

Research on Symbiosis Evolution of “Professional, Fine, Characteristic, Novel” Enterprises under the Double Cycle Background

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Abstract

“Professional, fine, characteristic, novel” enterprises are an important way to stimulate the vitality of market players and technological innovation of enterprises, but there are still many practical problems. Article based on the symbiosis theory, and put forward the “Professional, fine, characteristic, novel” enterprise symbiotic evolution of 16 kinds of patterns and pareto optimal route choice, at the same time, also analyzed the evolution power mechanism, put forward the “Professional, fine, characteristic, novel” enterprise along the path of Chinese modernization, high quality "symbiosis evolution" four countermeasures, Thus, it provides the theoretical basis and method reference for the high quality development of “Professional, fine, characteristic, novel” enterprises.

Keywords: “Professional, fine, characteristic, novel” enterprises; Symbiosis; evolution

1. Introduction

At present, great changes unseen in a century are accelerating in the world, and the "decoupling and chain breaking" crises of geopolitics, finance, energy and "adverse economic laws" are deeply superimposed, resulting in serious challenges to world economic development. Although China's industrial structure is relatively complete, there are still problems such as insufficient industrial basic equipment and core technical capabilities, and many "breakpoints" and "blockings" on the industrial chain. These problems are more prominent in today's complex and changeable world situation, and how to solve them has become a realistic problem facing theory and practice. From the perspective of the existing industrial optimization practice, the development of specialized new enterprises is conducive to the high quality development of Chinese industries, because the kind of strong international competitive enterprises master a batch of "jamming" technology, and the leading products are "forging plate", "forging plate" and "blank filling" to the strong chain and casting chain role, which can solve the "breakpoint" problem in technology of the industrial chain to a great extent. Effectively adapt to the "double cycle" high-quality development and the basic requirements of Chinese modernization, meanwhile, “Professional, fine, characteristic, novel” small and medium enterprises have become the key carrier to implement the innovation-driven development strategy, become an important source of new economic growth point, and play an increasingly important role in the national innovation system. However, most of the “Professional, fine, characteristic, novel” enterprises are small, medium and micro enterprises, with relatively scarce resources, lack of collaborative entrepreneurship model, unsound system and mechanism, weak basic research ability, digital transformation facing the "digital divide", weak cooperation impetus among members of the innovation ecosystem and other problems. Therefore, the research on the development of “Professional, fine, characteristic, novel” enterprises in the whole industrial chain has a sense of urgency of The Times.

2. Literature Review

The concept of “Professional, fine, characteristic, novel” first put forward by the Ministry of Industry and Information Technology in 2011, 2020 for the first time in the Political Bureau of the CPC Central Committee meeting, specialization, "new" and "fill strong chain " together, in 2022, specialization, "new" into the government work report, then the report further emphasize to support the party's 20 "specialization, new enterprises" development, Specialization, "new" enterprise in the great practice of Chinese modernization construction in full swing, in the “Professional, fine, characteristic, novel” enterprise theory research also soon became hot and difficult.

