# Little Giants, Single Champions

## China's Blueprint for Asymmetric Industrial Advantage

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# Executive Summary

China's industrial policy prioritizes developing leverage over international supply chains. Over the past decades of its industrial development, Beijing has made significant strides to this end. This matters for US-China geopolitical competition: China's approach is designed to create asymmetric dependencies and access. Recent experiences ranging from the breakdown of the semiconductor supply chain to the shortages of medical and protective equipment in the early days of the COVID-19 pandemic underscore this reality. They have also elevated awareness of China's supply chain dominance and corresponding risks in the minds of policy makers, corporate leaders, and consumers globally.

Still, the full scope and detail of China's industrial advantage and policy designs remain poorly understood. Beijing's supply chain leverage often goes overlooked because that type of power is unconventional and beyond the scope of traditional competitive frameworks. Traditional statistics (e.g., per capita GDP, profitability) do not account for the strategic points of leverage that Beijing enjoys vis-à-vis the global system. And despite awareness of the high-level banners that guide China's industrial policy (e.g., "Made in China 2025"), familiarity with its details, its comprehensive implementation, and firm-level positioning continue to lag. As a result, analysis may fail accurately to assess China's competitive standing, to monitor it in detail, and to identify risks before they emerge. Some surface-level threats, like Huawei, are recognized – after they become major global players. The seeds from which they develop are not. Nor is the larger ecosystem of less obvious players that Beijing uses to accrue dominant positions across critical supply chains.

However, this deficiency can be resolved. It *is* possible to assess both the objectives and the accomplishments of the Chinese Communist Party's (CCP's) industrial development program – at the macro and the micro level – the players and investments behind it, and implications for supply chains and tech ecosystems. That can be done by monitoring and assessing the granular detail of Beijing's centralized industrial policy, and provincial and municipal level manifestations. This report reviews a set of uniquely useful, and surprisingly overlooked, examples of such policy: The "Single Champion" and "Little Giant" programs.

"Single Champions" and "Little Giants" refer to almost 10,000 "specialized and advanced" small- and medium-sized enterprises (SMEs) selected and supported by the Chinese government for either their leading position in critical industrial nodes or their potential to establish such a position. These two programs and the companies they support offer unmatched, granular insight into where China has built industrial leverage internationally and relative industrial self-sufficiency domestically, its future efforts, and relative US and Chinese industrial strengths.

*Chinese government programs to promote "single champions" and "little giants" have been under way since at least 2011. But they have received little international attention. This report seeks to resolve that deficit.*

Chinese government programs to promote "single champions" and "little giants" have been under way since at least 2011. But they have received little international attention. This report seeks to resolve that deficit. It surveys the programs, their beneficiaries, and aggregate trends to find, among other key insights, that:

- The "single champions" and "little giants" programs – and their emphasis on the "advanced and specialized" – reflect and operationalize a deliberate CCP effort to dominate key nodes in critical supply chains.
- These programs offer granular insight into areas of particular dependence on China, and therefore vulnerability, in US and international supply chains; where China seeks to develop additional dependence; and the relevant Chinese companies behind that positioning.
- "Single champions" and "little giants" cooperate in mutually reinforcing partnerships that support Beijing's efforts to develop vertically integrated industrial capacity.

The "single champions" and "little giants" industrial programs should serve as a wake-up call for how advanced, sophisticated, and comprehensive Beijing's industrial offensive is – and the extent to which US national and economic security depends on the CCP.

# Introduction

In 2015, Beijing launched its Made in China 2025 national strategy, formally declaring the global industrial offensive that had been evident in national policy for decades – as well as the chief industrial and technological battlefields on which the Chinese Communist Party (CCP) would wage this offensive. Close to a decade later, that reality is finally registering in the United States. Washington and the US private sector increasingly recognize not only that the United States and China are locked in an outright great power competition, but also that this competition is an industrial one.

However, even amid this reckoning, awareness of the competitive balance lags. An insufficient grasp of relative strengths and weaknesses stymies US attempts to respond to Beijing's industrial offensive. The deficit is particularly acute when it comes to examining relative standing, vulnerabilities, and strengths within critical supply chains – including at the upstream point of the processes and materials on which they rely. Where has China already secured dominant positions of leverage in critical supply chains? Where does China remain weak? Where is Beijing focusing its efforts for the one, five, ten years to come?

Beijing's centralized and institutionalized system and its corresponding industrial policy offer analytical tools for answering these questions. Industrial policy programs – such as what the central government calls "single champion" and "little giant" companies – offer a map of Beijing's industrial priorities, key nodes and actors of leverage, and the areas and players poised to become those in the future.

The "single champion" and "little giant" programs are both run by Beijing's Ministry of Industry and Information Technology (MIIT). They involve identification, support, and guidance of companies and value chains deemed critical for developing both domestic Chinese capacity in strategic sectors and Chinese leverage over those internationally.

"Single champion" companies reflect areas of established Chinese dominance in key value chains. Over 600 have been identified thus far, well over a goal of 200 that was set in 2016, with another almost 700 receiving additional recognition in the program. To be selected, a company must be a top-three global leader in its niche market, produce one to two key products serving that segment, and derive the bulk of its revenue from sales of those products. "Little giants" are frontrunners in *developing* Chinese dominance in key value chain nodes. Beijing has selected over 9,000 "little giants" to date. Criteria for "little giants" include leading market share at the national or provincial level, a high degree of specialization in a specific market niche, high research and development expenditure, and robust profit growth.

Chinese government programs to promote "single champions" and "little giants" have been under way since at least 2011 but have received far less attention than the headline Made in China 2025 program. Yet these programs offer unmatched, granular insight into where China has built industrial leverage, where its future efforts lie, the relevant companies behind those efforts, and, accordingly, relative US and Chinese industrial strengths. In essence, the list of "single champions" and "little giants" companies constitutes a detailed operative blueprint of China's industrial standing, ambitions, and strategy.

# A State-Designed Industrial Hierarchy

China has long viewed small and medium-sized enterprises (SMEs) as fundamental to the country's economic development. Beijing's 11th Five-Year Plan (2006–2010) mentioned SMEs multiple times.[1] The 12th Five-Year Plan (2011–2016) built on that foundation, laying out a framework for developing SMEs.[2] It described SMEs as "an important force in China's national [economy]" and promoting their development is a "major strategic task." The document also proposed the concept of "specialized and advanced:" SMEs would bolster China's industrial basis by developing leading ("advanced") capabilities in niche ("specialized) areas.

In the years since, numerous national policies issued by the Ministry of Industry and Information Technology (MIIT) have operationalized the ambition to leverage "specialized and advanced" SMEs to power China's manufacturing industry. Chief among those, MIIT has developed programs for identifying and supporting "little giant" and "single champion" companies. MIIT has also implemented a state-designed and -led hierarchy for selecting, cultivating, and promoting select SMEs to become "little giants" and "single champions." Some of the key, relevant policy documents are summarized in the table below.

