Systematic Reflections on the Logical Framework of Think Tank Research (Postprint)

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Abstract

Think tanks are important components of national decision-making consultation systems and frameworks. Research on their underlying theories and methodologies helps elevate the level of think tank research, expand the scope of issues addressed, and effectively fulfill their roles and functions. This article examines think tank research as its subject of inquiry, offering theoretical reflections on the more universal roles and characteristics of think tanks, the principles and logical frameworks that should govern think tank research, the processes and methods for conducting such research, evaluation criteria for think tank outputs, and other important issues, thereby generating systematic contemplation regarding the logical architecture of think tank research.

Full Text

Systematic Thinking on the Logical System of Think Tank Research

Think tanks constitute an important component of national decision-making consultation systems. Research on their theories and methodologies can help elevate the quality of think tank research, expand the scope of issues addressed, and effectively fulfill their roles and functions. This paper examines think tank research as its object of investigation, reflecting theoretically on the more universal roles and characteristics of think tanks, the principles and logical frameworks that think tank research should follow, the processes and methods for conducting such research, and the evaluation criteria for think tank outputs. Through this examination, the paper develops systematic thinking on the logical system of think tank research.

Keywords: think tank, theoretical research, logical system of think tank research, evaluation criteria

Introduction

In January 2015, the CPC Central Committee issued the *Opinions on Strengthening the Construction of New-Type Think Tanks with Chinese Characteristics*, emphasizing the need to strengthen the construction of new-type think tanks with Chinese characteristics and fully leverage their important role in governance [1]. In December 2015, China officially launched the pilot program for building high-end think tanks, announcing the first batch of 25 institutions selected as pilot units for national high-end think tanks, covering top-tier professional research organizations in domestic politics, economics, science and technology, and military affairs. Among them, the Institutes of Science and Development of the Chinese Academy of Sciences serves as an important vehicle and comprehensive integration platform for the Academy to take the lead in building a high-level science and technology think tank, focusing primarily on providing advice to the state on issues related to science and technology.

Evidently, think tank construction and research play a critical policy role and hold significant theoretical value. First, think tanks have become an indispensable component of the national governance system and represent an important manifestation of national governance capacity. As institutionalized and professional consulting research organizations, high-end think tanks are not only vital components of national soft power but also represent an important institutional arrangement for scientific and standardized national decision-making [1]. Second, given the increasing complexity of decision-making problems and the reality that China's mechanisms for specialized research forces to participate in decision-making consultation remain imperfect, think tank research with decision-making value is particularly scarce. Most decision-making consultation departments within the existing system directly serve policymakers and focus primarily on major practical issues, whereas scientific and democratic decision-making requires reference to more independent and objective research results, as well as long-term and forward-looking perspectives that demand foundational and reserve research capacity. Simultaneously, as important components of national decision-making consultation systems, research on think tank theories and methodologies can help improve the quality of think tank research, expand the scope of issues addressed, and effectively fulfill their roles and functions. How to understand and leverage the role of think tanks, conduct valuable think tank research, and develop an understanding of the logical system of think tank research constitutes critically important work.

Literature Review

Since the emergence of modern think tanks in Western countries in the late 19th century, theoretical research on think tanks or empirical studies taking think tanks themselves as research objects have begun to emerge [2,3]. These studies have primarily used Western English-speaking countries, particularly the United States, as their background and have been based on respective specific national contexts. After the 1990s, think tank research set in developing countries located

in Central and Eastern Europe, Asia, and other regions began to rise [4-6]. Existing Western think tank theoretical research predominantly adopts elitist and pluralist perspectives, attempting to systematically consider the definition, role, and functions of think tanks, addressing the questions of "what are think tanks," "how do think tanks operate," and "whom do think tanks serve" [7-11].

Among the numerous definitions of think tanks, the one proposed by Weaver [12] in the late 1980s was widely accepted early on. He defined think tanks as "non-governmental, non-profit research institutions that maintain independence outside of interest groups such as government, enterprises, and political parties." Thus, in the Western context, independence has become one of the important criteria for judging the nature of think tanks, although Weaver's definition does not exclude institutions that receive funding and project support from the government. More recent studies have moved away from discussions about the organizational attributes and funding methods of think tanks, instead viewing them as special knowledge regimes serving policy formulation [13] and describing think tank research as "a mode of knowledge and ideological production reflecting pluralism" [14]. Think tanks demonstrate greater public spirit and provide research as public goods, diffusing ideas, initiatives, claims, and concepts to effective publics [15] while developing and maintaining policy networks to provide professional services to policymakers and serve as bridges between different actors in the policy space, such as government, academic institutions, enterprises, and media.