According to the existing literature, the current research on “Professional, fine, characteristic, novel” enterprises mainly focuses on the aspects of policy formulation, influencing factors and high-quality development. In terms of policies, Xie Jing(2023)sorted out the policies supporting the development of Chinese “Professional, fine, characteristic, novel” enterprises from the three dimensions of demand side, supply side and environment side according to the theory of policy instruments. Liu Zhibiao and Xu Tianshu(2022)believe that in order to solve the development obstacles and bottlenecks existing in “Professional, fine, characteristic, novel” enterprises, governments at all levels must change the ways and methods of industrial policy implementation, so as to play their dual roles of "chain master" and "chain leader" in the industrial chain. Through the quantitative research of provincial policy texts by Zhang Fan et al. (2022), government support policies can effectively promote the transformation of small and medium-sized enterprises to "specialized, refined and ultra-new". Lin Jiang(2021), from the functional perspective of government agencies at all levels, believes that provincial (directly under the Central government) governments and municipal (county) governments should have different priorities in cultivating specialized and innovative "little giant" enterprises. The former should act as "lubricant" and "booster", while the latter should focus on solving the practical problems faced by enterprises. In terms of influencing factor analysis, Song Yang and Fan Binai(2022)took 98 listed “Professional, fine, characteristic, novel” companies in Zhejiang Province as samples, adopted fuzzy set qualitative comparative analysis (fsQCA) method, and studied the mechanism of their synergistic influence on the digital transformation of "specialized, specialized and specialized and specialized and specialized" enterprises from the perspective of "technology-organization-environment" configuration. Zhang Sifei and Chen Yongqi(2023)found that the financing environment, research and development ability and market competitiveness of “Professional, fine, characteristic, novel” enterprises will significantly affect their innovation performance. In terms of high-quality development, Luo Fukai et al. (2023), based on the samples of the first three batches of listed "Little giant" listed family enterprises, found that “Professional, fine, characteristic, novel” enterprises have more significant contribution advantages to corporate value and social value than ordinary innovation-oriented enterprises. Mr Li(2020) to study the specialization, "new" "little giant" enterprise business choice, think “Professional, fine, characteristic, novel” "little giant" in the future development of the enterprise to its main business is given priority to, make full use of their own unique advantages, the elaborating management and strategy of "going out". In addition, there are also studies on the development mode. For example, Qiu Huidong, Sheng Wenhui et al. (2021) believe that in order to further grow bigger and stronger, "specialized, refined and ultra-new" enterprises should focus on market segments and constantly improve their core competitiveness. Zhou Tingting and Li Mengke(2023) studied the relationship between industrial technological self-reliance, hard technological innovation and trans-scale development of specialized, specialized and specialized new enterprises based on the hierarchical cultivation model of “city-county-provincial-level - national” . Liu Zhibiao and Xu Tianshu(2022), from the perspective of the whole value chain and the "double cycle", proposed that the "chain master" enterprise in the value chain is an effective way to promote the “Professional, fine, characteristic, novel” development of other related enterprises in the industrial chain.

From the above analysis, it can be seen that “Professional, fine, characteristic, novel” has attracted more and more attention from the academic circle, and has achieved a lot of useful results, which undoubtedly provides valuable resources for the subsequent practice and theoretical research. However, there are also many shortcomings in the existing researches, which lack the research on the growth model evolution and dynamic mechanism of “Professional, fine, characteristic, novel” enterprises from the perspective of sustainable development. Based on the context of Chinese modernization construction and from the perspective of symbiosis theory and value network theory, this paper studies the symbiotic evolution of “Professional, fine, characteristic, novel” enterprise value network system from three aspects: symbiotic evolution mode, path and energy generation. Thus, it provides theoretical decision-making basis and practical method reference for the high-quality development of “Professional, fine, characteristic, novel” enterprises.

3. The Symbiosis System of “Professional, Fine, Characteristic, Novel” Enterprise Value Network and Its Evolutionary Model

Specialization, "new" enterprise value network system mainly includes the “Professional, fine, characteristic, novel” enterprise and its customers, suppliers and competitors, complementary symbiosis unit, is one of the companies, in the “Professional, fine, characteristic, novel” enterprise symbiotic unit, the value network system can play at the same time customers, competitors, suppliers, or complementary multiple roles, and can have multiple identities.

Different combination forms among these symbiotic units constitute different symbiotic modes, which can reflect not only the interaction of matter, energy and information between symbiotic units, but also the mode and intensity of their interaction.

As for the symbiosis mode of “Professional, fine, characteristic, novel” enterprise value network system, it can also be divided from the two dimensions of behavior mode and organization mode according to the symbiosis theory.

According to the behavior pattern, it can be divided into four states: parasitism (P₁), favoritism (P₂), symmetric mutualism (P₃) and asymmetric mutualism (P₄). According to the degree of organization (organization mode), they can be further divided into point symbiosis (M₁), intermittent symbiosis (M₂), continuous symbiosis (M₃) and integrated symbiosis (M₄), thus determining the following 16 symbiosis state modes, namely:

$$S = P \times M = \begin{pmatrix} P_1 \\ P_2 \\ P_3 \\ P_4 \end{pmatrix} \times \begin{pmatrix} M_1 \\ M_2 \\ M_3 \\ M_4 \end{pmatrix} = \begin{matrix} P_1 M_1 & P_1 M_2 & P_1 M_3 & P_1 M_4 \\ P_2 M_1 & P_2 M_2 & P_2 M_3 & P_2 M_4 \\ P_3 M_1 & P_3 M_2 & P_3 M_3 & P_3 M_4 \\ P_4 M_1 & P_4 M_2 & P_4 M_3 & P_4 M_4 \end{matrix}$$

According to the behavior and organization mode, look from the node's stock in a certain time, there are 16 kinds of symbiotic state model, from the course of time, the original pattern is S₁₁ (P₁ , M₁), which is parasitic on behavior, organizational symbiosis is point. Other models can be understood as the evolution of the model, from which different paths are generated.

