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## Think Tank DIIS Three-Dimensional Theoretical Model Postprint

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**Date:** 2023-03-19T00:00:00+00:00

### Abstract

With the deepening exploration of think tank development, China has increasingly emphasized the rational development of think tanks and the production of high-quality research outcomes. However, existing think tank research typically focuses on fragmented aspects of think tank issues, lacking systematic consideration and cognition of the entire think tank research process. To address this, the article proposes a three-dimensional theoretical model of think tank DIIS from three dimensions—research process, think tank orientation, and methodological tools—based on the conceptual framework of the DIIS (Data-Information-Intelligence-Solution) theoretical method. The model is analyzed in depth from different perspectives, including the front view based on research process and think tank orientation, the top view based on research process and methodological tools, and the left view based on methodological tools and think tank orientation, thereby further exploring the systematic methodological framework for think tank research, with the aim of contributing to the development of high-quality think tanks in China.

### Full Text

#### Introduction

Since the 18th National Congress of the Communist Party of China, the central government has attached great importance to think tank construction, proposing a series of new concepts and ideas. In December 2012, President Xi Jinping pointed out at the Central Economic Work Conference that it is necessary to “improve decision-making consultation mechanisms and build high-quality think tanks according to the principle of serving decision-making and being moderately forward-looking.” In November 2013, the Decision of the Central Committee of the Communist Party of China on Some Major Issues Concerning Comprehensively Deepening Reforms from the Third Plenary Session of the

18th Central Committee explicitly stated the need to “strengthen the construction of new types of think tanks with Chinese characteristics and establish and improve the decision-making consultation system.” In January 2015, the central government issued the Opinions on Strengthening the Construction of New Types of Think Tanks with Chinese Characteristics, emphasizing the need to “earnestly strengthen the construction of new types of think tanks with Chinese characteristics and give full play to the important role of think tanks in state governance.” In May 2016, President Xi Jinping noted at the Symposium on Philosophy and Social Sciences that “think tank construction should focus on improving research quality and promoting content innovation.” In February 2017, the 32nd meeting of the Central Leading Group for Comprehensively Deepening Reforms reviewed and adopted the Construction Plan for the National Science and Technology Decision-Making Consultation System, clarifying that China would establish a supreme think tank for science and technology decision-making. In October 2017, President Xi Jinping explicitly stated in his report at the 19th National Congress of the Communist Party of China that it is necessary to strengthen the construction of new types of think tanks with Chinese characteristics.

Driven by this series of policy documents, think tanks in China have flourished, with increasing numbers and scale, and think tank research outputs have grown exponentially. As exploration of think tank construction has deepened, the central government has placed greater emphasis on the rational development of new types of think tanks with Chinese characteristics and the production of high-quality research outcomes. However, existing think tank research typically focuses on isolated aspects of think tank issues, suffering from fragmentation and lack of systematic perspective, and fails to provide systematic thinking and understanding of the entire think tank research process [1].

## The DIIS Theoretical Method and Three-Dimensional Model

To address these issues, Pan Jiaofeng [1], combining the general laws of think tank research, first conducted in-depth thinking on think tank research methodology from the perspective of “Data-Information-Intelligence-Solution” (DIIS), proposing the think tank DIIS theoretical method under problem orientation, evidence orientation, and science orientation. Building on this foundation, Pan Jiaofeng et al. [2] further studied the DIIS theoretical method for think tanks and the DIIS quality standards for think tank reports, and applied the DIIS theoretical method to science and technology evaluation, proposing the DIIS method for science and technology evaluation [3].

The think tank DIIS theoretical method, combining the general laws of think tank research, systematically analyzes the research process of think tank issues and provides important scientific support for think tank research in China. To further explore the systematic methodological system of think tank research, this article proposes a three-dimensional theoretical model of think tank DIIS

from three dimensions—research process, think tank orientation, and method tools—based on the DIIS theoretical method, and provides an in-depth analysis of the model’s main view, top view, and left view.

### Overview of the Three-Dimensional Theoretical Model

Based on the principles of think tank DIIS theory [1], research on think tank issues can be approached from three dimensions: research process, think tank orientation, and method tools, as detailed below.

