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Extension Assessment of the Transformation Ability of Scientific Research Achievements of Innovative High-end Scientific Research Talents

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Abstract:

Under the background of technological innovation-driven development, it is very important to assess the transformation ability of innovative high-end scientific research talents. This article focuses on this, using extension theory as a tool, and deeply analyzes the elements of the transformation ability of innovative high-end scientific research talents, including innovation ability, technology research and development ability, market insight ability and resource integration ability. Following the principles of scientificity, systematicness, operability and dynamics, this article constructs an assessment index system framework for the transformation ability of scientific research achievements based on extension theory, and refines the indicators from multiple dimensions such as originality and the number of technical problems overcome. Through this study, it is expected to provide a theoretical basis for the scientific assessment of the transformation ability of innovative high-end scientific research talents, help optimize the mechanism of talent selection, training and incentive, improve the transformation efficiency of scientific research achievements, and promote the deep integration of science and technology and economy.

Keywords:

Scientific Research Talents, Transformation Ability of Scientific Research Achievements, Extension Assessment, Assessment Index System, Scientific Research Competitiveness

1. Introduction

With the increasingly fierce global competition in science and technology, scientific research innovation has become the core driving force to promote economic and social development [1]. Innovative high-end scientific research talents are the key force of scientific research innovation, and their ability to transform scientific research achievements is of great significance to enhance the scientific research competitiveness of countries and regions and promote high-quality economic development [2]. How to scientifically and accurately assess the transformation ability of scientific research achievements of innovative high-end scientific research talents has become an important issue to be solved urgently [3].

At present, although there have been many studies in the field of scientific research talents assessment, the systematic assessment of the transformation ability of scientific research achievements of innovative high-end scientific research talents is still insufficient [4]. The existing assessment focuses on a single dimension, and fails to comprehensively consider the complex factors and multiple capabilities involved in the transformation of scientific research achievements [5]. Extenics, as a new discipline, based on matter-element theory and extension set theory, provides effective methods and tools for solving contradictory problems [6]. Introducing extension theory into the assessment of the transformation ability of scientific research achievements of innovative high-end scientific research talents is expected to break through the limitations of traditional assessment methods and build a more scientific, comprehensive and accurate assessment system.

Based on the extension theory, this article aims to deeply analyze the elements of the transformation ability of scientific research achievements of innovative high-end scientific research talents and build a scientific and reasonable assessment index system. Through this study, it is expected to provide theoretical basis for the selection, training and encouragement of innovative high-end scientific research talents, help optimize the allocation of scientific research resources and improve the efficiency of scientific research achievements transformation.

2. Related Theoretical Basis

Innovative high-end scientific research talents refer to high-level talents with profound professional knowledge, excellent innovative thinking and practical ability, and can carry out pioneering work in frontier scientific research fields [7]. Such talents usually have high academic qualifications or rich scientific research experience, and their innovative achievements have a great impetus to scientific research progress and industrial development. They can not only put forward new scientific theories and technical methods, but also be good at translating ideas into practical applications. They often play a leading and core role in the team and promote key breakthroughs and achievements transformation of scientific research projects.

The transformation ability of scientific research achievements is the comprehensive ability to transform scientific research achievements from knowledge form into practical productivity. It covers many aspects, first of all, the technical maturity of the results, that is, the degree to which the results can be applied and industrialized. Secondly, the market-oriented ability requires that the results meet the market demand and have commercial value [8]. Furthermore, the ability of resource integration in the process of transformation, including the allocation and utilization of funds, equipment, talents and other resources. The ability of communication and coordination is also very important. It is necessary to coordinate the relationship between scientific research teams, enterprises, governments and other parties to ensure the smooth transformation process.

Extenics is based on matter-element theory and extension set theory, and its core is to seek solutions to contradictory problems through the study of things' extensibility. Matter-element theory describes things by tripling things, characteristics and values, which provides a way for formal expression of problems [9]. Extension set theory breaks through the limitation of "either one or the other" of classical sets, and quantitatively describes the subordinate relationship between elements and sets with correlation function, reflecting the process of quantitative change and qualitative

change of things. In the assessment problem, extenics can construct a matter-element model, in which the assessment object, index and value are included, and through the calculation of correlation degree, the judgment of the quality level of the assessment object can be realized. This theory provides a unique perspective and an effective tool for the assessment of the transformation ability of scientific research achievements of innovative high-end scientific research talents, which is helpful to deal with the complex contradictions and uncertainties in the assessment.

3. Analysis on the Elements of the Transformation Ability of Innovative High-end Scientific Research Achievements

The ability to transform scientific research achievements of innovative high-end scientific research talents is not reflected in a single dimension, but is composed of multiple key elements interacting and cooperating. These factors jointly affect the whole process of scientific research achievements from theoretical research to practical application and commercial value realization.

