Industrial policy at the intersection of geopolitics and state–business relations. A comparative study of battery industries in China and South Korea

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Abstract

This article examines how industrial policy is shaped by the interplay of geopolitics and state–business relations. Moving beyond technocratic views that treat policy as a neutral tool to correct market failures, we integrate comparative and international political economy through the lens of developmental state theory. Our framework highlights industrial policy as a link between domestic coalitions and global positioning.

Empirically, we compare China and South Korea's battery industries – two non-hegemonic developmental states with shared traditions but different trajectories. We show how differences in state–business relations and geopolitical roles explain contrasting strategies of value-chain control and global integration.

Keywords

Industrial policy; developmental state; state–business relations; geopolitics and geoeconomics; global value chains

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1 Introduction

Recent years have witnessed a global revival of industrial policies. In the academic literature, this trend is usually discussed either in terms of technocratic tools by economists or as a reaction to rising geoeconomic and geopolitical tensions by political scientists. In isolation, both approaches lead to functionalist reasoning where industrial policies are seen as determined by rational choices of policymakers or structural conditions imposed by geopolitical conditions. Furthermore, the current policy debate often implies that historical experiences can be replicated (the proverbial "moonshot") while largely ignoring the East Asian experience with industrial policies and their deep reflection in the developmental state literature. To address these shortcomings, this paper argues that industrial policy is not a mere technocratic instrument, but rather shaped by an interplay of domestic state–business relations and global geopolitical positioning. By advancing this thesis through a comparative case study of the political economy of industrial policies in China and South Korea, we make three distinct contributions to the current debate on industrial policies.

First, we demonstrate the contribution of the developmental state literature to current industrial policy debates. East Asian developmental states from Japan to South Korea and China are widely considered the most successful cases of state-led industrial development. By engaging with this literature, we show that successful industrial policies are not just about "mission-oriented" goal setting but require specific institutional capacities and a historical understanding of state–business relations. It provides an important critique of functionalist approaches by illustrating the domestic political economic conditions that make policy implementation feasible.

Second, the developmental state literature is also instructive methodologically as it provides a blueprint for combining Comparative Political Economy (CPE) and International Political Economy (IPE). From IPE, we adopt the premise that policies are constrained by – and in turn, attempt to shape – a state's geopolitical and geoeconomic

position. From CPE, we incorporate the understanding that policies are path-dependent and embedded in specific institutional frameworks and class compromises. By synthesizing these approaches, we establish a comprehensive analytical framework to untangle the external geopolitical factors from the domestic institutional factors that jointly drive industrial policy. Third, we contribute empirically through a comparative case study of the electric battery industries in China and South Korea. Both countries are non-hegemonic developmental states that have successfully reached the technological frontier of this vital green industry. While they share developmentalist orientations and state capacity, they also substantially differ in their domestic trajectory and geopolitical economic context. Domestically, Chinese reinforced party-state dominance contrasts with the gradual emancipation of capital from the state in South Korea. Internationally, China acts as a hegemonic challenger while South Korea remains integrated into the US-led security and economic order. We demonstrate how these specific CPE and IPE conditions result in contrasting strategies: China pursues the territorial control of vertically integrated global value chains, whereas South Korea focuses on nurturing "national champions" to capture high-value segments of transnational supply chains.

The paper is structured as follows: Section 2 outlines the developmental state inspired critique of technocratic industrial policies and establishes our combined CPE-IPE analytical framework. Section 3 details our methodology. Sections 4 and 5 present our empirical case studies of the battery industries in China and South Korea, respectively. Finally, Section 6 concludes with policy implications and a summary of our findings.

2 Bringing together CPE and IPE in a developmental state inspired perspective on industrial policies

The revival of industrial policies in "the West" – particularly since the European Green New Deal of 2020 and the US Inflation Reduction Act President Biden of 2022 – marks an important departure from five decades of "neoliberal counter-revolution" (Friedman 1996) against state planning. During the era of neoliberal hegemony, industrial policies became "virtually ousted from the set of policy prescriptions offered by economists" (Noman and Stiglitz 2016, 1). In this view, direct state interventions should be strictly limited to correct seemingly exceptional "market failures". Despite a gradual paradigm

shift since the Global Financial Crisis of 2008, mainstream debates led by economists such as Mazzucato (Mazzucato 2013), Rodrik (Rodrik 2014) and Stiglitz (Stiglitz, Yifu Lin, and Patel 2013) remain heavily anchored in technocratic thinking. From this perspective, industrial policies are viewed primarily as technical instruments utilized by governments to facilitate "mission-oriented" (Mazzucato 2021) economic transformations. While we agree with this heterodox critique of the neoliberal focus on market failure as a rationale for state interventions, this mission-oriented approach largely disregards the political economic context of policies. As Chang and Andreoni (Chang and Andreoni 2020) point out, it neglects the inherently political character of industrial policies and the distributional conflicts involved. In fact, the CPE literature on industrial policies shows that there is a substantial varieties of industrial policies depending on the domestic political economic context (Andreoni 2016; Kalinowski 2015). Unfortunately, the CPE literature in industrial policies largely neglects the international context the global context (Apaydin, Sancak and Nölke 2026). The IPE perspective on the other hand has a certain functionalist bias in which economic statecraft and industrial policies become tools of governments in international "strategic competition" (Aggarwal and Reddie 2021).