*The list of "single champions" and "little giants" companies constitutes a detailed operative blueprint of China's industrial standing, ambitions, and strategy.*

1 国民经济和社会发展第十一个五年规划纲要 [11th Five-Year Plan], State Council, March 14, 2022

2 国民经济和社会发展第十二个五年规划纲要 [12th Five-Year Plan], State Council, March 16, 2011,

**Key policy documents related to "little giants" and "single champions"**

| Document name | Year | Key points |
|---|---|---|
| 12th Five-Year Plan for the growth of SMEs | 2011 | Proposes the idea of "specialized and advanced" companies as a key way to transform and upgrade SMEs; encourages the coordinated development of SMEs and large enterprises. |
| Guiding opinions on promoting SMEs' "specialized and advanced" development | 2013 | Outlines ideas and priorities for how to develop"specialized and advanced" companies, including by providing various type of financial support (e.g., loans, special funds) and business services (e.g., consulting, technology transfer). |
| Implementation plan for cultivating and upgrading manufacturing "single champions" | 2016 | Defines "single champions" and explains why they are key to China's bid to become a manufacturing superpower. Sets out goal of identifying 200 "single champion" companies by 2025. Outlines criteria for identifying "single champions." |
| Plan for promoting the development of SMEs (2016-2020) | 2016 | Called for the development of a large number of "little giants" and a number of "single champions." |
| Notice on work to cultivate specialized and advanced "little giant" enterprises | 2018 | Defines "little giants" and outlines criteria for selecting them. Specifies key industrial areas of focus for "little giants." |
| Notice on supporting the high-quality development of "specialized and advanced" SMEs | 2021 | Announces that from 2021-2025, the central government will earmark 10 billion RMB in funding for 1,000 "little giant" companies to support their high quality development. |

Source: MIIT

## *Defining "single champions"*

The term "single champion" was formally defined in the 2016 "Implementation plan for cultivating and upgrading manufacturing single champions," which stipulated that:

> Manufacturing single champion enterprises are enterprises that have focused for a long time on certain special and niche product market segments in the manufacturing industry, with world-leading production technology or process, and with market share of a single product ranked among the top in the world.[3]

3 制造业单项冠军企业培育提升专项行动实施方案[Implementation plan for cultivating and upgrading manufacturing single champions], MIIT, March 16.

The document also laid out specific criteria for identifying "single champions." Most importantly, a "single champion" must:

- Be a top-three global leader in the niche market that it operates in;
- produce one to two key products serving that segment; and
- derive the bulk of its revenue from sales of those products.

"Single champions" are selected according to an application process: Companies submit applications that are then reviewed by MIIT. Recognized companies are grouped under three categories:

- Fully-fledged "demonstration" companies that meet the criteria for "single champion" firms;
- "cultivation" companies that have the potential to become "single champions;" and
- "single champion" products produced by a certain company.

A "cultivation single champion" is a company that has not reached the level of global leadership demanded by "single champion" criteria, but that is deemed to have such potential.[4] No "cultivation single champions" have been identified since the third batch, in 2018. The "single champion" product designation is awarded to companies that make a leading niche product but have yet to derive 70% or more of their revenue from sales of that product.[5]

Since 2016, China has published seven batches of "single champion" companies, with the most recent batch published in October 2022. In total, this analysis has identified 1,286 "single champion" companies across the seven batches, split among 604 "demonstration" companies, 90 "cultivation" companies, and 592 "single champion products."[6]

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4 In discussing "single champions," MIIT has cited German management consultant Hermann Simon's concept of "hidden champions." (工业和信息化部就制造业单项冠军企业培育"方案"答问 [MIIT Q&A on the single champion cultivation plan], MIIT, April 21, 2016) Simon first wrote about "hidden champions" in Harvard Business Review in the early 1990s. (Hermann Simon, "Lessons from Germany's Midsize Giants," Harvard Business Review, March-April 1992, https://web.archive.org/web/20180927163045/https:/hbr.org/1992/03/lessons-from-germanys-midsize-giants) Simon developed the idea to explain why Germany's small- and medium-size companies, known as the Mittelstand, "have a talent for export and a command of their markets that belie their small size and low profile…[and] are champions of global competition but have remained largely hidden." (Ibid.) Simon's ideas have found a large and receptive audience in China, where he delivered an in-person keynote address as recently as 2019 at the Hidden Champions Development Summit hosted during the China International Import Expo. ("Proceedings for Supporting Activities of the 2nd China International Import Expo," China International Import Expo, June 3, 2020) Simon's criteria for identifying "hidden champions" are simpler than those for China's "single champions," but share broad similarities.

5 2022年制造业单项冠军企业（产品）培育遴选和复核评价工作的通知 [Notice on the selection and review evaluation of manufacturing single champion enterprises (products), 2022], MIIT, March 11, 2022

6 MIIT occasionally makes small revisions to earlier batches of "single champion" companies. Here, we build our data set on the original, unrevised version of each batch of "single champions."

**Criteria for selecting "single champions"**

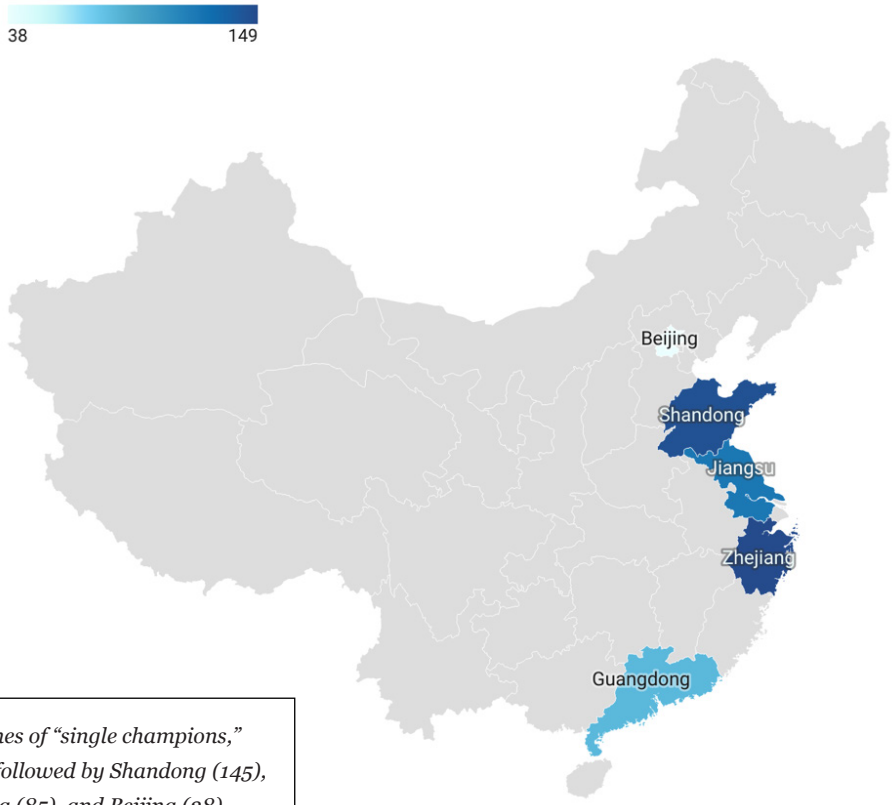
| Broad metric | Specific metric | Demonstration single champions | Cultivation single champions |
|---|---|---|---|
| Market concentration | Number of products in the particular market segment | 1 – 2 | 1 – 2 |
| | Revenue from market segment product sales as share of overall business revenue | > 70% | > 50% |
| Market position | Global market share of the leading product | Top 3 globally | Top 5 globally / top 2 domestically |
| Technical level | Production technology and process, product quality, etc. | Globally leading | Domestically leading |
| Business performance | Profit ratio | Exceeds overall level of enterprises in the same industry | Higher than overall level of enterprises in the same industry |
| Market focus | Time engaged in the relevant market segment | ≥ 10 years | ≥ 3 years |

Source: MIIT

MIIT's involvement in "single champion" companies goes beyond selecting them. According to the 2016 implementation plan, MIIT officials engage in "dynamic management" of "single champions," carrying out an audit every three years to assess whether the companies continue to meet the selection criteria. Companies in the "cultivation" category are judged on their progress toward becoming proper "demonstration" companies.

