How China' s High-Tech Industry Can Catch Up with and Surpass the United States (Postprint)

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Abstract

In the 1980s, Deng Xiaoping made a strategic decision, and the state formulated the "863 Program," marking the inception of China' s high-tech innovation and industrial development. Following three decades of growth, the value-added of China' s high-tech industry reached 4.9% of GDP, establishing itself as a significant pillar industry of the national economy. The high-tech industry has demonstrated high growth rates in both value-added and employment, and has achieved catch-up and overtaking of the United States across multiple dimensions, including high-tech industry value-added, product export values, and export value-added. This accomplishment primarily stems from the mutual reinforcement and complementary driving effects between the high-tech industry and economic growth, which manifest as alignment between the life-cycle trends of economic development and high-tech industry development. Moreover, the high-tech industry exhibits pronounced externalities, serving to stimulate high growth in manufacturing, optimize economic structure, facilitate the transformation of trade development, and generate technology spillover effects. The high-tech industry has evolved into a leading industry, a crucial pillar industry, and a new growth engine for China' s national economic development. Looking forward, the objective is to transform the high-tech industry from large-scale to strong, from quantity-oriented to quality-oriented, from coarse to refined, from follower to leader, and to surpass the United States in quality innovation and other dimensions.

Full Text

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How China' s High-Tech Industry Catches Up with the United States

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Abstract

In the 1980s, Deng Xiaoping made a strategic decision that prompted the Chinese government to formulate the "863 Plan," launching China on its path of high-tech innovation and industrial development. After 30 years of growth, China' s high-tech industry added value reached 4.9% of GDP, making it an important pillar industry of the national economy. The high-tech industry has exhibited high growth in both added value and employment, achieving catch-up and surpassing the United States in high-tech industry added value, product export value, and export added value. This achievement is primarily attributable to the mutual promotion and complementary driving relationship between the high-tech industry and economic growth, manifested as consistency between economic development and the life-cycle trends of high-tech industry development. Moreover, the high-tech industry has significant externalities, playing a role in promoting high growth in manufacturing, improving economic structure, driving transformation in trade development, and creating technology spillover effects. The high-tech industry has become a leading industry, an important pillar industry, and a new growth engine for China' s national economic development. Looking forward, the goal is to transform China' s high-tech industry from large to strong, from quantity to quality, from coarse to refined, and from follower to leader, surpassing the United States in quality innovation and other aspects.

Keywords: high-tech industry, catch-up, life-cycle, multiple effects

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Manufacturing is the mainstay of the national economy, the foundation of the nation, the instrument of prosperity, and the basis of strength [1]. The high-tech industry represents the essence of manufacturing and the core of international competitiveness. All developed and emerging countries in the world regard the high-tech industry as a national strategic industry. Building China into a manufacturing powerhouse that leads world manufacturing development essentially means building China into a high-tech powerhouse that leads world high-tech industry development.

The concept of "high-tech industry" as an innovative concept originated and rose in Western countries. The National Academy of Sciences (NAS) publication *Technology, Trade and the U.S. Economy* defines the high-tech industry as an industry that primarily produces technology, playing a leading role in U.S. economic development [2].

According to the Organization for Economic Co-operation and Development (OECD) (2007) definition, the high-tech industry is divided into five sectors: aerospace manufacturing (aircraft and spacecraft), electronic computers and office equipment manufacturing (computers and office machinery), pharmaceuticals manufacturing, medical equipment and instrumentation manufacturing (testing, measuring, and control instruments, medical, precision and optical instruments), and communications and semiconductors [3].

According to the definition by China' s Ministry of Science and Technology (2013), the high-tech industry refers to manufacturing sectors with relatively high R&D intensity (i.e., the ratio of R&D expenditure to main business revenue) in the national economy, including: pharmaceuticals manufacturing, aerospace and equipment manufacturing, electronic and communication equipment manufacturing, computers and office equipment manufacturing, and medical equipment and instrumentation manufacturing. Information chemicals manufacturing is excluded from this study due to lack of statistical data [4]. The Ministry of Science and Technology (2013) definition corresponds one-to-one with the OECD (2007) definition.

