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From Military Dominance to Military-Civil Fusion: China's National Defence in the Semiconductor Industry

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KEY TAKEAWAYS

- From the Mao Zedong to Xi Jinping eras, China's semiconductor industry has evolved from a military-dominated sector into a largely civilian-led industry.
- The military and defence establishment has remained a structuring force in the sector, but its role has evolved from direct patronage to relative decline, and more recently to strategic steering.
- The ongoing military-civil fusion (MCF) strategy has re-securitized semiconductors by building a more centralized party–military–government system to channel civilian capabilities toward defence use.
- Under MCF, China's emerging defence–semiconductor nexus is characterized by stronger defence steering, a renewed whole-of-nation approach, and the rise of a national team of largely civilian firms.
- It remains uncertain whether MCF can overcome the industry's "chokepoint" problems and deliver sustained technological breakthroughs.
- Europe needs to examine the Chinese model more closely, as either its success or failure could have major implications for its economic competitiveness and strategic security.

Keywords

China's semiconductor industry

Role of defence establishment

Military-civil fusion

Introduction

As the backbone of the digital-driven society, semiconductors—also known as integrated circuits (ICs) or simply (micro-)chips—enable nearly every modern industrial, commercial, and military system. For national defence, they are indispensable to information systems, command-and-control architectures, sensors, communications networks, and advanced weapons platforms. Semiconductor capability therefore affects not only the performance of individual weapons systems, but also the wider transformation of military organization, information processing, and operational effectiveness[1]. Conversely, the military and defence establishment has exerted significant influence on the development of semiconductors, as seen in the United States (U.S.) where the industry first emerged. It has played a foundational and catalytic role as military demand helped enable the industry's rise by providing early markets, funding, and technological direction. Although the industrial advancement is now largely driven by the market, the military remains a key strategic partner by catalyzing commercial innovation, sustaining technological superiority, and converting civilian technological advances into defence capabilities[2].

One of the most striking developments of the past two decades has been the rapid growth of China's semiconductor industry, which was reflected in its emergence not only as one of the most capable chip manufacturers but also as the world's largest market for chip consumption[3]. Despite the tightening of U.S. export controls and sanctions since 2018, the nation's semiconductor sector has demonstrated considerable resilience, as Chinese players have been accelerating efforts toward domestic substitution, technological upgrading, and expansion in alternative markets[4]. At the same time, China's military capabilities have developed rapidly, as the People's Liberation Army (PLA) has transformed from a large but technologically outdated force into a modern great-power military, with major weaponry advances that depend heavily on sophisticated electronics and advanced chips [5]. It is therefore clear that China's semiconductor rise and military modernization are advancing in parallel, reflecting an increasingly close link between industrial-technological upgrading and military transformation.

Against this backdrop, this research aims to clarify the role of China's defence establishment in the country's semiconductor development: its significance to the industry relative to civilian actors, its strategic orientation and posture toward semiconductors, and the decision-making and implementation system through which this role is exercised. While the analysis traces how these dimensions have evolved across different periods, it places particular emphasis on the present.

Understanding how China links defence to semiconductor is directly relevant to European debates on a range of critical issues the continent is faced with: economic and technological competitiveness, supply chain resilience, renewed arms race, and not to mention Europe's strategic dilemma posed by China. The debates nowadays often focus on what Europe should do—whether to tighten export controls, strengthen indigenous innovation and production, or reduce strategic dependencies. Yet such choices cannot be made effectively if the Chinese system and policies are understood only in broad and vague terms. Moreover, China represents a distinct pathway to the defence–semiconductor nexus, one that neither copies the U.S. model nor replicates the obsolete Soviet approach [6]. A more precise understanding of the Chinese model is thus increasingly urgent for formulating effective policy responses.

Before Xi Jinping: Defence Origins and Civilian Ascendance

China's semiconductor industry emerged in the Mao Zedong era (c.a. 1950s-1970s) as a small but strategically important part of the broader electronics and telecommunications complex. As such, semiconductors developed not so much as a civilian industry but a component of a state-led defence industry. Its early development followed the Soviet model characterized by centralized planning, state monopoly, administrative allocation, and the separation of research from production. The logic was self-reliance, as the policymakers sought to sustain essential capabilities under technological isolation—especially after Sino-Soviet split—and domestic political disruption [7].

The defence establishment shaped the industry primarily through defence supply requirements and strategic priorities. Although semiconductors had not yet become an independent industrial sector, electronic components were increasingly needed for defence communications, radar, computing, missiles, aircraft, naval platforms, and other advanced weapons systems[8]. As a result, military demand gave the sector political importance and resource priority, while the broader defence-industrial apparatus embedded semiconductor development within the logic of national security and self-reliance.

This period laid the institutional foundations of China's defence-centred semiconductor system, many features of which have persisted to the present. The main actors included party-state apparatus responsible for planning, resource allocation, and coordination; state-owned research institutions and factories for research, development and production; and the PLA as the end user. Their relationships were organized through vertical bureaucratic chains of command. Horizontal coordination between research, production, and military users remained weak and segregated, mainly through administrative planning rather than autonomous collaboration[9].

