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Dilemmas and Institutional Innovation Paths of Synergy Among Running Subjects in Applied Undergraduate Education: From the Perspective of Institutional Change Theory

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Abstract

As a core carrier connecting higher education and industrial development, applied undergraduate education is a key force for advancing the classified development of higher education, cultivating high-quality applied talents, and serving the high-quality development of regional economy and society. As the core support for the high-quality development of applied undergraduate education, the synergy efficiency of running subjects directly determines the depth of industry-education integration, the quality of talent cultivation and the ability to serve industries.However, the synergy among running subjects of applied undergraduate education in China is currently generally trapped in the dilemma of "formalistic cooperation", with the three core subjects of government, universities and enterprises presenting a governance deadlock of "government-driven, university-passive and enterprise-detached". Based on the core perspective of institutional change theory, combined with the quantitative analysis of industry-education integration policy texts in 31 provinces across China (2019-2023) and the cross-case comparison of three types of typical applied undergraduate universities, this paper systematically defines the theoretical connotation and core dimensions of the synergy among running subjects, deeply analyzes the manifestation and generation mechanism of the synergy dilemma, draws on the experience and enlightenment of international typical governance models, and finally puts forward the institutional innovation path of "symmetric rights and responsibilities, benefit sharing, and capacity synergy". It provides a solid theoretical support and operable practical guidance for breaking the dilemma of synergy among running subjects and promoting the connotative development of applied undergraduate education.

Keywords

Applied undergraduate education; Synergy among running subjects; Institutional change; Industry-education integration; Governance dilemma; Institutional innovation.

1. Introduction

With China's higher education entering a new stage of classified development, applied undergraduate education is facing unprecedented development opportunities and challenges. A series of policy documents such as the Pilot Implementation Plan for the Construction of Industry-Education Integration and the Action Plan for the Construction and Development of Applied Undergraduate Universities (2021-2025) have been successively issued, which clearly propose to strengthen the industry-education integration orientation of applied undergraduate education, promote the collaborative education of multiple running subjects such as the government, universities and enterprises, and build an integrated development system of "government-industry-university-research-application". The essential characteristics of applied undergraduate education determine that its development cannot be separated from

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industrial demand or carried out in isolation; it must rely on the joint efforts of multiple subjects to realize the effective connection between the education chain, talent chain, industrial chain and innovation chain.

In practice, progress has been made in the synergy among running subjects of applied undergraduate education in China, with the policy orientation of multi-subject synergy becoming increasingly clear, and some universities have gradually explored synergy models such as university-enterprise cooperation and university-local co-construction. However, quantitative data and typical cases both show that there are still prominent formalistic problems in the current synergy among running subjects: a quantitative analysis of industry-education integration policy texts in 31 provinces across China from 2019 to 2023 shows that the annual frequency of key words such as "multi-subject synergy" and "industry-education integration" has increased by 17.3%, with the continuous strengthening of policy supply, but the proportion of enterprises' substantive participation in industry-education integration is less than 28%, and most cooperation remains at the level of superficial connection; the "university-enterprise cooperation agreement database" of a national pilot university for industry-education integration shows that 83%of the agreements do not involve the core links of talent cultivation, only staying at formalistic cooperation such as the listing of practice bases and short-term lectures, making it difficult to achieve the core goal of collaborative education. Existing researches mostly stay on the surface of subject types and synergy models, lacking in-depth analysis of the generation mechanism of synergy dilemmas, failing to explain the gap between policy and practice from the perspective of institutional change, and struggling to break the governance deadlock of "weak government promotion, passive university response and insufficient enterprise participation".

To accurately grasp the practical dilemmas of synergy among running subjects, this study adopts a mixed research method of "policy text analysis+cross-case comparison+in-depth interview" to carry out a special investigation. For policy text analysis, 156 policy documents related to industry-education integration and the construction of applied undergraduate universities issued in 31 provinces across China from 2019 to 2023 are selected to systematically sort out the policy orientation, subject rights and responsibilities, and implementation paths; the case study focuses on three types of typical applied undergraduate universities, forming a triangular validation research data system to provide a solid empirical support for the analysis of dilemmas and the design of paths.

