

# Research on Synergetic Model of Talent Cultivation in School-Enterprise Cooperation Based on Synergy Theory

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## ABSTRACT

This paper discusses the application of synergy theory in the deep cooperation between higher vocational colleges and enterprises. From the perspective of organization and management, the role positioning of the government, enterprises, schools, students and other parties, is clearly defined. Under the guidance of the concept of collaborative innovation, a school-enterprise cooperation and coordination mode in the talent training of universities is constructed, which is an important research topic of the collaborative mechanism of school-enterprise cooperative talent training. It aims to solve the practical problems including the lack of specific cooperation strategies, enterprises' insufficient willingness to participate in, and universities' inadequate preparation and integration. What's more, understanding the collaborative mechanism of school-enterprise cooperation talent training better contributes to improve the efficiency and quality of school-enterprise cooperation talent training effectively.

**Keywords :** *Synergy theory, School-enterprise cooperation, Vocational colleges, Collaborative education.*

## 1. INTRODUCTION: DEFINITION OF SYNERGY THEORY CONCEPTS

In 1969, German physicist Hermann Haken (2005) first proposed the synergy theory, stating that there are interactions between subsystems that form a new ordered structure. Herman Haken proposed in his monograph that collaboration can produce a  $1+1>2$  effect, benefiting both individuals and the whole. [1][2] At the beginning of the 21st century, with the establishment of the synergy theory system, the synergy effect is mainly reflected in management synergy, business synergy, diversified operation, and financial synergy in the socio-economic field, and the achievements are becoming increasingly fruitful.

## 2. THE APPLICATION OF SYNERGY THEORY IN THE FIELD OF TEACHING

In the 1990s, synergy theory began to be applied in the field of education in China. In the

first decade of this century, Chinese colleges and universities began to pay attention to the relevant theories of synergetics, and their synergistic effects, servo principles, and self-organization principles began to be used to analyze specific educational problems. With the continuous promotion of the application scope of synergy theory, it is gradually being applied to the education field in China. Although the concepts of collaborative learning and collaborative innovation have been mentioned in foreign countries, in most cases, they are limited to theoretical analysis and academic research, and have not been deeply explored in the field of production-education-research collaboration. However, in recent years, collaborative innovation has been regarded as a national strategy in China, further enriching and expanding the meaning of collaborative innovation. For example, scholar Lin Tao (2013) analyzed from the perspective of collaborative theory that the collaborative innovation system in universities is composed of subsystems (such as universities, research institutions, enterprises, etc.) and various elements

(such as talents, knowledge, technology, information, funds, equipment, etc.), as well as the relationship flow between them. Through resource sharing, different innovative entities can achieve collaborative benefits. [3] Xu Chang et al. (2018) constructed a demand driving mechanism and a resource allocation mechanism for mutual benefit and sharing in vocational education from the perspective of integration of production and education, based on the collaborative linkage and role positioning of the main elements. [4] Liu Heng et al. (2018) designed a collaborative education mechanism for the integration of production and education in vocational colleges from the perspectives of resources, subjects, and interests based on the industrial park within vocational colleges, and proposed strategies for collaborative education, including exploring joint governance mechanisms and a "dual mentor" system of online integration of production and education, and promoting modern apprenticeship systems. [4]

### **3. PROBLEMS IN THE PROCESS OF SYNERGETIC DEVELOPMENT OF EDUCATION**

Overall, China's policies focus on the macro level, with too many macro policies listed and insufficient attention paid to micro methods, and lack of diversified and in-depth analysis of macro policies at multiple levels. The discussion on the collaborative education mechanism of integration of production and education in the Chinese academic community is not yet in-depth, and most of the analysis is from the perspective of education or economy, with research only in the initial stage. Although many vocational colleges have also carried out collaborative practices, there are few micro issues related to how to collaborate, collaborative paths, and the specific responsibilities of participants at each stage in collaborative practice. In recent years, Neosoft Institute Guangdong has proposed the eight collaborative production-education integration cultivation system, which focuses on micro problems and proposes specific directions for collaboration. Some achievements have also been made in some areas, but it has not been considered based on the characteristics of collaboration: coordination and cooperation in time, space, and function. In addition, due to the imperfect policy environment, differences in concepts and values between schools and enterprises, and imperfect profit distribution mechanisms, it is difficult to carry out substantive, deeper, and long-term synergetic cooperation with

enterprises, which cannot effectively achieve win-win cooperation. Therefore, improving the efficiency of talent cultivation through school-enterprise cooperation has become an important issue that urgently needs to be addressed in the talent cultivation of applied local undergraduate colleges.

