

On Governance of Higher Education in China: Historical Evolution, Realistic Dilemma, and Future Optimization



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ABSTRACT: The governance of higher education in China has gone through three different stages of development, and the relationship between government and universities in terms of management and being managed has not fundamentally changed. Efficient management institutions still occupy a central position in education governance within universities, neglecting the participation of teachers, students, and social subjects in governance, resulting in a lack of endogenous motivation, innovative vitality, and social functions in higher education. To address the issue, the author proposes a technology-empowered multi-subject co-governance model to optimize the structure of higher education governance.

KEYWORDS: Higher education governance, multi-subject co-governance, Technological governance

1. INTRODUCTION

Higher education governance refers to the process of effectively managing, regulating, and supervising the operation and development of higher education through institutions, mechanisms, and the collaboration of multiple stakeholders. Its core lies in coordinating the relationships among diverse stakeholders such as the government, higher education institutions, and society to achieve the improvement of higher education quality, the optimization of efficiency, and the enhancement of fairness. The goals of higher education governance not only include cultivating high-quality talents but also promoting scientific and technological innovation, cultural inheritance, and facilitating the coordinated development of higher education and society. With the rapid development and wide application of artificial intelligence technology in various industries, AI has injected new vitality into the field of higher education and is playing an increasingly important role, becoming a key force in promoting the transformation of higher education.

The author believes that AI can not only provide new tools and methods for higher education governance but also help reshape the logic and path of higher education governance. This paper takes "Chinese higher education governance" as the research object. By reflecting on the existing higher education governance methods, it proposes to expand the new path of Chinese higher education governance with "technological governance" as a tool.

2. THE HISTORICAL EVOLUTION OF HIGHER EDUCATION GOVERNANCE IN CHINA

Based on the evolution of the relationship between the government and universities in higher education governance, since the establishment of the People's Republic of China, the higher education governance in China has roughly gone through three development periods: the period of "government leads universities in higher education governance", the period of "government partially empowers universities in higher education governance", and the period of "government-university collaborative governance in higher education".

2.1 The period of "government leads universities in higher education governance"(1949-1977)

After 1949, the new Chinese government took over and reformed the old higher education system, eliminating the educational influence of imperialism, feudalism, and bureaucratic capitalism, and initially establishing a socialist-oriented higher education system. In line with the national system, the government also carried out socialist reforms in higher education governance, establishing a highly centralized higher education management system.

The core goal of the government's direct management of higher education was to cultivate urgently needed professional talents for the construction of New China. During this period, through a highly centralized planned management model, the government

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comprehensively controlled the establishment of universities, enrolment, major settings, curriculum arrangements, and graduate distribution. Universities were regarded as part of the state apparatus, and their educational directions, teaching contents, and management methods strictly followed government instructions. For example, the original comprehensive universities were split into single-discipline institutions with strong professional characteristics to meet the demand for specialized talents in industrial construction. At the same time, the government incorporated higher education into the overall framework of socialist construction through ideological education, emphasizing serving the proletarian politics. This direct management model rapidly increased the scale and quality of higher education in the short term and provided a large number of professional talents for the national economic construction. However, it also led to a lack of autonomy and diversity in universities, and academic freedom was somewhat restricted.

Starting in 1977, market-oriented and social factors were gradually introduced into the higher education management system on the basis of the government's direct management. During this period, the government quickly restored the normal order of higher education and gradually improved its overall level by restoring the college entrance examination system, expanding the enrolment scale, and promoting disciplinary construction. The government also supported the development of some universities and disciplines by concentrating resources through policies such as the "211 Project". In particular, the rigid state-assigned graduate distribution system under the planned economy was abolished, and a market-oriented employment model was adopted, which brought vitality to education and the market. However, although universities gained some autonomy in fund utilization, major settings, and internal management, the government still maintained a high degree of control in key areas such as enrolment plans, financial allocations, and personnel management. While this management model promoted the rapid development of higher education, it also led to the serious homogenization of universities.

In the 1980s and 1990s, in order to adapt to the market economy reform taking place in China, the government's education authorities issued a series of policy documents related to the reform of the higher education management system, establishing a new system of "two-level management by the central government and provincial government", further promoting the marketization of higher education. Under the new system, the scale and level of higher education also further developed, and some universities and disciplines emerged internationally. However, overall, this round of reform has not touched upon the direct "management and being managed" relationship between the government and universities, which are essentially government-affiliated educational institutions. The main problem with a highly centralized management system is that it severely limits the autonomy of universities, leading to a lack of innovation and vitality in areas such as education, teaching, and scientific research.