During the Deng Xiaoping era (c.a. 1980s and early 1990s), the industry began to shift from a closed and defence-centred system toward civilian use and commercialization. As central planning declined, semiconductors increasingly took on a dual-use character. The nation's Reform and Opening policies also enabled selective access to foreign technology and investment, and the global market, which became important channels for upgrading China's weak domestic capabilities[10].

The defence establishment lost the privileged position in the industry as defence production was reduced, procurement became more constrained, and many factories shifted their focus to civilian output. As a result, civilian demand gradually surpassed military demand to become the main driver of China's semiconductor development. Institutionally, this era saw limited reforms within the system and a broader weakening of the vertical structure of the Maoist defence economy. Defence enterprises gained greater autonomy, civilian agencies became more important, and foreign firms and local governments entered the system. Yet the transition was far from clean: although channels of horizontal coordination improved, military–civilian linkages remained limited and the military core retained many features of the old defence economy[11].

Between the mid 1990s and early 2010s (roughly Jiang Zemin and Hu Jintao eras), the semiconductor development was increasingly shaped by informatization demands, foreign technology absorption, dual-use applications, and industrial upgrading. Rapid growth in civilian demand and marketization pushed the sector beyond its earlier defence-centred role and embedded it into the global supply chain. Beijing no longer regarded semiconductors merely as a defence supply base but as a strategic sector with growing significance for the country's economy. Unlike in previous eras, civilian firms now played the leading role in industrial upgrading and technological innovation, rendering military modernization increasingly dependent on advances generated in the civilian sector[12].

Consequently, the defence establishment transformed from that of a direct industrial patron to that of an increasingly demanding customer. But this did not mean that the role of defence continued to decline as it had in the previous period; on the contrary, its importance revived after Beijing—facing sanctions after the 1989 Tiananmen incident—renewed its emphasis on self-reliance[13]. As semiconductors became more central to weapons modernization, the PLA's demand shifted from basic supply to advanced capabilities, often through procurement from civilian suppliers. Meanwhile, vertical coordinating institutions that had once been weakened were strengthened, and defence enterprises were reorganized into large state-owned conglomerates that combined research and production more closely than before[14].

Xi's Reforms: Security Resurgence and Institutional Realignment

Xi Jinping's accession to power in 2012 altered the balance between national security and economic growth. Whereas the Jiang and Hu eras generally subordinated security to economy, Xi recast them as co-equal core interests and increasingly treated the latter as a means of strengthening the former[15]. In the industrial-technological domains, this securitizing turn found expression in an ambitious program of military-civil fusion (MCF), which was elevated to a national strategy in 2015. Semiconductors were central to this agenda, with high-end chips and large-scale integrated circuits identified as priority areas for deeper military-civil integration.

The MCF strategy aimed not simply to coordinate military and civilian activities but to integrate them at a deeper operational level. It sought to erode the boundaries between military and civilian technologies by promoting dual-use innovation, expanding investment in indigenous research and development (R&D), mobilizing overseas talent, and widening civilian participation in defence-related research. This expansion was facilitated through streamlined approval procedures, broader participation channels, and subsidies for relevant R&D projects[16]. The underlying logic was a recalibration of technology importation in relation to indigenous innovation: foreign technology acquisition was increasingly subordinated to the goal of mastering the designated "key and core technologies" for minimizing strategic dependence[17].

To translate this strategic turn into institutional reality, The Xi administration carried out substantial institutional reforms that cut across the party, military, and government.

At the apex of the party-state structure, the Central Commission for Military-Civil Fusion Development was created to provide unified political leadership. Under this central-level body, the Central Military Commission (CMC)—-the nation's highest military command body—established a Military-Civil Fusion Bureau within its Office for Strategic Planning to coordinate with government agencies and facilitate civilian participation in the defence industries. It also reorganized the Equipment Development Department and the Science and Technology Commission, tasking them with linking military requirements, procurement, advanced weapons development, and technology projects to the wider MCF agenda. Meanwhile, military representative offices were embedded in defence contractors to supervise the procurement process such as contract execution and quality control[18].

On the government side, greater regulatory responsibilities for defence-industrial policy, dual-use technology diffusion, and defence conversion were assigned to the Ministry of Industry and Information Technology (MIIT)—especially its Department of Military-Civil Fusion Promotion—and the State Administration for Science, Technology and Industry for National Defence (SASTIND). Implementation then proceeded downward through provincial MCF bodies and local development agencies, which translated central priorities into regional industrial policies.

Also as part of the reforms, major state-owned defence conglomerates and military-affiliated research institutes were strengthened, a selected of which were tasked with developing into world-class national champions, such as the China Electronics Technology Group Corporation (CETC)[19].

Addressing the coordination issues, the MCF system established the *All-Army Weapons and Equipment Procurement Information Network*. Run by the CMC Equipment Development Department, this online platform posted regulated tender notices to private suppliers to reduce information barriers for private-sector entry. A second channel ran through SASTIND, which periodically issues matching lists that encourages both defence-to-civilian technology transfer and civilian participation in military technologies. The system also relied on local MCF centers and regional organizations to match private-sector advanced technologies against defence priorities, thereby extending central priorities into local industrial ecosystems[20].