From a pluralist perspective, the functions and roles of think tanks are also positively regarded as supporting and encouraging policy diversity, promoting broad and multi-actor political participation, improving the quality and transparency of policy formulation, and fostering democratic political procedures with credibility and openness. In contrast, elitist perspectives are more critical of think tanks: on the one hand, think tank research and viewpoints often represent the interests of funding institutions and communicate them to decision-makers; on the other hand, the consistency of think tanks in their origins, particularly their narrow social backgrounds, elitist values, and positions serving elite decision-making layers, often gives their empirical research an elitist perspective and traps them in relationships of unequal power [16].

Thus, what theoretical perspective is adopted to understand think tanks has guiding and fundamental significance for understanding their roles and functions, for conducting and evaluating think tank research, and thereby for effectively leveraging the role of think tanks in a country's governance system. Whether based on discussions of think tank organizational structure or from pluralist or elitist perspectives, foreign theoretical research on think tanks primarily uses Western political systems as its background. Different theoretical perspectives tend to focus on certain characteristics of think tanks: the pluralist perspective builds on the openness of think tanks and characteristics of knowledge production, while the elitist perspective builds on their homogeneity and class attributes. Therefore, how to adopt a systematic perspective to consider

this important phenomenon of think tanks and thereby form a logical system for think tank research has important theoretical significance. Currently, such research is extremely lacking both in domestic academic circles and among think tanks themselves. Domestic understanding of think tank research remains unclear, lacking systematic thinking on the roles of think tanks and the issues they address, and has not formed a think tank research system or theory [17].

Therefore, this paper synthesizes multiple research results on think tank theory and methodology by the authors [18-22]: on the one hand, taking think tank research as the object of investigation and stepping beyond specific social conditions, it uses systems theory to reflect theoretically on the more universal roles and characteristics of think tanks, as well as important theoretical issues such as the principles and logical systems that think tank research should follow; on the other hand, starting from China's practical needs to modernize its national governance system and governance capacity and build high-end think tanks, it provides practical recommendations for think tank organizational construction and output evaluation. The main body of this paper examines the roles of think tanks in serving macro-level decision-making, guiding innovation directions, and innovating research methods and tools, and then proposes a basic logical system for think tank theory. It explains the "why," "what," "how," and "how to evaluate" questions in think tank research, providing systematic understanding of the purpose, sources, orientations, processes, requirements, and characteristics of think tank research. In constructing this logical system, the paper focuses on questions of both academic and practical value, such as how think tank research questions are raised, what sources and characteristics these questions have, how to conduct think tank research, and how to evaluate think tank research outputs. In the conclusion, the paper proposes possible future questions and directions for think tank research.

Theoretical Cognition of the Basic Logical System of Think Tank Research

Different political systems, levels of economic development, social and cultural characteristics, and specific historical periods all exert significant influence on the roles and functions, organization and structure of think tanks. However, think tanks' dual impact on decision-making and the public, the diversification and openness of their research, and their independence from interest groups with people's welfare as the fundamental starting point are characteristics that exist independent of political context. If we move beyond the limitations of political systems and cultural backgrounds and take think tank research as our object of investigation to explore the more essential roles and functions of think tanks, we find that think tanks primarily play three roles: serving macro-level decision-making, guiding innovation directions, and innovating research methods and tools.

First, in serving macro-level decision-making, think tanks primarily provide independent, objective, scientific basis and consultation advice for decision-

making through recommendations and participation in decision-making research. To effectively serve national macro-level decision-making, think tanks should play roles in four aspects: (1) conducting research on major issues concerning the overall situation and providing policy consultation reports from a think tank perspective on issues of government concern; (2) consulting on and evaluating reform plans and policy measures, conducting third-party assessments before policy measures are introduced; (3) evaluating the implementation of major decision-making plans and policy measures; and (4) grasping trends and patterns, timely setting major research topics, and conducting forward-looking and reserve research.