"Single champions" benefit from preferential policies at both the national and provincial level. For example, nationally, MIIT has pledged to give "priority support" to "single champions" applying for various government funds related to technological upgrading, industrial infrastructure enhancements, and energy saving and emission reduction projects. Provincially, different provincial governments provide different types of support. For example, Anhui offers "factor support" on energy, electricity, and land use for companies in the "cultivation" category, and one-off bonuses to companies selected in MIIT's "demonstration" category. Zhejiang, which has the highest concentration of "single champions" in China by province or region, offers grants to "demonstration" and "cultivation" companies based on a percentage of their R&D expenses, and gives "single champions" priority support from provincial industrial investment funds.

### Top five provinces/regions with the most "single champions"




*Note: In the first six batches of "single champions," Zhejiang leads with 149, followed by Shandong (145), Jiangsu (122), Guangdong (85), and Beijing (38).*

### Breakdown of types of "single champion" companies by batch

| | Batch 1 | Batch 2 | Batch 3 | Batch 4 | Batch 5 | Batch 6 | Batch 7 | Total |
|---|---|---|---|---|---|---|---|---|
| **Year announced** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **-** |
| **Demonstration companies** | 54 | 71 | 68 | 64 | 89 | 118 | 140 | 604 |
| **Cultivation companies** | 44 | 20 | 26 | - | - | - | - | 90 |
| **Single champion products** | - | 36 | 66 | 60 | 95 | 141 | 194 | 592 |
| ***Total*** | - | - | - | - | - | - | - | **1286** |

Source: MIIT

**Top industries represented in "single champion" companies, by percentage share**

| Industry | Percentage share among all "single champions"* |
|---|---|
| Industrial appliances and machinery | 23.6 |
| Chemicals | 10.2 |
| Materials | 9.0 |
| Metals, minerals, and related manufacturing | 7.7 |
| Electronics and related materials | 5.8 |
| Electrical equipment and appliances | 7.4 |
| Automotives | 5.4 |
| Industrial intermediates and hardware | 3.9 |
| Transportation equipment | 3.2 |
| Renewable energy-related equipment and materials | 5.1 |

*Note: This includes "single champions" in the demonstration, cultivation, and product categories

"Single champion" companies indicate where China has built, and/or is seeking to consolidate, industrial leverage across different industry chains and their constituent nodes. They also highlight what can be obscure and underappreciated fields in which China has developed such leverage and that it has identified as strategically important. In addition, tracking changes in "single champion" lists over time can offer snapshots of China's evolving industrial capacity and priorities: An increase in the number of "single champions" in a particular field would indicate heightened competency and influence, for example.

## *Defining "little giants"*

The concept of "little giants" was formally defined in MIIT's 2018 "Notice on work to cultivate specialized and advanced 'little giant' enterprises:"

> ...the best of the 'specialized and advanced' SMEs, [little giants] focus on niche market segments, with strong innovation ability, high market share, mastery of key core technology, and that are frontrunners in quality and efficiency.[7]

7 专精特新 "小巨人" 企业培育工作的通知 [Notice on work to cultivate specialized and advanced 'little giant' enterprises" ], MIIT, November 26, 2018.

According to the criteria outlined in the 2018 notice, "little giants" must have:

- Between 100 million and 400 million RMB in annual revenue,
- robust profit growth,
- low asset-to-liability ratios,
- high research and development expenditure,
- a high degree of specialization in their market niches, and
- leading market share at the national or provincial level.

The "little giant" designation is valid for three years. Firms can re-apply for that designation or move up the ladder to apply as a "single champion" company.

**Criteria for selecting "little giants"**

| Broad metric | Specific metric | Little giants |
|---|---|---|
| Business performance | Annual revenue | 100 million to 400 million RMB |
| | Two-year average of net profit growth rate | > 10% |
| | Asset-to-liability ratio | ≤ 70% |
| Specialization | Time engaged in the relevant market segment | ≥ 3 years |
| | Main business income as share of overall operating income | > 70% |
| | National- or provincial-level market share | Top-ranked |
| Innovation | Two-year average of R&D expenditure | Highest among its peers in the same industry |
| | R&D personnel as share of headcount | ≥ 15% |
| | Number of invention patents related to the main product | ≥ 5 |
| | Leading or participatory role in setting international, national, or industry standards | ≥ 1 over the past two years |

Beijing has selected over 9,000 "little giants" to date. The selection process mirrors that of "single champions." To foster the growth of "little giants," China offers targeted state support to select firms. For example, from 2021 to 2025, the government has earmarked 10 billion RMB in subsidies for 1,000 "little giants."[8] The Chinese government also provides "little giants" with services to help their business growth, including consultation on whether and how to go public, cloud computing and industrial design services, and the application of intellectual property.

"Little giants" span a range of industries. An analysis of the 2,930 companies listed in MIIT's third batch of "little giants," released in 2021, shows that more than one in five are manufacturers of industrial appliances and machinery such as pressure valves, mining and drilling equipment, and construction equipment. Others are producers of electrical equipment, materials, chemicals, automotives and automotive parts, and electronics. According to MIIT, over 80% of all "little giants" are categorized as private enterprises, with the remainder either state-owned firms or joint ventures.[9]

**Top industries represented in Batch 3 of "little giant" companies, by percentage share**

| Industry | Percentage share of Batch 3 |
|---|---|
| Industrial appliances and machinery | 21.4 |
| Electrical equipment & appliances | 9.8 |
| Materials | 8.2 |
| Chemicals | 7.6 |
| Automotives | 5.0 |
| Electronics manufacturing | 4.7 |
| Industrial intermediate products | 4.3 |
| Metals and minerals | 2.8 |
| Semiconductors | 2.7 |
| Instruments and meters | 2.5 |

8 关于支持 "专精特新" 中小企业高质量发展的通知 [Notice on supporting the high-quality development of specialized and advanced SMEs], MIIT, January 23, 2021.

9 专精特新企业 '上市质量' 研究: 湖北位列中部四省第三位 [Specialized and advanced enterprises' 'listing quality' research: Hubei is ranked third among the four central provinces], 21 Jingji, July 20, 2022; 第四批专精特新 '小巨人' 公示, 民营企业占比超八成 [Notice of fourth batch of specialized and advanced 'little giants,' private enterprises make up over 80% ], Yicai, August 30, 2022.