2.2 The period of "government partially empowers universities in higher education governance"(1998-2011)

With the continuous advancement of China's market-oriented economic reform and government institutional reform, the national education management department decided to further adjust the higher education management system. The "Higher Education Law of the People's Republic of China", which came into effect in 1998, for the first time confirmed the autonomy of universities in running schools and established the legal status of universities as legal entities. This law defined the boundaries for the government's power to manage universities. It clearly granted universities' autonomy in seven aspects of running schools, namely: the autonomy in enrolment, the autonomy in setting and adjusting disciplines and majors, the autonomy in teaching, the autonomy in carrying out scientific research, technological development and social services, the autonomy in conducting international scientific, technological and cultural exchanges, the autonomy in internal institutional setup, the appointment and evaluation of teachers and other professional and technical personnel, and the adjustment of allowances and salary distribution, as well as the autonomy in property management and utilization.

In addition to the "Higher Education Law of the People's Republic of China", the education management department also issued policy regulations such as the "National Medium-and Long-Term Education Reform and Development Plan Outline (2010-2020)" and the "Interim Measures for Formulating University Charters" to regulate the relationship between the government and universities.

The higher education management system during this period can be referred to as the "partial empowerment management" system. Its main feature is that the government continuously streamlines administration and delegates power, builds a service-oriented government, and endows universities with the status of independent legal entities. Universities can independently adjust the setting of majors and the enrolment scale according to social needs and their own characteristics, which has promoted the differentiated development of universities to a certain extent. The core purpose of this reform is to stimulate the vitality of universities in running schools and promote the diversified development of higher education through appropriate delegation of power.

The "partial empowerment management" has significantly improved the overall level of China's higher education. The diversified development of universities has also promoted the optimal allocation of educational resources, providing more students with opportunities to receive higher education, and the popularization rate of higher education has been significantly increased. Many universities have also made remarkable progress in discipline construction and talent cultivation. Meanwhile, universities have established closer ties with society, and through industry-university-research cooperation, promoted the transformation of scientific and technological achievements and industrial upgrading.

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However, due to the "partiality" of the empowerment, universities are still restricted by the government in key areas such as personnel management and fund allocation. Overall, in core issues related to higher education (such as educational planning, educational models, the establishment and layout of universities, the setting of disciplines and majors, the supervision and evaluation of educational quality, enrolment models and enrolment plans, etc.), government power still dominates. Nevertheless, the government's delegation of educational management power has given universities more motivation and vitality, and both the overall scale and strength of China's higher education have been significantly enhanced.

2.3 The period of "government-university collaborative governance in higher education"(since 2012)

With the development of society, the education management department has gradually realized that relying solely on market regulation or government administrative means for management may lead to failures. Therefore, it is imperative to promote multi-stakeholder collaborative governance in higher education. Since 2012, the Chinese government has listed "promoting comprehensive reforms in the education sector" as one of the specific tasks for education reform and development. The core goal of this phase of education reform is to break the traditional government-led model and promote collaborative cooperation among the government, universities, and other social entities to achieve comprehensive reform and innovative development in higher education.

"Collaborative governance" is first reflected in the transformation of the government's role. The government has gradually shifted from a direct manager to a policy maker and service provider. By streamlining administration and delegating power, as well as optimizing the policy environment, the government has granted universities more autonomy. For example, through policies such as the "Double First-Class" initiative, the government guides universities to play a leading role in discipline construction and talent cultivation, while ensuring the rational allocation of educational resources through financial support and regulatory mechanisms.

Universities have gradually gained a leading role in higher education governance during this process. Through the optimization of internal governance structures, universities have obtained greater decision-making power in areas such as school running autonomy, discipline setting, and talent recruitment. Many universities have established academic committees and faculty congresses, enhancing their capacity for academic governance and democratic decision-making. In addition, universities have been empowered to collaborate with various sectors of society to promote the development of higher education, such as through industry-university-research integration and university-enterprise cooperation, driving the transformation of scientific research achievements and innovation in talent cultivation models.