Second, in guiding innovation directions, think tanks influence the public and promote social progress through the release of public reports, seminars, and other forms, shaping scientific concepts, methods, and culture. Third, in innovating research methods and tools, think tanks ensure the scientific authority of their research and gain recognition from think tank peers through publishing papers and developing think tank research methods, means, and tools.

Based on clarifying the roles of think tanks, and to better leverage these roles and realize their functions, this paper proposes a theoretical cognition of the basic logical system of think tank research, focusing on resolving the "why," "what," "how," and "how to evaluate" questions in think tank research. The establishment of this logical system (Figure 1 [Figure 1: see original paper]) enables more systematic understanding of think tank functions and roles, while also providing logical guidance for conducting high-level think tank research.

The "Why" Question: What is the Purpose of Think Tank Research?
Ultimately, one of the purposes of China's think tank construction and research is to serve the modernization of the national governance system and governance capacity. The concept of modernizing China's national governance system and governance capacity was first proposed in November 2013 at the Third Plenary Session of the 18th CPC Central Committee, which stated that "the overall goal of comprehensively deepening reform is to improve and develop the socialist system with Chinese characteristics and to modernize the national governance system and governance capacity." This modernization, which can be called the "fifth modernization," represents a major breakthrough in China's political system, extending from the economic and social spheres to the institutional level and providing institutional guarantees for China's modernization. Establishing the modernization of the national governance system and governance capacity as the overall goal of comprehensively deepening reform has major and far-reaching theoretical and practical significance for China's political development and for China's entire socialist modernization endeavor. On this basis, the *Decision of the CPC Central Committee on Several Major Issues Concerning Comprehensively Deepening Reform* explicitly stated the need to "strengthen the construction of new-type think tanks with Chinese characteristics and establish a decision-making consultation system," marking the elevation of think tank

construction to a national strategic level.

In July 2013, President Xi Jinping inspected the Chinese Academy of Sciences and requested that it "take the lead in building a high-level science and technology think tank." President Xi Jinping pointed out that science and technology think tank research should study major issues concerning the overall situation from the perspective of the impact and role of science and technology, think forward about global science and technology development trends from the perspective of the laws of science and technology, provide consultation recommendations, conduct scientific assessments, make predictions and foresights, and play a constructive role in national macro-level decision-making. This requirement also promoted the establishment of science and technology think tanks represented by the Institutes of Science and Development of the Chinese Academy of Sciences. Science and technology think tanks focus on research concerning both "promoting scientific and technological development" and "science and technology promoting development," thinking forward about global science and technology development trends from the perspective of the laws of science and technology, and studying major domestic and international economic and social development issues from the perspective of the impact and role of science and technology.

The "What" Question: What are the Sources and Characteristics of Think Tank Research? As seen from the establishment process of science and technology think tanks, the sources of think tank issues in China mainly come from two aspects. On the one hand, they originate from decision-making demands in social practice. From a global and strategic height, think tanks select major issues, conduct pre-decision research on major problems, consultation and demonstration of plans during decision-making, and third-party evaluation after decision-making, providing alternative constructive plans, scientific consultation recommendations, and evaluation opinions to effectively serve macro-level decision-making. On the other hand, think tank research cannot neglect the grasp and study of trends and patterns. The issues addressed by think tank research stem from the internal logical evolution of social development. Think tanks bear the important mission of grasping trends and patterns, forward-looking proposing major issues, conducting in-depth theoretical research, providing reserve and preparatory plans, and guiding innovative directions for socio-economic development.

2.2.2 The "Six Characteristics" Convergence of Think Tank Research: Interdisciplinarity, Interconnectedness, Policy Practicality, Social Impact, Innovation, and Uncertainty The convergence characteristics of think tank research are reflected not only in the fact that think tank research issues involve the comprehensive integration of natural sciences, humanities and social sciences, and engineering sciences, but also in that their problems often emerge at the convergence zones of knowledge across science and technology, economy, society, environment, and politics, as well as at the convergence

of value chain links such as basic frontier, technological innovation, and application transformation. Think tank research can break through previous research that acted on a single discipline, single field, or single value chain link, generating new cross-disciplinary, cross-field, and cross-value chain cognition and forming comprehensive solutions to complex think tank problems, thereby better understanding future science and technology development trends and providing a basis for macro-level decision-making. Therefore, think tank research embodies the convergence characteristics of interdisciplinarity, interconnectedness, policy practicality, social impact, innovation, and uncertainty (Figure 2 [Figure 2: see original paper]).