There are similarities between the industry breakdowns of "single champions" and "little giants." In both, industrial appliances and machinery make up around one-fifth of all companies. Meanwhile, electrical equipment and appliances, materials, and chemicals rank in the top five industries for both "single champions" and the third batch of "little giants." This is not surprising: Manufacturing is dependent on machines and raw material inputs.

The differences in the makeup of "single champion" and "little giant" lists can be telling, too. Metals, minerals, and related manufacturing make up 6.6% of "single champions," but only 2.8% of the third batch of "little giants." This may reflect China's already-dominant position in the production of many key metals and minerals. Similarly, renewable energy-related equipment and materials make up 3.6% of "single champions," but only 1% of the "little giants" batch, a reality that reflects China's industrial strength in key renewable energy equipment areas, including wind turbines and solar panels.

By contrast, among the third batch of "little giants," semiconductor-related firms rank ninth by frequency, compared to fourteenth among "single champions" – consistent with the reality that China is continuing, in real-time to develop its semiconductor industry, technology, and influence. That is not of course to say that the "single champion" and "little giant" lists do not reflect significant Chinese semiconductor capacity and leverage. For example, in a clear instance of China's asymmetric competitive approach, the demonstration "single champion" Xi'an LONGi Silicon Materials Co., Ltd. dominates the semiconductor value chain's upstream as the world's largest silicon wafer supplier, with 46% of global market share in 2021.[10]

## *The strategic implications of "single champions" and "little giants"*

"Single champions" and "little giants" are core to China's efforts to become more self-sufficient in material and technological resources, avoid vulnerable "chokepoints" in supply chains where the loss of access to a particular input or technology can imperil entire industries, and wield increased influence and control over global manufacturing.

The 2016 implementation plan for "single champions" makes these aims clear. It notes:

> ...single champion enterprises are the cornerstone of manufacturing innovation and development... [they provide] strong support for achieving the strategic goal of becoming a manufacturing superpower; and are conducive to the integration of resources in the global context, occupying the dominant position in the global industrial chain, and enhancing the international competitiveness of manufacturing.[11]

10 "LONGi releases Q1 2021 and full year 2020 results," LONGi, April 29, 2021.

11 Implementation plan for cultivating and upgrading manufacturing single champions, MIIT, March 16, 2016

If "single champions" are the recognizable faces of China's manufacturing industry, then "little giants" represent the foundation on which those globally leading enterprises are built. As one article in *People's Daily* put it: "If the country is to have a strong enterprise at the head of the value chain, then the chain must also have a number of 'specialized and advanced' SMEs to form the chain links; both the chain head and chain body are indispensable."[12]

To give an example of the interplay between "single champions" and "little giants," consider two "little giants:" Xinjiang-based "little giant" CRRC Hami Electric Co., a subsidiary of the state-owned CRRC Corp., specializes in making direct-drive permanent magnet wind turbines and related accessories; Hebei-based ONOFF Electric Co., Ltd. makes wind power converters. According to another *People's Daily* article, both "little giant" companies have partnered with the "single champion" Xinjiang Goldwind Science & Technology Co., Ltd., the multinational wind turbine manufacturer with offices and facilities throughout Asia, Europe and the Americas. Goldwind turbines incorporating technology from both CRRC Hami Electric and ONOFF Electric have been exported to Central Asia and Eastern Europe, according to the article.[13] Xinjiang Goldwind will be discussed further as one of three case studies of "single champions" in a following section.

Taken together, the "single champions" and "little giants" reflect Beijing's efforts to develop what Dong Jingmei, a researcher at the State Information Center's economic forecasting department, calls a "national level…ladder from 'specialized and advanced' SMEs, to 'specialized and advanced' little giant enterprises, to manufacturing single champions, in a cultivation hierarchy."[14] This hierarchy enables the Chinese government to incubate and guide thousands of manufacturing firms – to support China's overarching ambition to become a global manufacturing superpower.

China's state-led efforts to shape the composition and structure of various value chains that make up its domestic manufacturing base—down to the level of specific intermediate inputs, materials, and core technologies—arguably overturns a key tenet in the economic orthodoxy of globalization. That orthodoxy optimizes for the efficiency gains of offshoring low value-add segments of the manufacturing process based on the theory of comparative advantage. By contrast, China prioritizes industrial security and influence over efficiency. Beijing pursues those priorities by investing in domestic manufacturing capabilities across upstream and downstream segments of value chains – including those that economic orthodoxy would suggest it rely on imports for – for the sake both of bolstering domestic self-sufficiency and of securing positions of dominance in international industry that might be converted into leverage.

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12 让专精特新中小企业茁壮成长 [ 'Let the specialized and advanced SMEs thrive' ], People's Daily, October 19, 2021.

13 [新能源产业的"压舱石" ( "小巨人" 的进击之路 4) [Ballast of the New Energy Industry (The Road to Progress of the "Little Giant" 4)], People's Daily, December 24, 2021.

14 Dong Jingmei, 新发展格局构建下的隐形冠军培育路径, [The cultivation path for hidden champions under the construction of the new development pattern], China Development Observation, November 10, 2021.

*China's state-led efforts to shape the composition and structure of various value chains that make up its domestic manufacturing base—down to the level of specific intermediate inputs, materials, and core technologies—arguably overturns a key tenet in the economic orthodoxy of globalization.*

Liu Zhibiao, executive director of the Yangtze River Delta Economic Development Research Center at Nanjing University, underscores this reality, arguing that transforming China into a manufacturing superpower that is resilient to exogenous shocks must necessarily require rethinking the classical economic logic of comparative advantage. He writes:

> To extend the industrial chain upward and cultivate 'single champions' in [global value chains], we need to actively abandon certain economic theories of the past, such as not implementing the so-called 'play up strengths and avoid weaknesses' strategy guided by the theory of static comparative advantage, and giving up on catching up or investing in certain upstream segments of [global value chains] that are highly knowledge- and technology- intensive. Instead, we should be guided by the theory of dynamic competitive advantage, implement the strategy of 'building on our strengths to make up for our weaknesses', and make every effort to widen development bottlenecks.[15]

In this process, Beijing benefits from the reality that other international competitors, including the US, continue to hew to the traditional economic playbook of globalization, and therefore not only fail to protect against Beijing industrial offensive but also support it both by offshoring to China and directly investing capital in China's champions.

15 "隐形冠军" 决定着中国迈向制造强国的关键点 [ 'Hidden champions' determine the key point for China to become a manufacturing power], 21 Jingji, August 11, 2022.

# Analytic Insight to be Gleaned from Single Champions and Little Giants

While the "single champions" and "little giants" programs help Beijing foster asymmetric strategic advantage, they also constitute a valuable analytical asset for observers of Chinese industrial policy – and those considered about Beijing's industrial project. The "single champion" data set effectively constitutes a list of where, whether in Internet of Things modules or axial flow control valves, Beijing has secured outsized control over critical industrial nodes with policy guidance and support**.** The "little giant" data set delineates where Beijing sees opportunity, is cultivating such control, and/or diagnoses weaknesses in its existing industrial layout. Taken together, these offer a detailed portrait of China's industrial capabilities and priorities, the entities behind those, and relative US and Chinese strengths. Some case studies serve to illustrate the point.