We believe that in order to go beyond technocratic and functionalist approaches and integrate CPE and IPE approaches, the developmental state concept remains highly relevant (see Kalinowski 2021). We argue that the evolution of the developmental state literature is an early exercise of synthesizing approaches from comparative and international political economy. In fact, the first generation of developmental state literature, pioneered by Johnson (1982), started much like today's debates on industrial policies – by short-circuiting global ambitions and technocratic tools. Johnson established a direct link between Japan's global ambitions and the strategic, autonomous interventions of its state bureaucracy. In Chalmers Johnson's description, the Japanese economy was governed by the bureaucracy and since the 1930s "mobilized for war but never demobilized during peacetime" (Johnson 1999, 44). The IPE dimension of industrial policy is directly linked to bureaucratic governance (Johnson 1995) while neglected the domestic political economy.

The second generation of developmental state literature overcame this functionalist limitation by "bringing the state back in" (Evans, Rueschemeyer, and Skocpol 1985). It

demonstrated that state autonomy is the result of specific political-economic constellations that allow the state to "govern the market" (Wade 2004) and enforce guidance upon private businesses. Peter Evans' concept of "embedded autonomy" (Evans 1995) showed that successful industrial policies are rooted in strong, institutionalized state–business partnerships. This ensures that government plans are not merely top-down constructs, but are actively grounded in the capabilities of private firms while maintaining the state's guiding role and disciplinary power to subordinate private capital accumulation to national development goals, rather than devolving into the wishful thinking often found in today's primarily "mission-oriented" literature (Mazzucato 2021).

We argue that the developmental state inspired synthesis of CPE and IPE offers an excellent way to understand industrial policies (Table 1). The CPE axis focuses on a state's internal political and institutional ability to guide private companies based on the concept of embedded autonomy. Unlike the EU and US, which historically rely on market regulation and incentives, East Asian developmental states possess the embedded autonomy required to actively steer industrial development. However, domestic capabilities alone do not determine policy outcomes. The IPE axis accounts for the varying geo-economic positioning (Apaydin, Sancak and Nölke 2026), a state's geopolitical constraints and its willingness to act as a hegemonic challenger or system-integrator. A state's international positioning sets the boundaries and strategic intent of its industrial policy.

While our integrated CPE-IPE framework can be used for a broad range of countries, in this paper we first focus on a comparative study of China and South Korea. Because both countries share features of the developmental state, they allow us to control for basic state capacity while examining crucial variations. Along the CPE dimension, the two nations are similar but gradually diverge: South Korea's capital has matured and emancipated itself, transforming the state's role into a supporter of private "national cham-pions". Conversely, the Chinese party-state maintains high political and economic dominance, allowing it to decisively direct capital toward broader national goals. Along the IPE dimension, they differ systematically: South Korea is a system-integrated middle power allied with the US, relying heavily on open access to global supply chains. China, viewing itself as threatened by the US-led order, utilizes industrial policy as a

geoeconomic tool to challenge US hegemony and build autonomous, vertically integrated industrial chains within its own territory. We utilize this framework to explore the real-world evolution of their respective battery industries; these cases clearly demonstrate how the nexus of domestic coalitions and global positioning produces distinctly different industrial policies.

Table 1: East Asian industrial policies in the global context

		States' willingness and ability to shape geoeconomic/geopolitical position (IPE-axis)	
		Weaker	***Stronger***
States' willingness and ability to guide private companies (CPE-axis)	***Stronger***	**GVC-oriented industrial policy (e.g. Korea)** Focus on creating national champions to capture high-value added segments of global value chains	**Domestic vertical integration (e.g. China)** Focus on internalizing the complete industrial chain within the country, integrating developmental and security concerns
	Weaker	**Limited industrial policy and focus on regulatory measures (e.g. Germany/EU)** Focus on market-oriented solutions and attracting FDI.	**Defensive hegemonic strategy (e.g. US)** Focus on protectionism and incentives for business to produce within the country.

In the following sections, we will proceed to explore how variations in industrial policy between China and South Korea can be explained against the background of different state–business relations and geopolitical positioning. Against the historical experience of developmental states, we first develop an analytical framework integrating CPE and IPE perspectives. Following this, through a study of official policy documents, we compare Chinese and South Korean industrial policy for their electric battery Industries, in which both countries are global technology and market leaders. Here we ask how industrial policies are shaped by and in turn attempt to shape not only industries, but state–business relations. What strategies of world market positioning do industrial policies pursue, and how are these strategies explained in the context of geopolitics and geoeconomics? These questions provide insights into how the developmental state is transformed by changes in geopolitics and state–business relations and, vice versa, how the developmental states attempt to shape these structural conditions through policy.

3 Methodology

Based on our above discussion on a developmental state inspired perspective synthesizing CPE and IPE approaches, we developed the following analytical framework to guide our case studies (Figure 1).