The government has also taken measures to encourage enterprises, research institutions, social organizations, and other entities to participate in higher education governance through various forms. For example, by setting up scholarships, jointly building laboratories, and conducting major research projects, these entities support the development of universities and promote technological innovation. This multi-stakeholder collaborative cooperation not only enriches the connotation of higher education governance but also enhances its social adaptability and service capabilities.

The collaborative governance model has significantly improved the overall level of China's higher education. Some Chinese universities and disciplines have entered the international forefront, and the quality of scientific research achievements and talent cultivation has also significantly improved. In addition, the deep integration of universities and society has promoted the transformation of scientific and technological achievements and industrial upgrading, providing important support for economic and social development. Furthermore, collaborative governance has also driven improvements in educational equity, giving more students from impoverished regions the opportunity to receive higher education.

However, the current collaborative governance model also faces some potential issues. For example, the boundaries of responsibilities between the government, universities, and social entities are not yet clear, and the relationship between universities and the government has not fully transitioned from a traditional administrative subordination to a modern contractual relationship. Some universities lack vitality due to excessive dependence on the government, while others have fallen into the trap of educational utilitarianism due to over-reliance on market mechanisms. Overall, the government's approach to managing universities is still in the process of transitioning from a management-oriented government to a service-oriented government.

3. THE REALISTIC DILEMMA OF HIGHER EDUCATION GOVERNANCE IN CHINA

China's higher education has undergone 75 years of development and has formed its own unique path in the governance of higher education institutions, achieving great success. However, there are also some realistic dilemmas in the current higher education governance model.

3.1 Government's excessive intervention leads to the weakening of the endogenous driving force of higher education

The management and managed relationship between the government and universities is a prominent feature of China's higher education governance model. This relationship not only reflects the state's macro-regulation of higher education but also shows the universities' dependence on the government in the process of running schools. From a historical and real-world perspective, this relationship has shown different characteristics at different stages, but its essence has always revolved around the government's

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dominant position in resource allocation, policy-making, and supervision and evaluation, as well as the limited autonomy of universities in specific school-running practices.

In terms of resource allocation, the government directly or indirectly controls the development direction of universities through fiscal allocations, project funding, and policy preferences. The main source of universities' funds depends on government allocations, which means that universities must give priority to the government's policy orientation and strategic needs during the school-running process. The government's strict supervision of the use of funds ensures the rational utilization of funds, but it may also limit the flexibility of universities in innovation and characteristic development.

In terms of policy-making, the government provides macro-guidance on universities' school-running directions, discipline settings, enrollment plans, and talent-cultivation models through laws and regulations, administrative instructions, and planning documents. For example, by formulating higher education development plans, the government clarifies the development goals and key tasks of universities, guiding them to align their discipline construction and talent cultivation with national strategic needs. Although this policy orientation helps ensure the social service function of higher education, it may also make universities overly dependent on government instructions during the school-running process, lacking autonomy and innovation vitality. In addition, the government's strict control over enrollment policies, discipline evaluations, and quality supervision, while contributing to maintaining educational fairness and quality, may also make universities rigid in responding to social needs and academic innovation.

In terms of supervision and evaluation, the government conducts comprehensive inspections and evaluations of universities' school-running levels and talent-cultivation qualities through regular teaching evaluations, discipline evaluations, and scientific research appraisals. The evaluation results not only affect the reputation and social recognition of universities but also are linked to government fiscal allocations and enrollment plans, prompting universities to continuously improve educational quality. However, this government-led evaluation system, while promoting the standardized development of universities, may also cause universities to neglect the essence of education and academic innovation in the process of pursuing evaluation indicators. For instance, some universities, in order to meet the evaluation requirements, overly focus on quantitative indicators such as the number of papers and research projects, while neglecting teaching quality and the all-round development of students. The government-led evaluation system may lead universities to neglect the essence of education in the pursuit of quantitative indicators, resulting in a utilitarian tendency.

Under the current higher education governance model, the government remains the dominant force in the development of higher education, achieving supervision over higher education by directly formulating educational goals, policies, and methods. The educational administrative departments grant limited management power to universities and often directly manage universities' resource allocation, teaching, and academic activities through administrative approvals and instructions. Overall, the concept of government control over universities has not fundamentally changed. In most cases, universities are in a subordinate position of being "managed" and "guided".

Excessive government intervention in education management brings many problems. In particular, it restricts the autonomy and innovation vitality of universities, resulting in a lack of diversity in universities' school-running characteristics and academic development. It also makes higher education rigid in responding to social needs and academic innovation, making it difficult to adapt to the rapidly changing social environment.