## *Case Study: Shanghai Quectel Wireless Solutions Co., Ltd.*

Shanghai Quectel Wireless Solutions Co., Ltd (Quectel). Quectel designs and manufactures wireless communication modules for the Internet of Things (IoT). It earned its "single champion" designation under the product category in 2019, for its cellular wireless communication modules.

Also known as IoT modules, cellular modules are small electronic devices embedded in different machine and objects that can send and receive data over wireless networks. These modules are necessary components across the spectrum of connected technologies, including vehicles, drones, intelligent factories, robots, and power networks. Quectel makes a range of cellular modules that use different wireless technologies, covering various bandwidths and speeds. Sales of cellular modules represented over 95% of Quectel's revenues in 2020, according to Tianfeng Securities.[16]

Quectel dominates the wireless modules market both internationally and domestically. Globally, the company commanded 38.1% of the cellular module market Q1 2022.[17] Its closest competitor, also a Chinese company, had a 8.6% global share. The only non-Chinese cellular module provider in the global top 5 by market share in Q1 2022 was the Italy-founded, US-headquartered Telit. In July 2022, Telit acquired the cellular IoT business of French multinational Thales to form Telit Cinterion.[18] Together with Thales' share of 3.7% of the global cellular module market, Telit Cinterion now has 8.3% of the global market share, behind Quectel and Fibocom.

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16 Tianfeng Securities, "移远通信(603236): 春风化雨万物峥嵘，物联网模组龙头有望持续高增长" [The spring breeze and the rain make all things prosperous; IoT module leader expected to continue high growth], August 3, 2021.

17 Soumen Mandal, "Quectel, Fibocom & Sunsea Capture Half the Cellular IoT Module Market in Q1 2022," Counterpoint Research, June 23, 2022 https://www.counterpointresearch.com/global-cellular-iot-module-shipments-q1-2022/

18 "Telit and Thales announce the creation of a leading Western IoT Solutions provider: Telit Cinterion," Thales, July 29, 2022, https://www.thalesgroup.com/en/worldwide/security/press_release/telit-and-thales-announce-creation-leading-western-iot-solutions

**Global cellular IoT module shipments by vendor, Q1 2022**

| Company | Country | Market share, % |
|---|---|---|
| Quectel | China | 38.1 |
| Fibocom | China | 8.6 |
| Sunsea | China | 5.7 |
| Telit | US | 4.6 |
| China Mobile | China | 4.6 |
| Thales | France | 3.7 |
| MeiG | China | 3.2 |
| Sierra Wireless | Canada | 3.2 |
| u-blox | Switzerland | 2.2 |
| Foxconn | Taiwan | 2.2 |
| Others | Others | 23.9 |

Source: Counterpoint Research

**Chinese domestic IoT module shipments by vendor, 2020**

| Company | Market share, % |
|---|---|
| Quectel | 47 |
| Fibocom | 10 |
| Sunsea AIoT | 8 |
| Neoway | 7 |
| Cheerzing | 6 |
| MeiG | 5 |
| Gosuncn | 3 |
| Others | 15 |

Source: IoT Analytics

This creates a major dependency. Huawei's growing influence in international telecommunications markets has already raised security and economic alarms in the United States and internationally. But thus far, that conversation has ignored the more foundational, if less obvious, threat of established Chinese dominance at the upstream of the IoT industry, as reflected in Quectel's market share – and revealed in the "single champion" data set.

That said, a deeper dive into Quectel suggests a Chinese weakness and US strength of strategic import: Though Quectel commands vast swathes of the global cellular module market, it relies on cellular chipsets from foreign semiconductor companies. The cellular chipset is the foundation of wireless connections, performing basic tasks like generating frequencies and authentication that are required for establishing and maintaining connections to the Internet or Internet of Things.[19] The cellular module, meanwhile, is a package of electronics that includes the chipset and other hardware and software components to improve cellular connections.

According to Quectel's prospectus, the chipset made up over 82% of the company's raw material costs in 2018. Two of Quectel's major chipset suppliers are Qualcomm and Taiwan's Mediatek, which respectively constitute 29.15% and 10.82% of the company's total raw materials procurement costs.[20] Quectel also procures chips from Intel. Together, chipsets from US firms comprise nearly one-third of Quectel's input procurement costs, a level that the company cited as a risk factor in its prospectus.

## *Case Study: Southwest Aluminum (Group) Co., Ltd.*

Southwest Aluminum (Group) Co., Ltd (Southwest Aluminum) offers another case of underappreciated reliance on China revealed by the "single champion" data set – this one in a military-relevant, heavy industry domain.

Southwest Aluminum is a subsidiary of the state-owned Aluminum Corporation of China (Chinalco).[21] More specifically, it is a wholly-owned subsidiary of Chinalco Advanced Manufacturing, a conglomerate of 12 companies set up in 2019 under Chinalco to focus on high-end aluminum products.[22] Two of Chinalco Advanced Manufacturing's constituent companies are "single champions:" Southwest Aluminum and Northeast Light Alloy. Southwest Aluminum is designated as a "single champion" under the product category twice, in 2020 and 2021, for two different products: aerospace aluminum forged rings and high-precision aluminum-lithium alloys. Northeast Light Alloy is designated under the product category for its 7000-series aluminum alloy sheets for aerospace uses.

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19 "Cellular modems and vs. ceullar modules," Novotech, https://novotech.com/cellular-modems-vs-cellular-modules/

20 "上海移远通信技术股份有限公司首次公开放行股票" [Quectel Wireless Solutions prospectus], Quectel Wireless Solutions, July 3, 2019,

21 '西南铝简介," Southwest Aluminum (Group) Co., Ltd.,

22 中铝高端制造公司[Chinalco Advanced Manufacturing Co., Ltd.].

Aerospace aluminum forged rings are critical for developing heavy carrier rockets. High-precision aluminum-lithium alloys are necessary components in aircraft and spacecraft for their high strength-to-weight ratio. The US Defense Logistics Agency lists them as "materials of interest."[23]

According to China Non-Ferrous Metal News, China is the world's largest producer of aluminum forgings, accounting for 48% of global output in 2020. The United States ranks second, followed by Japan, Germany, and Russia.[24] While there is limited publicly available data on the relative global market shares of different companies in aerospace aluminum forgings and high-end aluminum alloys, US firms reportedly made up 35% of global output of aerospace aluminum products in 2016.[25] That is similar to US firms' 34.3% share of global revenue from aerospace forgings (which includes aluminum, titanium, and steel) in 2019.[26] And while the US retains significant market share in aerospace aluminum products, international competition is fierce. For example, US-headquartered Novelis, a world leader in flat-rolled aluminum products including for aerospace, lists Southwest Aluminum and its parent Chinalco as one of its primary competitors.[27]

Designating Southwest Aluminum and Northeast Light Alloy as "single champions," specifically for their aerospace-related aluminum products, clearly indicates emphasis on the area on the part of MIIT, and that there will likely be significant investment in the field in the years ahead.

23 "Materials of Interest," Defense Logistics Agency, https://www.dla.mil/Strategic-Materials/Materials/

24 中国铝合金锻造产业矗立世界潮头[China's aluminum alloy forging industry stands at the forefront of the world], China Non-Ferrous Metal News, February 23, 2021.