These changes resulted in a more vertically centralized party–military–government decision-making and implementation system, combined with a more formalized set of horizontal channels for coordinating with civilian actors.

Emerging Defence–Semiconductor Nexus under MCF

Under MCF, the role of the defence establishment has expanded, especially since 2018 when U.S. export controls have intensified China's concern over supply-chain vulnerability and technological dependence. However, this does not mean a return to the direct military dominance as in the Mao era since civilian actors and market forces remain the primary engines of techno-industrial innovation and upgrading. What has changed is the state's capacity to steer the sector toward national security priorities. Defence actors now play a more prominent role in shaping procurement demand, certifying technologies and absorbing selected civilian and foreign-derived capabilities into military systems[21]. The defence–civilian relationship is therefore not one of substitution but of selective redirection:

MCF seeks to make civilian semiconductor capabilities more accessible, reliable and responsive to defence needs.

This steering role is reinforced by a renewed "whole-of-nation" approach, which mobilizes civilian actors and market forces under centralized state direction. The policy toolkit extends well beyond direct military procurement to combine state planning, government funds and subsidies, procurement platforms, certification requirements, and technology--matching mechanisms[22]. Among the key policy instruments is the National Integrated Circuit Industry Investment Fund (nicknamed the Big Fund), whose successive phases have reached a cumulative scale of nearly US$100 billion. It serves as a major vehicle for directing state-backed investment toward the so-called "chokepoint" capabilities, particularly chip fabrication, semiconductor equipment, and advanced packaging. Yet this architecture should not be treated as a perfectly coherent command system. Central priorities still must pass through local governments, commercial incentives and bureaucratic competition. Its actual degree of policy coordination and resource concentration therefore remains uneven[23].

An intended consequence of the whole-of-nation efforts is the emergence of a semiconductor "national team." This is not a fixed list but an evolving group of firms that expands with policy cycles. Its core logic is to use state support to compensate for the structural weaknesses that prevent Chinese semiconductor firms from catching up with global leaders through market mechanisms alone. At the inner circle are commercial chip companies directly backed by the Big Fund, such as SMIC, Hua Hong, and Yangtze Memory Technologies. They span almost the entire semiconductor value chain, including foundry manufacturing, IC design, memory chips, equipment, materials, and packaging and testing[24]. Whether by choice or necessity, semiconductor firms—particularly large or technologically critical ones—have become more deeply bound to the party-state, in particular the defence establishment. As they face stronger expectations to contribute to self-reliance, secure supply chains, and defence-relevant applications, national security is now a political obligation on top of profitability.

Conclusion

This brief review above shows that national defence has remained a persistent structuring force in China's semiconductor development, even as its role has changed over time. In the Mao era, the industry took shape under conditions of military demand, self-reliance, and strategic isolation, with limited space for civilian applications. Meanwhile, this period laid the intuitional foundations of the industry, many of which endure to this day. During the Reform era, the defence's dominance declined, while military modernization became increasingly dependent on capabilities generated in the civilian sector. Civilian demand, foreign technology, and marketization became the main drivers of industrial growth. Under Xi Jinping, the balance has shifted back toward defence through the re-securitization of the industry that gave defence actors stronger channels to draw on civilian capabilities with greater emphasis on indigenous innovation.

This securitizing turn was institutionalized through a more centralized MCF system characterized by vertical coordination across the party, military, and government, as well as more formalized horizontal channels for engaging civilian actors. Within this system, defence actors became better positioned to redirect selected civilian and foreign-derived capabilities toward military applications. This process was by a renewed whole-of-nation approach with a massive state-backed fund serving as a key instrument for helping civilian firms advance in bottleneck areas. A noticeable result was the emergence of a national team of selected leading Chinese semiconductor firms, for which security compliance has become a political obligation alongside profitability.

Over the decades, China has made remarkable achievements in semiconductors: it built a relatively comprehensive industrial base almost from scratch and has more recently caught up rapidly to become a world-class player. Despite mounting pressure from U.S. restrictions, Chinese firms have shown resilience and continued to make breakthroughs in critical areas. However, it remains too early to conclude that MCF can overcome China's chokepoint problems. Stronger state direction may improve coordination and mobilization, but it may also weaken the market discipline and commercially driven experimentation needed for frontier innovation. This tension is becoming sharper as China faces reduced access to foreign technology, equipment, markets, and supply chains. Whether MCF can produce sustained technological breakthroughs, therefore, remains an open question.

For Europe, the implications are not straightforward. A successful Chinese model could strengthen Beijing's semiconductor competitiveness and military modernization; An unsuccessful one could still sharpen tensions across a wide range of issues from trade imbalances to geopolitical stability. Europe should therefore examine China's trajectory in greater detail and develop more targeted, timely responses to its evolving defence–semiconductor strategy.

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