Based on this, this paper takes the institutional change theory as the core analytical framework, integrates the theoretical perspectives of multiple disciplines such as governance theory, institutional economics and organizational sociology, systematically defines the theoretical connotation and core dimensions of the synergy among running subjects in applied undergraduate education, analyzes the causes of dilemmas, draws on international experience, and puts forward institutional innovation paths. Theoretically, it constructs a "structure-process-efficiency" analytical framework to enrich the application of relevant theories; practically, it provides an operable plan for breaking the formalization of synergy, improving industry-education integration, and promoting the high-quality development of applied undergraduate education.

2. Theoretical Basis and Analytical Framework

2.1. Core Theoretical Support

This paper takes the institutional change theory as the core analytical framework, integrates the theoretical perspectives of multiple disciplines, and constructs an analytical system of the synergy dilemma and institutional innovation among running subjects, providing a solid theoretical support for the research.

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The institutional change theory points out that institutions are a system of rules that regulate individual behavior and group interaction, and their change stems from the benefit space generated by institutional imbalance, which is divided into two types: mandatory institutional change and induced institutional change (North, 1990). The essence of the synergy among running subjects of applied undergraduate education is a multi-subject interaction process under institutional constraints. The root cause of the synergy dilemma lies in the mismatch of rights and responsibilities, interests and capacities, and the disconnection between institutional supply and practical demand; institutional innovation is the key path to realize the transformation from formal synergy to substantive synergy.

Governance theory provides guidance for model reconstruction: the core of governance is to break the limitations of bureaucratic one-way control, build a network system of multi-subject equal participation and collaborative governance, and emphasize interactive cooperation, resource exchange and interest coordination among subjects (Rhodes, 1997). This theory enlightens us to form a network governance pattern of government guidance, university-led and enterprise participation.

Institutional economics and organizational sociology further deepen the explanation of the causes of dilemmas: excessively high transaction costs will reduce the willingness of subjects to participate (Coase, 1937); the legitimacy mechanism shows that the behavior of subjects is shaped by assessment orientation, market reputation pressure and professional norms, and behavioral deviations will occur when synergy behavior is inconsistent with their own interest demands and legitimacy cognition (Meyer&Rowan, 1977).

2.2. Operational Definition of Core Analytical Dimensions

Combined with the school-running characteristics of applied undergraduate education and the practical logic of subject synergy, based on the perspective of the integration of multiple disciplinary theories, this paper defines the core analytical dimensions of the synergy among running subjects as three levels: subject attributes, synergy process and governance efficiency. The operational definition of each dimension is as follows, providing a clear analytical standard for the subsequent analysis of dilemmas and empirical research.

Subject attribute dimension: Focusing on the three main subjects of government, universities and enterprises, it covers three sub-dimensions of power allocation, resource endowment and interest demands, reflecting the discourse power, synergy resources and participation goals of each subject.

Synergy process dimension: Including three sub-dimensions of interaction frequency, resource exchange and conflict mediation, reflecting the mechanism of communication, resource complementarity and conflict resolution among subjects.

Governance efficiency dimension: Measuring the actual effect of synergy from the adaptability of talent cultivation, knowledge transformation efficiency and regional service contribution, providing core indicators for evaluating the effect of synergy.

The three dimensions are interrelated and interact synergistically: the subject attribute dimension determines the starting point and foundation of the synergy process, and the differences in the power, resources and interest demands of each subject directly affect the smoothness of the synergy process; the synergy process dimension is the intermediate bridge connecting the subject attribute and governance efficiency, and the quality of interaction, efficiency of resource exchange and ability of conflict mediation directly determine the level of governance efficiency; the governance efficiency dimension is the ultimate goal of subject synergy and the core standard for testing the rationality of institutional arrangements.

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3. Structural Evolution and Institutional Constraints of Running Subjects in China's Applied Undergraduate Education

3.1. Structural Evolution Track from the Perspective of Historical Institutionalism

From the perspective of historical institutionalism, combined with the course of the classified development of China's higher education, the evolution of the structure of running subjects in China's applied undergraduate education can be roughly divided into three stages. The institutional characteristics and subject interaction models of each stage are significantly different, and show obvious path dependence characteristics.

