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ARTICLE

'Digital Divide': How Do Central and Local SOEs Respond Differently to Digitalization in China

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Abstract
Despite the important role of state-owned enterprises (SOEs) in government policy implementation, there is a lack of research on how SOEs owned by different government entities differ. We draw on an attention-based view (ABV) to understand how central government-owned (called central SOEs) and local government-owned enterprises (called local SOEs) differ in their response to digitalization, a major state objective in China in recent years. The two types of SOEs differ in the foundational feature of attention structure – the rules of the game (as embodied in their different goals, identities, and evaluation of top executives) – as well as important features such as governance structures and resources. These features can trigger more attention in central SOEs to digitalization. Given the interdependence of these features in shaping the structural distribution of attention, we further propose how governance structures and resources can influence strategic attention differently in SOEs with different rules of the game. The arguments are tested using data from all Chinese-listed manufacturing SOEs between 2009 and 2020. The study reveals different responses to national strategy between central and local SOEs due to their distinct attention structures designed by the state. It also extends the ABV and research on corporate digital transformation.

摘要
国有企业在政府政策实施过程中发挥着重要作用，但现有文献对所属不同层级政府的国有企业的差异，却缺乏研究。本文基于注意力基础观，研究所属中央政府的国有企业（称为中央国企）和所属地方政府的国有企业（称为地方国企）对中国的国家战略，即数字化战略的不同反应。中央国企和地方国企在注意力结构的基础特征——"游戏"规则（包括目标、身份和对高管的考核机制），以及治理结构和资源等方面存在差异，这些差异使得中央国企对数字化战略的关注比地方国企更多。鉴于这些特征在塑造注意力结构上的相互依存关系，本文进一步提出治理结构和资源，如何影响不同"游戏"规则中的中央国企和地方国企的战略注意力。我们运用 2009 年至 2020 年中国的国有上市制造企业的数据进行实证，研究结论揭示出中央国企和地方国企的注意力结构不同，对国家战略的反应存在差异。本研究拓展了注意力基础观和企业数字化转型的研究。

Keywords: attention-based view; digitalization; national strategy; state-owned enterprises
关键词: 国有企业; 注意力基础观; 数字化转型; 国家战略

Introduction

Research on state-owned enterprises (SOEs) has established that state ownership gives these firms distinct governance mechanisms and goals that orient them to carry out state missions and strategies (Huang & Yu, 2006). However, the state is not a monolithic entity, as revealed in a growing number of studies. For instance, the central and local governments can have divergent interests and goals (Luo, Wang, & Zhang, 2017). Examining such differences is critical for understanding the implementation of national strategies concerning the economy and corporations. To better understand the state's role in

corporate change, prior research has started to analyze administrative capacity and state fragmentation (e.g., Chung, Luo, & Zheng, 2024; Guillén & Capron, 2016). However, research lacks on whether and why SOEs owned by different government entities respond differently to national policies.

To fill this research gap, this study draws on the attention-based view (ABV) to examine how central SOEs and local SOEs differ in their strategic attention to digitalization, a major national strategy of the government in China in recent years. The ABV proposes how various features of attention structure in organizations can jointly regulate and channel managerial attention (Barreto & Patient, 2013; Fu, Tang, & Chen, 2020). We extend the original analysis of attention structure (Ocasio, 1997) to the context of SOEs. One of the most important players for SOEs, the Chinese state, designs the foundational feature of attention structure, the rules of the game, and two other important features – governance structures and resources (Joseph & Ocasio, 2012; Ocasio, 1997). The rules of the game are embodied in SOEs' goals, identities, and evaluation criteria of top executives. We propose how the different attention structures in central versus local SOEs channel central SOEs to allocate higher value to issues of digitalization and pay more strategic attention than local SOEs. Moreover, we propose that the specific features of governance structures and resources – pyramid structure and government subsidies – interact with the rules of the game to regulate decision-makers' attention. Given the game rule difference – primacy of national policy implementation in central SOEs versus the balanced goals in local SOEs, the pyramid structure weakens attention to digitalization in local SOEs but not in central SOEs, and government subsidies channel attention to digitalization in central SOEs but not in local SOEs.

This study investigates SOEs' focus on digitalization because, in China, such a change initiative has been mainly driven by the Chinese government. The government made digitalization a national strategy and called upon companies to fulfill this plan. However, digitalization, especially at the core of the business, can be highly risky, and not all firms see the immediate need to take such a risk without strong competitive or survival pressures (Girod & Whittington, 2017; Liu, Yan, Zhang, & Lin, 2021). Moreover, digitalization is a long-term strategy that takes a long time to bear fruit and may have an adverse impact on a firm's short-term performance (Liu et al., 2021). Considering that top leaders of SOEs need to show their achievements during their tenures of office, usually three to five years, they are more inclined to invest in projects with shorter income cycles and less risk (Wu, 2012). Thus, SOEs are generally less likely to take the initiative to engage in digitalization, and the pressure from the state becomes a significant driving force. Therefore, digitalization offers an ideal context to observe whether and how central versus local SOEs attend differently to the government's national strategy. We test the arguments using all publicly listed state-owned manufacturing firms in China between 2009 and 2020 and find empirical support.

This study contributes to research on how the state influences policy implementation by understanding the differential responses of central versus local SOEs to national policy. While the literature on strong state and state capacity has focused on the role of the state in policy formulation and implementation for economic growth (Evans & Rauch, 1999; Guillén & Capron, 2016; Skocpol, 1985), it has not considered the structural reasons for heterogeneous national policy implementation. Local SOEs attend less to the central government pressures despite receiving government resources, especially when they are located at the far end of the control chain. In addition, this study extends the ABV by understanding the important characteristics of attention structure in different types of SOEs and how they regulate attention. Lastly, this study contributes to research on corporate digital transformation by revealing the important role of the government. The state has been promoting digitalization in many countries globally, but this burgeoning research has mainly focused on market competition and firms' internal factors to explain adoption. Our study is among the first to demonstrate how the state has channeled firms' strategic attention to digitalization in SOEs.

Theoretical Background

Attention-Based View

Ocasio (1997) proposed the ABV to understand what drives corporate decision-making. He defines attention as 'the noticing, encoding, interpreting and focusing of time and effort by organizational decision makers'. The ABV emphasizes that the focus of decision makers' attention affects the strategic

choice and outcomes of the firm (Cho & Hambrick, 2006). Generally, decision-makers face multiple goals (Mair & Martí, 2006; Ocasio, 2011; Stevens, Moray, Bruneel, & Clarysse, 2015), but the limited rationality of decision-makers prevents them from paying sufficient attention to each goal (Cyert & March, 1963; Kahneman, Treisman, & Gibbs, 1992; Simon, 1947). Thus, they selectively pay attention to the information they believe is relevant to success (Fu et al., 2020; March & Simon, 1958; Ocasio, 1997; White, 1992). Given competing demands for their attention, how they select issues and formulate answers is thus a key question ABV attempts to explain (Ocasio, 2011).

A central tenet of the ABV is that attention is situated, that is, based on the context or situation (Nicolini & Korica, 2021; Ocasio, 2011). The attention structure in organizations can regulate and distribute attention. In his original framework, Ocasio (1997) suggests four important characteristics of attention structure: rules of the game, players, structural positions, and resources. The rules of the game are 'the formal and informal principles of action, interaction, and interpretation that guide and constrain decision-makers in accomplishing the firm's tasks and in obtaining social status, credits, and rewards in this process' (Ocasio, 1997: 196). Players include the most important ones, such as top decision-makers and others who can influence the decision-making process. Structural positions refer to the system of hierarchical authority in organizations, which involves delegation of power and discretion and can shape differentiated attention to different aspects of the organizational environment. Resources are the 'tangible and intangile assets utilized in the construction of organization moves' (Ocasio, 1997: 198), and can affect the extent certain issues are attended to and certain answers are chosen. Subsequent studies describe how resources can provide both information and incentives to motivate or hinder the strategic attention of firms (Joseph & Ocasio, 2012).

