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Preface

This book is a research paper for my research work in Innovation Management Institute of Tsinghua University in China in 2022. This book discusses some important topics in China's national governance and social governance. These issues are of great significance to China's modernization development and the further improvement of the scientific and technological innovation governance system. Facing the future global technological competition, we need to build China into the world's technological power, which requires a scientific and rational national development strategy. This book uses theories of state governance, social governance, technological innovation, system management, complex systems, management logic, public cognition and scientific cognition, etc., combines the relationship between technology and society, technology and economy, organization management and management practice and discusses China's technological innovation and modernized national governance.

Science and technology is an important factor in the development of human society, and it is also a driving force for social economic development and social change. The rapid development of science and technology has become the strategic layout and strategic goal of the national development of a world power. Scientific and technological innovation is

the core driving force for the rapid development of science and technology. In the current national modernization governance, technological innovation has become a long-term strategy for the development of a world power.

In 2022, the world's economic activities and social life are still affected by the novel coronavirus epidemic. At the same time, the war between Russia and Ukraine in 2022 has brought new problems to the national governance and international relations of countries around the world. However, the trend of technological development is still striding forward. At present, the research, development and application of high-tech such as information technology, material technology, machinery manufacturing technology, new energy technology, biotechnology, medical technology, aerospace technology, etc., are developing vigorously in the world. As the second largest economic power in the world, China has excellent strategies and methods in terms of technological innovation strategy and modernized national governance.

This book, taking the international scientific and technological innovation environment and China's scientific and technological innovation strategy as the background, from the perspective of scientific and technological innovation, with the vision of the national think tank as the main research direction, combined with the current science and technology policy, analyzes some of the current high-tech development, strategic issues and management approaches in China. Technological innovation has

become the source of power for world powers to promote technological and industrial revolutions. Different disciplines have crossed and merged before, and science and technology and social development have influenced and linked to each other. We should deepen the management system and management level of scientific and technological innovation, further improve national governance and social governance, and improve the overall strategic layout of scientific and technological development and modernization.

The main points of each chapter of this book: China's high-tech industrial cluster promoted by technological innovation competition; quantum technology development strategy; the cooperative development of technological innovation industries and labor-intensive industries in the Guangdong-Hong Kong-Macao Greater Bay Area; the conception and strategy of creating the Pacific Ocean outlet in Northeast China and making it a coastal economic area; the transformation of technological paradigm and the industrial revolution caused by the innovation of scientific cognition; logic and cognitive reasoning for management decision making; rational model of organization with systemic openness.

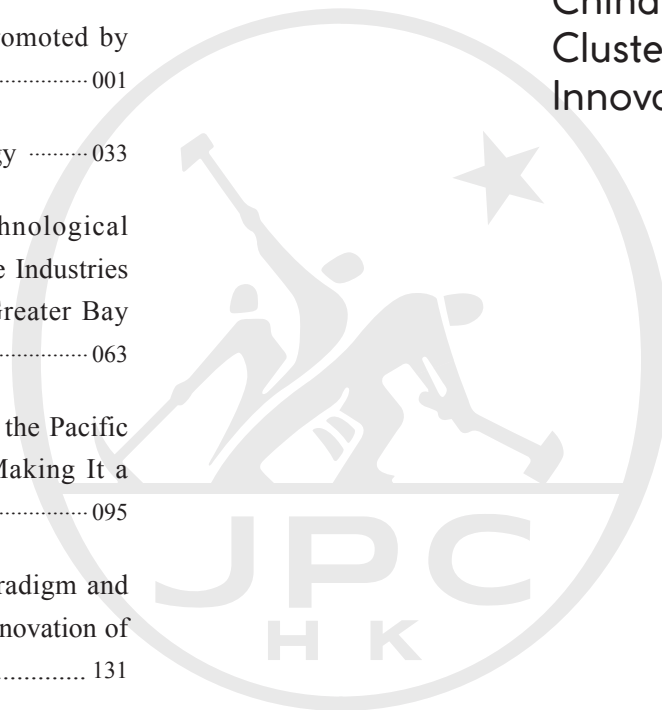
I am willing to provide the people of the world with the "Chinese wisdom" and "Chinese method" of China's modernized state governance, offer the world's people the scientific and rational theory of state governance, and promote the all-round development of modern governance of human society. This is a great joy and honored work.