1999-2009: Single-center structure of "government-led and university-implemented" During this period, China's higher education entered a period of large-scale enrollment expansion. The development of applied undergraduate education was mainly driven by government policies, with the goal of expanding enrollment and supply. The government dominated resources and policies, universities were responsible for implementation, and enterprises were only auxiliary participants. Academic evaluation was absolutely dominant, and the weight of application-oriented and industry-education integration indicators was extremely low, resulting in universities lacking motivation for synergy.

2010-2018: Transitional form of "policy advocacy and multi-subject attempts" With the issuance of the National Medium and Long-Term Education Reform and Development Plan Outline (2010-2020), the orientation of the classified development of higher education became clear, and the pilot transformation of industry-specific universities and the exploration of "dual-subject" school running were launched, with universities and enterprises initially co-constructing majors and platforms. However, the institutional guarantee was insufficient, and a large number of cooperation disputes were caused by non-standard contracts and uneven interest distribution, leading to low enthusiasm of enterprises to participate.

2019 to the present: Institutional dilemma of "policy mandatory and insufficient synergy" After the issuance of the Pilot Implementation Plan for the Construction of Industry-Education Integration in 2019, industry-education integration has become a rigid requirement for the development of applied undergraduate education, and the policy level has shown the characteristics of "mandatory promotion", clearly proposing to establish a multi-subject synergy mechanism for running schools. However, local governments mostly adopt a "campaign-style governance" model to assess quantitative indicators, and enterprises mostly respond with symbolic compliance such as signing cooperation agreements and hanging plaques, resulting in insufficient substantive synergy and a formalistic dilemma.

3.2. Empirical Description of the Current Structure of Running Subjects

Combined with the survey data, this paper makes an empirical description of the current situation of running subjects in China's applied undergraduate education from the perspective of subject attributes, clearly presenting the behavioral characteristics and existing problems of each subject.

Government: Imbalance of rights and responsibilities in the reform of "delegating power, improving regulation and optimizing services" A text analysis of the power and responsibility lists of provincial education departments shows that the government currently has the coexistence of "offside" and "absence" in the synergy among running subjects. On the one hand, 62.5%of provincial education departments still conduct direct micro-intervention in the major setting and curriculum system of applied undergraduate universities, restricting the school-running autonomy of universities; on the other hand, only 38.7%of provinces have issued special incentive policies for enterprises to participate in industry-education integration, and

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29.4% of provinces have not established an effective supervision mechanism for subject synergy, resulting in a lack of necessary policy support and guarantee for the synergy process.

Enterprises: Typological division of participation motivation and behavioral differencesThrough in-depth interviews and case analysis of 18 cooperative enterprises, the motivation of enterprises to participate in the running of applied undergraduate universities is divided into three types, and the behavioral performance of different types of enterprises is significantly different. First, policy-responsive enterprises (44.4%): the core motivation for participating in synergy is to respond to government policies and obtain policy preferences, and their cooperation mostly stays at the formalistic level with no willingness for long-term investment. Second, resource-acquiring enterprises (38.9%): the core motivation is to obtain the talent resources and scientific research achievements of universities, and their cooperation mainly focuses on talent recruitment and short-term technical consulting, without in-depth participation in the talent cultivation process. Third, strategy-embedded enterprises (16.7%): they take industry-education integration as a strategic layout for the long-term development of enterprises, and deeply participate in the core links such as major construction, curriculum development and practical teaching, which are the core force promoting subject synergy, but the proportion of such enterprises is extremely low.

Universities: Conflict between academic logic and application logicA discourse analysis of the meeting minutes of the Professor Committee of three typical universities shows that applied undergraduate universities generally face an inherent conflict between academic logic and application logic. On the one hand, traditional professional title evaluation and performance assessment are mainly based on papers and research projects, and 68.3%of teachers believe that industry-education integration affects their professional title promotion; on the other hand, the application-oriented school-running orientation requires universities to strengthen practical teaching and connect with industrial demand. This logical conflict leads to universities being in a "passive response" state in subject synergy, making it difficult to actively promote in-depth cooperation with enterprises and achieve the core goal of collaborative education.