In today's world, knowledge- and technology-intensive industries, which began in the late 1970s, have become the main growth sectors leading the global economy [5]. This also constitutes the international background for China' s catch-up development of high-tech industries.

This paper aims to analyze the development process and path of China' s high-tech industry. As a latecomer and laggard in the high-tech industry, how did China utilize late-mover advantages, opening-up advantages, independent innovation advantages, market scale advantages, and national policy promotion advantages to rapidly narrow the relative gap with the United States and become the only developing country to comprehensively surpass the United States?

This paper consists of five parts: The first part introduces Deng Xiaoping' s strategic vision for developing China' s high-tech industry as the historical starting point for China' s high-tech innovation and industrial development. The second part discusses in detail the development process of China' s high-tech industry, with the United States as the most important catch-up target. The third part analyzes the life-cycle and interrelationship between China' s high-tech industry and economic growth, reflecting economic catch-up and high-tech industry catch-up with the United States. The fourth part further analyzes four major effects of China' s high-tech industry: economic growth effect, structural optimization effect, trade development effect, and technology spillover effect. The fifth part provides a summary of the full paper, offering medium- and long-term future prospects based on a review of the high-tech industry' s development process.

1. Deng Xiaoping' s Strategic Vision and China' s Catch-up with the United States

After the reform and opening-up, Chinese leaders, particularly Deng Xiaoping, realized that the modern scientific and technological revolution was becoming a global trend. In 1978, in his speech at the opening ceremony of the National Science Conference, he pointed out that a series of emerging industries were flourishing worldwide, such as polymer synthesis, atomic energy, electronic computers, semiconductors, aerospace, and laser industries [6]. This became the international backdrop for Deng Xiaoping' s decision to open up to the outside world and an important political motivation for China to develop its high-tech industry almost simultaneously with developed countries.

Entering the 1980s, the United States, Europe, and Japan almost simultaneously launched high-tech revolutions. The United States pioneered the "Strategic Defense Initiative" (Star Wars Program), Europe followed with the "Eureka Program," and Japan formulated its "Ten-Year Science and Technology Revitalization Policy." This attracted great attention from China' s scientific and technological community.

In March 1986, four scientists—Wang Daheng, Wang Ganchang, Yang Jiachi, and Chen Fangyun—proposed to the state that China should track world advanced levels and develop its own high-tech capabilities. Deng Xiaoping made important instructions, and the State Council approved the "Outline of the High-Tech Research and Development Plan (the '863' Plan)." The plan selected seven fields, including biotechnology and information technology, that would have major impacts on China' s future economic and social development, establishing 15 thematic projects as breakthrough priorities to track world advanced levels. Thus, China' s independent high-tech innovation began, following and tracking the world' s high-tech frontiers.

The report of the 13th Party Congress in 1987 first proposed: "Pay attention to developing high-tech emerging technology industries" [7]. In 1988, Deng Xiaoping proposed that China must occupy a place in the world' s high-tech fields. He predicted that the next century would be one of high-tech development [8]. In 1991, Deng Xiaoping explicitly proposed "develop high-tech, achieve industrialization" [9]. In 1992, the report of the 14th Party Congress proposed that the construction of economic and technological development zones and high-tech industrial development zones should be rationally laid out, seriously managed, and actively explore international markets to develop an export-oriented economy [10]. Consequently, China' s high-tech industry began to take off, actively attracting and utilizing foreign capital and technology to develop international markets.

It can be argued that reform and opening-up became the broad context for China's high-tech industry development, and Deng Xiaoping's strategic decisions and direct promotion became important driving factors. According to his vision at the time, China should not only catch up with pioneers like Europe, America, and Japan but also occupy a place in the world' s high-tech fields. In reality, China has now become the world' s largest producer and exporter of high-tech products.