Out of the four characteristics of the attention structure, the rules of the game play a central role in distributing and channeling attention. They provide the 'logic of action' in assigning value and legitimacy to issues and ordering their importance. Ocasio (1997: 199) also argues for the interdependence of these characteristics in structuring attention 'while the rules of the game are central, the allocation of the firm's legitimacy, value, is a joint product of the rules, positions, players, and resources'.

Attention Structures in Central and Local SOEs

This study extends the ABV to understand how central versus local SOEs differ in attention structures and how such differences shape their strategic attention accordingly. While SOEs are designed as tools of government intervention in the economy (Huang & Yu, 2006), central and local SOEs diverge in some important characteristics, which lead to distinct attention structures in these two types of firms. As one of the key players in SOEs, the state designed the three characteristics of attention structures: rules of the game, structural positions, and resources.

The government administration has continued to impose on corporate decision-making in SOEs (政企不分), despite the market transition and mixed ownership reform allowing them more discretion (Chen, Lu, Liu, & Guo, 2000; Chinese Government, 2015). Chinese SOEs are affiliated with the State-owned Assets Supervision and Administration Commission (SASAC), an important government agency that manages the country's assets. SASAC sets the goals, provides resources, and appoints and evaluates top leaders for SOEs (Simon, 1997; Stan, Peng, & Bruton, 2014; Zhu, Qi, Belis, Lu, & Kerremans, 2019). Thus, the state has clear legally legitimated authority over SOEs (Monteiro & Adler, 2022), and SOEs strive to perform the tasks the state gives to its satisfaction (Bloom & Van Reenen, 2007).

Nevertheless, owned and managed by SASAC at different hierarchical levels of the state, central and local SOEs differ in the foundational feature of their attention structures: the rules of the game, which are embodied in the purpose, identity, and incentives of the organization (Ocasio, 1997; Selznick, 1957). Regarding the purpose, central SOEs aim to accomplish the government's national strategy and serve as an exemplar in the state-owned sector in complying with the central government's expectations. Moreover, such a focus ensures that national strategies are not overshadowed so that they do not become a source of national revenue expansion (Liu & Li, 2012). In contrast, the goals of local SOEs are influenced by both the central and local governments. While they pursue the government's

national strategy, they must also realize the local government's economic growth and employment targets.

The two types of firms also have distinct political identities (Genin, Tan, & Song, 2021; Meyer & Peng, 2016). Central SOEs are 'national champions'. They face strong institutional pressures from the central government, and lack of compliance will lead to penalties on the top leaders and withdrawal of resource support (Genin et al., 2021; Meyer & Peng, 2016). In comparison, local SOEs are major contributors to the local economy and social stability (Bai & Xu, 2005). Thus, they can be buffered from the central government's pressure if such compliance can distract them from realizing the demands from their local governments. This is particularly the case when the central government's national strategy conflicts with the local governments' short-term economic goals. For instance, studies show that local governments protected firms in heavy-polluting industries from the central government's environmental policies due to these firms' contribution to local tax revenues (Zhang, 2013).

Career-based incentives for top leaders of SOEs also differ, as reflected in their appointment and evaluation criteria. The central and local governments control the appointment and removal of top leaders of central and local SOEs (Yan & Xiao, 2019). The central government can highly value top leaders of central SOEs for following the government's national strategy (Yun, Li, & Hu, 2022). Compared with their counterparts in central SOEs, leaders in local SOEs may have less incentive to strictly follow the government's national strategy (Yun et al., 2022). Although local governments will also actively promote national strategy, they impose multiple demands on local SOEs, such as tax revenues, local economic growth, and employment.

In addition to the rules of the game, the structural positions of central and local SOEs can channel strategic attention. Here, we focus on an important governance structure, that is, the pyramid structure. Central SOEs are under the direct control of the SASAC of the National State Council, while local SOEs are under the direct control of the SASAC of provincial or municipal governments. Respectively, the agency of SASAC at central and local levels delegates its power through a control chain, the pyramidal structure (Fan, Wong, & Zhang, 2013), to manage multitudes of SOEs. The central SASAC exerts tight control over SOEs and holds them accountable for the central government's national strategy. Even a control chain does not diminish its control at the far end of the control chain. In contrast, there is a lack of centralized and unified supervision from local SASAC over local SOEs. Moreover, local governments tend to show supportive or relaxed control strategies based on their interests, such as an immediate increase in local fiscal revenues (Zhu, Chen, & Yu, 2006). This allows local SOEs more managerial autonomy and discretion, especially at the far end of the control chain (Zhang, Liu, & Cai, 2015).

Lastly, resources in the two types of SOEs serve different goals. Central SOEs are given priority in accessing natural resources, raw materials, technologies, energy, and financing (Li, Cui, & Lu, 2014). Indeed, they are guaranteed a plentiful and steady supply of resources, to the extent that they often pursue the government's national strategy without much consideration for costs (Lin, Cai, & Li, 1998; Liu & Li, 2012). In contrast, there is a reciprocal relationship between local SOEs and local governments (Chen, Kong, & Wang, 2016; Peng, Bruton, Stan, & Huang, 2016). Since local governments expect local SOEs to help with local economic growth and employment, they provide SOEs with some preferential access to resources compared with non-SOEs. However, given the limited resources of local governments, local SOEs also need to acquire resources through their own efforts. Moreover, local governments usually subsidize loss-making local SOEs to help them survive market competition (Röller & Zhang, 2005; Wei, Varela, & Hassan, 2002).

In summary, the differences between central and local SOEs suggest different attention structures. Table 1 summarizes the key differences.

Digitalization: SOEs' Response to the State's National Strategy

Digitalization of enterprises refers to the process of enabling production, management, marketing, and other corporate functions through digital technologies, including artificial intelligence, big data, cloud computing, and blockchain. The goal of digitalization is to help firms improve efficiency as well as

Table 1. Different attention structures in central and local state-owned enterprises

Characteristics of attention structures		Local SOEs	Central SOEs
Rules of the game	Goals	Implement national strategy and achieve local economic development targets and social objectives set by local government.	Serve as national policy instruments.
	Identity	Key contributors to local economic growth, tax revenues, and social stability (Liu, Pei, & Woo, 2006).	'National Champions', who are exemplary in carrying out national strategy and complying with central government expectations.
	Appointment and evaluation criteria of top leaders	The local government controls the appointment and removal of top leaders of local SOEs. Top leaders in local SOEs may have less incentive to strictly follow government's national strategy.	The central government controls the appointment and removal of top leaders of central SOEs. Top leaders of central SOEs can be highly valued by the central government for following the national goals.
Governance structure	Pyramid structure	Under the control of the State-owned Assets Supervision and Administration Commission (SASAC) of provincial or municipal governments. The chain of control (pyramid structure) is used to delegate the power of the local SASAC. Local SOEs have more managerial autonomy and discretion, especially at the far end of the control chain.	Under the direct control of the State-owned Assets Supervision and Administration Commission (SASAC) of the national State Council. The chain of control (pyramid structure) is used to delegate the power of the central SASAC. Central SOEs are under tight control of central SASAC and managerial autonomy is limited, even at the far end of the control chain.
Resources	Resources/ Subsidies	Local governments provide limited resources, and local SOEs must compete in the market to acquire resources. Government subsidies are usually provided to loss-making local SOEs to help them survive market competition.	Central government provides plentiful and steady resources, including natural resources, raw materials, technologies, energy, and financing. Government subsidies are usually provided to central SOEs to fulfill their strategic mission.

transform and upgrade manufacturing (Bharadwaj, Sawy, Pavlou, & Venkatraman, 2013; Bodrožić & Adler, 2021; Hanelt, Bohnsack, Marz, & Antunes, 2020). In many countries, the digitalization of manufacturing firms is regarded as an important national strategy, such as 'Industry 4.0' in Germany and the 'National Strategy for Advanced Manufacturing' of the United States. In China, the central government views digitalization as a window of opportunity to narrow the manufacturing gap with developed countries. It has adopted many digital-related policies to promote the digitalization of the manufacturing industry, such as 'Made in China 2025' (Corrocher, Mavilia, & Giorgio, 2018).