4. Generation Mechanism of the Synergy Dilemma Among Running Subjects:Based on Multi-case Comparison

4.1. Case Selection and Data Sources

To deeply analyze the generation mechanism of the synergy dilemma among running subjects, this paper selects three types of typical applied undergraduate universities as cases, covering different school-running types and regions to ensure the representativeness and diversity of the cases. The specific case information is as follows: University A is an eastern local public applied undergraduate university, focusing on engineering, with a long school-running history, carrying out industry-education integration relying on local industries; University B is a central industry-co-constructed applied undergraduate university, co-constructed by industry competent departments and local governments, focusing on industry-specific majors; University C is a western mixed-ownership applied undergraduate university, jointly organized by universities and enterprises, with obvious market-oriented school-running characteristics.

The data sources adopt the triangular validation method to ensure the authenticity and comprehensiveness of the data: first, text data, including 86 documents such as university annual reports, university-enterprise cooperation agreements, policy implementation reports and meeting minutes of the Professor Committee; second, in-depth interview data, interviewing 12 government education administrative officials,18 enterprise executives, 25 university managers and 30 front-line teachers, forming about 300,000 words of interview records; third, quantitative data, including core indicators such as the professional matching rate of graduates,

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the number of university-enterprise joint patents and the solution rate of enterprise technical problems, providing empirical support for the analysis of dilemmas.

4.2. Cross-case Analysis of Dilemma Manifestations

Through the cross-case comparison of the three case universities, it is found that the current synergy dilemma among running subjects of applied undergraduate education is mainly manifested in three dilemmas: power game, interest coordination and capacity adaptation. Although the manifestations of the dilemmas vary among different types of universities, all show the common characteristic of formalistic synergy.

Power game dilemma: Excessive government leadership and lack of discourse power of enterprises and universitiesIn the university-enterprise cooperation committee of University A, government representatives account for 60%, university representatives 25%,and enterprise representatives only 15%, with the approval rate of enterprise-proposed cooperation proposals less than 30%,and most decisions are dominated by the government and universities; as an industry-co-constructed university, University B has a relatively high participation of industry and enterprises, but the administrative intervention of industry competent departments is still obvious, and the school-running autonomy of the university is restricted, making it difficult to flexibly adjust the talent cultivation plan according to industrial demand. The imbalance of power allocation leads to the lack of equal interaction in the synergy process, suppresses the enthusiasm of enterprises and universities to participate, and reduces synergy to a formality.

Interest coordination dilemma: Lack of cost-sharing and benefit-sharing mechanism The cooperation dispute of the "order-based class" between University B and a manufacturing enterprise fully reflects the dilemma of interest coordination: to meet its own talent demand, the enterprise requires an increase in practical training hours and adjustment of the curriculum system, resulting in an increase in the teaching cost of the university, but the enterprise does not bear the corresponding cost-sharing responsibility; at the same time, the employment right of graduates from the order-based class is not clearly defined, the enterprise hopes to employ graduates first, but the university and students have different demands. The uneven interest distribution leads to the difficulty in the sustainable progress of cooperation. Survey data shows that 76.7% of enterprises say that "the investment in industry-education integration is greater than the benefit", and 63.3% of universities say that "enterprises lack the willingness for long-term investment". The lack of cost-sharing and benefit-sharing mechanism is the core crux that makes it difficult for subject synergy to go deeper.

Capacity adaptation dilemma: Mismatch between subject resources and demand The implementation of the teacher enterprise practice system of University C shows that the participation rate of teachers over 45 years old in enterprise practice is only 17%. The core reason is the mismatch between the academic ability of university teachers and the practical demand of enterprises: university teachers are good at theoretical research but lack industrial practical experience, making it difficult to meet the enterprise's demand for technical research and development and practical teaching; while enterprise technical personnel have rich practical experience but lack teaching ability, making it difficult to undertake classroom teaching and talent cultivation tasks. At the same time, the scientific research achievements of universities mostly focus on the academic field, which is disconnected from the actual technical demand of enterprises.68.9%of enterprises say that "the scientific research achievements of universities are difficult to transform into actual productivity". The mismatch between resources and demand leads to low synergy efficiency.

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4.3. Mechanism Refinement:Conflict of Three Institutional Logics

Based on the cross-case analysis, this paper refines the core generation mechanism of the synergy dilemma among running subjects—the conflict of three institutional logics of the government, enterprises and universities. This logical conflict leads to the difficulty in the coordination of the behavioral choices of each subject, and ultimately falls into a formalistic dilemma.

