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The making of government-business relationships through state rescaling: a policy analysis of China’s artificial intelligence industry

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\textbf{ABSTRACT}

Developing artificial intelligence (AI) is a priority on China’s state agenda, yet the constitutive state roles in AI development are understudied. Against the background of the coexistence of authoritarianism and market liberalism in the governance of the Chinese economy, state rescaling is a useful lens to understand how China is developing this new strategic sector. This paper proposes an analytical framework reifying vertical and horizontal scalar relations via the rescaling lens and three state roles (owner, promoter, and supervisor) to explore how government-business relationships are made. More than 100 Chinese AI policy documents have been collected from central, provincial, and city levels for a systematic multi-scalar policy analysis. As a result, this paper captures both downscaling/upscaling within the state hierarchy and statization/destatization between state and non-state actors in China’s AI development. A series of intertwined state rescaling practices manifest themselves in the state roles figuring in three functionalities of government-business relationships (sponsorship, cultivation, and disciplining). It is argued that the state roles are not pre-given modalities in a setting of a specific industry. The restructuring and even revolutionizing effects of AI in the socio-economic systems prompt non-state actors to respond proactively, which shapes the variegated functionalities of government-business relationships.

\textbf{Introduction}

In 2020, China’s digital economy grew by about 10% despite the pandemic, a much stronger result than China’s overall GDP growth for the year (CAICT 2021). At a Politburo meeting in 2023, Chinese leaders emphasized that China
must pay attention to artificial intelligence (AI) development. Less than a fortnight thereafter, Chinese president Xi Jinping stressed that China should leverage its abilities in AI to promote the modernization of the country’s industrial system. Developing AI is currently viewed as a national development priority in China and has received significant attention from different levels of government (Johansson 2022). While Chinese AI start-ups received noticeable levels of funding compared to their peers within the large economies like the European Union (EU), they still lag behind in terms of patent number and density (Cséfalvay 2020). This suggests certain developmental dilemmas in the rolling out of state-endorsed AI industrial strategies. According to the Bank of China (2022), machine vision, intelligent speech, and natural language processing are the three largest applications of AI in China, jointly accounting for more than 80% of the market. These three fields are also on the rise in other countries, e.g. Northern America and Europe, underlining a global innovation race and efforts to counter China’s prowess (The Economist 2022b). This background is the motivation for a multi-scalar and multi-actor investigation of policy responses in China.

Generally, strategies such as pilot zones, clustering approaches, and hybrid state-capital constellations are well-known ingredients of industrial policy in China (Barbieri et al. 2019; Lu, Wang, and Zhu 2019). However, specificities of different industries may result in different degrees of tension between the central and local levels of government (Zhu and Tang 2018), and between government and business sectors (Hofman, Moon, and Wu 2017). For example, the huge economic potential of AI and its use to reinforce political control may prompt the different levels of government to actively engage in developing AI (Beraja et al. 2023), but this also generates greater pressure with regard to industrial upgrading and restructuring, which may affect local development opportunities. Meanwhile, the potential noncompliance of local governments could be a result of localized growth coalitions with non-state actors (Zhu 2008). At stake is the state power struggle, as well as the involvement of non-state/business actors at various levels in central-local power dynamics. Consequently, government-business relationships are constitutive of and fraught with changes in central-local relations manifested in the evolving multi-scalar policy landscape and central-local relations. China’s development does not rely solely on centralized orchestration; rather, it relies on negotiations between the central government and diverse local entities (Gonzalez-Vicente 2011). Based on this understanding, this paper takes state rescaling as a conceptual starting point to analyze multiple levels of Chinese AI policies.

State rescaling can be deemed a territorial intervention tool within the state space that selectively transfers state capacities “upwards, downwards, and sideways” (Jessop 2002, 454), thereby foregrounding the power of the state to shape institutional arrangements. This concept helps to understand interactions and tensions between actors at central
and local levels (Brenner 2009; Fu 2024; Y. Li and Wu 2012; Lim 2017), potentially resulting in cooperation, negotiation, and compliance among them.

Via the lens of state rescaling, this paper aims to address two research questions: (1) How does the Chinese state interact within different administrative levels and with non-state actors for the development of AI in China? (2) How do these interactions shape government-business relationships in the field of AI? The first question leads to the exploration of (a) changes in central-local relations manifested in Chinese AI policies, and (b) interactions of state and non-state actors in AI development. The second question further facilitates understanding of how the interplay of the “central-local relations” and the “interactions of state and non-state actors” collectively figures into different government-business relationships. These research outcomes enrich the state rescaling literature, going beyond the discussion of central-local relations within the state apparatus by also adding the government-business nexus.

The paper pays particular attention to three state roles (i.e. promoter, supervisor, and owner of capital) to achieve a better understanding of the above-mentioned dynamic scalar practices. The roles are suggested by Alami, Dixon, and Mawdsley (2021) and Alami and Dixon (2023) in the field of state capitalism, and further examined in subsequent studies (Babić and Dixon 2023; Goulding, Leaver, and Silver 2023; Schindler, Alami, and Jepson 2023). This is relevant for this paper because different varieties of state capitalism are increasingly deployed across the globe in business and policy-making spheres as a form of geopolitical discourse (Alami and Dixon 2020), especially in China (Peck and Zhang 2013; Sperber 2019). We argue that these state roles are not modalities predetermined by the setting of a specific industry. Owing to the restructuring and even revolutionizing effects of AI in socio-economic systems, non-state actors are prompted to respond proactively, which shapes the variegated functionalities of government-business relationships.