4. Symbiotic Evolution Path of “Professional, Fine, Characteristic, Novel” Enterprise Value Network System

The system evolution path will be diversified due to the different internal characteristics and environmental factors of the system. Among these paths, there is a Pareto optimal path. Also, for specialization, "new" value network system, by specialization, "new" small micro enterprises to specialization, "new" "unicorn" small and medium-sized enterprises, to specialization, "new" "little giant" enterprises, finally evolved to specialization, "new" single champion "companies, there is a pareto optimal path.

Hypothesis “Professional, fine, characteristic, novel” enterprise value network system of the symbiosis between members in initial state for S₁₁ (P₁, M₁) , then, according to the symbiosis theory, in a variety of way of evolution, specialization, "new" in the evolution of enterprise value network system pareto way is S₁₁ (P₁, M₁) - > S₂₂ (P₂, M₂) - > S₃₃ (P₃, M₃) → S₄₄ (P₄, M₄), because only in this way, the symbiotic interface among members of the “Professional, fine, characteristic, novel”value network is improved the fastest, and the incentive compatibility increases the fastest. The effect between them is that the AC resistance on the symbiotic interface decreases the fastest, the incentive effect increases the fastest, and the symbiotic pure energy increases the fastest. Thus, the transformation of symbiotic mode from low energy steady-state to high energy steady-state is stimulated in the optimal path, and the symbiotic evolution of the system realizes Pareto optimization.

Actually, in the “Professional, fine, characteristic, novel” enterprise value network system in the course of the evolution of reality, symbiotic initial state is not always S₁₁ (P₁ , M₁), if the initial state of symbiosis S₁₁ (P₁ , M₁), pareto way of symbiotic evolution from its initial state S_{XY} (P_X , M_X) starting point and S₄₄ (P₄ , M₄) direction of the shortest path (X, Y = 1,2,3.)

Therefore, for those coecologies of “Professional, fine, characteristic, novel” value network members on the "non-Pareto path", their core resources and core capabilities (principal quality parameters) should be adjusted to convert to the coecologies on the "Pareto path", and then "evolve" from low-energy steady-state to high-energy steady-state to achieve sustainable and high-quality development.

From the results of the evolutionary path, “Professional, fine, characteristic, novel” enterprises have realized the transition from relatively low added value, weak brand, low quality and low technology content to high added value, strong brand, high quality and high technology content. The resource flow barrier between the members of the value network has been weakened, and it is easier for the members of the value network to obtain the technology, capital and "highly specialized" human resources needed for development, thus speeding up the derivative speed of “Professional, fine, characteristic, novel” enterprises.

5. Generation of Symbiotic Evolution Energy of “Professional, Fine, Characteristic, Novel” Enterprise Value Network System

5.1 Core Parameters Affecting Energy Generation

5.1.1 Principal Parameter Z

The main quality parameters that play a leading role in the enterprise value network system of "speciality, speciality and speciality" refer to the relatively unique and non-replicable core resources and core competence parameters, such as the core technical personnel, core patented technology ("choke" technology) and characteristic organizational culture of the "speciality, speciality and speciality" enterprise. They are the core elements to play the "strong chain" and "cast chain".

5.1.2 The Symbiotic Interface Eigenvalue λ

The sum of the contact modes and mechanisms between the members of the “Professional, fine, characteristic, novel” enterprise value network system constitutes the symbiotic interface, which is the medium of energy, information and material conduction between symbiotic units. The size of the AC resistance is expressed by the characteristic value λ of the symbiotic interface. The greater the AC resistance, the greater the λ , the better the quality of the contact medium, the smaller the resistance between the symbiotic units. Where $0 < \lambda < +\infty$ is mainly affected by the size of the symbiotic interface and the characteristics of the contact medium. Specialization, "new" enterprise value the greater the symbiotic interface between the members of the network system, so, specialization, "new" enterprise value between the members of the network system of material, information and energy flow of communication and also the more frequently, contact medium quality, the better, the corresponding eigenvalue is close to zero.