However, digitalization presents many challenges and uncertainties for firms. Digitalization, especially at the core of the manufacturing process, can be highly risky. Such a strategic change not only involves the application of digital technologies but also requires tight integration of digital technologies with all aspects of organizations (Tao, Cheng, Qi, Zhang, Zhang & Sui, 2018). As a result, the digitalization of China's manufacturing industry has remained in the exploratory stage, and no mature paradigm or success template has emerged (Girod & Whittington, 2017). Accenture's 2020 report shows that only 7% of firms in China have achieved significant results in digital transformation. Moreover, compared with developed countries, China only started industrialization in recent decades, and the

foundation of industrialization is still relatively weak (Chu et al., 2016). Thus, many firms cannot effectively use digital technologies, and digitalization has led to the efficiency paradox (Brynjolfsson, Rock, & Syverson, 2019). Firms invest huge amounts of resources in digitalization, but do not reap efficiency gains or even lose efficiency due to low proficiency in the use of digital technologies (Autor & Murnane, 2003; Bresnahan, Brynjolfsson, & Hitt, 2002). Lastly, corporate digitalization is a long-term project that may lead to declining short-term financial performance (Liu et al., 2021). For example, Wang Lei, a manager at Hefei Metal Forming Intelligent Manufacturing Co., Ltd., mentioned in a First Financial interview that the company's digital investment projects have not generated income in the past five years, and it will take another two to three years to become a new profit growth point of the company. Given that SOEs' top leaders are evaluated based on short-term firm performance, they can be reluctant to engage in such a strategic change (Wu, 2012).

Nevertheless, SOEs are expected to engage in digitalization, given their objective of national strategy implementation. Prior studies have established that SOEs are important policy tools because of the domination by superior administrative authorities and evaluation criteria based on the fulfillment of the national strategy (Zhu et al., 2019). According to this view, resources and opportunities of SOEs are mainly provided by the government departments and agencies, major corporate decisions need to be approved by superior administrative authorities, and top managers are appointed and evaluated by the Organization Department of the state (Koppell, 2007). State ownership and control make SOEs essential in addressing social problems and creating public value (Cappellaro, Tracey, & Greenwood, 2020; Lin & Tan, 1999). Moreover, the state's long-term strategic plan emphasizes the high quality and sustainable development of SOEs through digitalization, so that the Chinese economy can gain an edge in the international competition of digitalization. Therefore, SOEs are expected to play an important role in accomplishing the government's national strategy of digitalization and leading the development of a modern industrial system (Qi, Du, & Wen, 2021). In this context, digitalization has become an important political mission for SOEs.

Hypotheses Development

Central and Local SOEs' Different Strategic Attention on Digitalization

We propose that the different attention structures in central and local SOEs can distribute top decision-makers' attention to digitalization differently. First, different rules of the game can lead top decision-makers to assign different levels of priority and urgency to the state's agenda (Ocasio, 2011). For central SOEs, the goal of fulfilling the government's national strategy can channel their attention to digitalization. Issues related to digital transformation are perceived as worthy of time and resources, given this goal's high legitimacy and priority. In addition, the identity of 'national champions' can guide decision-makers' attention to issues that can strengthen rather than undermine their identity (Wry & York, 2017). For example, previous studies find that social enterprises tend to focus more on social issues than on how to make a profit due to their socially-oriented identity (Ebrahim, Battilana, & Mair, 2014). Central SOEs view themselves as leaders of the entire industry (Liu, 2021), and thus attend to the national strategy of digitalization before other firms start to do so. Furthermore, incentives used in the appointment and assessment of top leaders can regulate and direct their attention to issues most valued. Top leaders in central SOEs are appointed directly by the central government. Their career goal of political promotion is likely to focus their attention on the central government's national digitalization strategy because fulfillment of the national policy helps them obtain better evaluation from the central government (Yun et al., 2022).

In contrast, for local SOEs, the dual goals of complying with national strategies and achieving local government's economic and social objectives can dilute the local SOEs' attention to the central government's policies. In addition, local SOEs' identity as key contributors to local economic well-being and social stability can focus their attention on the responsibility of boosting local economic development, which has been emphasized by local governments (Cao, Liu, & Zhang, 2009; Chen et al., 2016). Such an economic burden often precedes compliance with the government's national strategy for local SOEs (Chen et al., 2016). Furthermore, career-based incentives for top leaders in local SOEs guide

them towards issues and solutions that are more rewarded by local governments. The local government appoints these top leaders whose needs (such as short-term local revenues and employment) are much broader than the national digitalization strategy. The evaluation of top leaders of local SOEs is not as tightly based on the national strategy implementation as it is on central SOEs. The broader set of goals – both national and local government objectives – linked to top leaders' evaluation in local SOEs provides them with more managerial autonomy and reduces their focus on digitalization.

Second, the governance structures in the two types of SOEs also influence the distribution of top decision-makers' attention. As central SOEs are under the direct and tight control of central SASAC (a subsidiary of China's State Council), reporting procedures, communication channels, and monitoring systems can focus top leaders' attention on the state objective of digitalization. In contrast, local SOEs report to the local SASAC (an agency of local government), and local SASACs do not exert a unified force of control (Zhang et al., 2015). This gives local SOEs' top leaders greater discretion and leads them to attend to the diverse set of goals of local government.

Third, resources often bear information that can influence firms' attention (Hu, Hughes, & Hughes, 2022; Joseph & Ocasio, 2012). Digitalization involves high investment and uncertain outcomes (Liu et al., 2021), and thus requires firms to have sufficient resources to implement such strategic transformation. For central SOEs, the abundance of resources provided by the central government conveys the information about its full support for the risky implementation of digitalization (Li et al., 2014). However, despite local SOEs' better access to local government-controlled resources compared with private firms, local SOEs still need to obtain resources through their own efforts. The resources transmit the information that local SOEs need to achieve local economic growth as well as national strategic objectives, and hence local SOEs are less likely to focus their strategic attention on digitalization.

In short, due to their different attention structures, central SOEs are more likely to give more strategic attention to digitalization than local SOEs. Thus, we propose:

Hypothesis 1 (H1): Central SOEs exhibit a stronger strategic attention to digitalization than local SOEs.

Variation in Central versus Local SOEs' Strategic Attention on Digitalization

The attention structures among central SOEs can still differ substantially, especially concerning the characteristics of governance structures and resources, while the same holds among local SOEs. The SASAC adopts the pyramid structure to manage multiple SOEs (Fan et al., 2013). Those firms at the far end of the control chain are situated in different structural positions than those at the close end, and their attention can be shaped differently. In addition, firms are provided with different amounts of government subsidies, and such resources can provide information and incentives to channel firm attention toward the state's objectives accordingly. More importantly, the rules of the game in attention structure play a foundational role in providing top leaders with the schema of decision-making, and how governance structures and resources regulate attention can be influenced by the rules of the game (Ocasio, 1997). We propose how the specific features of governance structures and resources – pyramid structure and government subsidies – can influence attention focus differently in central versus local SOEs, given their different rules of the game.