## **4. RESEARCH ON SYNERGETIC MODEL OF TALENT CULTIVATION IN SCHOOL-ENTERPRISE COOPERATION**

### **4.1 Determining Synergetic Goals**

On the basis of clarifying the positioning of all parties, the synergy theory is applied to analyze the practical difficulties. And from the perspective of organizational management, a hierarchical model of school-enterprise cooperation in talent cultivation in colleges and universities is constructed under the concept of collaborative innovation. [5] Specific directions for collaboration have been proposed for micro level issues, taking into account the characteristics of synergy: coordination and cooperation in time, space, and function. In this process, micro level issues such as collaboration, collaborative paths, and specific responsibilities of participants at different stages are provided to improve the effectiveness of integration of production and education, school-enterprise cooperation, and collaborative education, and to provide specific driving measures. This model design proposes four levels and different stages of synergy: including business synergy, individual synergy, team synergy, and management synergy. Each level has corresponding collaborative content. The division of collaborative levels can be based on the established goals of each level, and on the basis of integrating internal and external resources, corresponding management functions such as planning, organizing, commanding, coordinating, and controlling can be carried out to maximize the management efficiency of each level, maximize the system's benefits, and improve output efficiency. The main ways to promote the construction of this hierarchical model of "school-enterprise cooperation" include "targeted empowerment", "institutionalized promotion", "standardized promotion", and "process guarantee". In order to cultivate high-quality technical and skilled talents and promote the common development of the education and industrial systems, different expressions can be used to elaborate on this goal.

## 4.2 Synergetic Case Analysis

The researchers select representative universities and colleges for collaborative cooperation practice, and analyze the adaptability application of the school enterprise cooperation collaborative education case of the school, in order to verify the feasibility of constructing a collaborative hierarchical model for talent cultivation based on collaborative theory, and then improve the collaborative hierarchical model and propose optimization strategies for the development of collaborative education. Ultimately, these ways promote the transformation of the school-enterprise cooperation system in vocational colleges from disorder to order, establishing a stable structure from the initial chaotic state.

In recent years, Neosoft Institute Guangdong has been guided by the economic development and industrial needs of Guangdong Province and the Greater Bay Area, with the goal of cultivating applied talents and the industrial college as the carrier, and has initially established a collaborative education ecosystem with organizers and other industry enterprises, forming an "eight collaborations" mechanism for the integration of production and education. "Eight collaborations" refer to the collaboration of training objectives, talent cultivation, curriculum design, project design, teaching implementation, practical training guidance, teaching quality evaluation, and employment promotion. [6] The "eight collaborations" have formed a type of unilateral promotion and mutual docking; Although some achievements have been made in the integration of production and education, the "eight collaborations" measures are not targeted enough, and there are still practical problems such as insufficient enthusiasm and depth of enterprise participation. In the context of synergy theory research, taking Neosoft Institute Guangdong as an example, this article systematically organizes, analyzes, and summarizes the production, learning, research, application, and collaborative talent cultivation models of vocational colleges from the perspectives of external driving forces and school-enterprise cooperation. According to the synergy theory, the goal of applying this theory for research must meet the following conditions: high complexity, openness, composed of multiple subsystems, interaction between subsystems, and self-organizing characteristics. [7] In the preliminary research, the research group believes that the talent training

system of the school's industry, education, application, and school-enterprise cooperation already has the elements of the collaborative innovation system mentioned above: firstly, the talent training system has strong comprehensiveness. It is a system composed of subsystems such as government, industry, enterprises, and universities. In the process of transformation from disorder to order, there must be interaction and influence among them. Secondly, the talent cultivation system is an open system that is influenced by both internal and external dynamic factors. Thirdly, through changes in the concepts of government, industry, enterprises, and universities, positive collaboration has emerged among various subsystems, resulting in a synergistic effect. Fourthly, the training system has the characteristic of self-organization. The training system is mainly reflected in three aspects: the first is that, based on the vocational education group, by establishing corresponding systems and systems, the various subsystems are organically combined to make the cooperation between them more standardized; the second is that, both the Guangdong Provincial Government and the Foshan Municipal Government have formulated corresponding laws and regulations to ensure and supervise the training of talents; the third is that, Neosoft Institute Guangdong has formulated measures such as talent incentives and teaching quality assurance internally, fully leveraging the work enthusiasm of faculty and staff to ensure teaching quality. By analyzing the comprehensive influencing factors of the school enterprise collaboration system at Neosoft Institute Guangdong, it is suitable for collaborative integration on the basis of clarifying the common development goals of both the school and enterprise entities. (See "Figure 1")