Specifically: (1) **Interdisciplinarity** refers to the extensive breadth of information and knowledge required for think tank research, which is comprehensive research involving multiple disciplines. (2) **Interconnectedness** means that think tank issues are usually not generated independently but are a series of interrelated and mutually influential problems. (3) **Policy practicality** means that research results influence government decision-making and public policy, possessing practical utility for policy formulation. (4) **Social impact** means that think tank research results have significant impacts on society, ecology, economy, and science and technology. (5) **Innovation** means that think tank research cannot simply draw on existing experience but must propose innovative ideas for problems. (6) **Uncertainty** means that proposed solutions have long cycles and are usually closely related to external environments and factors.

Taking science and technology think tanks as the discussion object, we should recognize that the objects of science and technology think tank research are often complex, comprehensive strategic and policy issues that involve not only science and technology issues but also economic, social, environmental, management, and other aspects. For example, think tank research organized by the Institutes of Science and Development of the Chinese Academy of Sciences, such as "Assessing World Science and Technology Frontiers," "Forward-looking Research on China's Major Science and Technology Breakthroughs," "Research on Source Technologies in High-tech Industries for Global Competition," and "Research on Key Bottleneck Issues in Resources and Environment for a Strong Country in the Coming Century," involves only the science and technology issues themselves that are often cross-field and cross-disciplinary, encompassing comprehensive and cross-cutting research across science and technology, industry, innovation, energy, environment, and other fields.

The "How" Question: How to Conduct Think Tank Research? To effectively leverage the roles of think tanks in serving macro-level decision-making, guiding innovation directions, and innovating research methods and tools, while considering the comprehensiveness of research issues and the complexity of research objects, think tank research particularly requires comprehensive, multi-angle, and systematic observation and analysis of world development changes and their potential impacts on the economy and society. Specifically regarding

science and technology think tanks, their tasks and characteristics determine that their research is both specialized and requires systematic organization and comprehensive integration. In the research process, on the one hand, a systematic perspective should be used to analyze problems, decomposing research objects into interconnected specific science and technology issues, economic and social issues, policy issues, or management issues, and organizing experts in relevant directions for forward-looking judgment. On the other hand, a comprehensive perspective should be used to analyze problems, scientifically summarizing and comprehensively integrating the judgments of science and technology experts, policy experts, intelligence experts, and management experts to maximize consensus building and form holistic understanding of the research issues and proposed solutions. In conducting think tank research, attention should be paid to grasping and applying the "three orientations," "four stages," "five requirements," and "five integrations" proposed below.

2.3.1 The "Three Orientations" of Think Tank Research: Problem Orientation, Science Orientation, and Evidence Orientation The problem orientation, science orientation, and evidence orientation of think tank research are determined by the aforementioned purposes and sources of think tank research. Think tank research issues are complex, comprehensive, and cross-disciplinary, requiring effective comprehensive integration and summarization based on full understanding of relevant disciplinary knowledge, ultimately elevating to research on strategic consultation issues. When understanding the orientations of think tank research, we must recognize the relationship between academic research and think tank research. Academic research largely provides a source and support for the scientific and evidence-based nature of think tank research, providing clear and scientific basis for decision-making research, with the two forming an interactive relationship.

Specifically, **problem orientation** requires think tank researchers to approach through problems, which can be either current major strategic and policy issues or potential major strategic and policy issues. **Evidence orientation** requires arguments to be based on evidence, providing persuasive objective facts, scientific evidence, and data support. **Science orientation** means that research issues should follow patterns, adopt scientific research methods and tools, and conduct scientific, comprehensive, and systematic research on complex think tank problems.

2.3.2 The "Four Stages" of Think Tank Research: DIIS The DIIS method of think tank research describes the "four stages" of think tank research: "Data collection—Information revelation—Intelligence synthesis—Solution formation" (Figure 3 [Figure 3: see original paper]). DIIS represents a rethinking of think tank research methodology, a systematic summary of general research approaches to think tank issues, and a new think tank research method proposed under problem orientation, science orientation, and evidence orientation [19]. DIIS provides a comprehensive research approach and general research

process for think tank research, forming a multi-level comprehensive research method.

