facing the "double bottlenecks" of technology and market, Chinese AI enterprises are preparing for the cold winter)*, available at https://www.zhongguojinrongtouziwang.com/2019/03/07/70351/ accessed on 29 Feburary 2020: China Money Network.
Webb, A. (2019) *The Big Nine: How the Tech Titans and Their Thinking Machines Could Warp Humanity.* PublicAffairs.
Xi, J. (2017) *The Chinese Communist Party's 19th Party Congress Report*.
Xing, Y., Liu, Y. and Cary, C. (2018) 'Local Government as Institutional Entrepreneur: Public–Private Collaborative Partnerships in Fostering Regional Entrepreneurship', *British Journal of Management,* 29(4), pp. 670-690.
Xu, C. (2011) 'The Fundamental Institutions of China's Reforms and Development', *Journal of Economic Literature,* 49, pp. 1076–1151.
Yu, Y. (2019) 'Why China's AI players are struggling to evolve beyond surveillance', *Nikkei Asian Review,* available at https://asia.nikkei.com/Spotlight/Cover-Story/Why-China-s-AI-players-are-struggling-to-evolve-beyond-surveillance accessed on 1 March 2020.
Zeng, J. (2015a) 'Did Policy Experimentation in China Always Seek For Efficiency? – The Case of Wenzhou Financial Reform', *Journal of Contemporary China,* 24(92).
Zeng, J. (2015b) *The Chinese Communist Party's Capacity to Rule: Ideology, Legitimacy and Party Cohesion.* Palgrave Macmillan
Zeng, J. (2019) 'Narrating China's belt and road initiative', *Global Policy,* 10(2), pp. 207-216.
Zeng, J. (2020) *Slogan Politics: Understanding Chinese Foreign Policy Concepts.* London: Palgrave Macmillan.

Zhao, Y. (2019) *人工智能核心产业规模达570亿元 (Value of AI core industry reaches 57 billion yuan)*, available at http://bjrb.bjd.com.cn/html/2019-08/12/content_12059007.htm accessed on 29 Feburary 2020: Beijing Daily.
Zheng, Y. (2007) *De Facto Federalism in China: Reforms and Dynamics of Central-Local Relations.* Singapore: World Scientifics.
Zhongkegaofu (2019) *2019 年中国人工智能产业研究报告 （2019 Report on China's AI Industry）*, available at https://mp.weixin.qq.com/s/BGBZ-aqd_AMeuFUYbnAjFg accessed on 29 Feburary 2020: 中科高服 (Zhongkegaofu).

[1] For example, Ding argues that China's AI strategy is "not a monolithic, completely top-down approach; many actors are maximizing their own interests and responding to broad signals from the central government" Ding, J. (2018) *Deciphering China's AI Dream*, available at https://www.fhi.ox.ac.uk/deciphering-chinas-ai-dream/ accessed on 28 Feburary 2020: Future of Humanity Institute, University of Oxford..
[2] Similarly, Yu Yu, Y. (2019) 'Why China's AI players are struggling to evolve beyond surveillance', *Nikkei Asian Review,* available at https://asia.nikkei.com/Spotlight/Cover-Story/Why-China-s-AI-players-are-struggling-to-evolve-beyond-surveillance accessed on 1 March 2020. argues that "American AI development is market-driven and dominated by independent, private sector players... By contrast, China's approach is centralized and top down."
[3] In this article, a bottom-up approach refers to the process of policy ideas developed from the bottom level of the hierarchy, i.e. local states upwards to the top level, i.e. the central government.
[4] Interview with a university-based AI expert in China conducted on 26 March 2020
[5] This figure is compiled by the author based on public information. Hunan Province's target was for 2021, and Zhejiang's was for 2022. A similar statistic conducted by the Qianzhan Industry Research Institute shows that the accumulated target value of the AI core industry for the 12 provinces reaches 429 billion yuan by 2020. See Qianzhan (2018) *一文带你了解2018年全国各地人工智能行业最新政策！(One article to help you to know latest regional AI policies)*, available at https://www.qianzhan.com/analyst/detail/220/180329-8cef9d2f.html accessed on 29 Feburary 2020: Qianzhan Industry Institute, Qianzhan (2019) *2019年人工智能行业现状与发展趋势报告 (2019 report on industry status and development trends of AI)*, available at https://bg.qianzhan.com/report/detail/1910081709070618.html accessed on 29 Feburary 2020: Qianzhan Institute..
[6] This figure is compiled by the author based on public information. Hunan Province's target was for 2021, and Zhejiang's was for 2022. A similar statistic conducted by the Qianzhan Industry Research Institute shows that the accumulated target value of the AI related industry for the 10 provinces reaches 1,715 billion yuan by 2020. See Qianzhan (2018) *一文带你了解2018年全国各地人工智能行业最新政策！(One article to help you to know latest regional AI policies)*, available at https://www.qianzhan.com/analyst/detail/220/180329-8cef9d2f.html accessed on 29 Feburary 2020: Qianzhan Industry Institute, Qianzhan (2019) *2019年人工智能行业现状与发展趋势报告 (2019 report on industry status and development trends of AI)*, available at https://bg.qianzhan.com/report/detail/1910081709070618.html accessed on 29 Feburary 2020: Qianzhan Institute.
[7] For other estimations, please see Kewalramani, M. (2018) *China's Quest for AI Leadership: Prospects and Challenges* Takshashila Institution.
[8] One of our interviewees, however, argues that there is no need to make a fuss over those figures. After all, "unlike poverty alleviation tasks, there is no pass line. The value of AI industry is all up to how you calculate; statistics is nothing more than how you define those rules. The entire AI industry is very vague anyway." Interview with a university-based AI expert in China conducted on 26 March 2020