25 由铝板应用现状和趋势看镁板发展前景 [From the current situation and trends in the application of aluminum plates to assess development prospects of magnesium plates], China Non-Ferrous Metal News, June 14, 2016.

26 "Global Aerospace Forging Market Size & Share Report, 2027," Grandview Research, https://www.grandviewresearch.com/industry-analysis/aerospace-forging-market

27 Novelis, "Form 10-K," May 11, 2022 https://sec.report/Document/0001304280-22-000030/

## *Case Study: Xinjiang Goldwind Technology Co., Ltd.*

Xinjiang Goldwind Technology Co., Ltd. (Goldwind) is a major manufacturer of wind turbines. Founded in 1998, it earned its "single champion" designation in 2016, in the demonstration category, for its direct-drive permanent magnet wind turbines. It is now the world's second largest supplier of wind turbines, taking 11.8% of global market share in 2021, behind Denmark's Vestas.[28] Goldwind is also the world's third-largest supplier of offshore wind turbines, with 13.3% of global market share in 2021, behind China's Sewind and Mingyang. Altogether, Chinese companies make up more than 75 percent of the global offshore wind turbine market (by share of new installations) and 7 of the world's top ten companies. Domestically, Goldwind is the largest player in that field with 20% of China's market share.[29]

**Global wind turbine suppliers by share of new installations**

| Company | Country | Market share, % |
|---|---|---|
| Vestas | Denmark | 17.7 |
| Goldwind | China | 11.8 |
| Siemens Gamesa | Germany/Spain | 9.7 |
| Envision | China | 8.6 |
| GE Renewable Energy | US | 8.5 |
| Mingyang | China | 6.8 |
| Windey | China | 6.7 |
| Nordex Acciona | Germany/Spain | 6.3 |
| Sewind | China | 5.5 |
| CSSC Haizhuang | China | 3.4 |
| Dongfang | China | 3.2 |
| CRRC | China | 3.2 |
| SANY | China | 3.1 |
| Energcon | Germany | 2.4 |
| United Power | China | 1.2 |
| Others | - | 1.9 |

Source: Global Wind Energy Council

28 Global Wind Energy Council, "Wind turbine suppliers see record year for deliveries despite supply chain and market pressures," May 19, 2022.

29 Janet Wood, "Windey becomes one of China's top three turbine makers in 2021 – BloombergNEF," Wind Power Monthly, March 11, 2022.

**Global offshore wind turbine suppliers by share of new installations**

| Company | Country | Market share, % |
|---|---|---|
| Sewind | China | 21.6 |
| Mingyang | China | 19.5 |
| Goldwind | China | 13.3 |
| Vestas | Denmark | 12.2 |
| Siemens Gamesa | Germany/Spain | 11.4 |
| CSSC Haizhuang | China | 10.3 |
| Dongfang | China | 5.5 |
| Envision | China | 5.0 |
| Harbin Electric | China | 0.6 |
| Hitachi | Japan | 0.5 |

Source: Global Wind Energy Council

While ostensibly a private company, Goldwind's largest shareholders are state-owned. The state-owned Xinjiang Wind Energy Co., Ltd. has an 11.78% stake in Goldwind. The state-owned China Three Gorges Renewables (Group) Co., Ltd. has an 8.35% stake. China Three Gorges Renewables itself owns a 43.33% stake in Xinjiang Wind. Together, the two state-owned entities control over 20% of Goldwind.[30]

30 新疆金风科技股份有限公司 2021 年年度报告摘要 [Xinjiang Goldwind Technology Co., Ltd. 2021 Annual Report Summary], Xinjiang Goldwind, March 25, 2022.

## *Case Study: China's Space Industry*

The value of the "single champions" and "little giants" data sets goes beyond identifying specific nodes of industrial dependence – and the Chinese companies operating in them: These data sets also provide an analytical foundation for assessing China's development, and the competitive balance, across strategic value chains and sectors.

The space industry offers one such example. Beijing has designated the industry as "strategic and emerging."[31] While the US is an incumbent global leader in space, the White House acknowledges that the current moment represents "the cusp of historic changes in access to and use of space," offering both opportunities and "new challenges to US space leadership."[32] China aims to capitalize on this moment of change to accelerate its advancement in the space industry. Accordingly, the space-related industry is well represented – and increasingly so – across "single champion" and "little giant" companies.

The "single champions" identified thus far include at least 18 companies operating in the space and/or satellite industry (see table). Seven of those were designated in the most recent, seventh, batch, published in October 2022, suggesting a leap in Chinese industrial capacity in the field. With that capacity comes dependence on the part of the international system. GRIPM Advanced Materials, for example, which focuses on copper-based metal powders used in additive manufacturing of aerospace components, has 37.6% of global market share.[33] Hytera Communications Co., Ltd is the second largest vendor globally of digital mobile radio terminals; its 2017 acquisition of Canada's Norsat – the world's largest vendor of low noise block down converters, a key component of every satellite dish[34] – catapulted Hytera into the satellite communications field.[35]

31 "战略性新兴产业分类(2018)" [Categorization of strategic and emerging industries (2018)], National Bureau of Statistics, November 7, 2018.

32 "United States Space Priorities Framework," White House, December 1, 2021, https://www.whitehouse.gov/wp-content/uploads/2021/12/united-states-space-priorities-framework-_-december-1-2021.pdf

33 2020年中国铜基金属粉末行业市场现状分析，未来需求量不断增加 [China Copper-based Metal Powder Industry 2020 Market Status Analysis, Future Demand Increasing], Huajing Research, October 29, 2021.

34 Norsat, "Form 20-F," March 23, 2017 https://www.sec.gov/Archives/edgar/data/748213/000117625617000066/norsatintl20f.htm

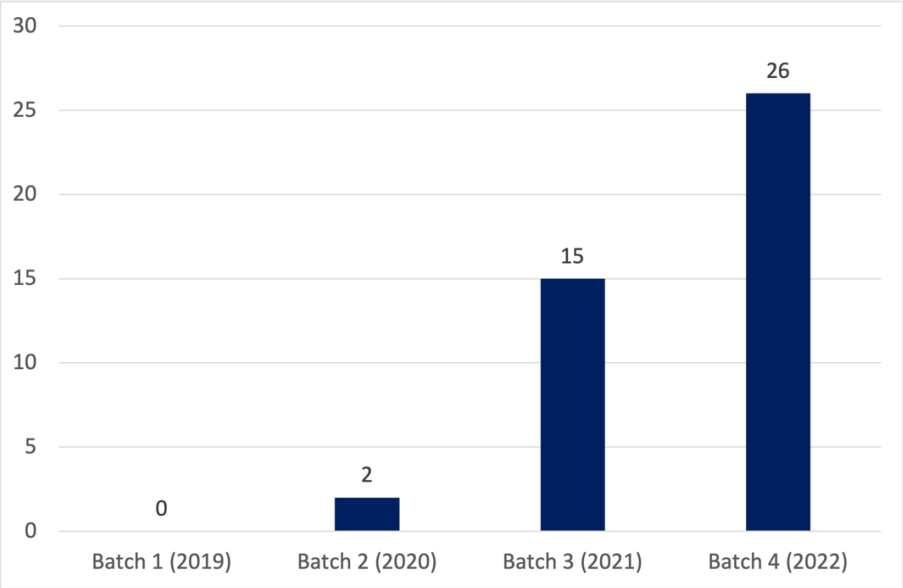
35 "Hytera Communications: well poised for upcoming boom," China Securities (Int'l) Research, November 13, 2017, https:/pdf.dfcfw.com/pdf/H3_AP201711141037088675_1.pdf?1601214330000.pdf