DIIS divides the think tank research process into four stages: (1) The **Data** collection stage, which involves comprehensively collecting various relevant data and phenomena around the research issue; (2) The **Information** revelation stage, which involves professional information mining, organization, and analysis to form objective cognition; (3) The **Intelligence** synthesis stage, which involves introducing expert wisdom to conduct research and judgment on cognition, obtaining new understanding and new ideas; and (4) The **Solution** formation stage, which involves proposing solutions under problem orientation and forming high-quality research reports.

The DIIS method of think tanks is closely related to problem orientation, science orientation, and evidence orientation in think tank research. Under the requirement of problem orientation, the DIIS method can be divided into a four-stage research process of "problem articulation—problem analysis—problem synthesis—problem resolution." Under the requirement of evidence orientation, the four stages of DIIS need to ensure true data, objective information, professional research and judgment, and rigorous and reliable solutions. Under science orientation, scientific research methods and tools need to be used to conduct systematic research on problems, ensuring precise and complete data, comprehensive and reasonable information, independent research and judgment, and forward-looking and scientific solutions in the four DIIS stages.

Taking the Chinese Academy of Sciences' science and technology development roadmap research as an example, in 2007, focusing on China's goal of basically achieving modernization by the mid-21st century, the Academy conducted forward-looking strategic research on science and technology development for 2050 across 18 important fields. From 2007 to 2013, the research process continuously summarized and refined think tank research ideas, forming and concretely practicing the DIIS theoretical method: in the data collection stage, a systematic perspective was used to analyze problems, decomposing them into interconnected sub-problems; in the information revelation stage, experts in relevant directions were organized for analysis to form objective cognition; in the intelligence synthesis stage, expert analysis and research and judgment were emphasized, comprehensively integrating expert judgments to maximize consensus building and form new cognition and new viewpoints; in the solution formation stage, overall concepts and problem-solving ideas were proposed to form planning solutions and policy recommendations that meet actual development requirements. The strategic research on the science and technology development roadmap was divided into 18 important fields with corresponding expert groups established, adopting work methods of centralized discussion, group research, comprehensive integration, and iterative improvement, as well as comprehensive research methods. In 2009, the *Innovation 2050: Science and Technology and China's Future* series of reports (hereinafter referred to as the "Innovation 2050 Roadmap") was published, establishing a mechanism for continuously con-

ducting strategic research. This was China's first set of panoramic reports forecasting the science and technology development blueprint for 2050, receiving widespread attention both domestically and internationally, with many viewpoints and research results being adopted by government decision-making departments, research institutions, enterprises, and social organizations. Based on the "Innovation 2050 Roadmap," in 2013, the Chinese Academy of Sciences released *Emerging Trends in Science and Technology Development and Strategic Options for 2020* (hereinafter referred to as "Strategic Options for 2020"). The "Innovation 2050 Roadmap" and "Strategic Options for 2020" together constitute China's medium- and long-term forecasts and judgments of science and technology development strategy.

2.3.3 The "Five Requirements" of Think Tank Research: Ideological, Constructive, Scientific, Forward-looking, and Independent From the entire process of think tank research, the "five requirements" of being ideological, constructive, scientific, forward-looking, and independent must be upheld. (1) **Ideological** requirements demand proposing new concepts, new ideas, new viewpoints, and new perspectives, and providing high-quality consultation recommendations and evaluation opinions. (2) **Constructive** requirements demand closely aligning with decision-making needs, being both grounded in the present and focused on the long term, and proposing "practical and useful" systematic solutions with depth, insight, and operability. (3) **Scientific** requirements demand being based on professional knowledge and scientific evidence, adopting scientific methods, combining qualitative understanding with quantitative analysis, and comprehensively and systematically analyzing problems to provide scientific demonstration. (4) **Forward-looking** requirements demand acutely predicting development trends and frontier directions, being adept at discovering regular, essential, and incipient issues, understanding new situations, new problems, and new characteristics, and providing policy recommendations for advance response and optimized layout. (5) **Independent** requirements demand, in the spirit of high responsibility to the country, following patterns, eliminating interference from personal, group, and local interests, and ensuring that research conclusions can withstand the tests of the people, practice, and history.