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Chapter 1

China's High-Tech Industrial Cluster Promoted by Technological Innovation Competition



1. Introduction

Science and technology is the most active factor in the development of productive forces. It is the core driving force that promotes the progress of human civilization and boosts the increase of social material and spiritual wealth. Science and technology is an important factor in the country's prosperity and the substantial increase in national competitiveness. At present, entering the second decade of the 21st century, all powerful countries in the world regard the improvement of science and technology and the application of science and technology as their long-term development strategies. "The economic competition among countries is the competition of comprehensive strength. It is embodied in the advanced scientific and technological productivity and strong national capabilities, the operational capabilities of the country's various organizational systems, the country's resource allocation capabilities, and the comprehensive use of social forces and mass forces."^[1]

2020 is an extraordinary year. The fierce novel coronavirus pneumonia (COVID-19) infectious disease has spread across the world, causing economic activities, government operations, and people's health and life security in all countries of the world to be greatly affected and injured. The new coronavirus infectious disease has caused a harmful impact on the world, and it has also

posed a major challenge to the science and technology and modern national governance of countries around the world. In this context, competition among major countries has become more intense. Countries in the world sometimes cooperate, sometimes separate, sometimes collaborate, and sometimes compete. International relations have entered a state of complexity, and competition among major powers mainly revolves around economy and technology. Science and technology is an important foundation and core driving force for economic development. Countries around the world have launched fierce competition in the field of science and technology.

At the same time, countries around the world are focusing their attention on Sino-US relations. Since 2008, the United States has ranked first and China has ranked second in global GDP. This ranking has continued to this year. In 2020, the US administration headed by Trump, worried that China's economy and technology will surpass the United States, so adopted a series of measures to hinder China's development. By 2020, after a large-scale outbreak of the COVID-19 infectious disease, the United States has taken unprecedented measures to restrict China's scientific and technological development. This kind of technological restriction is mainly manifested in the fields of modern information technology and artificial intelligence. For example, the United States has adopted economic measures to restrict the development of China's Huawei Technologies. In September 2020, the United States also

used economic measures to cut off the supply of chips from the high-tech information companies in the Netherlands and Taiwan to Huawei Technologies. The United States wants to use this obstructive means to limit the rapid development of China's information technology in order to maintain its global hegemony in global governance.

Faced with the scientific and technological containment from western developed countries led by the United States, how should China break through the technological blockade? How to upgrade national governance capabilities, improve the level of scientific and technological innovation, and enhance the independent research and development capabilities of science and technology? China's General Secretary Xi Jinping proposed: "Science and technology innovation is a strategic support for improving social productivity and overall national strength, and must be placed at the core position of the overall national development."^[2] As a world power, we should have the confidence and ability to overcome these difficulties and improve overall global governance capabilities and technological development capabilities. This article proposes a scientific and technological development strategy of high-tech industrial clusters that integrate scientific and technological innovation, and combines the theory and practice of national governance to provide methods and strategies for the modernized high-tech development of the country.

2. High-tech competition among world powers

At present, the scientific and technological innovation, together with technological revolution in the world, has led to the development of brand-new science and technology centered on the information technology revolution and artificial intelligence. The development of science and technology has entered an era of fierce competition, which is a distinctive feature among modern science and technology countries. These fierce technological competitions will bring about temporary social conflicts among countries. But based on the evidence of the history of human technological development, these technological competitions are inevitable. In terms of long-term goals, technological competition will stimulate the growth of the technological level of various countries. The technological competition among technological powers will also resolve the contradictions and conflicts in the competition through coordination and balance. A large country that has experienced technological competition will develop and improve its own country's technological level on the basis of safeguarding its own interests. Therefore, technological competition will trigger brand-new technological innovation and technological revolution, and promote the development of science and technology in the world.

In the global high-tech competition, the biggest impact on the world is the technological competition between

China and the United States. Both China and the United States have invested a lot of money, manpower and materials in technological innovation. A lot of work has been invested in the financial expenditures of the two countries, the investment of technical talents, the creation of science and technology platforms, the construction of technical projects, and scientific experiments. Currently, the United States leads the world in science and technology, and China's scientific and technological development is advancing by leaps and bounds, reaching the international advanced level in many aspects, and slowly narrowing the technological gap with the United States. As the United States fears that its status as the world's technological hegemony will be shaken, it has used various means to hinder China's technological development. On this basis, fierce competition in science and technology between China and the United States has emerged.

"Sino-US technology competition is a geopolitical conflict intertwined with multiple complex and comprehensive factors such as technology, industry, economy, politics, and global game. It is the inevitable result of Sino-US high-tech cooperation and game in the past 50 years. Under the wave of Internet globalization, technological change and innovation drive the transfer of industrial competitive advantages."^[3] The United States believes that China has three major deterrents against the development of American technology: 2025 Made in China, the Belt and Road strategic layout, 5G Technology

development. These Chinese influences and technologies have been vigorously disseminated in the mainstream media and the US government. Judging from the current level of China's science and technology development in 2020, China's high-tech has indeed reached the world's highest level in many aspects, and some technologies still have a leading position in the world. For example, quantum information technology, artificial intelligence, big data, high-voltage electricity long-distance transmission, 5G technology, high-speed railways, large bridges, large tunnels and other technologies are far ahead in the world. China is more powerful in military technology and space technology. For example, the establishment of space stations, Beidou navigation system, early warning aircraft, aircraft carriers, missiles, and other military and space technologies have reached the world's leading level of technology.