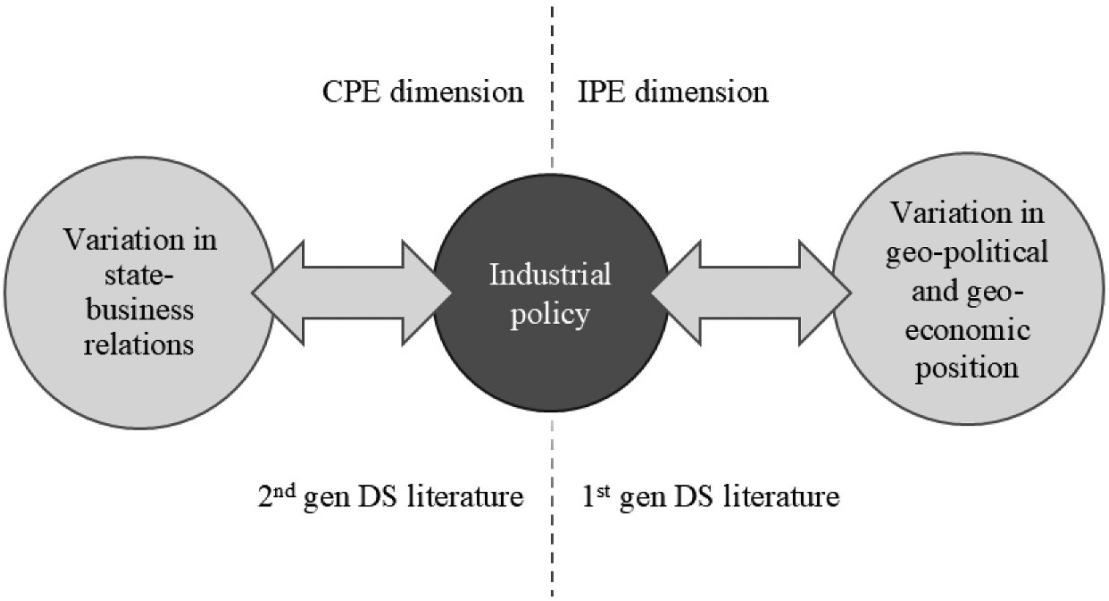

Figure 1. The industrial policy link between comparative and international political economy.

1) Industrial policies are jointly shaped by both external geopolitical and geoeconomic factors, as well as the dynamic of state–business relationships.
2) At the same time, industrial policies intentionally or unintentionally affect the geopolitical and geoeconomic positioning as well as state–business relationships.

Methodologically, we used a combination of secondary literature review with an extensive study of original language (Chinese and Korean) policy documents for our comparative case study. Both countries are similar cases in the sense that both share features of the ideal-typical East Asian developmental states, and they are both highly successful leaders in the batteries industry. They differ, however, gradually in terms of the nature of their state–business dynamics and systematically in their geopolitical/geoeconomic positioning. Against this background, our explorative case study approach (Gerring 2006) seeks to explore how the industrial policies targeting

the batteries sector are reflective of these different configurations and how, in turn, they seek to shape them.

The analysis of the Chinese case focuses on the period since MiC2025, which has first identified New Energy Vehicles, and thus batteries, as a strategic emerging industry. Chinese-language policy documents were identified through an exploratory process utilizing the existing literature, keyword searches in *Beida Fabao* (a database of Chinese legal and policy documents) and non-specialist search engines, key word searches on government websites, as well as within-document references to other policies. We focus on documents issued by the main industrial policy actors, such as the CPC Central Committee, the State Council, the National Development and Reform Commission (NDRC), the Ministry of Industry and Information Technology (MIIT), and the Ministry of Science and Technology (MOST) (Gomes and Ten Brink 2023; Naughton 2021).

For the Korean case, we analyze Korean-language policy documents issued from 2021 onwards, when the government launched its first comprehensive battery-specific strategy. Documents were identified through ministry websites and within-document references, focusing on strategic publications by the institutions with primary responsibility for battery policy: the Ministry of Trade, Industry and Energy (MOTIE) for industry and trade, the Ministry of Economy and Finance (MOEF) for financial support, and the Ministry of Science and ICT (MSIT) for R&D, as well as the Office of the President. These are supplemented by statements from the Korea Battery Industry Association (KBIA), Korean-language industry reporting, and customs data. Across both cases, our analytical approach is interpretive process tracing of how policy documents articulate goals, reference state–business dynamics, and respond to geopolitical context.

The case studies have three parts:

1) What is the scope and aims of these policies?
2) How do they implicitly or explicitly address state–business relations? How do they react to them or try to shape them?
3) How do they implicitly or explicitly address geopolitical/geoeconomic factors? How do they react to them or try to shape them?

4 Case studies of Chinese and Korean battery industries

We now explore and compare our two cases based on the framework laid out in Table 1 and Figure 1. The results can be summarized as detailed in Table 2.

Table 2: Chinese Territorial and Korean National Champions Strategy of Industrial Policies

	China: National vertical integration-centered strategy	**Korea: Global integration-centered national champions strategy**
CPE dimension: state-business relations	• Party leading state and business in industrial policy • Remaking state-business relations to strengthen state's steering capacity esp. of private actors • Remaking of the national innovation system to coordinate actors • R&D, production, and purchasing subsidies	• Firm-led industry development preceding state intervention • Coordination meetings between companies and president/ministers • Subsidies for R&D • Selective production-linked incentives (e.g., tax credits) and regulatory design (e.g., energy-density-weighted EV subsidies) that reinforce domestic technology strengths
IPE dimension: geopolitical position	• De-facto challenger of US hegemony • Dual circulation: Complete and controllable supply chains (vertical integration) at home, plus "going out" • Infant industry protection, selective FDI attraction • Globally leading manufacturing and innovation capacity	• Adaptive and alliance-oriented • Integrated with US/EU aligned supply chains • Focus on scaling overseas while retaining high-value capabilities at home ("mother factory" model) • Diplomatic and financial support for domestic and international projects by national champions • Critical mineral partnerships with allies

4.1 Industrial policy in China: Vertical integration for development and security

The development of a batteries industry must be understood in the context of a broader change of direction in Chinese industrial policy that integrates economic development with national security concerns. Since Made in China 2025 (MiC2025) (State Council 2015) was published in 2015, China's pursuit of an innovation-driven industrial policy in batteries and other strategic sectors serves not only the aim of developmental

autonomy but comes into its own as a security-conscious strategy of domestic vertical integration with the 14th Five-Year Plan (FYP) since 2021. As the analysis here will demonstrate, the Party-state seeks to reshape both state–business relations and its geoeconomic positioning through its innovation-driven industrial policy program.