Governance structure – Chain of control through pyramidal structure

Joseph and Ocasio (2012) argue how cross-level organizational structural linkages can influence the structural distribution of attention. The pyramid structure affects the involvement and influence of the ultimate firm controller. Firms structurally placed at several levels below the center of power can have more discretion in their decision-making, and their attention is less influenced by the ultimate controller (Belenzon, Hashai, & Patacconi, 2019). While SOEs are under the administrative control of SASAC, government officials from this agency do not intervene in multitudes of firms to the same extent. The agency relies on the chain of control to achieve delegation of power through an important governance mechanism of the pyramidal structure (Fan et al., 2013). As shown in

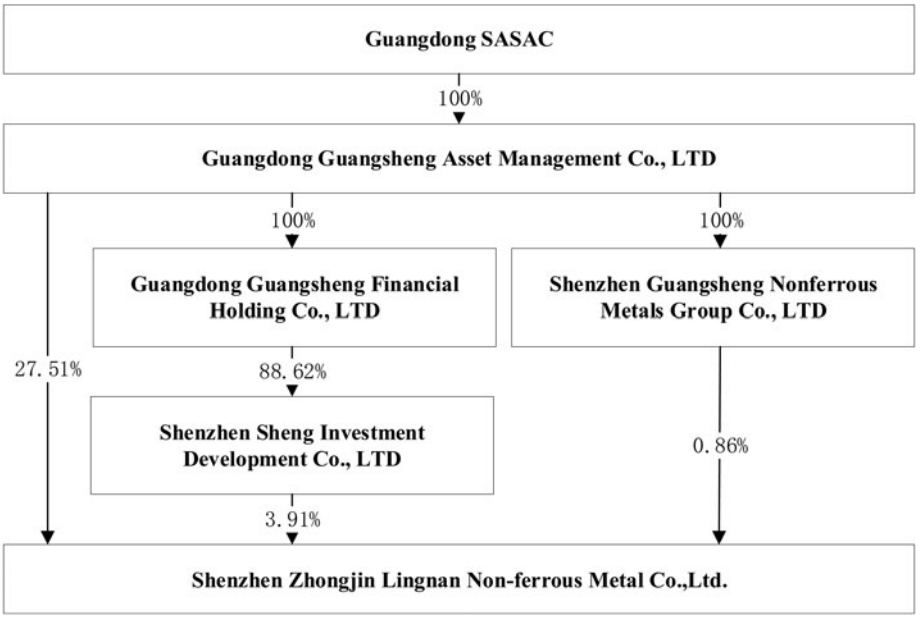

Figure 1. Pyramid structure of Shenzhen Zhongjin Lingnan Non-ferrous Metal Co., Ltd.

Figure 1, the SASAC of Guangdong Province controls the listed local SOE, Shenzhen Zhongjin Lingnan Non-ferrous Metal Co., Ltd. (the focal firm), through a pyramid structure. Specifically, Guangdong SASAC owns Guangdong Guangsheng Asset Management Co., Ltd. 100% (called Guangsheng). Guangsheng controls the focal firm through three control chains. It directly controls 27.51% of the focal firm and indirectly controls 4.33% (1*0.8862*0.0391 + 1*0.0086) of the focal firm. The length of the control chain is 3 as 'Guangdong SASAC-Guangsheng-focal firm' is the main control chain.

When the power of the SASAC is largely delegated, the state power is decentralized. Communication of state policy may not be timely, and monitoring of policy implementation may be weakened, resulting in a reduced policy burden on these firms at the far end of the control chain (Zhang, Lijun, Zhang, & Yi, 2016). Meanwhile, as it is difficult for the government to gather specific information about these SOEs, the cost of government intervention in their daily operation also increases (Chen, Sun, Tang, & Wu, 2011). Some scholars argue that a high level of delegation can effectively improve the professionalism of management, efficiency, total factor productivity, and profitability of SOEs (Cao, Xu, Lu, & Tang, 2015; Fan et al., 2013). As a result, when the distance between the SOE and the SASAC becomes larger, the SOE can pay less attention to the state's national objectives.

However, the pyramid structure can affect strategic attention differently in central and local SOEs, given their different rules of the game. The overarching goal and organizational identity of fulfilling national objectives in central SOEs can constrain decision-makers' attention to digitalization. The central government exerts its control through multiple channels, such as evaluation based on national policy implementation for top leaders. In comparison, in local SOEs, as their objective and identity of helping local governments have channeled their attention to multiple goals, power delegation can further weaken the institutional pressure and in turn compromise firms' attention to national policy (Jiang, 2016). Thus, an extended control chain of the pyramid structure weakens local SOEs' attention to the government's national strategy, such as digitization, more than it does for central SOEs. Hence, we propose:

Hypothesis 2 (H2): The chain of control through pyramidal structure decreases local SOEs' strategic attention to digitalization more than it does that of central SOEs.

Government subsidies

Ocasio (1997) suggests that resources can be utilized to serve different goals depending on the logic of action in an organization and that resources alone cannot determine attention. Resources transmit the will of resource providers (owners or those with access) and channel firms' strategic attention. For example, because family business owners often prioritize preserving family wealth, their resources divert family businesses' strategic attention away from risky activities, such as radical innovation (Hu et al., 2022). Resource allocation is essential for the state to 'guarantee an effective implementation of policies' (Weaver & Rockman, 1993: 446). Government subsidies are an important type of government resource, transmitting information about the state's expectations and providing incentives to achieve the state objectives.

We argue that government subsidies affect the distribution of attention to digitalization differently in central and local SOEs because the rules of the game can render the subsidies to be used to serve different goals (Stan et al., 2014). As central SOEs are 'national champions' expected to fulfill national strategy (Li et al., 2014; Wang, Hong, Kafouros, & Wright, 2012), government subsidies are to be used to, first and foremost, support their compliance with the government's national strategy. In contrast, local SOEs' goals of fulfilling the economic growth and employment targets from local governments can constrain the use of government subsidies. The failure of local SOEs will cause a blow to the local economy and employment, which will have a negative impact on the local government (Peng et al., 2016). Moreover, there is a reciprocal relationship between local SOEs and local governments (Chen et al., 2016; Peng et al., 2016). Generally, government subsidies are provided to help local SOEs survive market competition, which in turn can help the government gain more resources and revenues (Liu & Li, 2012; Röller & Zhang, 2005; Wei et al., 2002).

Therefore, when a higher level of subsidies is provided, more information is conveyed to the central SOEs than to local SOEs about the state's objectives related to digitalization, and more incentives are given to central SOEs to exert their efforts on the national digitalization strategy at all costs. Thus, government subsidies can make the national strategy even more salient in central SOEs, channeling their attention toward digitalization. Hence, we propose:

Hypothesis 3 (H3): Government subsidies increase central SOEs' strategic attention to digitalization more than they do that of local SOEs.

Methods

Samples and Data

This study examines how central and local SOEs differ in their strategic attention to digitalization in China. A database of Chinese-listed manufacturing SOEs from 2009 and 2020 was assembled to test the hypotheses. The manufacturing industry was chosen as the sample because the digital transformation of the manufacturing industry is one of the top concerns for the Chinese government, and the digitalization of the manufacturing industry is less developed than that of other industries, such as the service industry, in China.

Data were collected on firm performance, firm characteristics, and demographic characteristics of top leaders from the China Stock Market & Accounting Research Database (CSMAR), which is one of the most comprehensive databases for listed companies in mainland China and has been used in previous studies (Chen, Tang, Wu, & Yang, 2021; Giannetti, Liao, You, & Yu, 2020). Texts of the management discussion and analysis (MD&A) in annual reports from the Chinese Research Data Services Platform (CNRDS) were obtained. Provincial indicators were gathered from the National Bureau of Statistics of China. Data on digitalization policies was obtained from PKULAW, which collects policies at all levels in China, containing the title, content, and issuing agency of policies, and has been used in prior research (Nan, Feng, Hu, & Qi, 2020; Yang & Huang, 2022). After merging the databases and excluding missing information, we obtained 4,495 firm-year observations on 545 unique firms. Among them are 365 local SOEs with 2,783 firm-year observations, accounting for 61.97% of the full sample.

Dependent Variable

Strategic attention on digitalization

Following prior studies (Yu, Wang, & Li, 2020; Zhao, 2021), we used text analysis to evaluate the strategic attention on digitalization. The annual report's management discussion and analysis (MD&A) is used for text analysis. MD&A is a chapter that must be disclosed in the annual report of a listed company in China. Its content includes the operation and management of the enterprise, the development of the industry, the analysis of policies, and the deliberation and planning of the enterprise's future development strategy. Therefore, MD&A reflects a firm's strategic attention, and coding based on its text analysis is a valid measure (Wang, Zhang, & Shang, 2022).