The paper is structured as follows. First, an analytical framework for the subsequent analysis is proposed, and the research method of this paper is described. Subsequently, the following section answers the first research question, explicating the unfolding of China’s multi-scalar AI policy landscape through the lens of centralization/decentralization as well as statization/destatization. Afterward, this paper further explores the interactions between state roles and the business realm and how these interactions figure into the functionalities of government-business relationships (the second research question). A discussion of the specificities of China’s AI development policy compared to its policies in other industrial fields and contributions of this paper is found in the last section.
**Government-business relationships from a state rescaling perspective**

Extra-local rule regimes can consolidate and proliferate local actions as a means and a result of effective reproduction of scalar relations (Park 2006; Peck 2002). This argument highlights the importance of understanding the interaction between different territorial or institutional hierarchies in socio-spatial reproduction, which leads to a more concrete concept, “state rescaling”. State rescaling understands central-local relations not as a “zero-sum game” (Zhong 2001, 8), but as a mutual constituent. Rolf (2019) reveals that, in China, despite the central state’s efforts to retain as much of its unitary power as possible, local state-levels have unceasingly wrested control away from it, insofar as inflows of new economic actors have created leeway for local officials to reinforce place-based growth coalitions. Likewise, decentralization does not necessarily mean less power for the central state; it could be “a function of centralization” (Lim 2019, 203) or “recentralizing while decentralizing” (Ribot, Agrawal, and Larson 2006, 1864). This means that reshuffling the “scalar relation” could lead to a “win-win” or “lose-lose” result despite a trend of decentralization or centralization.

Drawing on Western experiences of state rescaling that regard state reconstruction as a dialectical process (Brenner 2009), studies in China have shed further light on its development as a function of statecraft at national, regional, and local levels (Fu 2024; Lim 2018; Wei, Li, and Wang 2007; Xu 2011; Yu and Xu 2022; J. Zhang and Peck 2016). China is characterized in particular by the coexistence of authoritarianism and market liberalism (Ma 2009), thus conducting its state rescaling with both upscaling/downscaling at a vertical level (Zeng 2021) and statization/destatization at a horizontal level (Li, Xu, and Yeh 2014). Upscaling/downscaling practices refer to the state’s capacity to move power and responsibilities vertically between different hierarchies of government, while the statization/destatization practices emphasize the process of reconfiguring the degrees and forms of state ownership and control in business operations. As summarized by Li and Wu (2012), a contentious process of vertical power reshuffling between administrative levels in China indicates the broad scheme of decentralization and recentralization, revealing that reshuffling central-local relations is not a zero-sum game but has in fact become a cross-feeding approach with rounds of selective experimentation underpinning regional development (Hsing 2006; Li 1997).

Vertical rescaling practices often trigger inter-regional competition, cooperation, or negotiation (Kevin and Jonas 2004; Su 2012; Li, Xu, and Yeh 2014), resulting in spatial disparities in terms of capital allocation and entrepreneurial dynamics (Lim 2018; Wu 2016). Beyond these vertical power reshuffling practices within the multi-scalar state organization (Brenner 2004), noteworthy, the horizontal rescaling of state power to and from non-state actors, is also crucial for the state’s capacity to enable and manage capital accumulation. It is because
power reshuffles occur not only among government actors (Carmody and Owusu 2007), but also among non-state/business actors such as private leading enterprises, state-owned enterprises (SOEs), small-and-middle-sized enterprises (SMEs), and start-ups (Hu 2005). Thus, state power may be transformed by the interactions between government and business (Weiss 1994), reflecting a dynamic process of destatization or statization (Büchs 2009; Xu, Yeh, and Wu 2009) and different degrees of “hollowing out” the state (Li, Xu, and Yeh 2014). The existing typology of state rescaling in the literature (Chusaini, Buchori, and Sih Setyono 2023; Hudalah, Talitha, and Fauzia Lestari 2022; Li, Xu, and Yeh 2014), which contains useful insights into the multi-dimensional framework of state capacities, does not bring the vertical and horizontal processes into a mutually constituted process. This is in contrast to a recent body of literature on state capitalism, which foregrounds the active state roles and industrial policy-making at the international and national level, yet overlooks (sub-nationally) regional and scalar processes underpinning the formulation of these state roles (Alami and Dixon 2020, 2023; Schindler, Alami, and Jepson 2023). In order to bridge this gap, this paper develops an analytical framework for understanding the making of government-business relationships through the interaction of vertical and horizontal rescaling practices within central and local state spaces (see Figure 1).

This framework draws attention to government-business relationships which are a critical and dynamic factor of state capacity in industrial development (Weiss 1994, 1995). Government-business relationships are

![Figure 1. Analytical framework of this paper.](image-url)
developed and shaped by rescaling practices at different levels between state/non-state actors (Peck 1995; Wang 2016). However, the definition of the government-business relationship remains vague and thus allows for a wide range of interpretation. The notion of “government-business relationships” here refers to the functionalities resulting from the interaction between myriad state and non-state actors across geographical scales as the outcome of fluid and open-ended state rescaling processes, manifested in various forms such as protection and supervision (Xu, Yeh, and Wu 2009). On the one hand, non-state business actors often use political connections as substitutes for formal legal protection in a weak rule-of-law regime. On the other hand, such substitution may expose them to political uncertainties and make them vulnerable in power relations under the supervision and jurisdiction of the government (Wang 2016). These power struggles lead to diverse forms of government-business relationships, largely depending on how they interact with each other within their power structure.

We argue that three state roles (i.e. owner, promoter, and supervisor of capital), proposed by Alami, Dixon, and Mawdsley (2021) and Alami and Dixon (2023) from the discourse of state capitalism, can potentially deepen understanding of the government-business relationships in the field of AI in China. These roles reflect the aggregate expansion of state involvement in achieving and facilitating capital accumulation, yet the definitions and specificities of them remain vague in the literature. Such vagueness could be problematic as the state roles could manifest themselves as aggregate forces, yet they are also simultaneously conflicting across multiple layers and scales (Fu 2024). Inspired by Horner (2017) and Pearson (2005), this paper further offers an explicit interpretation of the state roles (supervisor, promoter, and owner) proposed by Alami and Dixon (2023), and uses this as the framework to guide the understanding of the ways in which these state roles function for the development of the AI industry.