4.1.1 Industrial policies for the battery sector

MiC2025 identifies NEVs and batteries as one of the ten strategic emerging industries to be targeted by industrial policy. Together with the 2016 National Innovation-driven development strategy (NIDS) (CPC Central Committee and State Council 2016), MiC2025 marks a shift towards the innovation-led development of manufacturing industries at the technological frontier. Both policies see the development of autonomous (*zizhu*) technological capacity as the preconditions for sustained development and economic security. More than that, industrial policies in the wake of MiC20205 not only pursue the improvement of domestic innovation capacity to improve general competitiveness (as, for example, a "horizontal" innovation policy would) but see these capacities as preconditions for the strategic aim of vertically integrating emerging industries on Chinese territory. For example, for electric vehicles, the goal is to promote industrial innovation and productivity gains to push the industry into a globally leading position by "forming a complete industrial and innovation system from key components to the entire vehicle" (State Council 2015). The Technical Roadmap for MiC2025 seeks to create an "independently controlled and complete industry chain" in EVs (National Strategy Advisory Committee 2015). The Action Plan for Promoting the Development of the Automotive Power Battery Industry aims to "coordinate the development of the entire industrial chain" (MIIT 2017). Similar goals are formulated, inter alia, in the New Energy Vehicle Industry Development Plan (State Council 2020), the Development Plan for the Rare Earth Industry (MIIT 2016), and the MiC2025 Energy Equipment Implementation Plan (NDRC, MIIT, and National Energy Bureau 2016).

To realize these goals, China's industrial policy for the batteries sector rests on two pillars. The first is what could be called a traditional industrial policy of subsidies and protection, and the second are policies to systematically identify so-called technological "bottlenecks" and "chokepoints" and address them through innovation policies. Both

pillars combined enable the subsequent vertical integration of the complete batteries industry chain.

Regarding the first pillar, subsidies and protection, the development of the batteries industry heavily depends on comprehensive demand-side policies to create a domestic market for electric vehicles. These policies coordinate substantial purchasing subsidies for electric and hybrid vehicles with the construction of public and private charging infrastructures (Gomes and Ten Brink 2023). According to CSIS estimates, between 2009 and 2023, NEVs received US$ 65.7 billion in state-funded rebates, and were exempted from US$ 177.7 billion in sales tax. In absolute terms, total annual direct and indirect subsidies appear to have peaked in 2022, whereas per vehicle subsidies have fallen by more than 60% already since 2018 (S. Kennedy 2024).

Eligibility for subsidies is tied to certain conditions defined in the "Lithium-ion Battery Industry Standard Conditions" (MIIT 2015), with revisions published 2019, 2021, and 2024. The standards serve a dual purpose: the first is to drive qualitative upgrading and consolidation of the batteries industry; the second is to create non-tariff trade and investment barriers that serve to protect domestic industries.

To protect Chinese manufacturers from foreign competition, the standards require firms to provide certain domestic production and R&D capacity and to follow newly developed national technological and industry standards. Not meeting such requirements, foreign enterprises were de-facto excluded from a whitelist subsequently published by MIIT of corporations whose products were eligible to receive NEV purchasing subsidies, leading to a retreat of Japanese and Korean battery producers from China.

Furthermore, the standards and whitelist serve to consolidate the sprawling batteries industry, a necessity identified in several policy documents (MIIT 2017, 2022, 2024). The Standard Conditions support this aim by specify requirements for the production process, product performance, quality control, environmental standards, and enterprises' R&D capacity, which become stricter with each iteration of the policy. The Standard Conditions thus provide an instrument to steer the industry away from sheer expansion into innovation-driven development by tying access to subsidies to technological requirements.

China's approach follows familiar patterns of subsidies-driven expansion, protection, and technology- and competition-driven consolidation, i.e. by "picking winners" (Amsden 2001). The industry has now been consolidated around three major producers, CATL, BYD, and CALB, who in 2024 amongst themselves shared 75% of the market in lithium-ion batteries for electric cars and 79% of installed production capacity (Li 2024). However, to achieve the development of industries at the technological frontier, the innovation-aspects of Chinese industrial policy are arguably more important than classical instruments of subsidies and protection. MiC2025 and the NIDS identify the need to build independent and autonomous innovation capacity. Against this background, industrial policy documents of general scope as well as those targeting the batteries industry identify the need to systematically identify and address technological "bottle-necks" (*jishu pingjing*) and "chokepoints" (*qiabozi*) (CPC Central Committee and State Council 2016; MIIT 2016, 2017, 2021; National People's Congress 2021; NDRC 2016; MIIT, NDRC, and National Energy Bureau 2016; State Council 2015, 2016, 2020). Arguably the most significant policy through which such strategic innovation is addressed are the National Key R&D Programs, which exist since 2016. For example, the 2021 "New Energy Vehicle Key Project" aims to address "key technological bottlenecks" with the aim to achieve "independent control of key links" in the industrial chain (MOST 2021).

As discussed in the following, the design and implementation of such a strategic innovation policy have led the Party-state to pursue significant shifts in state–business relations.

4.1.2 Industrial policy and the reshaping of state–business relations

The industrial policy push into innovation-driven development includes policies that aim to reshape the relationships within the state and between the party, state, and businesses. Under Xi Jinping, the introduction of "Top-level Design" (*dingceng sheji*) as a principle of policymaking has emphasized stronger coordination between central-level bureaucracies under the Communist Party's Central Committee leadership and stronger adherence by sub-national bodies to central-level policies. Here, so-called Leading Small Groups and party groups play an increasingly important role in developing top-down steering and coordination capacity in both, government and firms. This increased steering capacity comes to bear in what the party-state calls the "New Whole-Nation-

System", which can be understood as a program to remake the national innovation system to mobilize all sectors of society, including state and private entities (He and You 2023; Zhang and Lan 2023).