3.2 Neglecting the participation of teachers and students in governance leads to a lack of innovative vitality in higher education

Within Chinese universities, there exists a management-managed relationship between administrative departments and teachers/students. This relationship not only reflects the organizational structure and operating mechanism of educational operation of universities, but also mirrors the roles and status of teaching and research staff and students in university governance. Administrative departments are given a dominant position in resource allocation, policy-making, and supervision and evaluation in universities, while teachers and students have only very limited say.

In terms of internal policy-making, university administrative departments provide macro-guidance for the teaching and research activities of teaching and research staff and the learning activities of students through rules and regulations, administrative directives, and planning documents. The administrative departments formulate teaching plans, scientific research assessment, and academic evaluation criteria for teachers, and set course content, credit requirements, and graduation standards for students to ensure that the teaching and learning activities of teachers and students meet the development goals and teaching requirements of the university. Although these measures help ensure the implementation of university education policies, they also cause teachers and students to rely excessively on the instructions of administrative departments during the teaching and learning process, resulting in the loss of autonomy and innovation vitality.

Since administrative departments lack in-depth participation from teachers and students when formulating policies, the policies they formulate mainly reflect the will of the management rather than the actual teaching and learning needs of teachers and students. This leads to overly rigid education policies in universities, which are out of touch with educational practice. As a result, it not only

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reduces teachers' teaching enthusiasm and scientific research innovation ability but also affects students' learning outcomes and the cultivation of their comprehensive qualities.

In terms of educational resource allocation, university administrative departments directly or indirectly control the activity space of teaching and research staff and students through budget allocation, project approval, and resource allocation. The administrative departments' decisions on the allocation of scientific research funds, teaching equipment, and laboratory resources will affect the scientific research output and teaching effectiveness of teaching and research staff. Similarly, the administrative departments' decisions on the allocation of scholarships, grants, and extracurricular activity resources also have an impact on students. The unified management of resource allocation by educational administrative departments restricts the flexible innovation and characteristic development of teachers and students in scientific research, teaching, and learning activities. The lack of transparency and democratic participation in the resource-allocation process by administrative departments may also lead to unfair distribution of educational resources or educational corruption.

In terms of supervision and evaluation, university administrative departments conduct comprehensive inspections and evaluations of the teaching and research levels of teaching and research staff and the learning achievements of students through regular teaching evaluations, scientific research evaluations, title assessments, and academic performance assessments. The evaluation results not only affect the title assessment, scientific research project application, and academic reputation of teaching and research staff but also influence students' scholarship evaluation, graduation eligibility, and employment prospects, prompting teaching and research staff and students to continuously improve their teaching, research, and learning achievements. Teaching evaluation is an important means to ensure the quality of education. However, if the evaluation criteria overly rely on the quantitative indicators of administrative departments while ignoring the actual feedback from teachers and students, the evaluation results may not fully reflect the real teaching effectiveness. The evaluation system dominated by administrative departments may also cause teaching and research staff and students to neglect the essence of education and academic innovation in the process of pursuing evaluation indicators. Some teaching and research staff, in order to meet the scientific research assessment requirements, overly focus on quantitative indicators such as the number of papers and scientific research projects, while ignoring teaching quality and the all-round development of students; some students, in order to meet the academic assessment requirements, overly focus on exam scores and credit accumulation, while neglecting the cultivation of comprehensive qualities and innovation ability.

Overall, the monopoly of power by university administrative departments in policy-making, resource allocation, and teaching evaluation ignores the main-body status of teachers and students in higher-education governance. It will weaken the democratic atmosphere within universities, and may also lead to the abuse of power and vicious competition, thus affecting the healthy development of higher education.

3.3 Neglecting the collaborative governance of social entities leads to the weakening of the social function of higher education

In the higher education governance system, the collaborative governance relationship between universities and other social entities is equally crucial for the development of higher education. It can not only reflect the roles and functions of universities in society but also mirror the participation and needs of other social entities in higher education governance. However, in China, the higher education governance system is dominated by the government and internal management departments of universities. Their attitude towards the participation of social entities in university governance is not very positive. Ignoring the participation of social entities in higher education governance will lead to a disconnect between the talent-cultivation model and social needs.

