Leveraging Comprehensive Resource Advantages to Build a First-Class Science and Technology Think Tank (Postprint)

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Abstract

[Purpose/Significance]Against the backdrop of China' s vigorous promotion of think tank development, this paper systematically elaborates on the practical experience of the Guangdong Academy of Sciences in providing scientific and technological decision-making support to the government, offering references and insights for the construction of science and technology think tanks nationwide.[Method/Process]Through literature research, web-based investigation, and case analysis, this study examines the background, management and operational systems, and related initiatives of the Guangdong Academy of Sciences' science and technology think tank construction.[Results/Conclusion]The Guangdong Academy of Sciences regards its science and technology think tank as a vital component of its strategic planning and attaches great importance to its construction. The think tank progressively expands its influence through a concurrent development and delivery approach. Additionally, this paper proposes recommendations for the future development of the academy' s think tank.

Full Text

Taking Advantage of Integrated Resources to Build First-Class Science and Technology Think Tanks: Practical Exploration in Propelling the Think Tank Construction of Guangdong Academy of Sciences

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Abstract

[**Purpose/Significance**] Against the backdrop of vigorous think tank development in China, this paper systematically expounds on the practical experience of Guangdong Academy of Sciences in providing science and technology decision-making support for the government, offering reference and lessons for the construction of science and technology think tanks in China. [**Method/Process**] Through literature research, web investigation, and case analysis, this paper examines the background, management system, operational mechanisms, and relevant measures of the Academy's think tank construction. [**Result/Conclusion**] Guangdong Academy of Sciences regards science and technology think tanks as a crucial component of its strategic planning and attaches great importance to their construction. The think tanks have gradually expanded their influence through continuous development and output of research outcomes. Additionally, this paper proposes recommendations for the future development of the Academy' s think tanks.

Keywords: science and technology think tank; science and technology decision-making; innovation-driven development
Classification Number: G311

1 Introduction

Think tanks are research institutions that focus on public policy, aim to influence domestic and international policy choices, and provide decision-making solutions and policy recommendations as intellectual products [**?**]. Science and technology think tanks primarily examine major issues of overall significance from the perspective of science and technology impact and function. They prospectively consider global science and technology development trends from the standpoint of scientific and technological principles, conduct scientific assessments, make predictions and judgments, and propose forward-looking and constructive recommendations on major economic and social development issues, playing an important role in national science and technology strategies, planning, layout, and policies [**?**]. Currently, China has entered a "new normal" in its economy and is in a strategic opportunity period for innovation-driven development and economic transformation and upgrading. There is an urgent need to strengthen macro-level strategic and policy research to provide a basis for scientific government decision-making. The Party Central Committee attaches great importance to think tank construction and has promulgated the "Opinions on Strengthening the Construction of New-Type Think Tanks with Chinese Characteristics," which explicitly requires scientific research institutions to "build high-level science and technology innovation think tanks," "focus on building an innovative country and implementing innovation-driven development strategies,"and "promote the deep integration of scientific and technological innovation with economic and social development." Therefore, accelerating the construction of science and technology think tanks by scientific research institutions aligns with the goals and requirements of the Party Central Committee and the state,

meets the urgent needs of economic and social transformation and development, and holds major strategic significance for strengthening ecological civilization construction, improving the level of opening-up, and enhancing national soft power.

2 Re-planning Development Positioning and Fully Promoting the Construction of Science and Technology Think Tanks

To respond to the new round of global scientific and technological revolution and industrial transformation, the Guangdong Provincial Party Committee and Provincial Government reorganized the Guangdong Academy of Sciences on June 28, 2015. The new Academy integrated the former Guangdong Academy of Sciences, Guangdong Institute of Industrial Technology, and other provincial research institutes, now comprising 22 key research institutions. Facing the trends of "Made in China 2025"and "Internet Plus Development,"the newly reorganized Guangdong Academy of Sciences is positioned to "focus on applied research for industrial development while giving consideration to basic research on major technology applications, better meeting the actual needs of Guangdong' s economic and social development." Its key research areas cover biology and health, materials and chemicals, resources and environment, electronics and information, equipment and manufacturing, think tanks and services, among others. Its construction goals are to become a highland for gathering high-level talents in Guangdong, an organizational carrier for industry-university-research cooperation and transformation of scientific and technological achievements, and a hub-type high-end platform for innovation-driven development. The Academy aims to innovate systems and mechanisms to stimulate vitality in scientific and technological innovation and development, strengthen industry docking and service functions, continuously enhance its ability to support industrial development and serve economic construction, deepen open cooperation, actively integrate into the global innovation network, and make due contributions to building an innovative Guangdong.