On the one hand, the interest of the Chinese government in maintaining control over crucial assets significantly lowers the possibility of the state’s regulatory independence (Pearson 2005). Beyond the role of an unbiased and neutral regulator, it implies the state may remain strong and calculated in key industries to continue or increase state ownership of strategic assets, making the state act as a non-independent regulator – the supervisor as outlined by Alami and Dixon (2023). In contrast, the role of regulator creates playing fields for market actors (Pearson 2005) or imposes rules to limit and restrict the activities of firms (Dawley et al. 2015; Horner 2017). The state role of supervisor encourages active business activities within certain regulatory frameworks and may subsequently redirect (or even drive out) actions contrary to its interests (Liu and McGuire 2015), underscoring calculated practices, which are much more complex and dynamic.
On the other hand, in contrast to regulatory narratives, the state’s developmental model in China enables substantial government intervention to create, foster, and structure markets (Chen and Lees 2016). In doing so, the capacity of the government highlights the state role as promoter and owner of capital in leveraging its substantial regulative and fiscal capacities to achieve specific goals (e.g. increasing national competitiveness) through channels such as investments and subsidies using its own capital (Babić and Dixon 2023; Fu 2024; Alami and Dixon 2022). Unlike with the state’s role of promoter, in the role of owner resources are used directly to achieve the state’s goals.

These three state roles may be contradictory, mutually reinforcing, or interdependent across different levels of government (Chien 2007; Yu and Xu 2022; Zheng 2006), depending on the time and place-specific coalescence of interests amongst factions of capital and power (E. Wang and Wing Chan 2007). Central government may strategically reconsolidate state leadership with regard to industrial development to enhance state control over national assets, while local governments might be more interested in short-term profit-seeking through large scale developments (Zhang and Lan 2022). These state roles often co-exist at different levels of government with various kinds of dominance, constituting and shaping different functionalities of government-business relationships through power struggles between different levels of government and between state/non-state actors.

**Research methods**

Industrial policy frameworks are established as a basis for managing economic changes (Weiss 1994). Specifically, industrial policies are not simply imposed by authorities, but are also the outcome of contested coordination with business entities (Weiss 1995). Given this, an analysis of Chinese AI policy documents has been carried out, complemented by secondhand data mainly from published materials such as statistical yearbooks, reports, and some other relevant, yet broader, policies. China’s AI policy landscape can be differentiated into central, provincial, and city levels, as China’s policy-making has a distinctive hierarchical character (Heilmann 2008). The policy documents were collected manually by the authors from relevant governmental websites at corresponding levels.

At the central level, the policies collected are from two phases based on the degree of focus on AI. As “developing AI” was elevated to the state agenda in July 2017, the first phase is from 2015 to 2017 when the term AI appeared in policy documents, but was not explicitly foregrounded, while in the second phase (from July 2017 to December 2022) policy documents with a focus on AI emerged in which “AI” was predominantly a part of the title of policy documents. Based on these two phases, this paper collects central-level AI policy documents with two kinds of selection criteria. For the first phase, the policy documents selected were those that mentioned “AI”,
“smart/intelligence” or “robotics” within the content of the document. For the second phase, the policy documents selected were those with a title including “AI”, “smart/intelligence”, or “robotics”. Furthermore, we conducted a cross-check method to examine and enrich our policy database by accessing numerous reports, news items, and articles mentioning Chinese AI-relevant policies from this time period. Still, these criteria may potentially overlook some documents that also contain the three key terms, especially in the first phase. These potential omissions are nevertheless deemed acceptable as it was not until July 2017 that central government decided to make a big move in terms of AI development (Roberts et al. 2021). Arguably, the main central-level policy documents dated before July 2017 are sufficient to comprehensively represent the AI policy landscape in China at the time. As a result, 32 central-level policy documents from 2015 to 2022 were screened; this period thus encompasses the 13th and 14th Five-Year Plans and we focus on the sections of these plans relevant to AI.

At the provincial level, policy documents which include “AI”, “smart/intelligence”, or “robotics” in the title were screened, as well as documents with a strong focus on strategic emerging industries from eight provinces (i.e. Beijing, Shanghai, Guangdong, Zhejiang, Jiangsu, Hubei, Sichuan, and Shandong). They were selected because their R&D expenditures always ranked in the top eight from 2016 to 2020, according to “China Science & Technology Statistics Data Book (2017–2021)” and “China Statistical Yearbook (2017–2021)”. It is justified to focus on these eight provinces because developing AI requires a high level of R&D capacity and willingness of local governments. These criteria resulted in 33 provincial-level (local-level) policy documents being screened.

At the city level, the same method as the provincial one was applied to 18 cities that have been granted the status as national AI pilot or pioneer zones. 61% of them are located in the eight provinces. Consequently, 54 city-level (local-level) policy documents (including 14 documents from the provincial-level cities Beijing and Shanghai) were collected.

A systematic analysis of these policy documents was mostly manually conducted with the help of the software NVivo, and the results of the analysis were triangulated by using additional materials (media reports, governmental reports, and statistical data). Specifically, NVivo was used to manage files and as an analysis tool. Based on the analytical framework, the authors carefully read all the documents, and highlighted important parts of the documents for subsequent rounds of revisiting and analysis in NVivo. For instance, NVivo was used to categorize the identified aspects by means of a clustering approach with subordinated “central-level”, “provincial-level”, and “city-level” sections in order to gather corresponding policies, and then to read these policies with a subsequent manual check to capture how particular policy instruments were used in each category. The complete list of the analyzed policy documents can be made available by the authors upon request.
Rescaling of state roles in China’s AI policy landscape

The analysis of the Chinese AI policy landscape has foregrounded prominent state roles (owner, promoter, or supervisor) at different levels of government, and between state and non-state actors. This section aims to provide an overview that unpacks how the modalities of state roles unfold in the formulation of the AI policy landscape.

China’s multi-scalar AI policy landscape: an overview

Chinese AI policies converge across central, provincial, and city levels regarding their goals, which include becoming technological leaders domestically or globally, promoting economic development, and addressing societal problems such as the aging society. Nevertheless, local authorities in China have a certain level of autonomy (Zheng 2006) that allows them to tailor AI development policies based on specific local conditions. In pursuit of political career goals, lower-level governmental officers may be willing to design their policies in line with the central goals. However, weak local financial and innovation conditions may likely reduce the local impetus for developing AI. Similar to other industrial policies, the lower-level governments need to consider aspects in relation to local conditions when designing their own AI policies, resulting in specific constellations of state roles at the local level. In particular, the role of promoter requires the localities to be in a good financial situation as this enables them to make a long-term investment (L. Zhang and Lan 2022; Zhou, Lazonick, and Sun 2016) to build their own developmental capacities with the engagement of universities, research institutes, business actors, and individual AI talents. In contrast, the role of supervisor creates a locally specific regulation environment to encourage various business activities to boost the market, and then redirects and restructures the market to ensure industrial development aligned with the state’s local interests. However, localities may not actively develop their roles as owners in the field of AI either due to legacies of a less SOE-oriented economy or a lack of attractiveness for state investments (e.g. from central state-owned enterprises (CSOEs) or national investment banks), which are needed for large-scale AI developments. Such considerations can be traced by scrutinizing multi-level layers of the Chinese AI policy landscape.