The fundamental mission of universities is to cultivate high-quality talent for society. If universities lack full consideration of industry needs, corporate feedback, and social development trends in curriculum design, teaching content, and cultivation goals, the talent they cultivate may have difficulty meeting the actual needs of society. Currently, the curriculum of some universities is overly theoretical, lacking practicality and applicability, which makes it difficult for students to quickly adapt to work positions after graduation. The specialty settings of some universities lag behind industrial development, resulting in graduates lacking competitiveness in the job market. If higher education fails to have an in-depth understanding of social needs, its educational effectiveness may not meet the public's expectations. If university education lacks pertinence and is divorced from the job market, the talent cultivated by universities cannot meet the actual needs of enterprises and industries. This phenomenon of supply-demand disconnect will not only reduce the social recognition of universities but also exacerbate the structural contradiction of talent in society, affecting the positive development of education and employment.

In addition, universities are important forces in scientific and technological innovation. If the research directions of universities overly pursue academic indicators while ignoring social needs, their research results may be difficult to industrialize. In reality, some university research projects lack cooperation with enterprises, causing the research results to remain in the laboratory and fail to enter the market. The research evaluation system of some universities overly emphasizes the number of published papers and patents while ignoring the actual effects of technology transfer and achievement transformation. This disconnection between scientific research and industry leads to the difficulty of converting research results into actual productive forces, weakening the role of universities in promoting scientific and technological innovation and industrial upgrading.

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As an important part of society, the governance model and decision-making process of universities should reflect respect for social needs and public interests. If universities lack transparency and democratic participation in the governance process, their decisions may more reflect the will of the management while ignoring social needs and public expectations. Currently, decisions on enrollment policies, discipline settings, and research directions in universities may more consider economic benefits and ranking indicators while ignoring social fairness and public interests. The short-sightedness and utilitarianism of this governance model will not only damage the social image of universities but also weaken their leading role in social development.

Overall, ignoring the effectiveness and sustainability of collaborative governance by social entities will lead to the weakening of the functions of higher education in talent cultivation, scientific research, and social services, resulting in a series of negative consequences such as the disconnection between higher education talent cultivation and social needs, the difficulty of converting scientific research results, insufficient social service capabilities, and the lack of social responsibility. These consequences will not only affect the educational quality and academic innovation of universities but also restrict their sustainable development and the overall progress of society.

4. OPTIMIZING HIGHER EDUCATION GOVERNANCE THROUGH TECHNOLOGY EMPOWERED "MULTI-SUBJECT CO-GOVERNANCE"

In the current governance of higher education in China, direct government intervention, insufficient participation of teachers and students, and the lack of collaborative governance by social entities are the three core issues restricting the development of higher education. The root cause of these problems lies in the single-subject dominance of the traditional governance model, which has led to the weakening of the internal driving force of higher education, the lack of innovation vitality, and the marginalization of social functions. To solve these problems, promoting a "multi-subject co-governance" model for higher education has emerged as a viable path. Multi-subject co-governance is not only an adjustment of the governance structure but also an innovation of the governance concept. Its core is to achieve democratization, scientification, and high-efficiency in higher education governance through the collaborative cooperation of multiple subjects.

4.1 Multi-subject co-governance can crack the imbalance of subject power

The multi-subject co-governance model refers to the situation in higher education governance where the government, higher education institutions, teachers and students, and social entities jointly participate in decision-making, management, and supervision. Through consultation and cooperation, they achieve the optimal allocation and efficient utilization of educational resources. This model emphasizes the diversity and equality of governance subjects, aiming to break the traditional pattern dominated by the government alone and build an open, inclusive, and collaborative governance system. Under the multi-subject co-governance model, the government shifts from direct intervention to macro-guidance, higher education institutions change from passive implementation to active governance, teachers and students transform from passive recipients to active participants, and social entities move from the marginal position to the core participants. The remarkable features of this governance model lie in the equalization of subject relations, the democratization of the decision-making process, the synergy of resource sharing, and the transparency of the supervision mechanism.