2.3.4 The "Five Integrations" of Think Tank Research: Organic Unity of Ideological and Political, Academic and Policy, Theoretical and Practical, Forward-looking and Constructive, and Independent and Disciplined

(1) **Integration of ideological and political nature** must be achieved. Think tank work is highly political with significant social impact and must adhere to the correct political direction. The focus of the national high-end think tank construction pilot work should be concentrated on providing high-level science and technology decision-making services for the CPC Central Committee, the State Council, and the Central Military Commis-

sion, which should serve as the starting point and foothold of think tank work. Focusing on the supporting and leading role of science and technology, understanding and grasping the interactive relationship between science and technology and economic and social development, and continuously proposing new concepts, new ideas, new viewpoints, and new perspectives to provide high-quality consultation recommendations and evaluation opinions.

(2) **Integration of academic and policy nature** must be achieved. Establish a high degree of theoretical consciousness and theoretical confidence, always placing academic pursuit and academic responsibility at the core of high-end think tank construction, proposing Chinese scientists' own judgments, and providing Chinese thought for building a community with a shared future for mankind. Simultaneously, pay attention to grasping the general trend of world science and technology development, research and judge the breakthrough directions of a new round of scientific and technological revolution, acutely capture the development direction and new growth points of scientific and technological innovation, and continuously propose leading and guiding academic judgments for the development of China's scientific and technological cause.

(3) **Integration of theoretical and practical nature** must be achieved. Adhere to the organic combination of theoretical innovation, methodological innovation, and practical application. Our academic research has never been self-admiration in a study but is problem-oriented research facing the world's scientific and technological frontiers, major national needs, and the main battlefield of the national economy. We must combine our academic research with social reality, achieve integration of theory and practice, use our knowledge to solve social problems, and enhance our theoretical cultivation in practice.

(4) **Integration of forward-looking and constructive nature** must be achieved. Focus on the long term, conduct predictions and foresights, be adept at discovering regular, essential, and incipient issues, understand new situations, new problems, and new characteristics, and provide policy recommendations for advance response and optimized layout. Closely align with decision-making needs, be grounded in China's basic national conditions and phased characteristics, solve hot, difficult, and bottleneck constraints in China's development, and address major global challenges; propose "practical and useful" systematic solutions with depth, insight, and operability that are conducive to advancing the modernization of the national governance system and governance capacity.

(5) **Integration of independent and disciplined nature** must be achieved. On the one hand, academia requires contention, and research should be autonomous. In the spirit of high responsibility to the Party and the country and the scientific spirit of following patterns and daring to question, we must objectively and independently propose scientific

recommendations, consultations, and evaluation opinions. On the other hand, we must adhere to the principle that "publishing has bottom lines," strengthen quality management, and establish and improve output management systems and publishing procedures.

The "How to Evaluate" Question: Evaluation Criteria for High-Level Think Tank Outputs

Constructing a logical system for think tank research provides systematic understanding of the purpose, sources, orientations, processes, and requirements of think tank research, which plays a foundational and guiding role in forming unique think tank research thinking, guiding the direction and mode of think tank research, innovating the management models of think tank organizations, and establishing evaluation criteria and systems for think tank outputs. The complexity and uniqueness of think tank research issues also determine that the evaluation of think tank outputs cannot rely solely on quantitative measurement through evaluation indicators. Correctly evaluating the influence, application effects, and contributions of think tank outputs should combine quantitative and qualitative evaluation methods and systematically evaluate and examine them from five levels (the five-level evaluation criteria for think tank outputs, see Table 1).

(1) **Development concept and strategy level**. The evaluation should focus on whether new concepts, new ideas, new viewpoints, and strategic recommendations have been proposed in research on major issues concerning the overall and long-term development of human civilization and the national economy and society, and whether these have become universal consensus, leading development trends or directions, or have become important scientific basis for national strategies. For example, the concept of sustainable development and the contribution of think tank research results during the formation of the innovation-driven development strategy, as well as the strategic judgment in the "Innovation 2050 Roadmap" that "the world today is on the eve of a new round of scientific and technological revolution," which has gradually become global consensus.

(2) **Regulations, planning, and methodology level**. The evaluation should examine whether think tank research results have become the scientific basis for the formulation or revision of relevant provisions in national laws and regulations; whether proposed scientific recommendations and predictions have been incorporated into national planning and task deployment; and whether developed research methods or tools are widely used by think tank peers. For example, the "Fourteen Articles on Science," the *1956-1967 National Long-term Science and Technology Development Plan*, the "Innovation 2050 Roadmap," "Strategic Options for 2020," and the Delphi method proposed by the RAND Corporation all represent think tank outputs with broad influence at the legal, planning, and methodological levels.