Government's "bureaucratic logic": Behavioral deviation oriented to short-term political achievements As a public manager, the government's behavioral choices are affected by the bureaucratic assessment system, showing an obvious orientation to short-term political achievements. It adopts a "campaign-style governance" to pursue quantifiable indicators such as the number of cooperations, ignoring the quality of synergy. Excessive administrative intervention restricts the autonomy of universities and enterprises and hinders substantive synergy.

Enterprise's "market logic": Rational participation oriented to investment return As market subjects, the core goal of enterprises is to maximize profits. Their behavior of participating in the synergy among running subjects follows the market logic, focusing on investment return and risk control. Industry-education integration for collaborative education has the characteristics of long cycle, large investment and slow return, which is contradictory to the short-term interest demands of enterprises; at the same time, the lack of effective interest incentive mechanism and risk guarantee mechanism leads enterprises to adopt an attitude of "cautious participation" in synergy, only carrying out superficial cooperation to avoid the risks brought by long-term investment, making it difficult to achieve in-depth synergy with universities.

University's "academic logic": Path dependence oriented to traditional evaluation As educational subjects, the behavioral choices of universities are affected by the traditional academic evaluation system, showing an obvious orientation to academic logic. Due to the path dependence of the traditional academic evaluation system, professional title evaluation and performance assessment still focus on academic achievements, resulting in low enthusiasm of teachers to participate in industry-education integration, and the school-running model is difficult to adapt to industrial demand, leading to a lack of capacity support for the synergy between universities and enterprises.

The conflict of the three institutional logics is essentially a reflection of the imbalance of institutional arrangements: the goal differences and interest differences of bureaucratic logic, market logic and academic logic fail to be coordinated through effective institutional design, leading to the mutual deviation of the behavioral choices of each subject, and ultimately forming a governance deadlock of "government-driven, university-passive and enterprise-detached", with subject synergy falling into a formalistic dilemma.

5. International Comparison: Institutional Diversity and Adaptation Conditions of Subject Synergy

The synergy among running subjects of applied undergraduate education has distinct locality, but the mature governance models of some countries in the world can still provide important experience and enlightenment for China. This paper selects three typical governance models: the German FH model, the Swiss University of Applied Sciences(UAS)model and the Japanese Professional University model, deeply deconstructs their institutional design and operation mechanism, refines the learnable experience, and analyzes the boundary conditions of institutional transplantation to ensure localization adaptation.

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5.1. In-depth Deconstruction of Three Typical Governance Models

German FH model: Legal compulsion-industry leadership With legal compulsion and industry leadership as the core, its institutional pillars include: the Vocational Education Act imposes rigid constraints on enterprises' participation in talent cultivation, which is directly linked to tax incentives, and enterprises participating in practical training and cultivation can enjoy a certain proportion of tax reduction and exemption; industry associations such as the Handwerkskammer (HWK) and the Federation of German Industries (BDI) undertake the functions of qualification certification, quality supervision and interest coordination, and are responsible for formulating talent cultivation standards, reviewing university-enterprise cooperation plans and mediating cooperation disputes; the "dual system" education model is implemented, where universities and enterprises jointly undertake the task of talent cultivation, and students spend half their time learning theoretical knowledge in universities and half their time carrying out practical training in enterprises, realizing the in-depth integration of theory and practice.

Swiss UAS model: Regional contract-multi-subject governance Taking regional contracts as the link, it builds a synergy network of multi-subject governance involving the government, enterprise alliances and universities. Its institutional innovation is mainly reflected in: first, cantonal governments, enterprise alliances and universities sign a "tripartite performance contract", clarifying the rights, responsibilities and interests of the three parties. The contract content covers core elements such as talent cultivation goals, resource investment, synergy mechanism and performance evaluation to ensure the standardization of the synergy process; second, a dynamic major adjustment mechanism based on regional economic demand, where universities jointly formulate professional talent cultivation plans with enterprise alliances according to the development demand of regional industries, flexibly adjust the curriculum system to ensure the accurate matching of talent cultivation and industrial demand; third, a diversified resource investment mechanism, where the government provides financial support, enterprise alliances provide practical resources and capital investment, and universities provide talent and scientific research resources, forming a synergy pattern of resource complementarity and benefit sharing.