Firstly, the equalization of subject relations. In the traditional higher education governance model, the government often takes the leading position, with higher education institutions acting as implementers, while teachers, students, and social entities are marginalized. This single-subject governance structure is prone to power concentration, resulting in uneven resource allocation and decision-making that deviates from actual needs. In the "multi-subject co-governance" model, the equalization of subject relations is manifested in which the government, higher education institutions, teachers and students, and social entities enjoy equal participation rights in the governance process. The government shifts from direct intervention to macro-guidance in governance, higher education institutions change from passive implementation to active governance, teachers and students transform from passive recipients to active participants, and social entities move from the marginal position to the core participants. This equalized subject relationship can effectively avoid excessive power concentration and ensure that the interests and needs of all parties are fully expressed and balanced in the governance process. Compared with the traditional model, the equalized subject relationship can stimulate the enthusiasm and sense of responsibility of each subject, forming a joint force to promote the optimization of education governance.

Secondly, the democratization of the decision-making process. In the traditional governance model, decision-making is often dominated by the government and the management departments of higher education institutions, lacking the participation of multiple subjects. This easily leads to decisions that deviate from actual needs or neglect the interests of vulnerable groups. In the "multi-subject co-governance" model, the democratization of the decision-making process is manifested in the way of achieving the joint participation of multiple subjects in decision-making through consultation, dialogue, and cooperation. For example, when formulating education policies or resource allocation plans, the government, higher education institutions, teachers and students, and social entities can fully express their opinions through hearings, symposiums, etc., to form consensus-based decisions. This democratic decision-making process can not only improve the scientificity and rationality of decisions but also enhance the

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legitimacy and acceptability of decisions. Compared with the traditional model, the democratic decision-making process can effectively avoid the "one-man-show" phenomenon, ensuring that decisions are closer to actual needs and thus improving the governance efficiency.

Thirdly, the synergy of resource sharing. In the traditional governance model, the allocation of educational resources is often dominated by the government and the management departments of higher education institutions, which easily leads to uneven resource distribution or inefficient utilization. In the "multi-subject co-governance" model, the synergy of resource sharing is manifested in achieving the optimal allocation and efficient utilization of educational resources through the cooperation of multiple subjects. For example, the government can provide policy guidance and financial support, higher education institutions can offer educational resources and platforms, teachers and students can actively participate and provide feedback, and social entities can provide technology, funds, or social resources to jointly promote the integration and sharing of educational resources. This synergistic resource-sharing mechanism can effectively avoid resource waste and redundant construction and improve the resource utilization efficiency. Compared with the traditional model, the synergistic resource-sharing mechanism can give full play to the advantages of each subject, forming resource complementarity and synergy effects, thereby enhancing the overall efficiency of governance.

Fourthly, the transparency of the supervision mechanism. In the traditional governance model, the supervision mechanism is often dominated by the government and the management departments of higher education institutions, lacking external supervision and public participation. This easily leads to the supervision becoming a mere formality, lacking transparency and effectiveness. In the "multi-subject co-governance" model, the transparency of the supervision mechanism is manifested in achieving an open, transparent, and effectively balanced supervision process through the joint participation of multiple subjects. The government, higher education institutions, teachers and students, and social entities can supervise and evaluate all aspects of education governance by establishing supervision committees, publicizing supervision reports, or introducing third-party evaluations. This transparent supervision mechanism can effectively avoid power abuse and corruption, ensuring the fairness and legitimacy of the governance process. Compared with the traditional model, the transparent supervision mechanism can enhance the credibility and sustainability of governance, thereby improving the overall governance effect.

Multi-subject co-governance is not only an innovation in the governance model but also a transformation in the governance concept. Through the equalization of subject relations, the democratization of the decision-making process, the synergy of resource sharing, and the transparency of the supervision mechanism, the "multi-subject co-governance" model can fully stimulate the enthusiasm and advantages of each subject, forming a joint force to promote the optimization of education governance, solve the problem of unbalanced subject power, and effectively improve the scientificity, rationality, and sustainability of governance. This governance model can not only stimulate the internal motivation and innovation vitality of higher education but also strengthen its social functions and improve governance efficiency.

4.2 Improve the efficiency of multi-subject co-governance with "technological governance"

In the current governance of higher education in China, multi-stakeholder co-governance is regarded as an important approach to solve the dilemmas of excessive government intervention and insufficient participation of teachers, students, and social stakeholders in governance. However, the effective implementation of multi-subject co-governance requires coordinating the complex relationships among the government, universities, teachers and students, and social stakeholders, which puts forward higher requirements for governance efficiency.