From its inception, the new Guangdong Academy of Sciences has taken building a first-class science and technology think tank in China to support major decision-making and industrial development in Guangdong Province as an important historical mission, placing think tank construction high on its work agenda. In the 2015 "Special Project for Research Platform Environment and Capacity Building of Guangdong Academy of Sciences," key arrangements were made for relevant platforms and team-building projects such as the "Guangdong Academy of Sciences Innovation Center," "Guangdong Innovation Development Research Institute," "Guangdong Geographic Information Industry Service Cloud Platform," "Technology and Industrial Innovation Development Intelligence Analysis" team, and "Pearl River Delta Urban Agglomeration Development Research" team. The Academy also attracted distinguished visiting professors such as Zhang Xiaolin, former Director of the Documentation and In-

formation Center of the Chinese Academy of Sciences, and Lin Chusheng from the Faculty of Arts and Social Sciences at the University of Hong Kong, to form innovation teams in Guangdong, laying a solid foundation for think tank construction.

3.1 Building Dual Platforms Serving Government Decision-Making and Industrial Development

To conduct think tank research more systematically, Guangdong Academy of Sciences established two think tanks: the Guangdong Academy of Sciences Innovation Center and the Guangdong Innovation Development Research Institute.

The Guangdong Academy of Sciences Innovation Center (hereinafter referred to as the "Innovation Center") [**?**] is a strategic research and consulting body for the Academy' s development, relying on the Guangdong Science and Technology Library (Guangdong Institute of Science and Technology Information and Development Strategy) to build a comprehensive information integration platform for technology and industrial innovation. The Center has constructed an information tracking, monitoring, and analysis matrix for Guangdong' s advanced manufacturing, modern services, and strategic emerging industries, providing in-depth analysis and layout recommendations for several important industries that Guangdong focuses on developing or prospectively deploying. It conducts forward-looking, macro-level, and strategic research on major technologies and industries serving national strategies, with the goal of becoming a leading technology and industrial innovation analysis research and decision-support institution in South China, first-class in China, and with important international influence by 2020.

The Guangdong Innovation Development Research Institute [**?**] is a strategic decision-making consulting research institution facing Southeast Asia, based in China, and focusing on Guangdong. It is the core supporting institution of Guangdong Academy of Sciences for providing government decision-making and industrial development consulting research, and a comprehensive integration platform for gathering outstanding domestic research forces to conduct strategic and policy research. Relying on the Guangzhou Institute of Geography, it leverages the comprehensive and regional advantages of geographical science, and draws on the disciplinary, technological, and talent advantages of the new Guangdong Academy of Sciences in industrial technology, social development, and resources and environment. By further enhancing the innovation capacity of existing platforms, gathering high-end talent teams, and building an expert network, it aims to build a science and technology think tank with strong scientific and technological support (monitoring, analysis, evaluation, simulation) and a complete expert system. It strives to transform scientific and technological achievements and scientific ideas into influence on government decision-making and driving force for industrial development, reaching domestic leading and internationally advanced levels, promoting the improvement of government scientific decision-making, supporting innovation-driven development, and facil-

itating industrial transformation and upgrading and regional sustainable development.

In 2016, the inaugural year of China's 13th Five-Year Plan, Guangdong Academy of Sciences thoroughly implemented the spirit of the Party Central Committee and Guangdong Provincial Committee on innovation-driven development strategies, meticulously organizing and scientifically planning its own 13th Five-Year Plan. Regarding think tank construction, the Academy will focus on breakthroughs in building the "Guangdong Key Industrial Technology Analysis and Strategic Decision Support Platform" and cultivating the "Guangdong Academy of Sciences Scientific and Technological Innovation Resources Platform" and "Guangdong Academy of Sciences New Knowledge Service Center."