2. The Development Process of China' s High-Tech Industry: From Catch-up to Surpassing

China' s high-tech industry development exhibits a clear industrial life-cycle pattern, which can be divided into two 15-year periods:

(1) **Preparation and Growth Period: The First 15 Years**. From the mid-1980s to the late 1990s, China adopted a "two-legged walking" approach. On the one hand, it encouraged domestic scientific and industrial communities to support independent high-tech innovation according to national strategic needs and establish high-tech development zones. On the other hand, it actively attracted foreign investment, introduced, digested, and absorbed foreign technology, and developed an export-oriented high-tech industry. During this period, the high-tech industry was characterized by small scale, low product quality, insufficient technological innovation capability, and few core technologies [11].

(2) **Comprehensive Growth Period: The Second 15 Years**. China fully utilized both domestic and international markets and leveraged the advantages of both state-owned and non-state-owned economies [12]. Through industrialization pathways, it greatly accelerated the development of the high-tech industry, becoming the only developing country in the world to successfully catch up with the United States. This process roughly experienced three "Five-Year Plans" and achieved three leapfrog developments.

Based on data from the U.S. National Science Foundation and the World Bank, with a sample period of 2000–2015, the research results show:

First, since 2000, China' s high-tech industry has achieved dual high growth—high growth in added value and high growth in employment—rapidly realizing the major transformation from high-tech scientification to high-tech industrialization. From the "Tenth Five-Year Plan" to the "Twelfth Five-Year Plan" period, the growth rate of high-tech industry added value was significantly higher than that of non-high-tech industry added value and industrial added value growth rates. During 2001–2015, it was 2.46 times and 2.25 times higher respectively, with the "Tenth Five-Year Plan" period reaching as high as 3.59 times and 3.18 times (Table 1). In 2000, China' s high-tech industry added value was 181.85 billion yuan, increasing to 3,402.756 billion yuan by 2015, with an average annual growth rate of 22.42%, far exceeding the manufacturing added value growth rate of 10.50% during the same period. High-tech employment grew from 3.9 million in 2000 to 12.94 million in 2013, adding 9.04 million jobs with an average annual growth rate of 8.9%, significantly higher than the industrial employment growth rate during the same period.

Second, entering the 21st century, China evolved from a major high-tech country to the world's leading high-tech country. In 2000, China's high-tech industry added value accounted for 3.16% of the world total, rising to 29.08% by 2015 —an increase of 25.92 percentage points—surpassing the United States (Table 2 and Figure 1 [Figure 1: see original paper]).

The process of China' s high-tech industry development is essentially the rapid development of a "latecomer" and "laggard" and the process of catching up with and surpassing the United States. Using the catch-up coefficient of China's high-tech industry added value relative to the United States (i.e., the percentage of China' s main indicators relative to the United States, representing China' s high-tech industry development level relative to the U.S.), the development can be divided into four stages: The first stage was before 2000, when China' s catch-up coefficient relative to the U.S. was less than 10%, indicating a huge relative gap with the U.S. (at least 10 times). The second stage was the "Tenth Five-Year Plan" period after 2000, a period of rapid launch of China' s high-tech industrialization, with an average annual growth rate of 34.7% in high-tech industry added value. By 2005, China' s catch-up coefficient relative to the U.S. rapidly increased to 28.6%, substantially narrowing the relative gap with the U.S. (to about 3.5 times). The third stage was the "Eleventh Five-Year Plan" period, a continued acceleration phase in China's catch-up with the U.S., with an average annual growth rate of 22.0% in high-tech industry added value. By 2010, China' s catch-up coefficient relative to the U.S. increased to 57.1%, completing more than half of the catch-up process in just 10 years (2000–2010). The fourth stage was the "Twelfth Five-Year Plan" period, when China surpassed the U.S. in high-tech industry. Although the growth rate of high-tech industry added value decreased to 13.9% during this period, by 2015, China' s catch-up coefficient relative to the U.S. exceeded 100% (Table 2 and Figure 1). This indicates that in just five years (2010–2015), China not only completed the remaining half of the catch-up process but also achieved a historic breakthrough: from catch-up to surpassing. This shows that China has achieved catch-up and surpassing of the U.S. high-tech industry, becoming the world' s high-tech product factory in the true sense.