With the rapid development of technology, its influence in various fields of society has become increasingly prominent, prompting people to think about how to use technology to improve governance effectiveness. The concept of "technological governance" has gradually emerged in the process of modern social development. This concept emphasizes leveraging advanced technological means such as big data, artificial intelligence, and the Internet of Things to optimize the governance process. It uses technology as a tool to accurately collect, analyze, and process various types of information, making governance decisions more scientific and precise. Under this concept, governance subjects can adjust governance strategies in a timely manner based on the quantitative data and analysis results provided by technology, enhancing the pertinence and effectiveness of governance. At the same time, technology can also promote the transparency and openness of the governance process, reduce the interference of human factors, and enhance the fairness and credibility of governance.

The core of technological governance lies in optimizing governance processes, improving governance efficiency, and enhancing governance transparency through technological means. In the governance of higher education, the application of technological governance is mainly reflected in data-driven decision-making, intelligent resource allocation, transparent supervision mechanisms, and the collaborative cooperation of multiple stakeholders. These technological applications are highly consistent with the core concepts of the multi-subject co-governance model, namely equality, democratization, collaboration, and transparency. In the era of artificial intelligence, introducing the concept of technological governance into the multi-subject co-governance model of higher education helps to improve the effectiveness of higher education governance.

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Firstly, technological governance can enhance the scientificity and precision of the multi-subject co-governance model through a data-driven decision-making mechanism. In the traditional governance model, decisions often rely on empirical judgment or limited data support, which easily leads to decisions deviating from actual needs. In the framework of technological governance, artificial intelligence technology can accurately identify the short-boards in educational resource allocation, the differences in the needs of teachers and students, and society's expectations for higher education through the analysis of massive educational data. For example, by analyzing students' learning behavior data, curriculum settings and teaching methods can be optimized; by analyzing employment market data, professional settings and talent training objectives can be adjusted. This data-driven decision-making mechanism can not only improve the scientificity of decisions but also ensure that decisions are closer to the actual needs of multiple stakeholders, thereby enhancing the precision and effectiveness of governance.

Secondly, technological governance can improve the collaborative efficiency of the multi-subject co-governance model through an intelligent resource allocation mechanism. In the traditional governance model, resource allocation often depends on administrative instructions or manual distribution, which easily leads to resource waste or inefficient use. In the framework of technological governance, artificial intelligence and the Internet of Things technology can achieve intelligent resource allocation and dynamic adjustment. For example, through intelligent algorithms to analyze the scientific research needs of universities and the supply of social resources, scientific research resources can be accurately matched; through the Internet of Things technology to monitor the usage of teaching facilities, teaching resources can be efficiently dispatched. This intelligent resource allocation mechanism can not only avoid resource waste but also give full play to the resource advantages of each stakeholder, forming resource complementarity and collaborative effects, thereby improving the overall efficiency of governance.

Thirdly, technological governance can enhance the credibility and sustainability of the multi-subject co-governance model through a transparent supervision mechanism. In the traditional governance model, the supervision mechanism often relies on internal reviews or limited public participation, which easily leads to the supervision being mere formality or lacking transparency. In the framework of technological governance, blockchain technology can ensure the transparency and immutability of the governance process. For example, by using blockchain technology to record the flow and use of educational funds, the public transparency of fund use can be ensured; by using blockchain technology to record the decision-making process and implementation results, the fairness and traceability of the governance process can be ensured. This transparent supervision mechanism can not only effectively avoid the abuse of power and corruption but also enhance the credibility and sustainability of governance, thereby improving the overall governance effect.

Finally, technological governance can enhance the inclusiveness and innovation of the multi-subject co-governance model through a multi-stakeholder collaborative cooperation mechanism. In the traditional governance model, the participation of multiple stakeholders is often restricted by time, space, and information, making it difficult to achieve efficient collaborative cooperation. In the framework of technological governance, cloud computing and collaborative platform technology can enable real-time interaction and collaborative cooperation among multiple stakeholders. For example, through the cloud computing platform, the government, universities, teachers and students, and social stakeholders can share educational data and governance information in real-time; through the collaborative platform technology, multiple stakeholders can jointly participate in decision-making, resource allocation, and supervision and evaluation. This collaborative cooperation mechanism can not only break the time and space limitations of the traditional governance model but also stimulate the innovation vitality of multiple stakeholders, thereby promoting the continuous optimization of higher education governance.