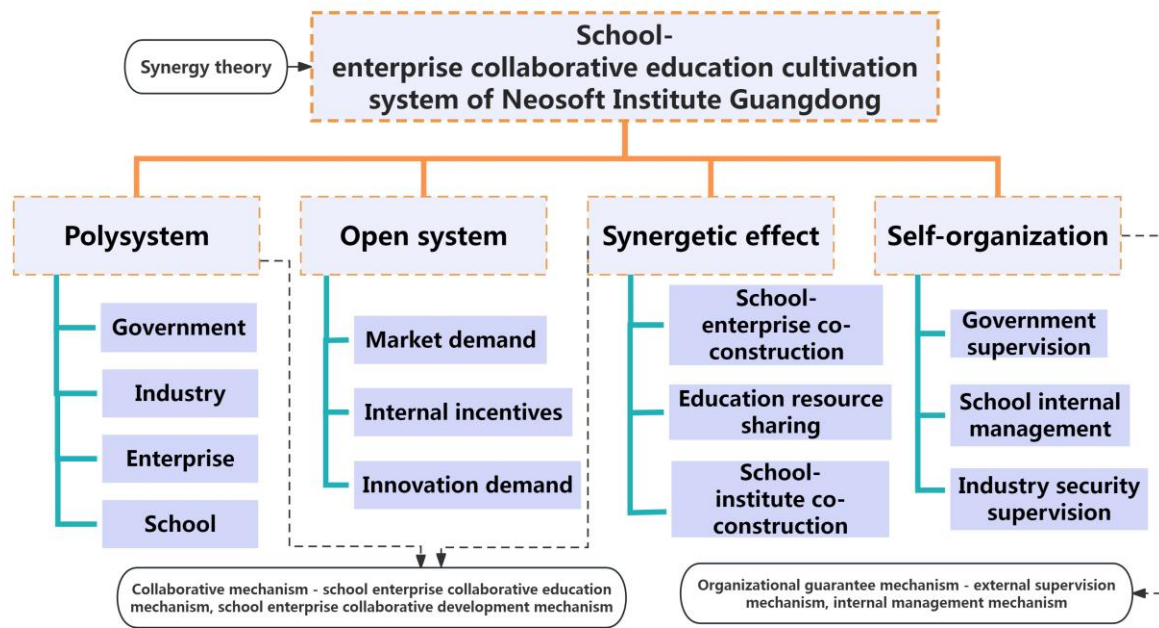


Figure 1 School-enterprise collaborative education cultivation system of Neosoft Institute Guangdong.

### 4.3 Construction of Synergetic Hierarchy Model

According to the synergy theory, collaboration between subsystems requires a common development goal as an important prerequisite. By analyzing the comprehensive factors affecting enterprises, the common development goals of universities and enterprises have been determined, and the collaborative gathering of enterprises has been achieved; In subsystems such as information, resources, and materials, schools and enterprises establish a collaborative model that combines multiple aspects such as time, space, and functionality to promote the progress of the entire system. This form of cooperation aims to cultivate high-quality technical and skilled talents, while also promoting the synchronous development of education and industry systems. For the school-enterprise cooperation education model involving multiple entities, there is a must to use a hierarchical identification method to classify the management objects and methods, in order to further study the development and laws of collaborative effects, grasp the order and laws of changes in collaborative effects, and have a deeper understanding of the systemic changes caused by collaboration, thereby improving the operational ability and level of the enterprise. Therefore, the division of collaborative levels can help integrate internal and external resources according to the pre-

set goals of each level, and carry out reasonable planning, organization, command, coordination, and control of corresponding management functions such as planning, organization, command, coordination, and control, in order to achieve optimal management of each level, maximize the effectiveness of the system, and also improve overall output efficiency. From establishing low-level collaboration with low difficulty and management costs to advancing towards high-level collaboration, it can form a stable collaborative system and achieve efficient output.