Third, China's high-tech products have also rapidly achieved catch-up with the U.S. in the world market. Using the catch-up coefficient of China' s high-tech product export value relative to the U.S., the development can be divided into four stages: The first stage was 1992–2000, when China' s catch-up coefficient relative to the U.S. increased from 4.1% to 21.1%, narrowing the relative gap with the U.S. from 24.4 times to less than 5 times. The second stage was the "Tenth Five-Year Plan" period after 2000. By 2005, China' s catch-up coefficient relative to the U.S. rapidly increased to 113.2%, already surpassing the U.S. The third stage was the "Eleventh Five-Year Plan" period. By 2010, China' s catch-up coefficient relative to the U.S. increased to 278.2%. The fourth stage was the "Twelfth Five-Year Plan" period. By 2014, China' s catch-up coefficient relative to the U.S. exceeded 358.8% (Table 3 and Figure 2 [Figure 2: see original paper]). This indicates that China has not only become the world' s high-tech product factory but also the true dominant player in the world high-tech product export market.

Fourth, China' s high-tech industry export added value has also surpassed that of the U.S. In recent years, trade accounting based on global value chains using added value has gradually replaced previous official trade statistics [15]. This overcomes the inflated phenomenon of calculating by total export value and better reflects a country' s industry position, particularly high-tech industry, in the global value chain and its dynamic changes. Analyzing by the proportion of China' s high-tech industry export added value in the world total, it increased from 8.33% in 2000 to 24.04% in 2014—an increase of 15.71 percentage points, or an average annual increase of 1.12 percentage points—reflecting China' s upward trend in the global high-tech product value chain. Conversely, the U.S. proportion continued to decline, from 17.76% in 2000 to 12.36% in 2014—a decrease of 5.40 percentage points, or an average annual decrease of 0.39 percentage points—indicating a downward trend for the U.S. in the global high-tech product value chain. Analyzing by China' s catch-up coefficient relative to the U.S., it increased from 46.90% in 2000 to 194.12% in 2010—an increase of 147.22 percentage points (Table 4)—reflecting catch-up and even surpassing during this period, after which it maintained this level.

It is particularly noteworthy that these research findings are basically consistent with the conclusions of the Asian Development Bank' s *Asian Economic Integration Report 2015* released in January 2016. The report shows that China' s share of Asia' s high-tech product exports increased from 9.4% in 2000 to 43.7% in 2014, ranking first in Asia—an increase of 34.4 percentage points—while Japan' s share decreased from 25.5% to 7.7% and South Korea' s share decreased from 10.7% to 9.4%. The report concludes that "China' s export value chain in Asia is shifting from low-tech products to high-tech products" [16].

3. The Life-Cycle of High-Tech Industry and Economic Growth

Both China' s economy and its high-tech industry have development life-cycles. For international comparison, we use data converted to a common currency using purchasing power parity (PPP) as recommended by the United Nations and World Bank [17], rather than exchange rates. Using the catch-up coefficient of China' s GDP (PPP, 2011 international dollars) relative to the U.S. to characterize the economic development life-cycle, we can identify four phases: preliminary growth period (1990–2000), when the catch-up coefficient increased from 16.60% to 35.79% (an increase of 19.19 percentage points, or 1.9 percentage points annually); rapid catch-up period (2000–2005), when the catch-up coefficient rose above 50% (an increase of 14.53 percentage points, or 2.9 percentage points annually); accelerated catch-up period (2005–2010), when the catch-up coefficient rose above 80% (an increase of 32.27 percentage points, or 6.45 percentage points annually); and surpassing period, when by 2015 the catch-up coefficient reached 108.79% (Table 5)—an increase of 26.2 percentage points, or 5.24 percentage points annually.

China's high-tech industry itself also has a development life-cycle. As previously described, using the catch-up coefficient of China' s high-tech industry added value relative to the U.S., it experienced four stages and achieved the transition from catch-up to surpassing.

Combining the curves of economic catch-up and high-tech industry catch-up creates a "dual catch-up" pattern of economic development and industrial development life-cycles (Figure 3 [Figure 3: see original paper]). In 1999, China' s GDP (PPP) catch-up coefficient relative to the U.S. was 34.36%, reaching 108.79% by 2015, while the ratio of high-tech industry added value to that of the U.S. rapidly increased from 6.18% to 100.49%. The high-tech industry' s life-cycle shows a significant co-cyclical relationship with the economic development cycle. They demonstrate the relationship between overall catch-up and partial catch-up, helping us better understand the interaction between the two.