At the central level, the government has shown strong interest in AI development for a decade by issuing promotion policies, underscoring its strong role as a promoter via its strong capacity to leverage state assets. In 2015, the concept of “intelligence” first appeared in “Made in China 2025” (see Figure 2), emphasizing manufacturing intellectualization as an industrial upgrading strategy. In the same year, the notion of “AI” entered the policy landscape for the first time in the policy document “Guidance on Actively Promoting the ‘Internet +’ Initiative”. In July 2017, “developing AI” was raised to the state agenda level as
a national developmental strategy in the “National New Generation AI Development Plan”. Not only does this milestone policy endorse “developing AI” as a priority on the state agenda, but it has also steered all the subsequent AI policies at all levels. It acts mainly as a seal of approval which de-risks the assorted AI initiatives championed by governmental departments at all levels and in the private sector (Roberts et al. 2021). To date, central-level AI-focused policies have been specifically associated with education, R&D projects, and industrial development, particularly regarding the strategies of incorporating AI into the real economy and the creation of infrastructure and the legal environment. In addition, important policies geared toward innovation, project-orientation, and place-based approaches have also been designed.

So far, based on the “Guidelines for the Construction of the National New Generation AI Innovation and Development of Pilot Zones”, the Ministry of Science and Technology (MOST) has selected 18 cities as national AI pilot zones, while the Ministry of Industry and Information Technology (MIIT) has selected 11 cities as national AI pioneer zones. It is an experimental approach for upsaling local practices, which selectively increases institutional and resource power in some regions. Moreover, these two sets of experimentation zones clearly overlap and are expected to identify effective practices which can be incorporated into the policies in other regions. This overlapping of two ministries can be beneficial due to cooperative promotion of local AI development and can improve market confidence in the AI industry, but might also cause an inefficient use of resources. Moreover, the central government has adopted a spatially balanced strategy across the provinces by selecting national AI pilot zones taking into consideration coordinated regional development. In practice, there is still a significant regional imbalance owing to different degrees
of developmental capacity. Evidently, according to the “Report of China’s New Generation AI Science and Technology Industry Development 2023”, there were about 2,200 AI backbone enterprises concentrated in Beijing (28%), Guangdong (26%), and Shanghai (14%), accounting for 68% of the nationwide total. This regional imbalance is mainly because local governments of less-developed cities are often constrained by an insufficient capacity to provide support to stimulate AI development.

At the provincial level, all the AI policies that have been promulgated came after 2017’s milestone policy highlighted in Figure 2. Most of the provincial policies are associated with an industrial agglomeration approach. Compared to central government, the provincial governments appear to approach the role of promoter in distinct ways. They seem to be more concerned with AI as an emerging industry to be developed through extensive industrial development plans, while central government focuses on AI more as an innovative field that requires a wider range of inputs in education, research, infrastructure, and the legal environment. For example, the domestic robotics industry has received subsidies from central and provincial governments as a push to boost its relatively low research and development capacity in order to make it competitive in the global tech market. In practice, the provincial governments often consider different factors when they provide subsidies, including whether the firm can conduct large-scale production and whether products have sound market prospects (Global Times 2016). Paradoxically, the productivist bias of provincial authorities might lead to overheated and rushed investments by localities, which is in conflict with the central state agenda focusing on innovation and capacity building. In 2018, Deloitte estimated that 99% of self-styled AI start-ups in China were fake (The Economist 2022a) and existed solely to benefit from the subsidies provided by the government.

City-level governments demonstrate different levels of interest in developing and capacities to develop AI, due to a wide disparity in the development conditions. Nevertheless, a similar AI development strategy at the city level is to use existing strengths as a way of localizing the higher-level policy guidance. For example, Guangzhou tends to leverage its more advanced research resources and its strong manufacturing base to integrate AI into the real economy, while Hangzhou highlights developments such as smart security and smart cars by leveraging its close relations with AI venture capital providers. Another common approach of city-level governments is to establish industrial agglomerations within their own jurisdiction. This approach is also prevalent for other industries in China (Fan and Scott 2003). These AI agglomerations constitute an important aspect of the competitiveness of the cities involved in AI development, and are themselves the subject of inter-city competition for resources. To facilitate agglomerations, local governments may act as promoters providing considerable resources (e.g. favorable land allocation support and rewards for the relocation of enterprises) in order to encourage potential AI
enterprises to relocate to the designated areas. Such competition equips large AI enterprises with more negotiating power when they attempt to acquire more resources from local authorities, which may result in these enterprises playing a more dominant role than local authorities in localized government-business relationships. Moreover, detailed financial plans demonstrate that many city governments have adopted diverse policy instruments from both the supply and demand sides to facilitate AI development. In general, supply-side instruments such as subsidizing R&D activities are mentioned more often in the policy documents than demand-side instruments such as government procurement. However, government procurement contracts for AI services and products are often not disclosed and their share is likely to be significant (The Economist 2022a).

Inter-city competition foregrounds the strong promoter role of city-level governments, although in a very constrained manner that only caters to jurisdictional interests. In the eight analyzed provinces, only Jiangsu proposed a strategy to break the constraints of administrative boundaries to promote inter-city collaboration within the province. This requirement de facto signals Jiangsu’s provincial government’s efforts to mitigate the fierce competition between cities and to combat the resulting waste of resources (Li and Wu 2012), hinting at the possibility of the role of supervisor at the provincial level, overseeing and redirecting the actions of the promoter role at the city level.