To analyze the text of MD&A, a corpus of keywords related to digitalization was first constructed. Python was used to conduct word segmentation and compute word frequency statistics for the MD&A in all the annual reports. Two coders separately reviewed the results of word segmentation and identified the keywords related to digitalization, which became the initial corpus. A high inter-rater reliability of 0.89 was obtained, indicating the initial corpus's high reliability (Short, Broberg, Cogliser, & Brigham, 2010). A word segmentation was then conducted for academic papers on digitalization in authoritative Chinese academic journals and keywords related to digitalization. These keywords represent the academic description of corporate digitalization. The initial corpus was expanded with the non-overlapping keywords extracted from the academic papers. Finally, six experts from government and digital associations with rich experience in digitalization were invited to evaluate the corpus and help improve it. The final corpus shown in Appendix I describes digital technologies and applications such as big data, cloud computing, artificial intelligence, and blockchain.

Then, MD&A was retrieved based on the corpus to identify the sentences containing keywords related to digitalization. The strategic attention of SOEs on digitalization was measured by calculating the proportion of sentences describing digitalization in the MD&A (Levy, 2005). Figure 2 shows the trend of strategic attention on the digitalization of SOEs over time. Central SOEs pay more strategic attention to digitalization than local SOEs.

Independent Variable

Central SOE

Whether an SOE is local or central depends on the hierarchy of the ultimate controller. *Central SOE* is a dummy variable coded 1 if the ultimate controller is the central government (specifically, controlled by the SASAC of the National State Council), and 0 if the ultimate controller is the local government (controlled by the SASAC of the local government, which refers to either provincial or city level local government).

Moderating Variables

Chain of control through the pyramidal structure

The pyramid structure of firm ownership was used to measure an SOE's position in the chain of control. Previous research suggests that a long control chain is associated with a high degree of government power delegation (Fama & Jensen, 1983; Fan et al., 2013; Jiang, 2016). *Length of Control Chain* was used to measure the number of intermediate layers between the listed company and its ultimate controller (i.e., SASAC at the central or local level, respectively) (Zhang et al., 2016). For example, the *Length of Control Chain* takes the value 1 if the ultimate controller directly controls the listed company, and the value 2 if there is an intermediate controller between the ultimate controller and the listed company, and so on. Alternatively, the number of control chains (i.e., the number of different chains through which the ultimate controller can exercise control over the listed company) was also used, which some studies suggest also indicates delegation and decentralization of state power (Su, 2012). The two variables were calculated based on the chart of shareholder control relationships in corporate annual reports.

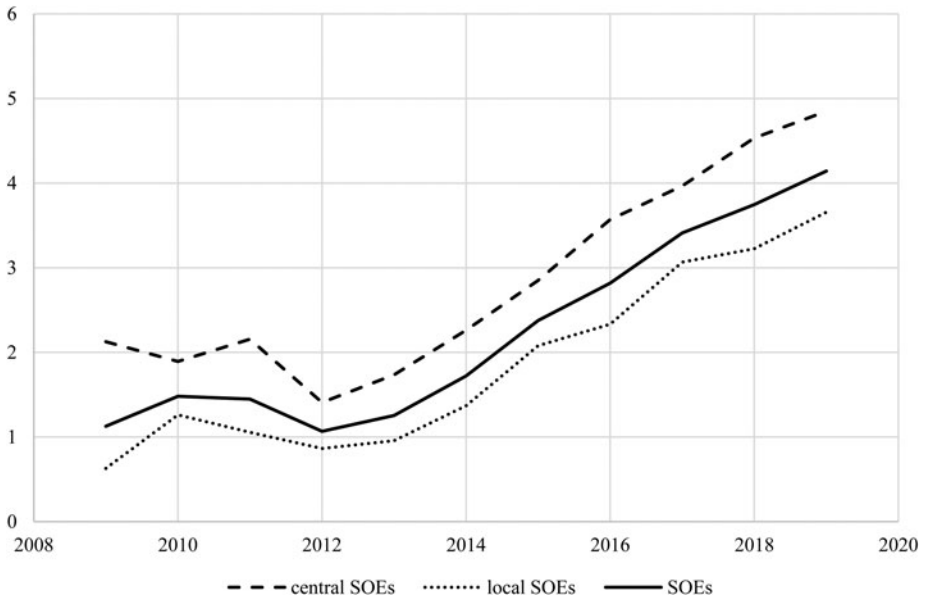

Figure 2. Trend of strategic attention on digitalization in SOEs

Government subsidies

The value of subsidies that firms received from the government each year was obtained through CSMAR. For missing values, the information was collected manually from corporate annual reports. Listed firms are required to disclose the subsidies they receive from the government (Lee, Walker, & Zeng, 2014). *Government Subsidies* is measured as a percentage of total assets to adjust for the influence of company size.

Control Variables

Firm characteristics that prior studies suggest are important for shaping strategic attention on digitalization were controlled (Eller, Alford, Kallmünzer, & Peters, 2020). Firm age can make firms less adaptable to new technology. Firm size is measured as number of employees (logged), and firm performance as ROA. Leverage is measured as the asset–liability ratio. Ownership by non-state shareholders (versus state ownership) in these listed firms can affect the extent of government influence (Maw, 2002). The nature of the top ten shareholders of these SOEs was examined, and the shareholding ratio of state-owned shareholders (Ma, Wang, & Zhang, 2015) was calculated as *State-owned shares*. Firms with more innovative capability may pay more attention to digitalization and the proportion of employees with college degrees or above (*high-education employees)* was controlled. Moreover, slack resources can help firms experiment with strategic transformation (Greenley & Oktemgil, 1998), and we controlled firms' slack resources as the ratio of net cash flow from operating activities to total assets.

We controlled for top leaders' characteristics as important decisions in SOEs are made through the joint consultation of the board members and top management team members. The average age of these leaders was controlled. Younger leadership teams tend to be more familiar with digital technology and more willing to pay attention to digitalization. We also controlled their average education, calculated as the percentage of board and top management team members with graduate degrees or above. Finally, we controlled their work experience, measured as the total number of different departments in which these top leaders have worked.

We also controlled for the characteristics of the province where SOEs are headquartered. Local SOEs contribute fiscal revenues to local government, which can be instrumental in filling the government's fiscal gap (Zhao & Yang, 2015). Therefore, when the local economy is in a downturn, local

SOEs in particular may face greater economic pressure. Hence, we controlled *Provincial GDP Growth Rate*. Moreover, the extent of government intervention in the market varies in different regions, which can affect firms' response to the government's national strategy. Thus, we controlled the degree of marketization in each province (Wang, Hu, & Fan, 2021).

Firms tend to imitate their peers, which generally refer to firms in the same industry, as they face similar technical and institutional environments. A similar technical environment means that firms face similar demands from suppliers, customers, and technological trends, and hence, their strategic attention can share commonalities (Allee, Do, & Sterin, 2021; Houston, Lev, & Tucker, 2008). Two measures were created accordingly given the difference between SOEs and non-SOEs (e.g., non-SOEs are more market-oriented). SOEs' average digital attention is measured by the average of the listed SOEs' digital attention in each industry (excluding the focal firm itself). Non-SOEs' average digital attention is measured by the average of the listed non-SOEs' digital attention (measured similarly as described in the dependent variable above) in each industry. These two measures were then orthogonalized to reduce collinearity. The industry of a firm was delineated according to the industry classification standard issued in China (GBT4754-2017). We also controlled the industry competition measured by the Herfindahl index, which reflects the concentration of the industry.