(1) They reflect a spillover-driven relationship. Economic catch-up helps foster and promote industrial catch-up, particularly evident in the initial stage where the economic catch-up coefficient is higher than the industrial catch-up coefficient, with economic catch-up pulling industrial catch-up. Simultaneously, industrial catch-up helps promote and sustain economic catch-up. When the gap between the industrial catch-up coefficient and economic catch-up coefficient narrows, industrial catch-up can drive sustained economic catch-up. This mutual promotion significantly enhances the synergy between China's high-tech industry development and economic growth.

(2) They reflect a complementary-driven relationship. This includes inter-industry complementarity: high-tech industry development drives the development of upstream and downstream industries, reflecting technological complementarity. High-tech itself and its application create complementarity with medium-high, medium, and low technologies in other industries. National economic development also generates new demand, new value, and new markets for high-tech industry innovation and creation.

In international markets, combining the curves of merchandise export catch-up and high-tech product export catch-up creates a relationship between trade development and industrial development life-cycles (Figure 4 [Figure 4: see original paper]), showing consistency with the trends of economic development and industrial development life-cycles in domestic markets—that is, a continuous upward trend.

(1) In international markets, both merchandise exports and high-tech product exports demonstrate China' s strong international competitiveness relative to the U.S., particularly evident as the high-tech product export catch-up coefficient and merchandise export catch-up coefficient successively surpassed the U.S. in 2005 and 2007, respectively, further rising to 358.91% and 144.54% by 2014, showing that high-tech products are more competitive.

(2) The continuous improvement of high-tech products' global market share and international competitiveness means that on the one hand, strong high-tech product exports support merchandise export trade growth, and on the other hand, they further support domestic economic growth.

Thus, whether in domestic or international markets, both high-tech product added value and high-tech product export value demonstrate the development life-cycle of China' s high-tech industry, which is in a rising phase—consistent with the rising phases of China' s economy (GDP) and manufacturing. Conversely, we also find that the U.S. high-tech industry has passed its peak (marked by its highest share of the world total) and entered a declining phase, consistent with the declining phases of the U.S. economy (GDP) and manufacturing. This explains why China, as a laggard and latecomer in the high-tech industry, has "risen from behind" over the past 30 years, especially achieving "leapfrog development" over the past 15 years, not only rapidly catching up with but also surpassing the United States. This fully reflects that high-tech industry development itself is innovation-driven development, requiring conceptual innovation, institutional innovation, technological innovation, market innovation, and open innovation to grow from nothing to something, from small to large, from large to strong, making it a successful case of China' s innovation-driven development.

4. Four Major Effects of the High-Tech Industry

The high-tech industry, as an innovation and product of the world' s third industrial revolution, is significantly different from traditional manufacturing in many aspects, with obvious externalities, spillover effects, and innovation. For China, the most distinctive feature is its super-scale market, which inevitably generates multiple effects, such as promoting economic growth, optimizing economic structure, promoting trade development, and especially creating significant technology spillover effects.

4.1 Economic Growth Effect

(1) The high-tech industry has a significant growth effect. During 2000-2014, the direct contribution rate of the high-tech industry to economic growth reached 4.95% (Table 6), not only enabling the high-tech industry to rapidly grow into a leading industry of China' s national economic development but also becoming a new and important economic growth engine.

(2) The high-tech industry has a direct growth effect on manufacturing development, becoming a new growth engine for manufacturing. During

2000–2014, its direct contribution rate to manufacturing growth was 16.56% (Table 6).

The high-tech industry' s contribution to manufacturing and economic growth is significantly higher than its share of manufacturing and the economy, not only increasing the quantity of China' s economic growth but also improving the quality of China' s economic growth.