The **research process dimension** comprises four stages of the DIIS theoretical method: First, comprehensively collect various relevant data and phenomena around the research issue (Data Collection); second, conduct professional data mining, sorting, and analysis to form objective cognition and knowledge (Information Revelation); third, introduce the wisdom of relevant experts and scholars to deliberate on this cognition (Intelligence Synthesis) to obtain new understandings, frameworks, and ideas; and finally, propose solutions or policy recommendations under problem orientation, evidence orientation, and science orientation (Solution Formation), ultimately providing high-quality and constructive think tank research reports for macro-level decision-making.

The **think tank orientation dimension** requires research on think tank issues to follow the fundamental principles of think tank research, namely problem orientation, science orientation, and evidence orientation [4]. Problem orientation requires think tank researchers to approach issues 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 well-founded, providing persuasive objective facts, scientific evidence, and data support. Science orientation means that research issues should follow scientific laws, employing scientific research methods and tools to conduct scientific, comprehensive, and systematic research on complex think tank issues.

The **method tools dimension** divides research methods and tools for think tank issues into three categories: quantitative analysis, qualitative analysis, and comprehensive analysis. Quantitative analysis methods and tools primarily conduct quantitative research on think tank issues by describing the numerical values and patterns of think tank research objects. Qualitative analysis methods and tools mainly conduct qualitative research on think tank issues through abstracting and summarizing the characteristics and patterns of think tank research objects. Comprehensive analysis methods and tools conduct comprehensive research on think tank research objects by combining quantitative and qualitative analysis.

Based on the above three dimensions, a three-dimensional theoretical model of think tank DIIS can be formed (Figure 1 [Figure 1: see original paper]). Starting from the three orientations of think tanks, four research processes, and three categories of method tools, and under the guidance of systems theory, dialectics, and cybernetics, this model combines the characteristics of think tank research

issues, conducts correlation analysis on think tank issues through appropriate methods, comprehensively integrates multidisciplinary information and expert wisdom, continuously supplements new knowledge, achieves comprehensive and systematic cyclic feedback and demonstration, and forms solutions that integrate objective information with collective wisdom.

From different perspectives, the think tank DIIS three-dimensional theoretical model can be divided into three views: the main view is the research process–think tank orientation quadrant, composed of the research process and think tank orientation dimensions; the top view is the research process–method tools quadrant, composed of the research process and method tools dimensions; and the left view is the method tools–think tank orientation quadrant, composed of the method tools and think tank orientation dimensions. To further understand the think tank DIIS three-dimensional theoretical model, the main view, top view, and left view of the model are detailed below.

### **Main View: Research Process–Think Tank Orientation Quadrant**

From the main view of the think tank DIIS three-dimensional theoretical model (Figure 2 [Figure 2: see original paper]), when researching think tank issues, one should proceed from problem orientation, evidence orientation, and science orientation, and conduct research on the four DIIS processes in combination with actual think tank issues.

#### **Evidence-Oriented Research**

The think tank research process should be well-founded, and research results should have corresponding data support and scientific evidence. Evidence-oriented think tank DIIS research ensures high-quality think tank research throughout the entire process by starting from the four stages of the DIIS theoretical method.

In **data collection**, three aspects are critical: reliability, authenticity, and consistency. Data must withstand scrutiny, with direct sources ensuring authority and indirect sources ensuring verifiability. Sources should be clearly documented, quantitative bases must be sufficient and reasonable, and subjective data collection should be well-evidenced. Additionally, data should be appropriately screened and processed, with standardized storage, extraction, and use that is logical, self-consistent, compatible, and free of contradictions.

In **information revelation**, information objectivity must be maintained to preserve original information without subjective bias. Information relevance requires clarifying relationships between current and existing research, explaining similarities and differences. Information timeliness necessitates continuous updating to avoid outdated information.

In **intelligence synthesis**, deliberation must be professional, with selected experts having senior research experience and credibility in relevant fields. Deliberation should be comprehensive, incorporating multidisciplinary knowledge for multi-angle analysis. Deliberation must be systematic, independent, and fair, avoiding bias from client relationships and balancing competing stakeholder positions through stakeholder analysis.