3.3 Constructing Think Tank Service Processes

The service targets of Guangdong Academy of Sciences' science and technology think tanks are primarily the Academy' s decision-making level and the leadership of Guangdong Provincial Committee and Provincial Government, with service coverage also extending to research institutes and enterprises. The service process adopted is shown in the figure below: network/field research, data collection and analysis, submission of outcome data, delivery via paper/e-mail, and new media promotion (web, WeChat).

[Figure 1: see original paper] The basic service process of think tanks of Guangdong Academy of Sciences

4 Remarkable Achievements in Science and Technology Decision Services

The think tank platforms of Guangdong Academy of Sciences have actively played roles in scientific and technological support and decision-making consulting services while being built upon existing research institutions, generating significant social impact and benefits.

4.1 Serving Major Planning and Decision-Making of Guangdong Provincial Government

The Guangdong Innovation Development Research Institute is committed to government decision-making consulting research services on industrial development and layout optimization, regional sustainable development, and ecological civilization construction. It has undertaken and completed a series of major research outcomes and reports at domestic leading levels that have profoundly influenced government decision-making. For example, the "Guangdong Provincial Main Functional Area Planning" was promulgated and implemented by the Provincial Government, holding important significance for implementing the main functional area strategy and promoting coordinated regional development in the province. The "Six Bays and One Peninsula" marine economic spatial

pattern proposed in the "Guangdong Marine Economic Map" was written into the provincial 13th Five-Year Plan, supporting marine economic development strategy. The "Research on Pearl River Delta Urban Agglomeration Layout and Spatial Form" was incorporated into the Pearl River Delta development strategy in the "National New-Type Urbanization Plan (2014-2020)" issued by the CPC Central Committee and the State Council. The ecological security pattern of "Two Rings, One Belt, Twelve Cores, Network Corridors, and Multiple Nodes" proposed in the "Research on Guangdong' s Urbanization Ecological Security Pattern Based on Ecological Civilization" was incorporated into the "Guangdong New-Type Urbanization Plan 2014-2020,"which is about to be promulgated and implemented. The "Guangdong Marine Main Functional Area Planning" currently being compiled will be submitted to the Provincial Government for approval in June.

The Innovation Center undertook the research work for the major consulting project of Guangzhou Municipal Government, "Research on the Current Situation, Direction, Methods, and Countermeasures of Guangzhou' s International Science and Technology Cooperation."Under the leadership of Guangdong Academy of Sciences, through questionnaires and field research on Guangzhou government agencies, leading enterprises, and large research institutes, it summarized the current situation of Guangzhou' s international science and technology cooperation and proposed basic countermeasures and suggestions for promoting such cooperation. Additionally, the Innovation Center has been involved in decision-making consulting for local governments through various channels, such as the Guangzhou Association for Science and Technology' s special project for building a national science and technology think tank, "Research on MOOC Application Schemes in Science Popularization for New-Type Urban Residents in Guangzhou," the Guangzhou Science and Technology Bureau' s soft science research project, "Feasibility Study on Applying British Technology Innovation Models in Guangzhou," and the Guangdong Provincial Intellectual Property Office' s soft science research special project, "Research on Intellectual Property Protection Strategies for Guangdong' s E-commerce Industry."

4.2.1 Intellectual Property Services for Research Institutes

As a key link in technological innovation, intellectual property protection has attracted increasing attention from research institutions. As a relatively independent institution, the Innovation Center provides various forms of intellectual property services for research institutions, including patent analysis, patent value assessment, and technology foresight. For example, the Center completed the "Patent Analysis of Soil Heavy Metal Pollution Remediation Technology" commissioned by Guangdong Institute of Eco-environmental Technology, interpreting relevant research patents from both macro and micro perspectives. This work was recognized by researchers and provided factual basis for the institute' s intellectual property strategy formulation.

4.2.2 Innovation Trend Monitoring Services for Guangdong Enterprises

The rapid development of science and technology has made enterprises' demand for industrial technology intelligence increasingly strong. As a high-end platform for innovation-driven development in the province, Guangdong Academy of Sciences actively serves R&D-oriented enterprises in the province by constructing innovation development monitoring systems for domestic and international R&D enterprises to safeguard their independent innovation. For instance, the Academy customized and built an "Innovation Development Trend Monitoring System for Copper-Clad Laminate Enterprises" for the leading copper-clad laminate enterprise, Guangdong Shengyi Science and Technology Co., Ltd., providing more in-depth and extensive monitoring content from perspectives of market information, scientific literature, and patent technology.