3.1. Elements of innovation ability

Innovation ability is one of the core abilities of innovative high-end scientific research talents. It includes keen insight, which can capture potential innovation points from complicated phenomena and problems; Unique thinking ability, breaking through traditional thinking patterns and putting forward novel concepts, methods or technical routes. In addition, the courage and perseverance of innovation are also indispensable. Facing the risks and failures in the process of innovation, we can persistently pursue new solutions.

3.2. Technology R&D capability elements

Technology research and development ability is the key to transform innovative ideas into practical technological achievements. This requires talents to have solid professional basic knowledge and master the core technologies and research methods in their fields. Taking semiconductor chip research and development as an example, high-end scientific research talents should not only be proficient in semiconductor physics, integrated circuit design and other professional knowledge, but also skillfully use electronic design automation (EDA) tools for chip design and simulation. In the process of technology research and development, it is also necessary to have the ability of experimental operation, to build an experimental platform, to verify and optimize the experiment, and to ensure the feasibility and reliability of the developed technology.

3.3. Elements of market insight ability

Market insight determines whether scientific research achievements can be successfully commercialized. Innovative high-end scientific research talents need to deeply understand the dynamic changes of market demand and accurately grasp the market trend. This includes the investigation and analysis of consumer demand, understanding the expectations of different customer groups on product functions, performance, price and so on. It is also very important to analyze competitors, understand the advantages and disadvantages of existing products and technologies in the industry, so as to make their own scientific research achievements have differentiated competitive advantages.

3.4. Resource integration capability elements and technological achievements.

The transformation of scientific research achievements often requires a lot of funds, equipment, manpower and other resources. Innovative high-end scientific research talents need to have the ability to integrate these resources. They should be good at obtaining financial support through various channels, such as applying for funds for scientific research projects and attracting venture capital. It is necessary to rationally allocate human resources, set up an efficient R&D and transformation team, and clarify the responsibilities and division of labor of each member. They should also be able to integrate experimental equipment, venues and other material resources to ensure the smooth progress of scientific research and transformation.

In order to more clearly present the elements and specific performance of the ability to transform scientific research achievements of innovative high-end scientific research talents, this article arranges Figure 1. From the table, we can see that each component plays a unique role in different stages of the transformation of scientific research achievements, and they are interrelated and influence each other, which together constitute the organic whole of the transformation ability of innovative high-end scientific research talents.

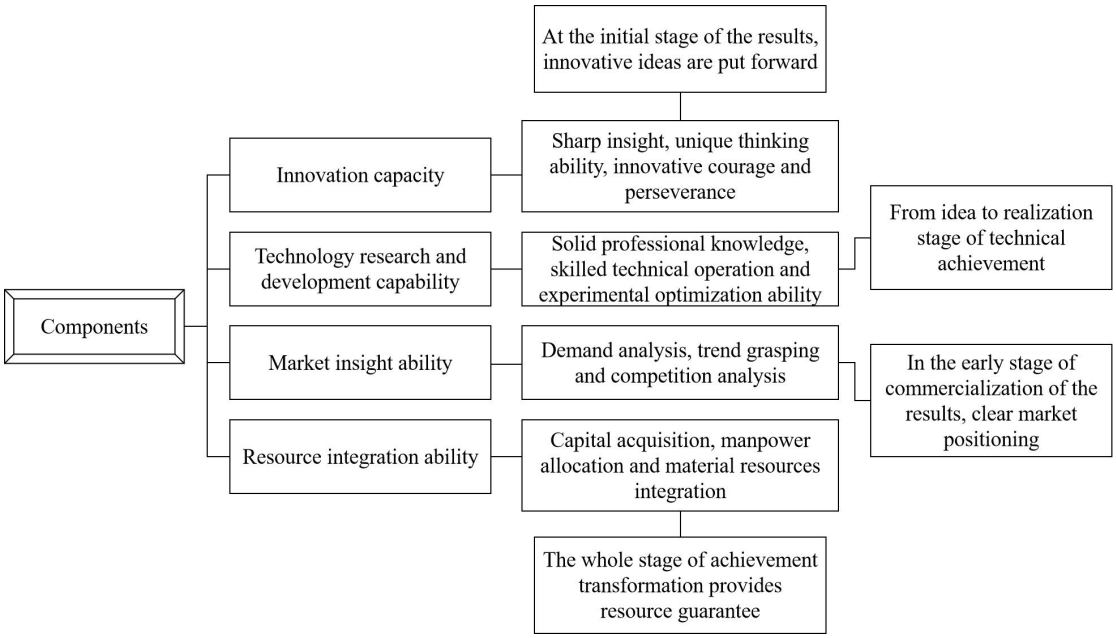

Figure 1. *Elements of the ability to transform scientific research achievements of innovative high-end scientific research talents.*

4. Construction Principles and Ideas of Assessment Index System of Transformation Ability of Scientific Research Achievements Based on Extension Theory

Based on extension theory, it is necessary to follow specific principles and clear ideas to build an assessment index system for the transformation ability of innovative high-end scientific research talents, so as to ensure that the assessment system is scientific, reasonable, practical and effective.