**Select space-related "single champions"**

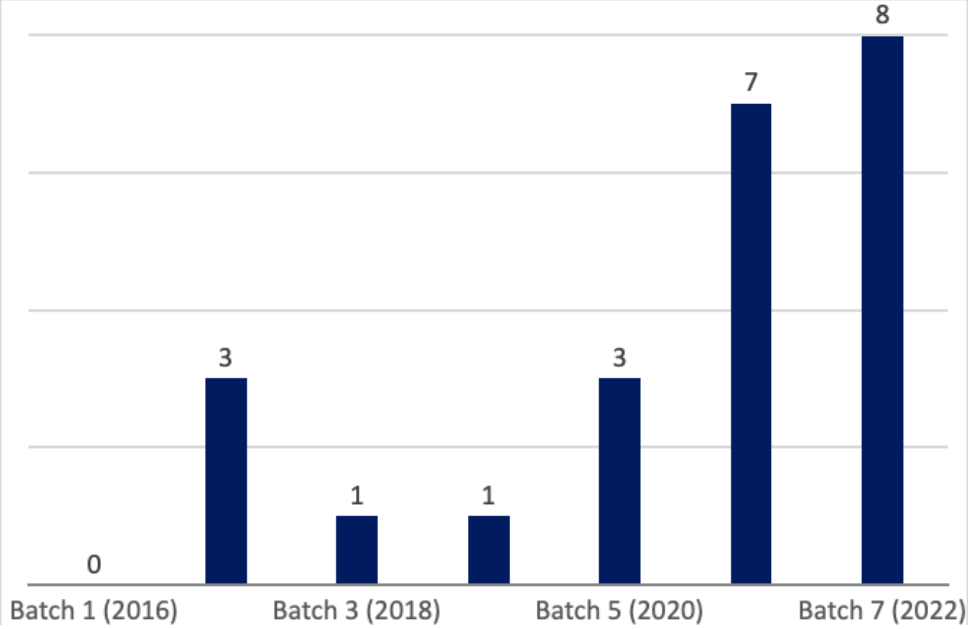
| Company name | Specific product | Batch |
|---|---|---|
| ChemChina Zhuzhou Rubber Research and Design Institute Co., Ltd. | Weather balloon | 2 |
| Western Superconducting Materials Technology Co., Ltd. | Titanium alloy rod for aviation | 2, 5 |
| Ningbo Yongxin Optical Co., Ltd. | Optical microscope | 2, 5 |
| Hytera Communications Co., Ltd. | Digital mobile radios; satellite terminals and components | 4 |
| Quanzhou Tiandixing Electronics Co., Ltd. | Digital satellite receiver | 6 |
| Southwest Aluminum Industry (Group) Co., Ltd. | Aerospace aluminum alloy forged ring; high-precision aluminum-lithium alloys | 5, 6 |
| Northeast Light Alloy Co., Ltd. | 7000-series aluminum alloy sheets for aerospace | 6 |
| GRIPM Advanced Materials Co., Ltd. | Advanced copper-based metal powder materials | 6 |
| Hangzhou Zhongke Microelectronics Co., Ltd. | Beidou navigation chips and modules | 6 |
| Space Star Technology Co., Ltd. | Satellite application technology equipment | 6 |
| Guangzhou South GNSS Navigation Co., Ltd. | Beidou high-precision satellite navigation receiver | 6 |
| Beijing Compo Advanced Technology Co., Ltd. | Alloy solder powder for microelectronic interconnection | 7 |
| Guizhou Aerospace Technology Development Co., Ltd. | Civil aviation engine case | 7 |
| Guangdong Galanz Microwave Living Appliance Manufacturing Co., Ltd. | Microwave oven, including for use in space | 7 |
| Bichamp Cutting Technology (Hunan) Co., Ltd. | Bi-metal band saw blades | 7 |
| Aerospace Precision Products Co., Ltd. | Aerospace fasteners, including for rockets and satellites | 7 |
| Wuxi Paike New Material Technology Co., Ltd. | Medium and large aerospace special alloy precision ring forgings | 7 |
| Shanghai CHC Navigation Technology Co., Ltd. | Beidou high precision GNSS receiver | 7 |

As with single champions, identification of space-related "little giants" has grown significantly of late. Beijing has identified at least 43 "little giants" operating in the space industry thus far. The first batch of "little giants," declared in 2019, featured no space-related companies and the second, published in 2020, featured 2. But the 2021 third batch listed 15 space-related "little giant" companies – and the 2022 fourth batch 26.

**Space-related "little giants," by batch (and year)**




**Space-related "single champions," by batch (and year)**



These space-related "single champions" and "little giants" span the full industrial chain, from upstream inputs to downstream applications. Together, they reflect a state-led effort to build a domestic space industry chain that is globally competitive, has a high degree of self-reliance, and minimizes the number of potential chokepoints where a shortage of a particular component risks sparking widespread disruptions. Some examples of space-related "single champions" and "little giants," and their positions in the industry chain, help to flesh out this picture.

**Northeast Light Alloy Co., Ltd. (Northeast Light)** was founded in 1952. Like Southwest Aluminum discussed above, it is designated a "single champion" under the product category. It specializes in aluminum alloy products and has supplied those materials to a number of spacecraft, rockets, and space station modules.[36] One example is the Tianzhou 2, which launched in May 2021. The cargo spacecraft uses key aluminum alloy materials from both Northeast Light and Southwest Aluminum.[37] Northeast Light provided aluminum alloy materials including plates, forgings, profiles, and tubes used in key parts and components of the spacecraft. Southwest Aluminum similarly supplied aluminum alloy materials, but for more structural uses such as the spacecraft's frame and surface.

Another upstream firm is **GRIPM Advanced Materials Co., Ltd., (GRIPM)**, founded in 2004 as a subsidiary of the state-owned GRINM Group. GRIPM specializes in advanced copper-based metal powders, and is listed under the "single champion" product category. In addition, GRIPM produces metal powders for additive manufacturing, or 3D printing. According to the company's prospectus, its 3D printing metal powders are used in aerospace components including satellite antennas and rocket engine combustion chambers and thrust chambers.[38]

GRIPM has a robust and growing international presence, with 37.6% of global market share of copper-based metal powders in 2020, according to Huajing Research.[39] Its overseas share of total revenue is also increasing, reaching 18.9% in 2021 from 15.2% the year before.[40] That global push has been years in the making. Its 2015 acquisition of the British metal powders manufacturer Makin Metal Powders – one of Europe's largest copper and copper alloy powders producers[41] – paved the way for GRIPM's entry into the European market.

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36 浩瀚宇宙 '问天' 畅游—东轻材料为国家航天事业再添新功 [Wentian tours the vast universe—Northeast Light adds new capabilities to the national space industry], Chinalco, July 26, 2022.