In **solution formation**, solutions must be feasible to meet actual needs, with logically and evidentially supported recommendations and appropriate explanations for proper application. Solutions should be rigorous, with logical construction and scientifically selected methods. Solutions must be reliable, with traceable evidence and practical effectiveness in application.

### Problem-Oriented Research

Think tank research requires integrated study of problem characteristics to provide strong support for decision-making activities. Problem-oriented think tank DIIS research follows the four stages of DIIS, corresponding to four specific phases: problem formulation, problem analysis, problem synthesis, and problem resolution.

In **data collection**, relevant data is gathered around the problem, and the research issue is decomposed into multiple sub-problems, corresponding to the problem formulation phase. In **information revelation**, relevant data is organized and analyzed, and sub-problems are studied in depth to form preliminary solutions, corresponding to the problem analysis phase. In **intelligence synthesis**, preliminary solutions for each sub-problem are systematically integrated, and expert opinions are synthesized for deliberation, corresponding to the problem synthesis phase. In **solution formation**, solutions for different scenarios are established based on the above research, corresponding to the problem resolution phase.

### Science-Oriented Research

Think tank research should follow objective laws and conduct systematic studies of problems. Science-oriented think tank DIIS research ensures scientific rigor throughout the entire process from the four stages of the DIIS theoretical method.

In **data collection**, data must be accurate and consistent with facts. Data collection should be reasonable, with comprehensive and structured sampling yielding representative and random samples. Data should be complete, with full collection and sufficient supplementation for missing data.

In **information revelation**, information must be comprehensive, analyzing problems from multidisciplinary and multi-field perspectives. Information should be applicable to different conditions, methods, and scenarios of the research issue. Information revelation methods should be appropriate for the

research problem and purpose, with explanations for method selection and advantages compared to alternatives.

In **intelligence synthesis**, deliberation must be systematic, analyzing problems comprehensively from a systems perspective. Deliberation should be independent, avoiding bias from relationships with clients or funding agencies. Deliberation must be fair, balancing competing positions through stakeholder analysis.

In **solution formation**, solutions should demonstrate innovative thinking. Solutions must be forward-looking, considering future development trends to propose prospective solutions. Solutions should be scientifically robust, accounting for uncertainty factors affecting validity and analyzing different scenarios by changing assumptions to enhance persuasiveness.

### Top View: Research Process–Method Tools Quadrant

From the top view of the think tank DIIS three-dimensional theoretical model (Figure 3 [Figure 3: see original paper]), when researching think tank issues, appropriate quantitative, qualitative, and comprehensive analysis methods and tools should be selected to conduct systematic research on the four DIIS processes. The think tank DIIS theoretical method can systematically cover existing quantitative, qualitative, and comprehensive analysis methods and tools, facilitating in-depth and systematic analysis of think tank issues. For illustration, some commonly used quantitative, qualitative, and comprehensive analysis methods and tools are listed below.

#### Quantitative Analysis Methods and Tools

For **data collection**, these include network data collection methods that use crawler software to capture public or user behavior data from the internet for secondary processing according to specific rules and screening criteria to maximize network data value, and database retrieval tools containing professional data on literature, patents, and economics—such as Web of Science, Scopus, and CNKI for literature; Chinese, US, and European patent databases and Derwent for patents; and World Bank, WTO, BIS, global economic indicators, and Federal Reserve Economic Data for economics.

For **information revelation**, these include factor analysis to identify main factors and essential relationships through internal relationship analysis, set pair analysis to quantitatively describe certainty and uncertainty from identity, difference, and opposition perspectives, IBM DB2 Intelligent Miner for data selection, transformation, mining, and visualization, and SAS Text Miner to convert structured and unstructured documents into numerical expressions.

For **intelligence synthesis**, these include the 拉开档次法 (Maximum Difference Method) to maximize differences among research objects and highlight overall

distinctions, and the 集值迭代法 (Set-valued Iteration Method) to find approximate solutions through initial estimates, extending classical and fuzzy statistics.

For **solution formation**, these include multi-attribute decision-making to evaluate and select optimal alternatives based on decision information, and causal analysis to identify important influencing factors based on cause-and-effect relationships for decision-making.