Finally, the number of national digitalization policies and provincial digitalization policies issued each year (logged) were used to represent the extent to which the government promotes corporate digitalization. We used the keywords retrieval method to evaluate whether a policy is related to digitalization. The keywords included intelligent, intelligent manufacturing, industrial internet, internet plus, automation, big data, 5G, robot, internet, IOT, cloud, and blockchain. These keywords were chosen because they appeared in the most representative Chinese government documents, such as China's five-year Plan and Made in China 2025. Descriptions in other Chinese policies were generally consistent with these programmatic documents. National digitalization policies and local digitalization policies were orthogonalized to reduce collinearity.

Finally, dummy variables were included for each year to take the temporal effect into account. Province dummies were also included in the model. All the independent and control variables are measured at t, and the dependent variable is measured at $t + 1$.

Results

Table 2 presents the descriptive statistics and correlations for the variables. The correlation coefficients of all the variables are between −0.44 and 0.39. Hence, multicollinearity is unlikely to be a problem for our analysis. Strategic attention to digitalization is positively related to Central SOE ($r = 0.11$, $p < 0.001$). Variance inflation factor tests were also performed. The results showed that the variance inflation factors for all variables across all models were below 2, far below the empirical threshold of 10, confirming that multicollinearity was less likely for analysis.

Since the independent variable, central SOE, is a dummy variable that hardly changes over time, the random effects models were used. In Table 2, Column (1) contains only the control variables. Column (2) includes the independent variable, Central SOE. The coefficient of Central SOE is 0.810 ($p \leq 0.05$), meaning that the proportion of sentences related to digitalization in the MD&A in central SOEs is 0.810% higher than in local SOEs. Such a difference is substantial, given that the average proportion of digital-related discussion in the full sample is only 2.52%. Hence, central SOEs pay more attention to digitalization than local SOEs. Thus, H1 is supported.

To test H2 and H3, interaction terms were included in Columns (3) and (4), respectively. Model 5 includes all the interaction terms and is the full model. Continuous variables in the interaction terms were standardized.

In Column (5), the interaction term of Central SOE * Length of Control Chain ($\beta = 0.663$, $p < 0.05$) is positive, indicating that the length of control chains moderates the relationship between central SOE and strategic attention on digitalization. All continuous variables were centered before generating interaction terms. Thus, the two-way interaction is the moderation effect of the length of the control chain on central SOEs at its mean, which means that at the average level of control chain length, the digital attention of central SOEs is 0.633% higher than that of local SOEs. Figure 3 is also plotted to

Table 2. Correlations and descriptive statistics

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Strategic attention on digitalization	2.52	4.45										
2. Central SOE	0.38	0.49	0.11***									
3. Length of control chain	2.91	1.13	0.05***	0.33***								
4.Government subsidies	0.01	0.02	−0.09	−0.02	−0.01							
5. Average digital attention of SOEs in the same industry	0.06	0.94	0.39***	0.15***	−0.04*	0.02						
6. Average digital attention of non-SOEs in the same industry	−0.08	0.95	0.28***	0.07***	0.05**	−0.01	0.04**					
7. Slack resources	0.16	0.11	0.11***	0.02	−0.00	0.02	0.12***	0.03*				
8. Firm age	18.83	4.99	0.19***	−0.08***	0.08***	−0.04*	−0.18***	0.29***	0.04**			
9. Firm size	8.32	1.16	0.07***	0.01	−0.00	−0.07***	−0.04**	0.04**	−0.07***	0.00		
10. Leverage	0.53	0.23	−0.04*	−0.06***	−0.10***	0.06***	0.03**	−0.02	−0.18***	−0.04*	0.19***	
11. State-owned shares	0.81	0.16	−0.01	0.10***	−0.00	0.00	0.03**	−0.01	−0.06***	−0.12***	−0.05**	0.07***
12. ROA	0.02	0.06	0.07***	−0.02	0.04**	−0.02	−0.01	−0.00	0.27***	0.02	0.07***	−0.37***
13. Average age of TMT	50.74	2.78	0.02	0.02	−0.05**	−0.07***	−0.15***	0.15***	0.07***	0.14***	0.29***	0.09***
14. Percentage of high-education in TMT	0.60	0.33	0.05***	−0.03	−0.08***	−0.01	0.05***	0.03	0.04*	0.03*	0.18***	0.045**
15. Experience of TMT	6.53	1.41	0.14***	0.12***	0.07***	0.00	−0.07***	0.19***	0.00	0.18***	0.11***	0.02

(*Continued*)

Table 2. (*Continued.*)

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
16. High-education employees	0.39	0.20	0.30***	0.16***	0.07***	−0.03*	0.12***	0.13***	0.13***	0.12***	−0.09***	−0.05***
17. Industry competition	0.08	0.05	−0.09***	0.08***	−0.01	−0.00	−0.07***	0.08***	0.04**	−0.06***	0.11***	0.05**
18. National digitalization policy	−0.06	1.00	0.14***	0.07***	0.10***	−0.01	−0.25***	0.30***	−0.01	0.34***	0.09***	−0.05***
19. Provincial digitalization Policy	−0.02	1.00	0.13***	−0.08***	0.05***	−0.02	−0.14***	0.26***	0.02	0.39***	0.04*	−0.07***
20. Provincial marketization	8.41	1.75	0.22***	−0.02	0.09***	−0.02	0.09***	0.20***	0.11***	0.34***	0.01	−0.09***
21. Provincial GDP growth rate	0.11	0.05	−0.13***	−0.01	−0.05***	0.02	0.15***	−0.19***	0.00	−0.29***	−0.05***	0.04**

Variable	11	12	13	14	15	16	17	18	19	20
12. ROA	−0.12***									
13. Average age of TMT	0.03*	0.08***								
14. Percentage of high-education in TMT	−0.10***	0.05***	0.07***							
15. Experience of TMT	−0.01	−0.01	0.03	0.17***						
16. High-education employees	0.03*	0.12***	0.06***	−0.00	0.16***					
17. Industry competition	0.02	−0.02	0.04**	−0.03*	0.02	−0.14***				
18. National digitalization policy	0.03	−0.05***	0.26***	0.02	0.23***	0.14***	0.00			
19. Provincial digitalization policy	−0.09***	0.05***	0.19***	0.04*	0.19***	0.07***	−0.03*	−0.00		
20. Provincial Marketization	−0.10***	0.10***	0.18***	0.02	0.07***	0.14***	−0.05***	0.03*	0.44***	
21. Provincial GDP growth rate	0.01	0.07***	−0.25***	−0.01	−0.15***	−0.10***	0.01	−0.44***	−0.21***	−0.23***

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-tailed test).

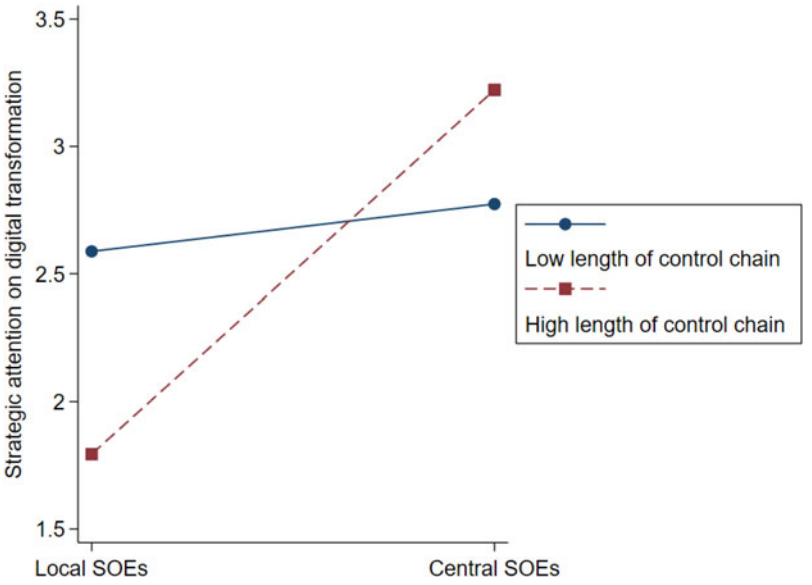

Figure 3. Moderating effect of length of control chain on the relationship between central SOE and strategic attention on digitalization

illustrate the interaction effects. With the short control chain, the difference between central SOEs and local SOEs regarding their strategic attention to digitalization is small. However, with the long control chain, the strategic attention on digitalization in central SOEs is significantly higher than that in local SOEs. This suggests that power delegation significantly reduces local SOEs' attention to the state's national strategy but has little impact on that of central SOEs. These results lend support to H2.