In short, these promoting measures of the policies confirm strong governmental intervention in the creation of the emerging AI market. In this regard, these levels of government all act as promoters for AI development. Specifically, it appears that direct state funds are a more prevalent tool than the provision of loans, whereby the former enabled firms to seek short-term profits. The multi-scalar AI policy landscape, as encapsulated in Figure 2, does not simply imply the unidimensional disaggregation of central government’s promotion goals. Rather, there are uneven, and sometimes overheated, responses from the local governments, as well as power struggles between provincial and city governments in terms of balancing the promoter and supervisor roles. Moreover, SOEs responded proactively to this cycle of downscaling and upscaling of AI policies, leading to increasing interdependencies between the state and the market in the AI sector. The next section will turn to this key aspect.

**The effect of multi-scalar policies on the AI business sector**

China’s AI development has experienced a transformation from pure market behaviors to state-led acts, signifying a statization process. There were already some AI enterprises emerging in China before 2010, yet very few of them got the attention of the government and the capital market (ITJUZI 2022). In 2010, the private tech giant Baidu started to massively invest in AI R&D projects, attracting significant attention from the venture capital market. However, at
that time, central government did not recognize AI as one of the national strategic emerging industries. Evidence for this is the absence of AI as a strategic emerging industry in the document “Decision on Accelerating the Development of Strategic Emerging Industries” issued by the State Council in 2010. It was only in 2015 that the first central-level policy document mentioned the need to develop AI.

Baidu’s massive investment in AI development occurred five years prior to AI’s first appearance on the policy landscape. This time gap can probably reveal that even in the absence of any policy support, private leading enterprises were able to be proactive and to pioneer in R&D related to the field of AI. Naturally, it could be argued that the Chinese government might have provided Baidu with unofficial support (Baek 2005). What can be certain, however, is that the subsequent interweaving of government and business entities can provide the government with an opportunity to engage in learning by doing by instructing its state assets to invest in or develop AI, as well as to enhance social governance. Beraja et al. (2023) illustrate that local unrest leads to greater government procurement of face-recognition products, and furthermore, that the increased AI procurement suppresses subsequent unrest in China, explicating an interaction of the state roles as promoter and as supervisor. In 2017, developing AI was deemed a national developmental strategy in a central-level policy “National New Generation AI Development Plan”, motivating place-based public-private partnerships to develop AI. The policy was a watershed in this regard, explicitly symbolizing a potential tendency to guard state ownership in the AI industry.

Thereafter, the state started to officially play a dominant role in shaping government-business relationships. Unlike private tech giants, the AI development of CSOEs was initially driven by AI policies. Based on the analysis of 98 websites of all CSOEs in December 2022, they had not undertaken AI development activities such as building AI research centers, cooperating with external partners, and establishing AI spin-offs until “developing AI” became a part of the state agenda in 2017. In contrast to the lagging involvement of CSOEs, AI start-ups emerged even before 2010. The contrast between the lagging actions of CSOEs and the proactive development by private enterprises indicates that the state allowed (or even hoped for) the private sector to accumulate useful AI development experiences with the intention of learning-by-doing in state-owned sectors and then redirecting the AI development to bring it in line with state interests. Although there was an increase in AI start-ups before 2015, the number of entrepreneurs has been decreasing since AI entered the policy landscape (ITJUZI 2021). This decrease is mainly due to the increasing financial thresholds as a result of venture capital providers rushing to support the leading enterprises, which are now ready to take off because AI has gained the attention of the state. According to ITJUZI (2022), the 10 most active venture capital providers increased their investment in AI enterprises 1.3 times from
2015 to 2017, implying that the statization of AI development has heated the venture market.

A strong statization might increase the information gap between the government and the market, leading to ineffective government policy-making. Thus, there is still a need for destatization mechanisms to galvanize the participation of business actors (Weiss 1995). The Chinese government has, therefore, supported the establishment of AI industrial alliances with private actors at the national level. However, after suggesting the establishment of such alliances, central government has not emphasized any explicit developmental guidance for them. This might be due to concerns related to an institutional reorganization of the complex bureaucratic structure and high bureaucratic costs (Li and Wu 2012). In practice, such alliances often consist of CSOEs, private leading enterprises, universities, and research institutes. Ordinary SMEs and start-ups are a minority. This may lead to the marginalization of these groups in terms of specific policy support, thus leading to an effective lack of participation of a critical mass of firms. Additionally, alliances at the national level seem to be limited in terms of their responses to local contexts.

Local industrial AI alliances often emerged after national alliances had been established as an outcome of subnational AI policies. It should be noted that such alliances are government-led, implying that this destatization practice is confined to the state-directed framework. Unsurprisingly, enterprises often view joining industrial alliances as a means to improve their reputation and improve their access to resources. Specifically, national alliances (e.g. the AI Industry Alliance of China) have more well-known enterprises as members than local alliances. The differing profiles of the members of national and local alliances demonstrate their respective degrees of power in the institutional restructuring related to AI.

In summary, these interactions between state and non-state actors, reflected in the AI policy landscape, underline the synergetic and cross-feeding relations between statization and destatization.

**State roles in and through rescaling: three functionalities of government-business relationships**

The previous section examined how modalities of state roles can be reflected in the AI policy landscape by comparing rescaling processes of the policies between different levels of the government, and between state and non-state actors. This section intends to further explore how these interactions figure in the functionalities of government-business relationships.

These state roles collectively construct the three functionalities discussed in this section, in which one state role might be more dominant than the other in certain practices. Nevertheless, it should be noted that the intention here is not
to argue that any one particular state role results in a particular functionality. Here, we further highlight the interplay of state roles at different levels of government as this interplay elicits specific responses from non-state actors, consequently shaping the government-business relationships in AI business activities.

**State sponsorship of AI businesses**

Driven by the responsibility and capability of allocating resources, the state in the role of owner has invested in creating a long-standing innovation engine with global ambitions by preparing a foundation for AI development. In doing so, the state not only provides financial support to scientific and business sectors for research projects, but also strives to coordinate and sponsor resource allocation by firms.