In the synergetic model, various levels of work are designed: the first layer is business synergy, which is based on the teaching standards and professional training needs of various majors in the school. It connects the internal training of the school with the teaching and training business system of the enterprise, achieving an organic combination of internal and external. This level of synergy emphasizes the connection between enterprises and schools, providing comprehensive information support and services for the training business of enterprises. Both schools and enterprises jointly maintain the efficient and secure operation of data platforms through cloud technology, and jointly build resource databases. The second level is personal synergy, which means that above business collaboration, it is personal synergy. [8] On the basis of clarifying their respective responsibilities, both schools and

enterprises adopt a dual tutorial system. The responsibility system of on campus teachers and school enterprise mentors enables timely and sufficient communication and seamless integration in student teaching, including academic planning, course guidance, and on-the-job learning; In terms of improving professional abilities, school-enterprise cooperation has organized education theory and job skills training, as well as academic exchanges and new technology training; In terms of scientific and technological research and development, schools and enterprises collaborate to carry out teaching and research activities and apply technology research, utilizing the technical resources of both schools and enterprises to build various types of specialized experimental and training rooms. Schools and teachers can carry out various activities such as teaching, experimentation, and technological innovation through these experimental training rooms to promote mutual learning and common improvement between teachers from both sides. The third layer is group synergy. School-enterprise cooperation is a complex system that involves the collaboration of multiple entities such as government, industry, enterprises, and schools. It is worth noting that there are significant differences in management and organizational culture in school-enterprise cooperation. In terms of the overall goal of talent cultivation, school-enterprise cooperation implements centralized management, while decentralized management is required in the sub system, which needs to be achieved through systems and business processes. Therefore, an important measure for group synergy is to establish a team culture. There is a necessity to establish a common value orientation for cooperation between schools and enterprises, and build innovative and collaborative cultural consciousness through team culture such as socialist values, collective spiritual values, and collective character, so as to make schools, enterprises, schools, and research institutions a community of science, industry, education, and common development. The fourth level is the highest level of collaboration, and management synergy is the management personnel of both schools and enterprises who reach a consensus on the smooth development and implementation of school-enterprise cooperation at a higher level. Synergetic management is a collaboration that takes place at the institutional level and development strategy level, including collaboration concepts, goal planning, investment and risk control, revenue distribution and operational management. [8] Management synergy

is based on three-layer synergy, and under determined goals, to establish a quality monitoring system for specialty construction and the entire process of school enterprise teaching between schools, and make improvements in teaching content, teaching evaluation, on-the-job internships, talent training programs, etc. At the same time, in order to keep up with the rapid changes in the industry market and job positions, it is necessary to enable both parties to respond quickly to this in the process of school-enterprise cooperation. It is a must to divide the proposed school-enterprise cooperation project into modules and carry out in stages, stimulate the subjective creativity of both teaching teams, establish an encouraging and supportive management system, and keep the entire team in a flexible working state at all times.

#### ***4.4 Operational Elements of Synergetic Hierarchy Model***

The promotion of collaborative construction of school-enterprise cooperation in the entire talent cultivation process first requires targeted empowerment. A common goal should be formed between schools and enterprises to promote organic collaboration among various subsystems within the organization. The second is to promote through institutional construction. The institutional arrangement transforms various uncontrollable factors between schools and enterprises into controllable factors, transforming them from orderly operation to orderly operation, making it a norm. The third is standardization. In order to promote the continuous progress of school-enterprise cooperation and talent cultivation system, it is necessary to establish a complete set of rules and regulations to ensure that schools and enterprises carry out various operations within the institutional framework. Whether it is curriculum arrangements, resource utilization, work records, or evaluation systems, they must all comply with regulatory requirements in order to jointly improve work quality and promote the long-term development of school-enterprise cooperation. In addition, programmatic protection is also very important, which indicates that a mature collaborative approach can ensure the rights and responsibilities between schools and enterprises, and it is also a firm confidence in the concept and methods of school construction. So, in the process of joint training between schools and enterprises, the program ensures the efficient operation of teaching business and engineering construction. Then, in response to the current problems in

production, learning, application, and school cooperation in vocational colleges, there is a necessity to propose countermeasures and suggestions for improving the talent training mechanism in vocational colleges from three levels: external strategic planning, internal incentive mechanisms, and collaborative development mechanisms. The talent cultivation mechanism should include collaboration mechanism,

motivation mechanism, organizational guarantee mechanism, etc. The collaborative mechanism covers mechanisms for jointly cultivating talents between schools and enterprises, as well as mechanisms for collaborative development between schools and enterprises. The driving mechanisms mainly include external support and internal incentives. ("Figure 2")