Japanese Professional University model: Policy guidance-market regulation Taking policy guidance as the orientation and market regulation as the core, it focuses on the in-depth participation of enterprises. Its institutional design mainly includes: first, the Standards for the Establishment of Professional Graduate Schools stipulates the proportion of enterprise teachers, clearly requiring that the proportion of part-time enterprise teachers in professional universities is not less than 30%to ensure the professionalism of practical teaching; second, the market-oriented operation model of "enterprise customized courses", where universities jointly develop customized courses with enterprises according to the specific needs of enterprises, enterprises bear part of the curriculum development costs, and obtain the priority to employ graduates at the same time to realize benefit sharing; third, government policy incentives, where the government gives tax incentives, financial subsidies and other support to enterprises participating in industry-education integration, and commends outstanding synergy projects to stimulate the enthusiasm of enterprises to participate.

5.2. Boundary Conditions of Institutional Transplantation

Although the experience of international typical governance models is instructive, it must be localized based on national conditions and cannot be copied directly.

Adaptability of institutional environment Countries such as Germany and Switzerland have a sound legal system and mature industry organizations, where the law clearly defines the rights and responsibilities of each subject, and industry organizations can effectively play the role of coordination and supervision; however, the relevant laws and regulations of China's applied

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undergraduate education are still imperfect, and the development of industry organizations is not mature enough to undertake the core coordination function. Therefore, when drawing on international experience, it is necessary to first improve the relevant laws and regulations and cultivate mature industry organizations to provide a good institutional environment for subject synergy.

Constraints of resource endowmentForeign applied universities have a high degree of school-running autonomy, and enterprises have a long average life span and strong technical strength, able to undertake the responsibility of collaborative education; while the school-running autonomy of China's applied undergraduate universities is still restricted, and some small and medium-sized enterprises have weak technical strength and a short life span, making it difficult to participate in industry-education integration for a long time. Therefore, in institutional design, it is necessary to formulate differentiated incentive policies combined with the actual situation of Chinese enterprises, and further expand the school-running autonomy of universities to improve their synergy capacity.

Differences in policy orientation The development of foreign applied undergraduate education is mainly driven by market demand, and the main role of the government is guidance and guarantee; while the development of China's applied undergraduate education is mainly driven by government policies, and the role of the market mechanism has not been fully exerted.Therefore, when drawing on international experience, it is necessary to balance the relationship between government guidance and market regulation, not only strengthen the government's policy guarantee and guidance role, but also give full play to the resource allocation role of the market mechanism to stimulate the synergy enthusiasm of multiple subjects.

6. Institutional Innovation Path: Constructing a Governance System of"Symmetric Rights and Responsibilities, Benefit Sharing, and Capacity Synergy"

The core to breaking the synergy dilemma among running subjects of applied undergraduate education lies in resolving the conflict of the three institutional logics, reconstructing the rules of subject interaction through institutional innovation, and building a multi-subject synergy governance system of "symmetric rights and responsibilities,benefit sharing, and capacity synergy", so as to realize the resonance and joint efforts of the three main subjects of the government, enterprises and universities, and promote the transformation of subject synergy from formalization to substantiveness.

6.1. Legal Reconstruction of Subject Rights and Responsibilities: Clarifying Boundaries and Realizing Symmetric Rights and Responsibilities

Symmetric rights and responsibilities are the foundation of subject synergy. It is necessary to clarify the core rights and responsibilities of the three main subjects of the government, universities and enterprises through legal means, break the situation of unbalanced rights and responsibilities, and ensure that each subject has equal rights and responsibilities and performs its own duties in the synergy process.

First, formulate the Regulations on the Running of Applied Undergraduate Education to clarify the legal rights and responsibilities of each subject. The core rights and responsibilities of the government are planning and guidance, policy support, resource guarantee and supervision and management, responsible for formulating the development plan of applied undergraduate education, issuing special incentive policies, providing financial support and supervising the synergy process; the core rights and responsibilities of universities are talent cultivation, scientific research innovation and school-running autonomy, responsible for formulating talent

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cultivation plans according to industrial demand, carrying out industry-education integration and improving synergy capacity; the core rights and responsibilities of enterprises are practical education, technical support and resource investment, responsible for providing practical platforms, participating in curriculum development, undertaking practical training tasks and carrying out technical cooperation.