In the central government, the core industrial policy actors are the National Development and Reform Commission (NDRC), the Ministry of Science and Technology (MOST), and the Ministry of Industry and Information Technology (MIIT). Since the revival of industrial policy in China in the mid-2000s, overlapping competencies and bureaucratic competition have resulted in the creation of competing policies for industrial sectors such as photovoltaics and automotive, creating inefficiencies in policymaking and -implementation (Gomes and Ten Brink 2023; Heilmann and Shih 2013; Naughton 2021).

Against this background, the development of an innovation-driven industrial policy has been supported by comprehensive and ongoing reforms of the ministerial bureaucracy to address these coordination problems in the design of a coherent and strategically oriented innovation-policy (Gomes and Ten Brink 2023). These reforms include the strengthening of central party leadership over the ministerial bureaucracy, such as through the recently created party-led Central Science and Technology Commission, which, as an institution of the Party, takes the strategic lead over ministries (He 2024).

The shift in industrial policy towards innovation is accompanied by the recognition that this requires the inclusion and coordination of a broad range of actors outside of the state bureaucracy and state-owned enterprises. For example, the Action Plan for the Automotive Power Battery Industry seeks to support "breakthroughs in bottlenecks and industrialization of key core technologies" by coordinating "large, medium and small enterprises, universities, and research institutes" (2017). While in the past, the party-state pursued strategic economic policy through the state-sector, it now seeks to align private enterprises with national industrial policy (Pearson, Rithmire, and Tsai 2023). One avenue of influence through which the state seeks to accomplish this is by acquiring equity shares and this formal foothold in the corporate governance of strategic firms (Rithmire 2023). In addition, the proliferation and strengthening of party groups, especially in strategically important sectors such as technology, is improving the party-state's capacity to coordinate and steer these actors in concert with the state

bureaucracy (Gomes and Ten Brink 2023; Köncke, Erlbacher, and Schmalz 2026; Zhang and Lan 2023).

Private enterprises have become key participants in national R&D programs and recipients of funding. National Key R&D programs during the 13th and 14th five-year plan periods cover the whole range of activities composing the batteries industrial chain. Funding from National Key R&D projects is available to both academic institutions and corporate R&D centers, encouraging cooperation between academic and economic actors. Battery makers like CATL, BYD, and others have received funding under National Key R&D programs (Li, Yu, and Li 2022). CATL now houses a National Key Laboratory (China Instrument Manufacturer Association 2025). Private enterprises in the batteries sectors are not only recipients of state-led R&D programs, but, through the broad inclusion of industry associations, involved in a consultative policy-making process (Fraunhofer 2024; Gong and Hansen 2023), arguably aiding the identification of the technological bottlenecks that R&D policy should address.

Industrial policy for batteries furthermore calls for the mobilization of non-state capital by power battery funds to increase the technological level of the industry (MIIT 2017). To this end, so-called Government Guidance Funds partner with private venture capital firms to improve access to funding for firms engaged in economically risky technological development (Zhang and Lan 2023), and which are often excluded from funding by the risk-averse state-owned banks. Battery makers like CATL have been recipients of funding from the National Emerging Industry Venture Capital Guidance Fund (Wei, Yuen Ang, and Jia 2023).

4.1.3 The geopolitics and geoeconomics of Chinese industrial policy

The party-state's turn towards an innovation-driven industrial policy with Made in China 2025, the NIDS, and subsequent policies can be interpreted against the back-ground of the increasing securitization of the economy and economic policy, driven by domestic as well as international concerns, including the exhaustion of export-driven development, domestic unrest, and geopolitical and geoeconomic confrontation predominantly with the USA and EU, which are seen to be aimed at containing China's rise and undermining its development (Cheung 2022; He 2024; A. B. Kennedy 2024; Pearson, Rithmire, and Tsai 2023).

Both, MiC2025 and the NIDS frame China's turn to an innovation-driven industrial policy as matters of national security. MiC2025 links technology-driven economic advancement directly to China's geopolitical position. "Building a manufacturing industry with international competitiveness is the only way for China to enhance its comprehensive national strength, ensure national security, and build a world power" (State Council 2015). The NIDS states that innovation is crucial for the fate of the nation and national strength, citing China's historical vulnerability to superior foreign technology. At present, it sees the international balance of power determined by technology-driven competition (CPC Central Committee and State Council 2016). Innovation, here, is understood as the basis of continued autonomous control over national development, which in turn is seen as the precondition for economic and national security.

It is in the context of the 14th FYP that China's industrial policy explicitly turns from the idea of development begetting security towards the need to secure development towards outside threats. The 14th FYP aims for an "integrated approach to development and security" (*tongchou fazhan yu anquan*) (National People's Congress, NPC 2021). Here, not only is development seen to be a necessary condition for security, but, different from before and in addition, security is seen as a necessary condition for development (Wang 2023). To operationalize this approach, the 14th FYP calls for the development of "autonomous and controllable industrial chains" in strategic manufacturing industries (National People's Congress, NPC 2021). This means to have a degree of security and control over every link in the industrial chain, which, in addition to raw materials and processing capabilities, involves command over technology and innovation as the desired degree of control necessitates technological autonomy (Wang 2023). Core to achieving the aim of building relatively complete and controllable industrial chains at the forefront of global competitiveness is to build an independent innovation capacity by, as formulated in MiC2025, placing innovation at the core of the overall development of the manufacturing industry. The aim to build complete and controllable industrial chains in key industries is reflected in a policy that seeks to promote the development of the entire value chain of power batteries, integrating R&D, resources, production processes, and recycling (State Council 2020).