### Qualitative Analysis Methods and Tools

For **data collection**, these include questionnaire surveys using written forms to indirectly collect data, face-to-face interviews where investigators directly visit respondents, and online interview surveys using internet platforms to communicate with and survey respondents.

For **information revelation**, these include analogy learning to systematically study similarities and differences among categories of things, and case study methods to extract valuable common patterns and key features from numerous past cases.

For **intelligence synthesis**, these include game theory where participants adjust behaviors based on expectations of others' actions to achieve optimal strategic combinations, and the Delphi method relying on expert knowledge and experience through multiple rounds of consultation and feedback to achieve convergent collective judgment.

For **solution formation**, these include expert review where domain experts evaluate research objects' past, present, and future developments, and scenario analysis to predict and compare possible future situations and consequences under different hypothetical scenarios for optimal decision-making.

### Comprehensive Analysis Methods and Tools

For **data collection**, these include text clustering using machine learning to group documents with maximum similarity within clusters and minimum similarity between clusters, and information extraction using machine learning and natural language processing to extract specific information from text in structured form for query and analysis.

For **information revelation**, these include the analytic hierarchy process establishing judgment matrices through pairwise importance comparisons to obtain weights for different solutions, patent mapping processing and analyzing patent information in target technology fields to summarize technical distribution patterns in data form, and utility function methods quantifying decision-makers' risk attitudes based on utility theory for decision-making.

For **intelligence synthesis**, these include scientific mapping scientifically summarizing, sorting, and analyzing large volumes of scientific literature and data to visualize knowledge development processes and structural relationships, and

trend extrapolation inferring future development trends from past and present situations for forecasting science, technology, economic, and social development.

For **solution formation**, these include fuzzy comprehensive evaluation using fuzzy mathematics membership functions to transform qualitative evaluations into quantitative ones for ranking or selecting alternatives, benchmarking comparing research objects with optimal ones to identify strengths and weaknesses and form targeted policy recommendations, and social network analysis using graph theory and matrix methods to analyze social relationship structures and attributes to identify key nodes for problem-solving.

### **Left View: Method Tools–Think Tank Orientation Quadrant**

From the left view of the think tank DIIS three-dimensional theoretical model (Figure 4 [Figure 4: see original paper]), when researching think tank issues, appropriate method tools should be selected under problem orientation, evidence orientation, and science orientation.

#### **Problem-Oriented Method Tools**

Under problem orientation, think tank research requires rational selection of the three categories of method tools based on problem characteristics. When research issues involve concrete, quantifiable, and clearly defined objects, appropriate quantitative methods should be selected. When issues involve abstract, textually describable, and ambiguous concepts, appropriate qualitative methods should be chosen. When issues possess combined conditions for quantitative and qualitative analysis, appropriate comprehensive methods should be employed.

#### **Evidence-Oriented Method Tools**

Under evidence orientation, think tank research needs to use the three categories of method tools to form corresponding evidence, providing solid arguments and strong support for research results. Quantitative methods form evidence for data collection, storage, refinement, and use. Qualitative methods form evidence for cognitive subjects' wisdom judgment, thinking logic, and cognitive results. Comprehensive methods form evidence combining objective information and subjective cognition for research objects.

#### **Science-Oriented Method Tools**

Under science orientation, when existing quantitative, qualitative, and comprehensive methods cannot meet research needs, they should be improved and innovated according to specific research object conditions to ensure scientific rigor and reasonableness of think tank research.

## Conclusion

The think tank DIIS theoretical method explores general laws of think tank research and provides important scientific support for think tank research in China. To further explore the systematic methodological system of think tank research, this article proposes a three-dimensional theoretical model of think tank DIIS from three dimensions—research process, think tank orientation, and method tools—based on the DIIS theoretical method, and analyzes the model's main view, top view, and left view in depth. The main view presents evidence-oriented, problem-oriented, and science-oriented think tank DIIS research processes; the top view presents quantitative, qualitative, and comprehensive analysis method tools for think tank DIIS research processes; and the left view presents method tools based on problem orientation, evidence orientation, and science orientation. It is hoped that the think tank DIIS three-dimensional theoretical model will promote rational development and high-quality research output of Chinese think tanks and provide theoretical reference for constructing new types of think tanks with Chinese characteristics.

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