Of course, compared with the United States and other technological powers, China still has many limitations in terms of high technology. Among them, in 5G technology, China's biggest flaw is the lack of high-performance chip manufacturing capabilities. Therefore, the United States has used economic monopolies to restrict high-level chip manufacturing companies such as the Netherlands and Taiwan from trading chips and materials for chip production in China. In this way, China's 5G technology development has encountered unprecedented obstacles. How to overcome the difficulties of technical blockade encountered by the current 5G technology? How to overcome technical barriers

to make other aspects of China's high-tech development smooth and rapid? This is a difficult problem in the modern governance of the country, and it is also an important issue that China needs to solve at present.

The Chinese government has taken a series of measures to break through the US restrictions on China's 5G technology. China has issued some policies on how the integrated circuit industry and software industry can develop rapidly. In April 2020, China formulated the "New Infrastructure Construction" white paper and established high-level information technology development goals and plans for the comprehensive construction of artificial intelligence, big data, 5G technology, and so on.

On April 20, 2020, China's National Development and Reform Commission clarified the main content of "new infrastructure construction" for the first time: "New infrastructure construction mainly includes information infrastructure, integrated infrastructure, innovative infrastructure, and integrates 5G. Infrastructure such as the Internet of Things, Industrial Internet, Satellite Internet, Artificial Intelligence, Cloud Computing, Blockchain, Intelligent Transportation, etc. are included in the key construction scope."^[4]

The Chinese government has carried out a national technology management plan and technology research layout for 5G technology. At the same time, high-tech companies such as Huawei Technologies and numerous information technology research institutions in China have

invested in breakthrough research on 5G technology and high-tech chips. Chinese scientific research institutions are studying the use of graphene chips to replace silicon chips and have achieved certain research results. If there is a breakthrough in this area of technology, graphene chips can successfully replace silicon chips. This will cause technological innovation and technological revolution in chip technology, and will re-subvert the existing chip technology system. Many research institutions in China are carrying out hard research in this field.

Every country has certain limitations in the field of science and technology, and the United States and China are of course no exception. In fact, the shortcomings and limitations of high-tech are not terrible. As long as we can find ways to make technological breakthroughs, then science and technology will certainly achieve unprecedented development. Modern national science and technology competition and national governance both require us to seek development in various competitions and to make great progress in science and technology. We must take technological innovation as a driving force for scientific and technological progress.

In recent years, China has made great achievements in various aspects of science and technology development, and many science and technology research achievements have taken the lead in the world. For example, quantum radar, stealth machine, unmanned driving technology, electric power car, electromagnetic gun, etc. are leading

the world in high technology. In addition, China has made outstanding achievements in the theoretical basis of scientific and technological research. According to the statistics of scientific papers published by Japanese research institutes from 2016 to 2018, the number of papers published by China in leading scientific journals ranks first in the world, the United States ranks second, Germany ranks third, and Japan ranks Fourth place. This shows that China has made achievements that have attracted the attention of the world in both the application of science and technology and the research of scientific theories.

Due to the development of science and technology, China has brought about rapid economic growth at the same time. The following are the percentage changes of China, the United States, and Japan in the percentage of world GDP from 1960 to 2018.

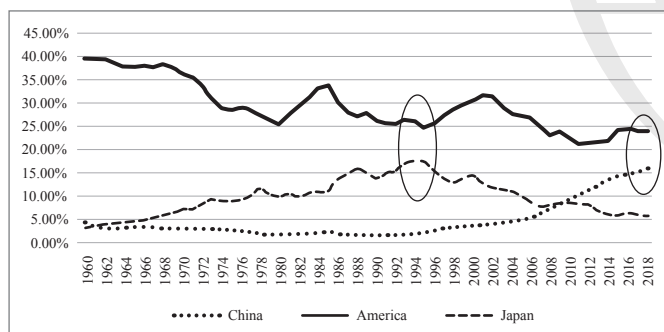


Figure 1 China, America and Japan's GDP ratio in the world

(Description: Abscissa: year; Ordinate: %)

(Source: Wuhan University Sino-US Technology Competition Research Group ^[5])

Because of China's brilliant scientific and technological achievements, western countries, led by the United States, have created a threat theory of China's economy and technology, which has hindered China's technological development. Faced with the blockade in science and technology, China has adopted a diplomatic strategy with the style of a great power. In the last century, China's diplomacy has always followed the Five Diplomatic Principles of Mutual Benefit. By 2020, China's General Secretary Xi Jinping has been advocating the international communication strategy of the global governance system of a community with a shared future for mankind. The long-term scientific and technological confrontation among countries in the world is not conducive to the harmonious development of human society. Countries in the world should join hands to gradually reduce conflicts in technological competition and reduce artificial obstacles in technological competition on the premise of mutual benefit, strive for balance and coordination for the development of science and technology for all mankind, and jointly promote the progress of human science and technology.

However, all countries in the world have their own beliefs and interests. It is indeed difficult to achieve a balanced and coordinated joint development of global technological competition. China's current obstacles to the development of science and technology do exist. Now facing the obstacles set by the United States to the