China's drive towards completely integrating the batteries industry chain on its national territory is contextualized by the broader "Dual-Circulation" geoeconomic strategy, which also becomes official policy with the 14th FYP. Dual circulation emphasizes a strengthening of domestic capabilities, while remaining open to international trade and investment to the extent that this serves developmental goals (Xi 2021). Dual Circulation seeks to mitigate dependence and vulnerabilities arising from China's reliance on foreign markets and the reliance of its industries on foreign intermediate inputs (García-Herrero 2021; Lin and Wang 2022). The strategy thus relies upon the ability of China's innovation-driven industrial policy to identify and address technological "bottlenecks" that stand in the way of the domestic vertical integration of industrial chains through the policies discussed above.

Under Dual Circulation, the vertical integration of industries at home based on developing an autonomous control over key technologies goes hand-in-hand with continued global integration. On the one hand, this facilitates technological transfer in the declining number of technologies that Chinese firms haven't mastered. Chinese authorities encourage foreign investment in certain sub-sectors. For example, the "Catalogue of Industries Encouraged for Foreign Investment" issued by the NDRC lists several key technologies, such as organic polymers for lithium-ion battery diaphragms, high-tech non-ferrous metal materials and products, R&D and manufacture of special production equipment for automotive power batteries, manufacturing of high-tech "green" EV batteries, as well as battery recycling (NDRC 2020, 2022).

While pursuing the vertical integration of strategic industrial chains at home to strengthen domestic circulation, Dual Circulation continues to envision the global integration of the Chinese economy through "high-level opening up" and the "going out" of its companies. While China's industrial policies do not explicitly and directly support the foreign expansion of Chinese corporations, they do shape the conditions under which they do so. China's domestic market is now entirely dominated by Chinese firms that have become technology leaders. Under these conditions, even if the market is now formally open, it will be difficult for foreign firms to establish themselves again in China. At the same time, the manufacturing and technological capacity of Chinese firms alone is now sufficient to supply the global post-carbon transition (Tauschinski, Stylianou, and White 2025). More than that, domestic vertical integration under Dual

Circulation suggests that China is not primarily intent on replicating the neoliberal model where firms exploit their technology leadership to reorganize their production across globally fragmented value chains. Rather, external circulation is conceptualized to be structurally separate from domestic capacity. While the party-state emphasizes that it is continuing to further open its economy, this may be an openness on decidedly different terms than conventionally understood in the "West".

4.2 Industrial policies in Korea: from private business initiative to national champions strategy

Compared to China, Korea was a latecomer in industrial policies in the battery sector. While Korean firms were global pioneers, comprehensive, battery-specific state industrial policy only emerged in 2021 (Table 3). This temporal gap between firm-led industry development and state policy intervention is itself analytically significant: it is both a product and a reinforcer of the higher business autonomy that characterizes the Korean state–business relations. By the time, the Korean government identified batteries as a strategic industry, major Korean firms such as Samsung, LG, and SK had already established themselves as global leaders in lithium-ion battery cell production, funda-mentally shaping the nature of state–business relations and the range of feasible policy instruments available to the government. Korea's early entry into the battery industry has its roots in the early to mid-1990s, when major electronics companies sought to internalize lithium-ion battery cell production for their IT products. LG Chem initiated lithium-ion R&D in 1992, with Samsung SDI and SK Innovation following through the late 1990s and 2000s (Park, Jun, and Kang 2021). This reversed the classic developmental state sequence in which the government directed firms into targeted industries (Amsden 1989): here firms moved first, and the state followed. Jo (2024) documents that green car and battery policymaking was "directly led by big business elites from large business groups," with the Lee Myung-bak government adopting LG's industrial vision for new growth engines, first presented at the Federation of Korean Industries' forum in 2007. The government's comprehensive "2030 K-Battery Development Strategy" (2021) was thus not creating a new industry but coordinating an existing one facing intensifying competition from China and US industrial policy under the IRA (see also Kang and Jo 2021). Korea's GVC-oriented strategy reflects a fundamentally different CPE/IPE configuration from China's territorial approach:

Korean firms built their competitive position through GVC integration from the outset and the government's subsequent policy was designed to strengthen these existing global strategies rather than redirect them toward domestic vertical integration as in China. Latter path would not just have been inconsistent with the pattern of firm-led internationalization but also unfeasible given Korea's limited domestic market, near-total mineral import dependence, and alliance-oriented security posture.

Table 3: Overview of Korean Battery Industrial Policy Measures (2021–2024)

Policy	Year	Lead	Financial Commitment	Target Area
2030 K-Battery Development Strategy	2021	MOTIE	~40T KRW (~29.7B USD) by 2030	R&D, ecosystem, demand
Public-Private R&D Innovation Fund	2021	MOTIE + firms	80B KRW (~60M USD)	SME/start-up R&D
Battery Alliance /Innovation Strategy	2022	MOTIE	3T KRW loans/guarantees over 5 yrs	Critical minerals, supply-chain
National Strategic Tech Nurture Plan	2022	MSIT	R&D: 111.4B→136.4B KRW (23→24)	1 of 12 national strategic techs
Mission-Centric Strategic Roadmap	2023	MSIT	(within above)	Performance, safety, raw materials
Post-IRA Joint Strategy	2023	MOTIE	7T KRW (~5.26B USD) via KEXIM/K-SURE	North America investment
Strategic tech tax credits	2023	National Assembly (via MOEF)	Tax expenditure (rate-based)	25% SMEs, 15% large firms
Battery Lifecycle Competitiveness Plan	2023	MOEF	38T KRW (~28.6B USD) over 5 yrs	EV batteries, reuse/recycling
All-solid-state pilot line	2023	Firms+ government	~1.6T KRW (~1.2B USD)	Next-gen battery R&D/pilot

Note: KRW/USD conversions based on ~1,330 KRW/USD; Tax credits are rate-based, so the total fiscal commitment depends on firm investment levels and is not ex ante fixed; LG Energy Solution alone booked ~1.65 trillion KRW in US AMPC credits in 2024 as a comparable reference.