In terms of construction principles, the first is the scientific principle. The selection of indicators should be based on solid theoretical foundation and practical experience, and accurately reflect the essential characteristics and internal laws of the

transformation ability of scientific research achievements. The second is the systematic principle. The transformation ability of scientific research achievements is a complex system with multiple factors interacting with each other. The index system should comprehensively cover innovation, technology research and development, market insight, resource integration and other aspects, and all the indicators are interrelated and distinct, forming an organic whole. Thirdly, the principle of operability. The selected index data should be easy to obtain and quantify, and the assessment method is simple and feasible. For example, measuring innovation output by the number of patent applications, data acquisition is relatively easy. In addition, we must follow the dynamic principle. With the development of science and technology and the changing market environment, the index system needs to be adjusted and updated in time to adapt to the new trends and requirements.

In terms of construction ideas, the transformation ability of innovative high-end scientific research talents is regarded as a matter-element system with extension theory as the core. Firstly, it is clear that the assessment goal is to accurately assess the talent's ability to transform scientific research achievements. Then, according to the above-mentioned construction principles, the elements of the transformation ability of scientific research achievements are decomposed in detail, and the assessment indexes at all levels are determined. Then, the appropriate magnitude range and dimension are determined for each index, and the classical domain matter element is constructed. At the same time, considering the differences of different assessment grades, the nodal matter element is constructed. By determining the weight of each index, the extension correlation function is used to calculate the correlation degree, and the quantitative assessment of the transformation ability of talents' scientific research achievements is realized.

In order to clearly show the framework of constructing assessment index system based on extension theory, Table 1 is listed. The table is sorted from three levels: target level, criterion level and index level. The target layer is the assessment of the transformation ability of scientific research achievements of innovative high-end scientific research talents. The criterion layer includes four aspects: innovation ability, technology research and development ability, market insight ability and resource integration ability. The index layer further refines the capabilities of the criterion layer. Through this framework, it lays a foundation for the screening and weight determination of specific indicators in the future, and makes the construction of assessment index system based on extension theory more organized and oriented.

Table 1. *Framework table of assessment index system of transformation ability of scientific research achievements based on extension theory.*

Target layer	Criterion layer	Index layer
Assessment on the transformation ability of scientific research achievements of innovative high-end scientific research talents	Innovation capacity	Creativity novelty: measure the novelty of ideas put forward by innovative high-end scientific research talents in the industry.
		Application of innovative methods: to assess the application of advanced innovative methods and tools by talents in the process of innovation.
		Break through the traditional thinking ability: examine its ability to break through the conventional thinking pattern and put forward unique solutions.
	Technology research and development	Number of technical problems solved: Count the number of talents who have successfully solved key technical problems in the R&D process.

	capability	R&D efficiency: Assess the R&D efficiency of talents through indicators such as the time required to complete R&D tasks.
		Advanced research and development achievements: judge the advanced level of the developed technological achievements in the same field.
	Market insight ability	Forward-looking market demand: check the accuracy of predicting the future market demand trend.
		Depth of competitive situation analysis: assess the depth of analysis of competitors' products, technologies and market strategies.
		Market feedback sensitivity: measure the sensitivity to the feedback information about products or technologies in the market.
	Resource integration ability	Diversification of fund raising: assess the diversity of channels for talents to obtain funds, such as government funding, enterprise investment, venture capital, etc.
		Utilization efficiency of equipment resources: to investigate the effective utilization of experimental equipment, production equipment and other resources.
		Talent team collaboration and coordination: measure the collaboration and cooperation among team members in the process of integrating human resources.

5. Conclusions

Based on the extension theory, this article makes an in-depth study on the transformation ability of scientific research achievements of innovative high-end scientific research talents, and has achieved a series of results. In this article, the elements of the transformation ability of scientific research achievements of innovative high-end scientific research talents are systematically analyzed, and the key role of each element in the transformation process is clarified, which lays a solid foundation for the selection of subsequent assessment indicators. Based on the principles of scientificity and systematicness, this article constructs an assessment index system framework of transformation ability of scientific research achievements based on extension theory, and refines specific indicators from four dimensions: innovation, technology research and development, market insight and resource integration ability. The framework is comprehensive and targeted, which is helpful to realize the quantitative assessment of talents' ability to transform scientific research achievements.

With the rapid development of science and technology and the dynamic change of market environment, the assessment index system needs to be continuously updated and optimized to ensure its adaptability and effectiveness. Looking forward to the future, we should further deepen the research and practical application of assessment system based on extension theory, strengthen targeted research on innovative high-end scientific research talents in different industries and fields, and provide more powerful support for promoting the efficient transformation of scientific research achievements and enhancing the national scientific research innovation strength.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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