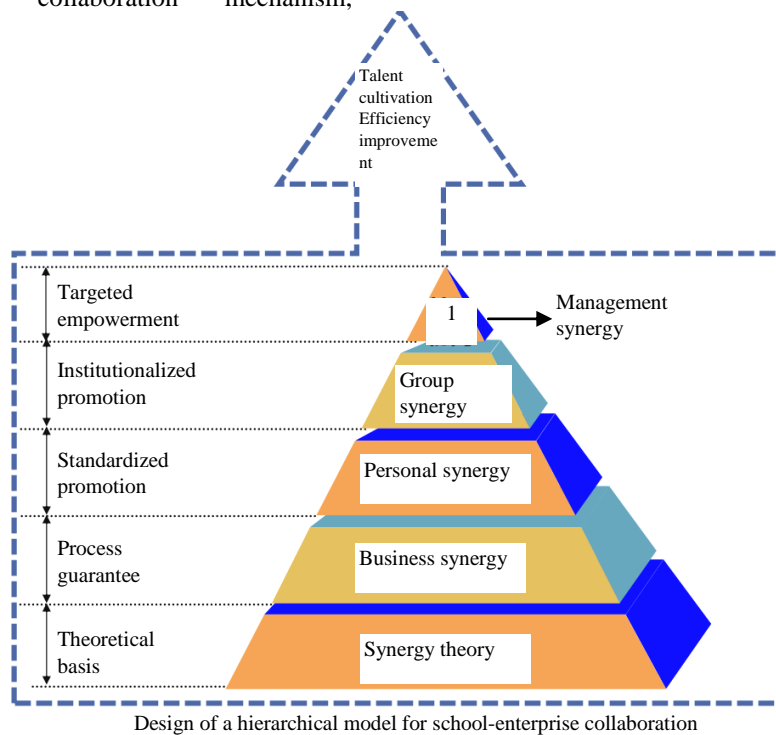


Figure 2 Design of a hierarchical model for school-enterprise collaboration.

## 5. SUMMARY OF THE PRACTICE OF SCHOOL-ENTERPRISE COOPERATION SYNERGETIC MODEL

With the support of the local government of Foshan City, Neosoft Institute Guangdong has applied the concept of collaborative innovation to research and construct a synergetic model for talent cultivation in school-enterprise cooperation. It has made beneficial attempts and practices in production-education-research-application collaborative innovation cooperation, Shishan University City Science and Technology Park operation, and school-enterprise cooperation promotion, and has achieved significant results. Based on the synergy theory, the practical dilemma of Neosoft Institute Guangdong has been solved. In terms of research content, the project deeply

analyzes the application value of synergy theory from the perspectives of collaboration characteristics, the necessity and importance of applying synergy theory, and management methods, and improves the optimization strategy at the micro level; In terms of enhancing the depth of collaborative cooperation, the researchers have further improved the synergy between professional configuration and regional industrial transformation. For example, the researchers focus on regional leading industries, quickly adjust and optimize talent training plans based on the characteristics of each profession, and improve the match between talent training and regional industrial and economic development; they deeply promote school-enterprise cooperation and forming a relatively stable school enterprise collaborative education system, and then students have more opportunities to hone their skills, truly acquire knowledge transfer abilities, and become interdisciplinary and

innovative applied talents. Conclusion Overall, the synergetic hierarchical model for talent cultivation in school-enterprise cooperation has high application and promotion value, and has been effectively applied in the practice of school-enterprise cooperation in Neosoft Institute Guangdong, solving the difficulties and problems in the integration of education and industry in School of Digital Media and Design, Neosoft Institute Guangdong. This proposes optimization strategies for the development of production-education integration, and will also provide reference for interdisciplinary research on production-education integration in higher vocational education in China.

## 6. CONCLUSION

In summary, in the research on the synergetic model of talent cultivation in school-enterprise cooperation based on the synergy theory, the establishment of top-level synergetic relationships is a long-term process that requires government, industry, enterprises, schools and other parties to shape the cultural concept of "cooperation, sharing, and win-win" through "cooperation, communication, and dialogue" under the guidance of core socialist values. All parties need to jointly build a professional growth community to achieve the goals of cooperation, mutual assistance, sharing, and win-win.

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