Sources: MOTIE 2021, 2022, 2023; MSIT 2023a, 2023b, 2024; MOEF 2023; Fraunhofer 2024.

4.2.1 Industrial policies in the battery sector

Korean battery industrial policy since 2021 can be organized around three functional domains: R&D support, ecosystem-building, and financial support for overseas investment.

The first domain, R&D support, targets next-generation battery chemistries. The K-Battery Strategy established a Public-Private R&D Innovation Fund of 80 billion KRW (~60 million USD), with contributions from MOTIE and the three leading companies, targeting SMEs in materials, parts, and equipment (MOTIE 2021). In 2022, the National Strategic Technology Nurture Plan designated batteries as one of twelve national critical and emerging technologies (MSIT 2023b), reinforced by the Mission-Centric Strategic Roadmap in August 2023 setting objectives for performance, safety, and raw-material self-reliance (MSIT 2023a). The sectoral R&D budget rose from 111.4 billion KRW in 2023 to 136.4 billion KRW in 2024 (MSIT 2024). This illustrates how the state channels public resources into areas of collective action failure – pre-competitive research and SME development – rather than directing firm-level strategy.

The second domain, ecosystem-building, responds to Korea's acute mineral dependency. Unlike China, Korean manufacturers depend almost entirely on imported battery inputs processed primarily in China. According to a Korea Chamber of Commerce and Industry analysis of eight key battery minerals, Korea records the highest single-country import concentration among major battery-producing economies with 83.3% of cobalt oxides and hydroxides, 81.2% of lithium oxides and hydroxides, and 77.6% of manganese and cobalt sulfates sourced from China. The average single-country dependency is 77.1%, compared with 66.5% for Japan, 60% for China, and 51.1% for Germany (Korea Chamber of Commerce and Industry 2022). More recent customs data indicate this dependency is deepening rather than diminishing: between January and October 2022 alone, China's share of Korean nickel imports rose from 88.3 to 99.4%, lithium from 55.4 to 63.2%, cobalt from 73.7 to 81.5%, and graphite from 88.6 to 93.1% (Greenium 2023). To address this, the Battery Alliance (launched November 2022) coordinates mineral acquisition across the Big 3, POSCO Holdings, Korea Zinc, the state-owned Korea Mine Rehabilitation and Mineral Resources Corporation (KOMIR), and public financial institutions, with 3 trillion KRW in planned financing (MOTIE 2022). The government's 2023 Critical Minerals Stabilization

Measures target reducing single-country dependency from over 80 to 50% by 2030. Bilaterally, Korea has signed mineral agreements with several partners, beginning with Australia in 2021, followed by Canada, Chile, Indonesia, and African nations – the 2024 Korea-Africa Summit alone produced 47 MOUs. The Battery Lifecycle Competitiveness Plan (MOEF 2023) allocated 38 trillion KRW in policy financing over 5 years, including support for battery reuse and recycling to reduce primary mineral reliance. However, the scale of Chinese dominance with 407 overseas mines for lithium, nickel, and cobalt versus Korea's 15 means these efforts remain incremental (Greenium 2023).

The third domain, financial support for overseas investment, directly reflects the geopolitical dimension. Following the US IRA in 2022, MOTIE's Post-IRA Joint Strategy committed 7 trillion KRW via KEXIM and K-SURE to support North American investments (MOTIE 2023). Critically, nearly all foundational investment decisions preceded the IRA: LG-GM announced Ultium Cells (Ohio) in January 2020, SK-Ford announced BlueOval SK in mid-2021, and Samsung SDI-Stellantis announced StarPlus Energy in May 2022. Post-IRA projects constituted a second wave reinforcing existing trajectories, bringing total committed investment to an estimated 45–54 billion USD (US DOE 2024). State policy provided the financial infrastructure for decisions firms had already made, which is different from the Chinese pattern.

4.2.2 Industrial policy and the accommodation of state–business relations

In the canonical Korean developmental state of the 1960s–1980s, the government directed firms into targeted industries through financial control and performance-based discipline (Amsden 1989; Woo 1991). Scholarship documents how democratization and chaebol maturation progressively shifted this balance: Lim (2012) traces the move from sector-specific targeting to sector-neutral support, while D'Costa (2018) shows how post-democratization political space expanded for big business. In the battery sector, this transition reached its fullest expression. The three major firms entered commercial production between 1999 and 2006, well before any government battery strategy. The state's role shifted toward accommodating firms that had established market positions independently and incentive-based instruments (R&D subsidies, tax credits, financial guarantees) and coordinative platforms rather than directive ones.

The policy formulation process confirms this accommodating role. Before launching the K-Battery Strategy, the government held meetings with industry stakeholders in which companies identified the priorities subsequently incorporated into the strategy (Kwon 2021; Yoon 2021). Jo (2024) shows that policymaking involved direct appointment of business elites to policy positions, resulting in "systemic marginalization" of SME suppliers. The institutional architecture of consultation has deepened: the Battery Alliance established permanent subcommittees in 2022. President Yoon's April 2023 National Strategy Meeting committed 20 trillion KRW and described batteries as "core security and strategic assets" (Office of President 2024); and a standing Public-Private Joint Council was established in June 2024.