In Column (4), the interaction term of Central SOE * Government subsidies is positive ($\beta = 1.249$, $p < 0.05$), which means that at the average level of subsidies, the digital attention of central SOEs is 1.249% higher than that of local SOEs. As shown in Figure 4, compared with the line for low-level

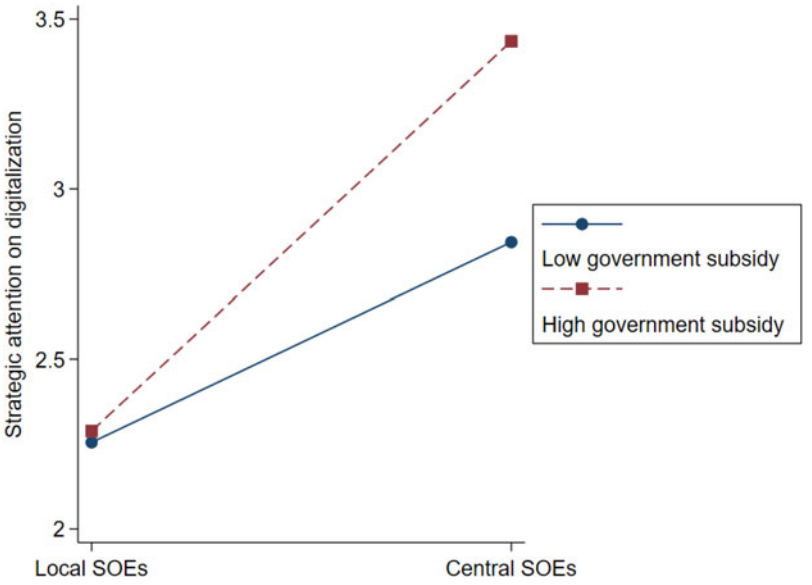

Figure 4. Moderating effect of government subsidies on the relationship between central SOE and strategic attention on digitalization

Table 3. Random-effect regression models predicting central and local SOEs' strategic attention on digitalization in China, 2009–2020

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Central SOE		0.810*	0.753†	0.834*	0.777†
		(0.416)	(0.407)	(0.419)	(0.410)
Central SOE*length of control chain			0.638*		0.638*
			(0.279)		(0.280)
Central SOE*government subsidies				1.093*	1.249*
				(0.551)	(0.582)
Length of control chain	−0.028	−0.078	−0.353*	−0.073	−0.358*
	(0.111)	(0.120)	(0.149)	(0.120)	(0.148)
Government subsidies	2.050	2.031	2.039	0.718	0.539
	(1.892)	(1.857)	(1.814)	(1.179)	(1.060)
Average digital attention of SOEs in the same industry	1.966***	1.941***	1.948***	1.941***	1.949***
	(0.273)	(0.268)	(0.267)	(0.269)	(0.267)
Average digital attention of non-SOEs in the same industry	0.194*	0.188*	0.177†	0.189*	0.178†
	(0.097)	(0.095)	(0.094)	(0.095)	(0.094)
Slack resources	0.072	0.109	0.229	0.097	0.221
	(0.881)	(0.869)	(0.849)	(0.868)	(0.848)
Firm age	0.033	0.041	0.036	0.041	0.036
	(0.039)	(0.038)	(0.038)	(0.038)	(0.038)
Firm size	0.379*	0.378*	0.370*	0.378*	0.370*
	(0.182)	(0.182)	(0.181)	(0.182)	(0.181)
Leverage	−0.197	−0.153	−0.142	−0.185	−0.178
	(0.513)	(0.511)	(0.507)	(0.508)	(0.503)
State-owned shares	−1.081	−1.157	−1.153	−1.169	−1.166
	(0.722)	(0.731)	(0.728)	(0.733)	(0.730)
ROA	0.795	0.829	0.665	0.738	0.555

(*Continued*)

Table 3. (*Continued.*)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
	(1.172)	(1.176)	(1.157)	(1.163)	(1.143)
Average age of TMT	−0.066†	−0.068†	−0.072†	−0.067†	−0.072†
	(0.038)	(0.038)	(0.037)	(0.038)	(0.037)
Percentage of high-education in TMT	−0.296	−0.275	−0.222	−0.284	−0.230
	(0.542)	(0.533)	(0.520)	(0.534)	(0.521)
Experience of TMT	−0.028	−0.033	−0.030	−0.034	−0.030
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
High-education employees	2.174***	2.085***	2.033**	2.106***	2.055**
	(0.647)	(0.630)	(0.622)	(0.633)	(0.625)
Industry competition	−2.023	−2.170	−1.852	−2.260	−1.943
	(1.736)	(1.739)	(1.735)	(1.735)	(1.729)
National digitalization policy	2.726***	2.678***	2.737***	2.678***	2.740***
	(0.392)	(0.388)	(0.391)	(0.388)	(0.391)
Provincial digitalization policy	1.270***	1.249***	1.273***	1.249***	1.274***
	(0.177)	(0.176)	(0.176)	(0.176)	(0.176)
Provincial marketization	−0.047	−0.051	−0.047	−0.049	−0.045
	(0.153)	(0.152)	(0.152)	(0.153)	(0.153)
Provincial GDP growth rate	1.778	1.738	2.036	1.714	2.020
	(1.928)	(1.933)	(1.937)	(1.934)	(1.937)
Constant	6.365*	6.291*	7.314*	6.275*	7.336*
	(3.099)	(3.086)	(3.142)	(3.091)	(3.150)
Year	Controlled	Controlled	Controlled	Controlled	Controlled
Province	Controlled	Controlled	Controlled	Controlled	Controlled
Number of observations	4495	4495	4495	4495	4495
Wald chi^2	487.39***	468.92***	467.26***	474.01***	472.43***

Notes: Robust standard errors in parentheses. †$p < 0.1$, *$p \leq 0.05$, **$p < 0.01$, ***$p < 0.001$ (two-tailed test).

government subsidies, the slope of the line for high-level subsidies is steeper. When the level of subsidies is high, the difference between the two types of SOEs is further enlarged. Thus, Hypothesis 3 is supported.

Regarding control variables, both average digital attention of SOEs and non-SOEs in the Industry have a significant positive effect on the focal SOE's strategic attention on digitalization. However, the effect of average digital attention of SOEs is significantly stronger than that of non-SOEs ($p = 0.000$). Firm size also has a significant positive effect. This is probably because large SOEs are more visible targets for institutional pressures (e.g., Luo et al., 2017). Moreover, a higher proportion of employees with college degrees or above attend more to digitalization, suggesting that a higher level of knowledge and innovation capability enables firms to better integrate digital technology (Bresnahan et al., 2002). Moreover, the average age of the leadership team has a significant negative effect, which indicates that younger teams pay more attention to digital transformation. Finally, both national digitalization and provincial digitalization policies have a significant positive effect, which is consistent with the assumption that the government plays an important role in promoting SOEs' digitization.

Robustness Test

Alternative measures of a firm's strategic attention to digitalization were used. First, we used the number of sentences containing descriptions related to digitalization (logged) instead of the ratio. The hypotheses remained supported. Second, we calculated the dependent variable according to the digital keywords that Zhao (2021) disclosed and similar results were obtained. Third, we tried a non-text-based measure of digitalization – investment in non-tangible digital assets. These data were obtained from the non-tangible assets table of firms' annual reports according to Zhang, Li, and Xin (2021). If the items of non-tangible assets included keywords related to digital transformation technologies, they were identified as non-tangible digital assets. The annual increment of non-tangible digital assets (logged) was calculated as the dependent variable. H1 and H2 were supported, while the interaction for H3 was in the same direction but non-significant.