5.1.3 The Symbiosis Degree δ

The degree of symbiosis is closely related to the number and correlation degree of the main quality parameters of the “Professional, fine, characteristic, novel” enterprise value network system, and is the direct criterion of whether the symbiosis system of the “Professional, fine, characteristic, novel” enterprise value network system generates new energy ΔE . For example, between high-end chip equipment manufacturing enterprises and new-generation information technology enterprises, the closer the number and correlation degree of their main quality parameters, the greater the new energy ΔE generated by the symbiotic system.

5.2 Symbiotic Energy Function and Its Constraint Relation

The improvement of symbiotic quality and the expansion of quantity of symbiotic system require continuous energy generation. The symbiotic energy is mainly determined by the main quality parameters, symbiotic mode, symbiotic coefficient, symbiotic density, symbiotic dimension and interface eigenvalues of the symbiotic system, which is the concrete embodiment of the survival and proliferation ability of the symbiotic system. Whether the symbiotic system evolution generates new energy for the “Professional, fine, characteristic, novel” enterprise value network system can be judged by the energy function.

In an N-dimensional symbiotic system of enterprise value network system, the i ($i = 1, 2, 3, \dots, n$) a symbiotic unit symbiotic mode to M_i , decided the unit inner nature and its changes of the main parameters for Z_i , dZ_i/Z_i for the symbiotic unit of the rate of change of the main quality parameters, symbiotic dimension (heterogeneous symbiotic units and symbiotic space ratio) for η_j ($j = 1, 2, 3, \dots, m$), the symbiotic density was ρ_j (the ratio of the number of symbiotic units to the number of symbiotic Spaces), and the symbiotic coefficient was θ_{ij} ($j = 1, 2, 3, \dots, n_i = j$), the δ_{ij} is symbiotic, interface characteristic values for λ , the a symbiotic unit of energy in the symbiotic environment for E_i , under the condition of coexistence of new energy for ΔE , is “Professional, fine, characteristic, novel” enterprise value network system total energy E of symbionts are as follows:

$E = \sum E_i + \Delta E$, E , E_i is composed of M_i , Z_i , ρ , η_j , λ , the δ_{ij} and θ_{ij} joint decision, and meet the constraints as follows:

$$\theta_{ij} = \delta_{ij}/(\delta_{ij} + \delta_j), \text{ where } \delta_{ij} = (dZ_i/Z_i)/(dZ_j/Z_j).$$

5.3 Determination of Symbiotic Energy Increment ΔE

According to the symbiotic theory, the magnitude of δ_{ij} is the direct criterion of whether the symbiotic system generates new energy ΔE . Therefore, the following conclusions can be drawn from $\delta_{ij} = (dZ_i/Z_i)/(dZ_j/Z_j)$:

When $\delta_{ij} < 0$, the main and quality parameters resist each other, $\Delta E < 0$, and the energy of the symbiotic system of the “Professional, fine, characteristic, novel” enterprise value network system decreases, such as the

technology blockade of some foreign enterprises that master the "choke" technology on the relevant Chinese enterprises.

When $\delta_{ij} > 0$, the main and quality parameters promote each other, $\Delta E > 0$, and the symbiotic system of "specialized, refined and special" enterprise value network system generates new energy, which has obvious "chain reinforcement", "strong chain" and "chain casting" effects. From the development results, "Professional, fine, characteristic, novel" enterprises can realize the transformation from relatively low technology content, low added value and weak brand to high technology content, high added value and strong brand.

When $\delta_{ij} = 0$, that is, Z_i and Z_j do not change, and there is no interaction between the principal and principal parameters, $\Delta E = 0$. In this case, there is no new energy added to the symbiotic system of "specialized, refined and special" enterprise value network system. In this case, "Professional, fine, characteristic, novel" enterprises do not focus on the small fields of the vacancy of large enterprises, and they do not realize each other's specialization and small complement, which makes it difficult for enterprises to stand out.

6. Conclusions and Suggestions

Based on the perspective of Chinese modernization, the "Professional, fine, characteristic, novel" enterprise value network system has its own basic law and growth logic. By the end of 2022, the Ministry of Industry and Information Technology has certified four batches of specialized, specialized and innovative "little giant" enterprises, totaling 9,279. To achieve high-quality symbiotic evolution and ensure the Pareto optimal path of evolution, the following four countermeasures can be adopted.