Korean battery firms have also adopted a "mother factory" strategy, retaining R&D, pilot production, and quality control domestically while expanding mass production overseas. LG Energy Solution designated Ochang, Samsung SDI designated Ulsan, and SK On designated Seosan as their respective mother factories – each housing next-generation technology development including solid-state battery programs. This model was elevated to national policy in March 2023 under the National Strategy for Advanced Industries (Kim and Jwa 2023) and represents the spatial manifestation of the national champions strategy: firms anchor technological capabilities domestically while distributing production across geopolitically aligned markets. The concept has roots in Japanese manufacturing discourse (Oki 2016).

One notable departure from this facilitative pattern is the government's use of regulatory design to shield domestic producers. Starting in 2024, EV subsidy rules incorporate energy density and recycling value criteria that structurally disadvantage Chinese LFP batteries (Lee 2024). However, the competitive context has shifted dramatically: the Big 3's combined global market share fell from 31.7% in 2021 to 18.4% in 2024, while CATL and BYD surpassed 55% (SNE Research 2025). All three firms entered "emergency management" in 2025, underscoring the limits of the national champions strategy against structural cost advantages in LFP chemistry.

4.2.3 The geopolitics and geoeconomics of Korean industrial policy

Korea's battery industrial policy operates within a geopolitical context that both enables and constrains its strategic options. As a system-integrated middle power allied with

the United States, Korea benefits from preferential market access and inclusion in "friend-shoring" frameworks but must continuously adapt to regulatory decisions made by the US and the EU over which Korea has limited influence.

The IRA was the single most consequential external shock. The government facilitated firm-initiated North American investments through KEXIM/K-SURE financing, with President Yoon framing the state's role: "if our country's key companies cannot compete effectively abroad, we have no future" (Office of President 2024). However, the alliance-based model carries inherent structural risks. Korean firms' North American investments are premised on the continuation of IRA incentives and favorable trade conditions – parameters set by external factors over which Korea has limited influence. Any shift in US trade or industrial policy could rapidly alter the calculus underlying billions of dollars in committed investment, exposing the vulnerability of a strategy in which the state facilitates firm-led internationalization but cannot control the external conditions on which it depends.

The EU Battery Regulation (2023/1542) presents a different challenge: mandatory compliance burdens such as carbon footprint declarations, recycled content mandates, supply chain due diligence, and a digital battery passport from 2027 (European Union 2023) that raise costs particularly for smaller suppliers in the battery value chain. Korean firms have partially insulated themselves through European manufacturing (LG in Wrocław, Samsung SDI in Göd, SK On in Hungary), but the government's response has been coordinative – emissions guides, a CBAM helpdesk, and EU engagement (Choi 2024) – rather than directive.

In sum, Korea's geopolitical industrial policy follows a distinctive causal sequence: the pre-existing CPE condition determines how geopolitical adaptation takes shape. Firms respond to external pressures through their own global strategies; the state facilitates these responses.

5 Conclusions

The recent revival of industrial policies has too often been viewed as technocratic tools by economists or reduced by political scientists to an inevitable structural reaction to geopolitical tensions. By revisiting the rich legacy of the East Asian developmental state, this article has argued that industrial policy cannot be understood in isolation. Instead,

it is the product of a complex intersection between a state's domestic political economy (CPE) and its international geopolitical positioning (IPE). Empirically, our comparative study of the battery industries in China and South Korea illustrates how this intersection produces different industrial strategies, even among states with shared developmentalist traditions. In China, the party-state's dominant steering capacity over business (CPE) combined with its position as a hegemonic challenger facing US containment (IPE) has driven a strategy of domestic vertical integration. Industrial policy is utilized here not just for economic upgrading, but to achieve comprehensive supply chain security and autonomous controllability within its own territory. The globalization strategy pursued by Chinese companies is predicated on vertical integration at home and thus different from the GVC-based out-sourcing strategies pursued by companies in advanced economies. Instead of globally fragmenting production chains along cost advantages, Chinese firms pursue internationalization on top of vertical integration at home. Conversely, South Korea's strategy reflects the gradual emancipation of private capital from the state (CPE) and its status as a system-integrated middle power allied with the US (IPE). Lacking the domestic market size and raw material autonomy of China, the South Korean state acts as a strategic supporter, nurturing private "national champions" to capture high-value, technologically advanced segments of transnational supply chains, while actively utilizing its geopolitical alliances to secure market access and critical minerals.

Theoretically, these findings address a critical gap in the literature by demonstrating that the comparative and international political economy dimensions of industrial policy are inseparable. The first generation of developmental state literature accurately identified the geopolitical imperatives driving state intervention but neglected domestic coalition building. The second generation corrected this by highlighting "embedded autonomy" and state–business relations but often ignored the limiting boundaries of global hegemony. By synthesizing these approaches, our framework moves beyond functionalism. We show that state capacity (the CPE axis) shapes a government's ability to implement policy, while geopolitical positioning (the IPE axis) shapes the policy's strategic intent and feasible boundaries.

Finally, this combined framework yields vital practical implications for the current design of green industrial policies in the West and beyond. Policymakers cannot simply

replicate the "moonshots" or policy instruments of other countries without accounting for their own institutional and geopolitical realities. As our comparison demonstrates, states are able to pursue outward-oriented, supply-chain integration strategies, if they possess highly competitive private actors and secure geopolitical alliances. Conversely, states will move toward a territorial approach with tighter domestic steering and vertical integration when faced with severe geopolitical threats and equipped with the requisite institutional capacity to guide private companies. Ultimately, treating industrial policy as a mere technical instrument divorced from its political-economic context risks significant policy failure. Successful reforms require aligning developmental goals with the concrete realities of domestic class compromises and global power dynamics.

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