A certain level of resources is necessary to facilitate innovation and market creation (Teets 2015). Central and local governments have provided substantial funding for AI research projects. In 2017, the National Natural Science Foundation of China (NSFC) adjusted its AI funding policies and began accepting funding applications in 2018. In 2021, 613 AI projects were funded by NSFC (G. Wu et al. 2021). This sponsorship provided to universities and research institutes indirectly contributes to the emerging AI industry by preparing its intellectual basis. Moreover, based on the analysis at different policy levels, the Chinese government differentiates between its supporting approach for leading AI enterprises and for SMEs. For example, at the central level, the government claims to promote the development of all kinds of AI enterprises including SMEs, while the provincial and city-level governments are more interested in supporting leading AI enterprises. This provides further evidence of the tension between the central government’s interest in patient, long-term investment to nurture innovation and the local interest in realizing faster profits.

Specifically, at the central level, the MIIT set up an open call to subsidize the development of AI by business actors. For the same purpose, the National Development and Reform Commission (NDRC) and MOST generated two key policy documents. The state’s goal highlighted by inter-ministerial cooperation has reduced political uncertainties, further increasing the alignment of the development visions of central government and businesses. So far, 18 leading AI enterprises have been selected as national AI innovation platforms, 15 private enterprises, and 3 local SOEs, and are dubbed “China’s AI national team”. The large proportion of private enterprises hints at a selective destatization strategy within the overall process of statization in AI development. This selective destatization is *de facto* a dialectical combination of the state roles of owner and promoter with the goal of establishing a team with both SOEs and private firms in order to promote AI innovation capacity. Central government strategically reshuffles power in the business sector through sponsorship, further
mediating government-business relationships by creating an uneven and selective policy environment for business actors.

It is surprising that there are few AI development missions for CSOEs/SOEs at the central and local levels, whilst the actual implementation of financial support tends to favor them. It seems that central, and provincial governments in particular, strive to leverage private premium assets as pioneers to create the market via sponsorship, opening a pipeline for new rounds of accumulation to enhance its role as the owner of capital. Additionally, some provincial governments have designed specific supportive measures for leading AI enterprises. For instance, Guangdong province provides policy support for Tencent (private enterprise) and iFlytek (local SOE). At the central level, a lot of governmental funding goes to enterprises with a state-owned background. For instance, at least 50% of such enterprises received the central budget for AI projects and infrastructure projects related to “Internet+” in 2018 (Ministry of Finance of China 2018). In China, CSOEs/SOEs are expected to contribute to political agendas (Xing and Shaw 2013), serving as a vehicle for the state to increase its control over strategic fields. However, our policy analysis shows limited attention is given to CSOEs in AI policies at lower government levels. It is plausible that local authorities are eager to promote their own corporate delegates rather than CSOEs, as they lack executive power to instruct CSOEs and provide tax incentives because of mismatched tax jurisdiction. Nevertheless, the development of an AI industry can bring talents with strong innovation capacities to the region irrespective of the ownership structure.

The role of CSOEs in China’s multi-scalar AI policy landscape as detailed above thus contradicts the stereotype of CSOEs as the forerunners of the nation’s strategic industrial development. It suggests power struggles have resulted from a combination of the roles of promoter and owner in the process of state rescaling, with central government attempting to promote regional economies whilst encouraging local governments to engage in fierce competition to anchor key AI enterprises and increase competitiveness. Once large firms (especially CSOEs/SOEs) have gained the attention of the state, they can expand vigorously through loans and equity financing, thus enhancing the monopolistic power they provide for the state in its role as owner.

Unexpectedly, the increasing governmental focus on AI has negatively affected the establishment of AI start-ups. According to the Chinese company Zhiyan Consulting, the establishment of AI start-ups has decreased since AI entered the policy landscape (Consulting 2022). This may be due to the increasing monopolization and centralization as a result of selective destatization and temporal promotion. Weak participation of start-ups in policy-making can result in strong elite control and a shortage, or abuse, of local autonomy (Robinson 2011). It should also be noted that state capital has been used to narrow the investment gap left by foreign investors scared away by American sanctions against some of
China’s AI enterprises. For example, a fund run by the Cyberspace Administration of China (CAC), a central regulator, has acquired an undisclosed stake in SenseTime, which had been hit by American sanctions over its alleged involvement in the repression of the Uyghur ethnic minority (The Economist 2022a). Despite the exclusion from most Western markets, SenseTime still performs well in terms of overseas revenues mainly from South-East Asian markets with tremendous funding coming from the Chinese government (The Economist 2022a). In this sense, the patient state capital is conducive to withstanding geopolitical risks and sustaining the market expansion of key AI business actors.

Apart from providing direct funding, the state plays an irreplaceable role in redistributing AI data resources, the key “raw material” of the AI industry. Notably, leading AI enterprises usually collect a lot of data, which puts them in an advantageous position compared to SMEs in developing effective algorithms. Our policy analysis shows that despite a trend toward increased Chinese government ownership of data, they can still be shared with private companies. In fact, the Chinese government strives to leverage leading enterprises to collect and build standard test datasets for niche areas, and to also subsequently provide data to SMEs. Sponsorship of leading enterprises via subsidies can thus simultaneously have the effect of lowering the entry barriers for new AI businesses because these sponsorship arrangements are beneficial for SMEs that lack data and large-scale computing facilities to train their products. In contrast to central government strategies for the accumulation of state-owned data, local authorities are more proactive in enhancing the accessibility of data. For example, Beijing has designed the rules for sharing open data with the public by classifying data confidentiality levels in several policies, and Shenzhen also calls for the promotion of sharing open data through the standard test dataset for niche areas. Furthermore, Shanghai and Shenzhen plan to build an intellectual property marketplace with an AI algorithm trading bazaar for data trading. The establishment of data trading platforms is per se a way of sponsoring and lowering transaction costs for enterprises at the local level, facilitating data flow between AI enterprises of different sizes and types. The contrast in attitudes between central and local levels of government highlights how central government is acting more as an owner than as a promoter, since enhancing its ownership over data is seemingly more important than developing the AI industry with undifferentiated provision of data. In this sense, the state role as owner is prominent in the sponsorship functionalities of government-business relationships with the capacity to sponsor AI development and an intention to enhance its ownership of capital, despite potential tensions or compromises between different levels of the government.
State cultivation of Al businesses

In comparison to direct sponsorship of financial capital and data, central and local governments collaboratively attempt to direct private capital to state-designated areas of investment and production. The state acting as a promoter fosters Al market development, increases the Al talent pool, and supports SMEs.