In October 2015, Guangdong Academy of Sciences signed an agreement with Zhuhai Municipal People's Government to establish the Guangdong Academy of Sciences Marine Engineering Equipment Technology Institute, Aerospace Equipment Technology Institute, and Biomedical Technology Institute in Zhuhai, launching the construction of new-type R&D institutions [**?**]. Subsequently, the Innovation Center undertook the preliminary research reports for the three key institutes, ultimately forming the construction frameworks for these three key institutes, which were adopted by Guangdong Academy of Sciences and Zhuhai Municipal Government as the framework foundation for cooperative construction of innovation institutes.

In December 2015, Guangdong Academy of Sciences signed an agreement with Zhongshan Municipal People' s Government to jointly build the "Guangdong Academy of Sciences Zhongshan Branch" [**?**]. The Innovation Center provided rapid and efficient decision-making consulting services for the preliminary preparation of the Zhongshan Branch, receiving affirmation from the Zhongshan Municipal Government.

In December 2015, the Innovation Center and Guangdong Innovation Development Research Institute participated in the planning work for constructing the "Internet Plus Research Institute" of Guangdong Academy of Sciences. By holding the Guangdong Academy of Sciences "Internet Plus" and Innovation-Driven Development Strategy Seminar, they extensively solicited opinions from industry experts. Subsequently, the Academy selected intelligence experts from its two think tanks to form a construction plan team for the "Internet Plus Industry Research Institute" and drafted the construction report for Guangdong' s "Internet Plus Research Institute." Currently, the "Internet Plus Research Institute" has entered the substantive construction stage.

In April 2016, Guangdong Academy of Sciences signed a comprehensive strategic cooperation framework agreement with Nanfang Media Group to jointly promote the implementation of Guangdong' s innovation-driven development strategy [**?**]. Prior to this, the Innovation Center provided preliminary litera-

ture research and scheme design for the Academy. The agreement drafted by the Center was recognized by both Guangdong Academy of Sciences and Nanfang Media Group and served as the basic framework for further cooperation. After the agreement signing, the Innovation Center and Guangdong Development Research Institute jointly promoted the construction of the "Guangdong Scientific and Technological Achievement Transfer and Transformation Market Trading Platform." Through the "Science and Technology + Media" model, Guangdong Academy of Sciences has built online and offline platforms for scientific and technological achievement transfer and transformation, boosting "mass entrepreneurship and innovation" development.

5 Conclusion

Since its reorganization, Guangdong Academy of Sciences has regarded the construction of science and technology think tanks as an important component of its strategic planning and attached great importance to it:

1. From the perspective of top-level design, during the formulation of its 13th Five-Year Plan, the Academy made forward-looking deployments for think tank development. In the strategic layout process, it emphasized leveraging the professional advantages of think tanks in strategic decision-making services, enabling think tanks to conduct theoretical exploration while deeply investigating Guangdong's development status and extracting practically valuable proposals.

2. In think tank talent team construction, the Academy attracted high-end strategic intelligence talents to settle in Guangdong through talent programs, supported innovation teams in conducting think tank research through platform projects, and cultivated a professional and efficient team through a task-driven model.

3. In terms of achievement transfer and transformation services, the Academy has attempted to take the path of "Science and Technology + Media" by facilitating in-depth cooperation between its think tanks and traditional media to innovate service models, opening up new futures for think tank construction. The science and technology think tank construction of Guangdong Academy of Sciences will give full play to the concentric circle effect of "small institution, large network" and "small core, large periphery," emphasizing cooperation and interaction between think tanks and subordinate institutes as well as universities and other research institutions in South China. It will timely establish a "Think Tank Alliance," gathering the wisdom of numerous experts to offer suggestions for accelerating economic structural adjustment and industrial transformation and upgrading, and providing intellectual support for Guangdong's innovation-driven development.

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Author Contributions

Li Dingqiang: Responsible for topic selection and framework construction;
Wei Dongyuan: Responsible for overall research direction and revision;
Zhang Hongou: Responsible for refining main viewpoints and textual revision;
Zhu Lin: Data investigation and paper writing.

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