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Multidimensional quantitative analysis of the fit of Chinese science and technology talent policy

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Introduction

High-quality science and technology talent policies are essential for unlocking the innovative potential of scientific and technological talent, addressing the mismatches between talent supply and the demand for technological innovation, advancing the national strategy for science and technology talent, and fostering a conducive environment for talent development. In this context, deconstructing the policy framework for China's scientific and technological talent, analysing gaps, redundancies, and deficiencies in policy design, and optimizing the policy system are critical and timely endeavours.

This paper proposes a multidimensional analytical framework for assessing the fit of science and technology talent policies. It seeks to interpret the characteristics and challenges of China's science and technology talent policies through three dimensions: consistency fit, embedded fit, and compensatory fit. Specifically, this framework examines: the internal coordination of policies (consistency fit), the compatibility between policies and the overarching policy system (embedded fit), and the complementarity between policy supply and talent demand (compensatory fit). By employing quantitative analysis methods, this study aims to contribute to the theoretical research on talent policies, provide methodological insights, and offer practical recommendations for optimizing China's science and technology talent policy system.

Materials and methods

The analysis of policy fit comprises two components: the policy analysis module and the talent analysis module. The policy analysis module primarily examines two sub-dimensions: policy supply and policy goals, while the talent analysis module focuses on two sub-dimensions: talent demand and talent goals (Figure 1). These four sub-dimensions form six key interrelationships: the relationship between policy supply and policy goals—If the tools provided by the policy (policy supply) align effectively with its stated objectives (policy goals), consistency fit is achieved; the relationship between policy supply and talent goals—If the policy integrates seamlessly into the broader policy framework and serves as an effective tool for achieving talent goals, embedded fit is established; the relationship between policy supply and talent demand—If the policy supply meets the specific needs of talent (talent demand), compensatory fit is attained; the relationship between policy goals and talent goals—Since policies are inherently designed to achieve talent development goals, there is an automatic fit between these two dimensions; the relationship between policy goals and talent demand—The primary aim of a policy is to address talent demand, which serves as a sufficient condition for policy goals. Thus, an automatic fit exists between these two dimensions; and the relationship between talent demand and talent goals—Talent goals are derived from individual and collective talent needs, with collective needs often

reflecting government requirements for talent development. Talent goals are therefore a necessary condition for talent demand, creating an automatic fit between these dimensions.

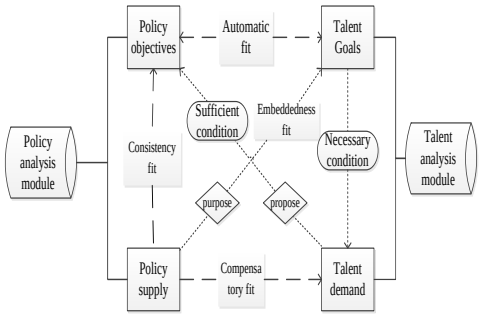

Figure 1. Relationship diagram for analysing the fit of talent policies.

Empirical Analysis of the Fit Degree of China's Talent Policies

After a decade of development, China's science and technology talent policy system has essentially established a relatively stable framework. Both the consistency fit and compensatory fit values of the policies exhibit an upward trend, reflecting an improvement in the quality of China's science and technology talent policies. However, certain shortcomings persist in the formulation and implementation of these policies, as detailed below:

Limited Use of Development Planning Policy Tools: The utilization of development planning policy tools remains relatively limited, resulting in a lack of comprehensive top-level design for talent development. Instead, fragmented and piecemeal policy measures are frequently employed. This shortfall is one of the key reasons why the goal of improving talent quality in China has not been effectively achieved.

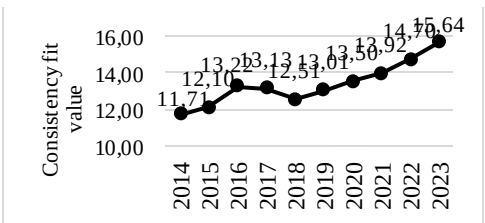

Figure 2. Consistency fit value of China's science and technology talent policy.

Discrepancy in Policy Tool Usage: A significant imbalance exists in the application of policy tools, with training and development tools being used more frequently, while introduction and aggregation policies, as well as development planning policies, are comparatively underutilized. The insufficient use of introduction and aggregation policy tools is a major factor hindering the realization of the goal to expand the talent pool as envisioned in China's talent policies. Furthermore, the content of existing introduction policies reveals a stronger focus on the recruitment of domestic talent, with less emphasis on attracting international talent. While there is substantial attention given to attracting talent for innovation and entrepreneurship, the introduction of high-level talent remains a lower priority.

Gap Between Policy Goals and Actual Outcomes: A noticeable gap exists between the stated goals of policy implementation and their actual effects. For example, while China's science and technology talent policies aim to enhance talent quality, the outcomes have been suboptimal, indicating that the measures and intensity of tools designed to improve talent quality require further strengthening.

Mismatch Between Policy Supply and Talent Demand: Although China has implemented numerous policies to support talent development, data indicates that a gap persists between policy supply and talent demand. This issue warrants significant attention in the future development of China's science and technology talent policies. As the scale and capabilities of the talent pool continue to grow, the nature of talent demand is also evolving. On one hand, the coordinated use of multiple policy tools should be prioritized to achieve the goals of expanding the talent pool and enhancing talent quality. On the other hand, a detailed analysis of talent demand should be conducted. Strengthening protections for talent in areas such as knowledge, living conditions, services, and institutional support is essential for transitioning from a general talent base to a higher-quality talent pool.

Table 1. Evolution of compensatory fit value in China's science and technology talent policy.

Year	*Value of compensatory fit*	*Year*	*Value of compensatory fit*
2014	(0.707，1)	2019	(0.902，1)
2015	(0.767，1)	2020	(0.911，1)
2016	(0.774，1)	2021	(0.944，1)
2017	(0.821，1)	2022	(0.992，1)
2018	(0.842，1)	2023	(0.999，1)

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