As a promoter, central government applies market-pull approaches to nurture the emergence of the Al industry. In 2022, the state council issued the “Outline of the Strategic Plan for Expanding Domestic Demand (2022–2035)” with the goal of increasing domestic market demand. In this strategic plan, the Al market is one of the emerging industrial markets targeted by the government. Specifically, the policy mentions promotion methods, such as “increasing consumption of smart home appliances”, “supporting autonomous driving and unmanned delivery”, “developing age-appropriate technologies and products”, and “improving the safety and intelligence of power grids” in order to expand domestic demand for Al products.

There is a significant shortage of Al talents in China. The ratio of demand and supply has reached 10:1 (Mo, Liu, and Zhan 2022) and is predicted to keep growing by 2030 (Maes and Sawaya 2023). In order to address this problem, central government urges educational institutions at all levels to enhance their Al workforce training. Specifically, another central-level policy “Action Plan for Al Innovation in Higher Education Institutions” highlights the need to establish and standardize Al education at all levels and provides detailed guidance in this regard. As a result, 29 out of 34 provinces have taken actions in response to the labor force shortage. Moreover, the central government uses existing overseas talent recruitment programs such as the “Cheung Kong Scholars Programme” to attract global Al talents, while subnational governments often provide additional incentive packages. Additionally, the Chinese government encourages domestic tech giants to recruit Al talents abroad. By adopting a cluster approach, some enterprises have already entered the US high-tech hub of Silicon Valley, setting off a fierce battle for talent with companies such as Google, Amazon, and Microsoft. It is noteworthy that Al talents are unevenly spatially distributed in China. According to a white paper (BMBEIT 2023), more than 60% of the country’s Al experts were employed in Beijing in 2022. Solutions to tackle this problem are often proposed by local governments in order to enhance their opportunities in the inter-city competition for talent. Although most provincial and city-level policies do not specifically include packages to attract Al talent, they highlight the tendency to do so by using existing local talent recruitment programs particularly by linking them with their industrial agglomeration plans.

With regard to cultivating SMEs, the state council also promulgated “Opinions on Several Policy Measures for Vigorously Promoting Mass
Entrepreneurship and Innovation” in 2015, encouraging start-up activities and the promotion of entrepreneurial innovation. This overarching policy differs from the state logic in the AI industry of selectively supporting tech giants and small champions as announced in other central-level policies. This policy does not explicitly highlight the support for AI, yet the implementation measures such as intellectual property rights protection for new ventures and providing various tax incentives to SMEs might have a far-reaching impact on AI start-ups. The Chinese government often combines the roles of owner and promoter to leverage state funds for mergers and acquisitions of successful SMEs after “making SMEs grow stronger and bigger” (zuqiăng zuoda 做强做大, as mentioned in many policies). Moreover, central government requires CSOEs to carry out professional integration with private enterprises in order to increase the government’s control over industry and national security (Securities Times 2023). In parallel, central government runs several tech-investment vehicles, and local governments are increasingly creating their own, often equipped with billions of dollars (The Economist 2022a). In combination, governments at all levels have given considerable policy support including subsidizes to foster leading start-ups, such as iFlytek (focusing on voice-recognition technology) and CloudWalk (focusing on image-recognition technology). In this sense, the promoter role complements direct sponsorship by means of a clearer goal of directing private capital to state-designated areas of investment and production.

Therefore, the state role as promoter is prominent in cultivating the functionality of the government-business relationship, as the central and local levels of government have employed various strategies including developing a domestic AI market, growth of the AI talent pool, and fostering the development of various business actors. This role of promoter, however, does not function independently; it is guided by state interests which are largely affected by the nature of the state’s role as owner.

**State disciplining of AI businesses**

Beyond the state roles of owner and promoter, due to a “productivist” state capitalistic impulse (Alami and Dixon 2023), the state plays an active role as a supervisor in the hope of controlling the development of AI businesses, preventing market developments from harming national interests and weakening the government’s control over strategic data.

The central government has created a legal basis for the AI industry consisting of the “Cybersecurity Law of China” of 2016, the “Data Security Law of China” of 2021, and the “Personal Information Protection Law of China” of 2021 as well as “Generative AI Service Management Approaches” of 2023, “Measures for the Ethical Review of Science and Technology” of 2023, and two algorithm
regulations. The generation of Chinese legislation on AI has been somewhat slower than the progress made in the development of the AI industry itself. For instance, surprisingly, bearing in mind the significant performance of the digital economy in 2020, the first central-level policy “Code of Ethics for the Next Generation of AI” on an AI ethics framework, in which privacy protection and requirements for improving the quality of data collection and usage were emphasized, was only released in 2021. However, the definition of incorrectly collected data was imprecisely stated in the policy, thereby often leading to privacy protection being ignored in practice.

Despite the emergence of central and local legislative concerns, in reality, China is still considered to have a relatively lax regulation and vague legislative environment on data collection (Ding 2018; Yu, Liang, and Xue 2021). As Roberts et al. (2021, 70) note, “[t]he strength of privacy protection in China may be and often is determined by the government’s decisions […] rather than legal and practical constraints”. China approaches personal information protection from a more holistic perspective, prioritizing economic growth and social stability in practice (Boullenois 2021). Evidently, the implementation of privacy protection is weak in China. According to the China Consumers Association, 85% of people had experienced their personal data being leaked (Financial Times 2018). The CEO of Baidu, Robin Li, said that this is “not a big problem for many Chinese people” because they are on the whole less sensitive about privacy and willing to exchange it for convenience and efficiency (Sun 2018). According to the central-level policy “Outline for the Promotion of Big Data Development” of 2015, data collection does not necessarily require consent from individuals. Illustratively, with the permission of the government, the company WeDoctor was able to collect massive data about health conditions linking it with corresponding personal identification numbers in exchange for providing free health checkups for the individuals, with the government gaining access to the dataset in return (Hawkins 2019).

This stage is characterized by the emergence of the Chinese state’s ideas for the creation of a data regulation regime to reshuffle public-private powers (Boullenois 2021). One notable example is that, in order to avoid a data monopoly of private enterprises, the Chinese government broke up Ant Financial Group’s Alipay (backed by private tech giant Alibaba) and created a separate app for the Fintech giant’s loan business, which can require Ant to transfer user data to a new credit scoring joint-venture that is partly state-owned (Financial Times 2021). The state thereby maintains its jurisdictional power through gray areas that are above formalized legal regulations.