6.1 In the Management Philosophy, we Must Pay Attention to the Idea of Symbiosis

The idea of "symbiosis" is an inevitable requirement for the sustainable development of human society. Common adaptation, activation and development is the best antidote to the increasingly acute contradiction between resource depletion and population expansion, geopolitical decoupling and chain breaking against globalization, and the law of world economic development. The Times require symbiosis not only between man and man, and between man and nature, but between all things in nature. Therefore, "Professional, fine, characteristic, novel" value network enterprises must also pay attention to the idea of symbiosis in their operating guiding ideology. Only in this way can they become "supporting experts" in the subdivision field and "singles champions" who master unique skills. Only by focusing on and deeply cultivating a certain link or product of the industrial chain, can we finally achieve high-quality sustainable development with Chinese characteristics.

6.2 In the Choice of Business Organization Mode, We Must Pay Attention to the Pareto Path Optimization of Evolution and Take the Road of Chinese Modernization

In order to improve the autonomous ability of "reproduction ability" and "survival ability" of members in symbiosis, the "Professional, fine, characteristic, novel" value network enterprises should finally realize the symbiosis evolution of symbiosis through Pareto pathway. On the one hand, the operators must choose good cooperation objects to ensure the stability of symbiosis. Its basic requirement is to have a good stability, the value network members are mutual attraction, mutual cooperation, rather than mutual exclusion; They complement and promote each other, rather than replace each other, with obvious "synergistic and complementary effect" and "spillover side effect". For example, chip research institutes and "Professional, fine, characteristic, novel" blockchain big data enterprises, as well as 5G information technology enterprises and "Professional, fine, characteristic, novel" intelligent robot enterprises. On the other hand, operators must also choose good cooperation content to ensure the formation of a "two-way incentive" stable symbiotic ecology. Its basic requirements are strong correlation of cooperative content, high degree of resource sharing, and strong complementarity of capabilities. Only in this way, the value net may evolve symbiosis along the Pareto path.

6.3 In the Choice of Business Behavior Mode, We must Pay Attention to "Smooth Interface", and Strive to Maximize the Value Added and Efficiency of Symbiotic Energy

The unimpeded symbiotic interface of the "Professional, fine, characteristic, novel" value network makes the new energy of symbiosis constantly gushing out. Conversely, the sluggish symbiosis interface makes the "three flows" (material flow, energy flow and information flow) not smooth, resulting in insufficient symbiotic new energy. So, in the symbiotic system of "Professional, fine, characteristic, novel" enterprise value network system, how to smooth the symbiotic interface of each enterprise, on the one hand, to deepen the compatibility of core capabilities. Chips of operation, management, for example, large data block chain, the management of 5 g information technology, etc., due to the transition between the core competence of different, can produce a large number of interface in the coordination and integration problems, only the core competence is compatible with each other, to maximize the incentive symbiotic companies (symbiotic units) and open their "symbiosis

interface", ensure enterprise symbiosis symbiotic evolution. On the other hand, you want to unblock sticky information. Information stickiness will not only weaken the communication effect among value network members, but also weaken the mutual learning of core competence among value network members, which will increase the organizational costs of value network enterprises and reduce the sharing benefits.

6.4 In the Aspect of Organizational Behavior, There Must Be a Reasonable Value Network Boundary to Avoid Falling into the Trap of Diseconomies of Scale

With the expansion of the operation scale of the members of the value network, it means that a lot of knowledge and ability within the members can learn from each other and share, which leads to the decrease of external transaction costs of the members of the value network and the increase of sharing benefits. But at the same time, the reverse makes the cost of the internal organization of the value network (mainly manifested by the increase of the difficulty of coordination and supervision) and the cost of sharing (mainly manifested by the disclosure of trade secrets and the phenomenon of "free riding") increase. Therefore, the "specialized and ultra-new" value network must have a reasonable value network boundary, and its optimal scale meets the corresponding scale when marginal income equals marginal cost, because when marginal income is greater than marginal cost, the value network can continue to expand the scale, or deepen the mutual learning and communication among the members of the enterprise value network, which will increase the benefits of the value network members. The value network can continue to expand; When marginal income is less than marginal cost, the knowledge and ability transfer among the member enterprises of the "Professional, fine, characteristic, novel" value network has already stopped. At this time, diseconomies of scale appear, and the expansion of scale must be terminated. Therefore, only when marginal revenue is equal to marginal cost, the total revenue is the maximum, and the corresponding "Professional, fine, characteristic, novel" value network size is the optimal size.