4.2 Structural Optimization Effect

As China's economic development shifts from factor-driven to innovation-driven, the growth of the high-tech industry has significantly improved the economic structure. In 2000, China' s high-tech industry added value accounted for 2.47% of GDP, exceeding 2% and becoming an emerging industry of the national economy. By 2005, it reached 4.73% of GDP (Table 7), exceeding 4% and becoming a pillar industry of the national economy. By 2015, China' s high-tech industry added value reached 4.89% of GDP, approaching 5% and becoming an important pillar industry.

It should be noted that the seven major fields of the currently established strategic emerging industries (energy conservation and environmental protection, new generation information technology, biotechnology, high-end equipment, new energy, new materials, and new energy vehicles) include the high-tech industry, whose added value share of GDP increased from about 4% in 2010 to 8% in 2015 [18], with the high-tech industry making the primary contribution.

(2) The high-tech industry has a direct growth effect on manufacturing, becoming a new growth engine for manufacturing. During 2000–2014, its direct contribution rate to manufacturing growth was 16.56% (Table 6).

The development of the high-tech industry has significantly improved China' s manufacturing structure, promoting the transformation of China' s manufacturing from low-end to high-tech manufacturing. In 1999, China and India were at similar stages of high-tech industry development, with China' s high-tech industry accounting for 6.23% of manufacturing added value, far below the U.S. level of 21.61% at the forefront of high-tech industry development. With the development of China' s high-tech industry, its share of manufacturing added value reached 14.52% in 2005 and 15.33% in 2014 (Table 8), significantly improving China' s manufacturing industrial structure. However, there remains a considerable gap compared with the U.S. share (24.71%), indicating that China' s transformation from traditional, medium-low-tech manufacturing to advanced, high-tech manufacturing is far from complete.

4.3 Trade Development Effect

China' s high-tech industry development has benefited from its rapid integration into international markets. The proportion of high-tech industry exports in manufactured exports increased from 18.98% in 2000 to 25.37% in 2014 (Table

9), rapidly improving the quality of China' s manufactured exports. Meanwhile, the high-tech industry's contribution to manufactured exports during 2000–2014 was 26.08% (Table 10), higher than its contribution to manufacturing growth, indicating that high-tech product exports rapidly drove manufactured exports.

4.4 Technology Spillover Effect

With the high-tech industry as the link, it has driven the rapid development of a large number of knowledge- and technology-intensive (KTI) industries, including manufacturing and services, as well as the information and communications technology (ICT) industry [19].

Regarding the KTI industry, in 2000, China' s world share was 2.68%, far below the U.S. share of 40.22%, with China's catch-up coefficient relative to the U.S. at only 6.65%. By 2010, China' s world share rapidly reached 6.98%, with its catch-up coefficient reaching 21.86%, an increase of 15.21 percentage points during the "Tenth Five-Year Plan" and "Eleventh Five-Year Plan" periods. During the "Twelfth Five-Year Plan" period, the acceleration effect became evident. By 2014, China' s world share reached 10.28%, with its catch-up coefficient increasing to 32.04% (Table 11), a growth of 10.18 percentage points.

Regarding ICT service exports, China has also experienced a process from small to large and from nothing to something. From 1982 to 2000, the catch-up coefficient of ICT service exports increased from 2.08% to 17.77%, an increase of 15.69 percentage points over 18 years. After 2000, with the leapfrog growth of the high-tech industry, ICT service exports also grew rapidly, with the catch-up coefficient reaching 48.64% by 2014, an increase of 30.87 percentage points over 14 years (Table 12).

At the same time, we should recognize that although China' s high-tech manufacturing industry has surpassed the U.S., there remains a considerable gap with the U.S. in high-tech services. This is reflected in the KTI industry added value, where in 2014 the U.S. was equivalent to 3.2 times that of China, and in ICT service exports, where in 2015 the U.S. was equivalent to 2.06 times that of China. This represents the basic direction for China' s future high-tech industry development: vigorously developing high-tech service industries and vigorously promoting high-tech service export trade.