China’s lax privacy protection environment might be intentionally designed by the central government to allow massive data collection that feeds into AI-engineered capital accumulation. The Chinese government increases the quantity of state-owned data by collecting data directly via a wide range of SOEs and tech giants, as well as by means of expanding digital infrastructure like the
construction of big data centers guided by MIIT’s “Three-year Action plan for the Development of New Data Centres (2021–2023)”. Cadell (2021) provides evidence that China’s state-owned media won many bids from the government to collect data with the aim of gaining insights into public opinions, while Liang et al. (2018) imply that the government can leverage social credit scores as a result of big data collection from private tech giants. Moreover, the arm of state supervision in data management has stretched to foreign enterprises. According to the “Cybersecurity Law of China”, all large foreign enterprises have to set up independent databases to ensure the security of Chinese citizens’ data and privacy. As a result, the data storage facilities of foreign enterprises like Tesla and Apple were required to be located in China (Schaefer 2020).

Intriguingly, the lax regulation on personal information protection might stoke concerns about lower-level governments that are striving to engage in cooperation with foreign enterprises. Chinese industrial policies are often “marked by coherence [between multiple levels of administration], given the overriding goal of economic growth and structural transformation” (Carmody and Owusu 2007, 506). However, in China’s AI policies, in contrast to the central government’s strong interest in acquiring data and avoiding a situation whereby private firms have a data monopoly (Boullenois 2021), city-level governments are more devoted to providing a trustworthy legal environment for AI enterprises. For instance, Shenzhen has implemented the first Chinese special legislation on the AI industry since 2022, in which data rights for individuals, the government, and enterprises are defined. This document emphasized that this city-level AI legislation has the potential to be adapted nationwide. As such, Shenzhen attempted to compensate for a lack of central government regulations. However, this central-local divergence does not indicate an independent regulatory role of the state, rather, the primary role of supervisor at the local level is to fulfill the promoter role of the local governments in and for inter-city competition.

As shown by the analysis, a disciplining functionality within government-business relationships has formed as a result of the interaction of the role of biased supervisor, the role of local promoter, and the role of dominant owner.

**Conclusion**

This paper goes beyond the focus of central-local relations in state rescaling theory, and deepens understanding of central-local relations by introducing the government-business nexus as an additional dimension of state rescaling. By focusing on state actions led by particular state roles, this paper proposes three functionalities of government-business relationships, contributing to the political and economic geography literatures.

Specifically, based on the policy analysis, two patterns of state rescaling can be identified. First, a policy-making pattern has been discovered that enables
local governments to tailor local AI policies as a result of decentralization. This exists despite selective upscaling practices (e.g. developing pilot zones). The analysis also notably revealed that while the central state strives to set clear directions, such as patient and innovation-oriented investments, and to exert controls over areas like data access and data regulation, local governments often have diverging goals and distinctive approaches in their dealings with the corporate delegates that they aim to anchor and facilitate. The observed tensions in Chinese AI development refute the notion that it is characterized by a complete top-down centralized development mode as implied by Webb (2019). First, downscaling practices may lead to the fragmentation of policymaking at local levels potentially resulting in an inefficient use of state resources (Howell 2006). Second, it has been found that patterns of statization are primarily dominating due to the venture capital market responding to the unfolding multi-scalar AI policies. This may be balanced by destatization efforts in selecting and anchoring certain AI private enterprises in industrial alliances and innovation platforms. These two seemingly contrasting patterns – one stressing decentralization, the other emphasizing central dominance – are better understood as a strategy to improve market performance and the innovation capacities of the state as a whole, instead of an attempt to downsize or disentangle the state apparatus. This is confirmed by Anguelov et al. (2023) who argue that scalar relations are imbued with polymorphic and open processes.

It is argued that AI policies in China are based on three functionalities of government-business relationships, namely, sponsorship, cultivation, and disciplining. This results in different constellations of state roles that are collectively presented in certain AI business activities. Specifically, this paper argues that in order to develop the AI industry, the Chinese government is not only developing a capitalist market economy by sponsoring and cultivating the development of AI businesses, but the state itself is acting as an active participant in regulating, redirecting, and restructuring the market. Noteworthily, in its supervisory role, the Chinese government cannot be understood to be an independent and unbiased regulator in liberal markets. Instead, it functions as a filter and maximizes benefits in order to enhance its power as the owner of the capital, and potentially makes corrections through the role of localized promoter. The reconfiguration of central-local relations is not fixed; it is itself periodized and phased as contended by Brenner (2009). This is confirmed by this paper with government-business relationships in the AI industry constantly evolving as a result of central and local governments entering into provisional collaboration and non-synchronization relationships.

Compared with other industrial policies in China, four specific characteristics of Chinese AI industrial policies can be summarized based on our policy analysis. First, unlike industries that are strongly based on human and financial capital, AI development generates and is fed by data resources. Therefore, the Chinese state tends to act as a biased supervisor (in contrast
to a fair regulator as is found in a liberal market) aiming to strategically increase its data ownership by rearranging the responsibilities of state and non-state actors at different levels of government. The state seems to play a stronger supervising role to control government-business relationships than in other industries. Second, in contrast to the usual pursuit of policy convergence between central and local levels (Carmody and Owusu 2007), Chinese AI policies show that a divergence of interests between central and local governments regarding data protection is not necessarily negative, as it may cause localities to design policies to fix regulatory failures. Third, unlike other strategic industries in China where CSOE/SEOs are often used as spearheads, the AI policies tend to leverage private premium assets as pioneers to create the market for new rounds of accumulation. Fourth, unlike non-strategic industries such as the garment industry, the attention of local governments leverages the potential of AI in their respective policies, thereby using AI as a window of opportunity to absorb resources (e.g. talent) and to increase local competitiveness.

In conclusion, this paper offers a new angle to examine state rescaling theory by combining central-local and state-non-state relations. It contributes to the identification of the characteristics of China’s AI policy, and foregrounds three functionalities of government-business relationships. This could be an avenue for future studies focusing on state rescaling theory and industrial policy development.

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