Second, establish a "negative list" management system to expand the school-running autonomy of universities. Strip off the government's micro-intervention in the major setting, curriculum system and professional title evaluation of universities, retain the government's functions of macro-supervision and policy guidance, and enable universities to flexibly adjust talent cultivation plans and carry out industry-education integration cooperation according to industrial demand. At the same time, clarify the obligations and responsibilities of enterprises in participating in synergy, and cancel the policy preferences and project application qualifications of enterprises that fail to perform their synergy obligations.

Third, improve the synergy supervision mechanism to ensure the implementation of rights and responsibilities. Establish a multi-subject participation supervision mechanism involving the government, universities, enterprises, industry associations and the public, and incorporate the quality and effect of subject synergy into the performance assessment system of each subject; carry out regular synergy efficiency evaluation, and directly link the evaluation results with government financial support, enterprise tax incentives and university school-running evaluation to ensure that each subject effectively performs its own rights and responsibilities.

6.2. Market-oriented Design of Interest Coordination Mechanism: Cost Sharing and Realizing Benefit Sharing

Benefit sharing is the core of stimulating the enthusiasm of subject synergy. It is necessary to build a "cost-sharing-benefit-sharing" interest coordination mechanism through market-oriented design, resolve the interest conflicts of each subject, and maximize the synergy benefits.

First, construct a cost-sharing model to clarify the resource investment responsibilities of each subject. The government mainly undertakes the responsibility of policy resources and financial investment, increases financial support for applied undergraduate education, sets up a special fund for industry-education integration to subsidize the cost of university-enterprise cooperation; universities mainly undertake the responsibility of talent resources and scientific research investment, and invest teachers and teaching resources to carry out collaborative education; enterprises mainly undertake the responsibility of practical resources and capital investment, provide practical platforms, technical equipment, practical training teachers and other resources, and bear part of the costs of curriculum development and practical training cultivation.

Second, establish a benefit-sharing mechanism to realize win-win benefits for all subjects. Enterprises can obtain the priority to employ graduates, convert the investment in industry-education integration into "talent options" in proportion to reduce the cost of talent recruitment; universities can improve the quality of talent cultivation and the efficiency of scientific research transformation with the help of enterprises' practical resources and enhance their school-running competitiveness; the government can realize the accurate matching of talent cultivation and industrial demand through subject synergy, promote the development of regional economy and society, and maximize public interests.

Third, develop a "university-enterprise cooperation credit index" to strengthen interest constraints. Incorporate the depth of enterprise participation in industry-education integration, the intensity of resource investment and the effect of cooperation into the credit evaluation system, and directly link the credit index with enterprise tax incentives, government project application qualifications and social reputation; give more policy support and incentives to

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enterprises with high credit ratings, and conduct interviews, circulate a notice of criticism and even cancel the synergy qualification of enterprises with low credit ratings to force enterprises to take the initiative to participate in substantive synergy.

6.3. Professional Support for Capacity Synergy: Accurate Matching and Improving Synergy Efficiency

Capacity synergy is the key to improving the efficiency of subject synergy. It is necessary to build a subject capacity adaptation mechanism through professional support, resolve the problem of mismatch between resources and demand, and realize the accurate matching of the educational capacity of universities, the practical capacity of enterprises and the guiding capacity of the government.

First, establish a "double-qualified" teacher certification system to improve the practical capacity of university teachers. Treat enterprise work experience equally with academic qualifications, clarify the certification standards for "double-qualified" teachers, and require the proportion of "double-qualified" teachers in applied undergraduate universities to be no less than 50%;establish a normalized mechanism for teachers' enterprise practice, universities and enterprises jointly formulate teacher practice plans, provide salary guarantee and professional title promotion inclination for teachers during practice, and encourage teachers to go deep into enterprises for practical training to improve their industrial practical capacity.

Second, cultivate third-party synergy organizations to strengthen the intermediary support for capacity synergy. Led by industry associations, set up third-party synergy organizations for industry-education integration to undertake the functions of talent demand forecasting, cooperation plan design, conflict mediation and efficiency evaluation; third-party organizations regularly release regional industrial talent demand reports to provide a basis for universities to adjust talent cultivation plans; coordinate the cooperative relationship between universities and enterprises and mediate cooperation disputes; conduct an objective evaluation of the effect of subject synergy to provide a reference for policy adjustment and mechanism optimization.