(3) **Institutional mechanism level**. The evaluation should focus on whether scientific recommendations proposed by think tanks have been adopted by national or relevant departments or have become important scientific basis for institutional mechanism reform and improvement. For example, recommendations to establish the National Natural Science Foundation of China, the Chinese Academy of Engineering, to implement the "863" and "973" Programs, to build the national innovation system, and to reform the science and technology planning system were adopted by national decision-making departments and have promoted China's scientific and technological progress.

(4) **Policy level**. The evaluation should examine whether think tank outputs have conducted research on key issues concerning national economic and social development, national security, and scientific and technological progress, proposed scientific recommendations and predictions, and become research support for national policy formulation. For example, policies supporting medium- and long-term planning, policies on R&D expense super-deduction, and policies on the "three rights" reform of scientific and technological achievements are typical results of think tanks playing a role at the policy level.

(5) **Measure level**. The evaluation should examine whether systematic solutions proposed by think tanks for major issues in reform, innovation, and development have been adopted by relevant national departments and important regions and have become important measures and concrete actions for reform and development. For example, recommendations to develop "two bombs and one satellite," to implement national major science and technology special projects (such as aircraft engines and gas turbines), to build comprehensive innovation reform pilot zones, and to implement strategic pilot science and technology special projects all represent think tank outputs in terms of reform measures and actions.

Conclusion and Discussion

The theoretical exploration of think tanks conducted in this paper addresses key questions concerning think tank construction and output evaluation, including what think tank research is for, what are the sources and characteristics of think tank research, how to conduct think tank research, and how to evaluate think tank outputs, thereby forming a cognition of the basic logical system of think tank research. Different from existing Western theoretical research on think tanks, this study starts from general patterns, transcends specific political systems and national contexts, does not confine itself to certain characteristics of think tanks, and from a systems theory perspective, treats think tank research as a relatively complete yet unique research system to explore its more fundamental roles and characteristics, thereby proposing how to conduct think tank research in terms of orientations, processes, and requirements. In practical terms, the basic concepts and methods for evaluating think tank outputs proposed in this

study provide theory, methods, and tools for China's think tank construction, which is still in the exploratory stage.

Specifically, China's think tank research primarily serves the goal of modernizing the national governance system and governance capacity, which is one of the purposes of think tank research. This also determines the two sources of think tank research issues: based on decision-making demands and exploration of trends and patterns. Different from traditional academic research, think tank research has "six characteristics" of convergence, including interdisciplinarity, interconnectedness, policy practicality, social impact, innovation, and uncertainty. In conducting think tank research, we must adhere to the "three orientations"—problem orientation, science orientation, and evidence orientation. Additionally, this paper provides the DIIS research tool, constituting the "four stages" of think tank research, while also proposing the "five requirements" of being ideological, constructive, scientific, forward-looking, and independent that think tank research must uphold, as well as the "five integrations" of development concept and strategy, laws and regulations and methodology, institutional mechanisms, policy, and measures as evaluation criteria for think tank outputs.

Think tank research, with its complexity, broad span, and urgent need for macro-level strategic thinking, differs from academic research that focuses primarily on micro-level in-depth study. Therefore, think tanks themselves need to conduct capacity building for think tank teams in the process of decision-making consultation research, continuously training specialized talents who differ from general academic researchers. These talents are often strategy and policy talents based on academic research. Think tank research teams should include not only academicians but also practitioners and talents with decision-making experience, which is crucial for both think tank self-construction and supporting decision-making research. In the process of think tank talent cultivation, the "revolving door" mechanism will help build a bridge for two-way talent exchange between think tanks and decision-making departments. On the one hand, it absorbs talents who have long worked in government decision-making departments and have in-depth thinking and decision-making experience in certain directions into think tanks; on the other hand, it transfers talents cultivated in think tanks who have strategic thinking to government decision-making departments [21].

Looking to the future, research on think tank theory should, on the one hand, be committed to providing theory, methods, and tools for think tank construction and think tank research; on the other hand, it should also consider the new media and means provided by emerging technology development for think tank research. At the same time, the continuous deepening and expansion of cooperation among think tanks has promoted the formation of think tank networks, which exert certain influences on national policy decision-making and changes in international relations. How to take think tanks as a starting point to conduct research on specific practical issues is also a possible future research direction.

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