In short, in the current era when the world is undergoing no major changes in a century, "Professional, fine, characteristic, novel" enterprises play a role of strong chain casting and effectively adapt to the basic requirements of "double cycle" high-quality development and Chinese-style modernization in China. They are the key carriers of innovation-driven development strategy and important sources of new economic growth points. Based on the new research perspective of symbiosis theory and value network theory, this paper proposes 16 symbiosis modes of symbiosis evolution of "specialized" enterprise value network system, as well as the balanced characteristics of evolution and Pareto optimization path, and deeply analyzes the energy generation mechanism of symbiosis evolution of "specialized" enterprise value network system. It also puts forward the countermeasures of high quality "symbiotic evolution" along the road of Chinese modernization from four aspects. These research conclusions, no doubt, provide a literature reference for the subsequent relevant theoretical research, but also provide a decision-making basis for Chinese "Professional, fine, characteristic, novel" enterprises to further explore the road of Chinese-style modernization.

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References

- Dong, Z., & Li, C. (2021). High quality development trend and path selection of "Professional, fine, characteristic, novel" SMEs. *Reform*, 10(1), 1-11.
- Dong, Z., & Li, C. (2021). High quality development trend and path choice of small and medium enterprises with specialized and special innovation. *Reform*, 10(1), 25-38.
- Guangming. (2023, March 15). Research group of National Global Strategy Think Tank, Institute of World Economics and Politics, Chinese Academy of Social Sciences. Rapid evolution of once-in-a-century great changes: Outlook on nine global trends in 2023. *Guangming Daily*, p. 12.
- Guo, J. (2022). Improving policy weaknesses and increasing the number of "Professional, fine, characteristic, novel" enterprises. *China Economic Times*, 22 March, Edition 004.
- Li, J. (2021). The situation and solutions of Chinese "Little Giant" enterprises. *Reform*, 10(1), 13-25.
- Lin, J. (2021). Fostering and supporting more specialized and special new "Little Giant" enterprises. *People's Forum*, 31(1), 23-30.
- Liu, Z., & Xu, T. (2022). Cultivating "Professional, fine, characteristic, novel" small and medium-sized enterprises: Special action to strengthen chain. *Fujian Forum (Humanities and Social Sciences Edition)*, 1(1), 23-32.
- Luo, F., Di, Y., & Li, Q. (2023). "Specialization and innovation" strategy, family involvement and technological innovation. *Science and Technology Progress and Countermeasures*, 3(1), 1-12.
- Qiu, H., Sheng, W., Zhou, M., Zhu, Q., & Li, K. (2021). "Specialization and innovation": Reshaping urban "core" strength. *Xinhua Daily*, Edition A01.
- Song, Y., & Fan, B. (2023). Research on configuration path of digital transformation of manufacturing process in "Professional, fine, characteristic, novel" enterprises. *Science and Management*, 25(2), 80-88.
- Wang, W., Wang, K., & Yan, Z. (2023). Research on the influence mechanism of regional high-quality development on the innovation performance of "Professional, fine, characteristic, novel" SMEs. *Science Research Management*, 44(2), 32-44.
- Xie, J. (2023). Current situation, deficiencies and optimization suggestions of support policies for Chinese "Professional, fine, characteristic, novel" enterprises. *Science and Technology Management Research*, 3(1), 44-52.
- Zhang, F., Wang, Z. Q., & Yu, X. Y. (2022). Government support and the transformation of "Professional, fine, characteristic, novel" private small and medium-sized enterprises: Empirical evidence from quantification

- of provincial policy texts. *Finance and Economics*, 1(1), 60-72.
- Zhang, S., & Chen, Y. (2023). Research on the path of innovation performance improvement of small and medium-sized enterprises. *Studies in Science of Science*, 4(1), 1-17.
- Zhao, J. (2023, February 24). Chinese specialization, "new" theory of evolution, the industry leader in stimulating. *Tencent News*. Retrieved from <https://new.qq.com/rain/a/20230224A09LLF00>
- Zhou, T., & Li, M. (2023). Hard science and technology innovation, industry science and technology self-reliance and development of soft science in the trans-scale. *Science and Technology Progress and Countermeasures*, 3(1), 1-11.