Third, build an integrated "government-industry-university-research-application" platform to realize resource sharing and capacity complementarity. Universities and enterprises jointly build practical training bases and scientific research innovation platforms to share technical equipment, talent resources and scientific research achievements; universities carry out practical teaching and scientific research innovation relying on the platform, and enterprises carry out technical research and development and talent cultivation relying on the platform, realizing the effective connection between the education chain, talent chain, industrial chain and innovation chain, and improving the overall efficiency of subject synergy.

7. Research Conclusions and Prospects

Based on the institutional change theory, combined with policy text analysis, cross-case comparison and in-depth interview, this paper systematically studies the dilemmas and institutional innovation paths of the synergy among running subjects in applied undergraduate education. The core conclusions are as follows: First, the current synergy among running subjects of applied undergraduate education in China is trapped in a formalistic dilemma, forming a governance deadlock of "government-driven, university-passive and enterprise-detached", which is specifically manifested in three dilemmas: power game, interest coordination and capacity adaptation; Second, the root cause of the synergy dilemma is the conflict of the three institutional logics of the government, enterprises and universities, rather than insufficient coordination at the technical level. The government's bureaucratic logic, enterprises' market logic and universities' academic logic deviate from each other, leading to the difficulty in the coordination of subject behaviors; Third, the core of breaking the dilemma

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is institutional innovation. It is necessary to build a governance system of "symmetric rights and responsibilities, benefit sharing, and capacity synergy", and promote the transformation of synergy from formalization to substantiveness through the legal reconstruction of rights and responsibilities, market-oriented coordination of interests and professional support of capacities.

The theoretical contribution of this study is to break through the limitations of the "subject enumeration" research paradigm, build a "structure-process-efficiency" systematic analytical framework, combine the institutional change theory with the synergy among running subjects of applied undergraduate education, reveal the generation mechanism of dilemmas, and enrich the application scenarios of the institutional change theory in the field of applied undergraduate education and improve the theoretical system of applied undergraduate education governance. The practical contribution is to put forward targeted and operable institutional innovation paths, provide specific practical guidance for the government to formulate industry-education integration policies, universities to promote the reform of school-running models, and enterprises to participate in collaborative education, help break the formalistic dilemma of subject synergy, and promote the high-quality development of applied undergraduate education. At the same time, this study also has certain limitations: first, the case selection only covers three types of typical universities, failing to cover all applied undergraduate universities of different regions and school-running levels, and the generalizability of the research conclusions needs to be further verified; second, the research on the regional heterogeneity of subject synergy is insufficient. There are differences in industrial foundation, policy environment and resource endowment among the eastern, central and western regions, and the dilemmas and paths of subject synergy should also be different; third, it does not pay attention to the impact of digital transformation on the synergy among running subjects. With the development of digital technology, the rise of "platform-based subjects" may reshape the governance structure of subject synergy.

The synergy among running subjects of applied undergraduate education is a long-term and systematic project that requires the continuous efforts of multiple subjects such as the government, universities, enterprises and industry associations. Only by resolving the conflict of the three institutional logics through institutional innovation and realizing symmetric rights and responsibilities, benefit sharing and capacity synergy, can we break the formalistic synergy dilemma, build an integrated collaborative governance system of "government-industry-university-research-application", promote the connotative development of applied undergraduate education, and inject new vitality into the classified development of China's higher education and the high-quality development of regional economy and society.

Future research can be carried out from three aspects: first, expand the scope of cases, select applied undergraduate universities of different school-running types in the eastern, central and western regions to carry out research, explore the impact of regional heterogeneity on subject synergy, and improve the generalizability of research conclusions; second, focus on the background of digital transformation, deeply explore the role of platform-based subjects in the synergy among running subjects, and analyze the reshaping effect of digital technology on the synergy model and mechanism of subjects; third, adopt a longitudinal follow-up research method to track the implementation effect of institutional innovation in subject synergy, timely optimize and improve the institutional design, and provide more refined theoretical support and practical guidance for the sustainable advancement of the synergy among running subjects in applied undergraduate education.

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