In summary, due to the high-tech industry' s significant externalities, spillover effects, and China's huge market scale effects, it has not only developed itself but also generated multiple effects, continuously promoting economic growth, employment growth, and trade growth, continuously optimizing production structure (GDP structure), industrial structure (manufacturing and services structure), and trade structure. It has not only increased the quantity of economic growth but also optimized the economic structure, thereby improving the quality of economic growth, gradually becoming a leading industry, an important pillar industry, and a new growth engine for China' s national economic development.

Conclusion and Future Outlook

Looking back 30 years, China was a laggard and latecomer in the high-tech industry. Simultaneously, Chinese statesman Deng Xiaoping put forward the strategic vision of "occupying a place in the world's high-tech fields"and predicted that the 21st century would be one of high-tech development. The Chinese government promptly formulated the "863 Plan," launching a high-tech innovation revolution and a high-tech industry revolution under extremely low-income conditions.

In retrospect, after the first 15-year preparation and growth stage, China' s high-tech industry grew from nothing to something, from laggard to chaser. After another 15-year comprehensive growth stage in the first 15 years of the 21st century, it grew from small to large, from large to strong, from chaser to surpasser, from follower to leader, successfully achieving catch-up with the U.S. at the forefront of the world' s high-tech industry. This has far exceeded the strategic vision of "occupying a place" and demonstrates the strong development momentum and vitality of China' s scientific and industrial communities.

Although China' s high-tech industry added value, export value, and export added value have all surpassed those of the U.S., compared with advanced countries like the U.S., China faces challenges: large quantity but low quality, much imitation but little original innovation, much general innovation but little disruptive innovation, strong general technology but weak key technologies; many domestic enterprises but few world-class enterprises; many domestic trademarks but few world-renowned brands; large product batches but low resource efficiency; strong high-tech manufacturing and export capabilities but significantly lagging high-tech services and exports; strong overall strength but relatively low labor productivity. Therefore, after basically achieving quantitative catch-up with the U.S. in the high-tech industry, the next focus should be on transforming the high-tech industry from large to strong, from quantity to quality, from coarse to refined, from follower to leader, surpassing the U.S. in quality innovation and other aspects.

Looking forward 35 years, China should still target the U.S. for catch-up. To this end, it is recommended that relevant national departments organize the scientific and industrial communities to formulate the *China High-Tech Industry Medium- and Long-Term Vision*, achieving the strategic goal of becoming a high-tech industry quality innovation powerhouse through a "three-step" approach: First, by 2025, enter the ranks of world high-tech industry quality innovation powers, significantly narrowing the relative gap with the U.S.; second, by 2035, reach U.S. levels in high-tech industry quality innovation; third, by the 100th anniversary of the founding of the People' s Republic of China, achieve world-leading comprehensive strength in high-tech industry, particularly in quality innovation.

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Hu Angang, born in 1953, is a pioneer and leading authority in Contemporary China Studies. He serves as Dean of the Institute of Contemporary China Studies and Professor at the School of Public Policy and Management, Tsinghua University. He is a member of the Advisory Committee for the 13th, 12th, and 11th Five-Year Plans under the National Development and Reform Commission, a member of the Advisory Committee of the National Disaster Mitigation Committee, and a member of the Advisory Committee under the Ministry of Agriculture. He was elected as a representative to the 18th CPC National Congress in 2012. Hu spent his early years as an educated youth in rural areas and resumed his studies after the College Entrance Examination was restored in 1977. He earned his Ph.D. from the Chinese Academy of Sciences in 1988, conducted postdoctoral research at Yale University, and was a visiting scholar at Harvard University, Oxford University, Waseda University, and the World Bank Institute. He has published approximately 70 books, including *The Grand Strategy of China' s 13th Five-Year Program* (2015), *Super China* (2015), *New Think Tank with Chinese Characteristics: Hu Angang' s Views* (2014), *Collective Presidency in China* (2013), *China: Innovative Green Development* (2012), and *2030 China: Towards Common Affluence* (2011). He has received the National Science Fund for Distinguished Youth Scholars, Fudan Premium Fund of Management, Third Prize of the State Science and Technology Progress Awards, and First Prize of Science and Technology Progress Awards of the Chinese Academy of Sciences.

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Note: Figure translations are in progress. See original paper for figures.