Moreover, the impact threshold of a confounding variable (ITCV) was also estimated following Busenbark, Yoon, Gamache and Withers (2021). This threshold test aims to assess how sensitive the results are to potentially omitted variables. The threshold for our model was 0.211. Only the partial correlation between 'SOEs' Average Digital Attention' and the dependent variable in our model exceeded this threshold. We think this result was acceptable because it is difficult to find a variable as relevant as 'SOEs' Average Digital Attention' to the dependent variable. Even the partial correlation between 'non-SOEs' Average Digital Attention' and the dependent variable was less than this threshold.

Discussion

Our study is motivated by the lack of understanding of how different types of SOEs respond to national policies differently. Drawing on the ABV, we argue that different attention structures in central and local SOEs can shape top leaders' strategic attention accordingly. In the context of SOEs' response to the state's national strategy for digitalization in China, we found evidence consistent with our argument. The results show that central SOEs pay more strategic attention to digitalization than local SOEs. Moreover, the chain of control decreases local SOEs' attention to digitalization more than it does that of central SOEs. Central SOEs pay even more attention to digitalization than local SOEs when these central SOEs receive more government subsidies. These results suggest how the characteristics of attention structures, namely, governance structures and resources, can be influenced by the game rules (which differ in central versus local SOEs) in shaping strategic attention.

This study contributes to a deeper understanding of the heterogeneity of SOEs. Most studies emphasize the difference between SOEs and non-SOEs in their compliance with national policies (Lin & Li, 2008; Lin & Tan, 1999). Some studies that examine the difference between central and local SOEs tend to focus on how the different objectives of central versus local governments influence firms owned by the different levels of government (Luo et al., 2017). This study systematically develops

a framework to understand the differences in attention structures between central and local SOEs and demonstrates how these differences shape their strategic attention to national policy. By understanding different responses to digitalization, this research discovers a consequence when the national policy is not necessarily aligned with the short-term objectives of local governments: local SOEs pay less attention to the national digital transformation strategy than central SOEs. Our study reveals how central SOEs are important for effective policy implementation, as well as a less-noted structural reason why national policy implementation can be compromised – local SOEs' attention structure characteristics.

Our study also extends the ABV to the context of SOEs. First, based on Ocasio's (1997) original framework of the important characteristics of attention structure, it depicts how two types of SOEs differ in these characteristics. The findings of this study reinforce the core tenet of ABV, which is that attention is situated, by showing how attention to national strategy diverges among SOEs due to their different attention structures. Second, although ABV recognizes the interdependence of the characteristics of attention structure, our study advances the understanding of how governance structure and resources can regulate decision-makers' attention differently, given the different rules of the game. While previous studies focus on how the governance structure of the control chain provides more managerial autonomy (Fan et al., 2013), this study demonstrates that attention is distributed differently at the far end of the control chain between central SOEs and local SOEs. In other words, the length of the control chain will not reduce attention to the state policy from the top if the organization's goal, identity, and incentives are tightly centered on carrying out the state policy. Recognizing the interplay between governance structure and game rules can better explain the structural distribution of attention. Similarly, while prior studies have examined the role of government subsidies in SOEs, such as increasing R&D investments and reducing innovation efficiency (Zhou, Gao, & Zhao, 2017), this study uncovers the different effects of government subsidies on SOEs' strategic attention to national policy in central versus local SOEs.

Lastly, our study also contributes to research on corporate digitalization. Most of this literature has focused on the market and the internal characteristics of organizations that facilitate or impede this strategic change (Bharadwaj et al., 2013; Bodrožić & Adler, 2021; Hanelt et al., 2020). However, given the high-risk and long-term nature of digital projects in manufacturing, other driving forces, such as the state, may be critical. The study adopts the perspective of digitalization as firms' responses to the government's national strategy and underscores the state's role in different types of SOEs. Our framework helps to better explain SOEs' digital decisions in contexts where the government's national strategy largely drives digitalization. Given the global state policies that promote digital transformation, it may also have implications for other countries.

Limitations and Future Research Directions

Nevertheless, this study has some limitations. First, in the theoretical framework on the attention structure, the focus is only on one important player – the state, which shapes the rules of the game, structural position, and resources for SOEs. However, according to Ocasio (1997), players that affect firms' attention are diverse, including internal and external actors. Future research can further examine how other actors, such as private shareholders or different levels of management, can shape SOEs' attention. Second, due to data availability, the sample includes only listed SOEs. Non-listed SOEs can also exhibit the pattern argued, and future studies can examine them to test our arguments further. Third, the digital strategic attention of SOEs was measured through text analysis of MD&A and investment in non-tangible digital assets. While these variables reveal managerial attention well, different measures, such as questionnaires, other corporate efforts to digitalize, and resources spent on digitalization, can illustrate strategic attention in a well-rounded manner. Fourth, this study did not address how differences in digital attention of central and local SOEs can change over time. When market competition based on digitalized manufacturing intensifies, the market forces may affect these two types of firms differently. A significant change in the difference over time was not observed in the limited time window. Future research can examine a longer

period and explore such temporal change. Finally, this research investigates differences between central and local SOEs in only one country. Future research can examine this issue in different political regimes and explore the generalizability of the arguments.

In sum, our study extends the ABV to understand the structural sources of heterogeneity in central versus local SOEs regarding their responses to national policy. It reveals the distinct and varied attention structures in SOEs and the impact of such structures on their digital transformation.

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Data availability statement. The data that support the findings of this study are openly available in the Open Science Framework at https://osf.io/n9e8x/?view_only=049e8322a78546809ad1199200eba15f

Appendix I The keyword list of digitalization (Translated from the Chinese keywords list)

Big data technology		Cloud computing technology	Artificial intelligence technology			Blockchain technology
Big data	Data transfer	Cloud computation	Artificial intelligence (AI)	Smart home	Smart production	Blockchain
Data chain	Data mining	Secure multi-party computation	Intelligent	Smart transportation	Deep learning	Consensus mechanisms
Digital information	Data communication	Neuromorphic computing	Smart manufacturing	Smart customer service	Cashierless retail	Bitcoin
Database	Data management	Apache storm	Highly intelligent	Smart tourism	Business intelligence	NFC payment
Internet of things (IoT)	Data sharing	Green computing	Fully intelligent	Smart healthcare	Image understanding	Third party payment
Consortium blockchain	Data system	In memory computing	Smart	Smart marketing	Semantic search	Quantitative finance
Decentralization	Data service	Cognitive computing	Digital intelligence	Smart construction	Text mining	Mobile payment
Data mining	Data terminal	Image computing	Smart warehouse	Smart tools	Voice recognition	Open banking
Data visualization	Data warehouse	Eb-level storage integration framework	Smart environmental protection	Smart contracting	Automatic driving	Financial technology
Heterogeneous data	Data security	Distributed computing	Industrial intelligence	Smart home appliance	Natural language processing	
Digital currency	Data analysis system	Industrial cloud	Mobile intelligence	Smart manufacturing of IoT	Face recognition	
Digital finance	Data network	Industrial internet	Smart control	Smart device	Identity authentication	
Digital marketing	Digital control	IoT	Smart terminal	Smart production	Augmented Reality (AR)	
Digital network	Data transfer	Network-based	Smart transportation	Smart system	Virtual Reality (VR)	
Data analysis	Data mining		Smart management	Smart robot	Machine learning	
Data safety	Data communication		Smart factory	Smart data analysis	Virtualization	
Data center	Data management		Smart logistics	Smart agriculture	Virtual production	
Digital control	Data sharing		Smart technology	Smart wearables	Internet healthcare	
Data protection	Data system			Smart grid	Internet finance	
Data analysis system	Data service			Virtual reality	Augmented reality	
Data network	Data terminal			Virtualize	Mixed reality	
	Data warehouse					

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