37 "'天舟' 飞天 续写'中铝造'骄傲" [Tianzhou launches, continues the pride of 'Made by Chinalco'], China Non-Ferrous Metals News, June 1, 2021.

38 招股说明书(申报稿) [Prospectus (Filing Draft)], GRIPM, June 17, 2020,

39 Huajing Research, October 29, 2021

40 有研粉末新材料股份有限公司 2021 年年度报告 [GRIPM annual report 2021], GRIPM, April 21, 2022,

41 Makin Metal Powders, http://www.makin-metals.com

In December 2021, GRIPM spun off its additive manufacturing unit as a separate company.[42] GRIPM maintains an 80% stake in the new entity directly and through a wholly-owned subsidiary. That subsidiary, Beijing Compo Advanced Technology Co., Ltd., is itself a "little giant" specialized in alloy solder powders. It has worked with the China Academy of Launch Vehicle Technology to produce copper-based alloy powders for rocket motor combustion chambers, including copper-zirconium powders, copper-silver-zirconium powders, and copper-chromium-niobium powders.[43] The China Academy of Launch Vehicle Technology is designated on the US Treasury Department's Non-SDN Chinese Military-Industrial Complex (CMIC) Companies List.

**Hangzhou Zhongke Microelectronics Co., Ltd. (Zhongke Microelectroncis)** is a "single champion" in the demonstration category, specializing in Beidou navigation and positioning chips and modules. The company was set up under the Institute of Microelectronics of the state-run Chinese Academy of Sciences in 2004, and is fully state-owned: The Institute of Microelectronics holds a 50.24% stake, while the state-owned Hangzhou High-tech Industrial Development Zone Asset Management Co., Ltd. owns the remaining 49.75%.[44] Zhongke Microelectronics's flagship product is a system-on-chip (SoC) that can support multiple global navigation satellite systems (GNSS), including Beidou, GPS, and GLONASS. The US Commerce Department placed Zhongke Microelectronics on the Entity List in 2021.[45]

**Ningbo Yongxin Optical Co., Ltd. (Yongxin Optical)** was founded in 2007 and is designated as a "single champion" under the demonstration category for its expertise and market leadership in optical instruments and components. The bulk of Yongxin Optical's revenues come from exports. Major international customers for its optical microscopes and optical components include Nikon, Leica Microsystems, Honeywell, and Sanmina.[46]

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42 有研粉材新设增材及特种粉体材料子公司 [New subsidiary for additive and special powder materials], GRINM, December 29, 2021,

43 增材及特种粉体材料产业公司化运营项目可行性研究报告 [Feasibility Study on the Corporate Operation of the Additive and Special Powder Materials Industry], GRIPM, November 2021.

44 杭州中科微电子有限公司 [Hangzhou Zhongke Microelectronics Co., Ltd.], Chinese Academy of Sciences Holdings.

45 "Addition of Entities and Revision of Entries on the Entity List; and Addition of Entity to the Military End-User (MEU) List," Federal Register, November 26, 2021, https://www.federalregister.gov/documents/2021/11/26/2021-25808/addition-of-entities-and-revision-of-entries-on-the-entity-list-and-addition-of-entity-to-the

46 2021 年年度报告 [2021 annual report], Yongxin Microelectronics, April 22, 2022.

Domestically, Yongxin Optical is a supplier for the Chinese space program. Specifically, its fluorescence microscope has been used aboard the Tianhe space station module to observe changes in living cells under microgravity conditions; the company notes that its space microscope technology will be "important equipment for the development of space life science and technology.[47] As the US space agency NASA notes, studying cellular response to altered gravity will be key to developing long-term space exploration.[48]

In addition, Ningbo Yongxin also develops satellite lenses. Its lenses have been used on the Chang'e 2, Chang'e 3, and Chang'e 4 lunar probes.[49]

**Space Star Technology Co., Ltd. (Space Star)** is a wholly-owned subsidiary of China Spacesat Co., Ltd., which itself is a subsidiary of the state-owned China Aerospace Science and Technology Corp. (CASC). It is a "single champion" under the product category, specializing in satellite application technologies. The China Academy of Space Technology (CAST), the space agency under CASC, describes Space Star as "the backbone of satellite application for CASC and CAST."[50]

Space Star is positioning itself to be a major player in future digital infrastructures, noting on its website that "satellite applications in the Internet era are becoming one of the real infrastructures of modern society, just like electricity and roads."[51] The company's products span civilian, commercial, and military uses. Its parent company, China Spacesat Co., Ltd, has been designated on the US Treasury Department's Non-SDN CMIC Companies List.

**Guangzhou South GNSS Navigation Co., Ltd.** was founded in 2009 under South Group, a geographic information systems (GIS) solutions provider. Guangzhou South GNSS is designated as a "single champion" under the product category for its Beidou high-precision satellite navigation receivers. Among the company's flagship products are real-time kinematics positioning (RTK) receivers, which are used in surveying to correct for errors in GNSS positioning. According to Guangzhou South GNSS, the company in 2019 won the world's largest bid to date to sell over 3,300 RTKs to the Indonesia government.[52]

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47 Ibid.

48 "Space Station Shrinks Fluorescence Microscopy Tool," NASA, July 10, 2018 https://www.nasa.gov/mission_pages/station/research/news/ISS_Shrinks_Tool

49 "Satellite lenses," Yongxin Microelectronics.

50 Space Star Technology Co., Ltd., CAST.

51 卫星应用科普" [Satellite applications popular science], Space Star.

52 "3324 RTKs! SOUTH Won the Bid for the Largest Order in the World by Indonesian Ministry of Land and Resources," Guangzhou South GNSS, May 28, 2019.

# Conclusion

China's approach to competition focuses on the whole industry chain. That runs contrary to the US approach, which focuses on specific high margin nodes while outsourcing low value-add segments abroad. This US strategy, built on an orthodox view of globalization's merits, has delivered decades of growth-heavy quarterly reports for US companies and cheap goods and commodities for consumers, often fueled by offshoring capabilities. But it also entails inherent economic and national security risks, especially when it means critical nodes of industry chains are controlled by an authoritarian, adversarial power. Failing to grasp that reality, and neglecting to acknowledge China's asymmetric approach to competition, risks undermining US understanding of the extent of China's challenge, and Beijing's potential advantage.

What is needed is a clear reckoning with Beijing's competitive approach to global industry and business, and the risks it poses. A key first step is to assess the competitive balance across US and Chinese industry, including the nature of relative strengths and weaknesses, and where influence and dependencies are accruing.

The "single champions" and "little giants" data sets are an invaluable tool for doing this: They offer unmatched, granular insight into where China has built industrial leverage, where it plans to direct future investments, the entities behind this effort, and, in turn, where and how the United States and its allies should work to consolidate existing strengths and address weaknesses.

Finally, the "single champions" and "little giants" industrial programs should serve as a wake-up call for how advanced, sophisticated, and comprehensive Beijing's industrial offensive is – and the extent to which US national and economic security depends on China.

*Finally, the "single champions" and "little giants" industrial programs should serve as a wake-up call for how advanced, sophisticated, and comprehensive Beijing's industrial offensive is – and the extent to which US national and economic security depends on China.*

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