4.3 Standardize the use of technology to resolve technological dependence

On the positive side, the integration of the concept of technological governance can significantly enhance the governance efficiency of the multi-subject co-governance model. The data-driven decision-making mechanism and the intelligent resource allocation mechanism can improve the scientific nature and efficiency of governance, ensuring the precise allocation and efficient utilization of educational resources. Through information sharing and collaborative cooperation, the connection between universities and social entities becomes closer. The transformation of scientific research achievements and the efficiency of social services are enhanced. Universities can better respond to complex social needs and industry changes, and cultivate more competitive talents. In addition, technological governance can also enhance the transparency and democratization of governance, reduce power abuse and decision-making errors, and increase public trust in higher education.

However, the empowerment of technological governance may also bring some negative impacts. For example, over-reliance on technological governance may lead to the "de-humanization" of governance, ignoring the humanistic care and ethical considerations in education, and causing higher education to gradually become mechanized and stylized. Secondly, technology dependence may also widen the digital divide. Some universities or social entities may be unable to effectively participate in governance due to insufficient technological capabilities, resulting in technological discrimination and the loss of educational fairness. In addition, the use of big data platforms may involve the privacy leakage of teachers, students, and social entities, and the application of blockchain technology may face challenges in data storage and data security. To avoid the potential adverse effects of technological empowerment in higher education governance, the following preventive measures can be taken.

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First, the multi-subject co-governance empowered with technology should emphasize both technicality and humanity. With the rapid development of artificial intelligence technology, higher education governance increasingly relies on data analysis and intelligent algorithms, which is prone to excessive technology dependence, de-humanization of decision-making, and the lack of humanistic care. Therefore, in the innovation of higher education governance in the era of artificial intelligence, a governance concept of "emphasizing both technicality and humanity" must be established, and humanistic care and social responsibility need to be introduced in technology application. On the one hand, enhance the human-centered consideration in decision-making. Build a "human-machine collaboration" decision-making mechanism, integrate humanistic care and individual differences into data-driven decision-making, and ensure that the final decision is controlled by humans. At the same time, promote the participatory governance model in higher education, encourage different stakeholders (such as students, teachers, industry representatives, etc.) to participate in the decision-making process, and ensure that decisions reflect diverse perspectives and needs. On the other hand, ensure the fairness of governance results. Establish a special review mechanism to regularly evaluate and adjust AI algorithms to avoid potential algorithmic biases. Use diverse data sets in algorithm training to ensure that groups with different backgrounds and characteristics are covered. Make the basis of algorithmic decisions public to all stakeholders so that users can understand how algorithms affect the results. Establish user feedback channels to encourage vulnerable groups to express their experiences and needs in technology use.

Second, the multi-subject co-governance empowered with technology should balance materiality and normativity. Data serves as the prerequisite and foundation for higher education governance in the era of artificial intelligence. To achieve comprehensive data collection, in-depth analysis, and effective supervision, it is necessary to first build a sound physical infrastructure and create a digital governance space. This includes deploying a high-performance network environment, expanding the coverage of network bandwidth, and ensuring the stable connection of various devices to support large-scale, multi-scenario, and multi-modal data collection. Internet of Things (IoT) and smart devices should be introduced into universities. Through IoT devices, intelligent management of classrooms and laboratories can be realized. By connecting smart security devices, campus safety can be enhanced, and functions such as pedestrian flow monitoring and automatic alarm for abnormal events can be achieved. A safe and efficient intelligent governance platform should be constructed for data storage, analysis, and sharing, which can support large-scale computing requirements and resource integration. In addition, it is equally important to break the "information silo" dilemma by formulating normative systems and standards. A team composed of the government, universities, enterprises, and data experts should form a systematic and complete institutional mechanism around the technical and management standards of educational data and resources. A mechanism for the standard implementation and supervision of various systems should also be established to strengthen execution and supervision, and effectively ensure the consistency and accuracy of the internal and external use and exchange of educational data and resources.

Third, the multi-subject co-governance empowered with technology should combine openness and security. The Internet organizational structure and big-data-driven artificial intelligence systems are attracting and gathering more and more stakeholders in an open manner, and stakeholders participate in higher education governance through group collaboration and collective wisdom. At the same time, it also faces the problem of how to handle and protect the data privacy and security of stakeholders. Therefore, in the innovation of higher education governance in the era of artificial intelligence, a higher education governance model that "combines openness and security" must be promoted, and four-fold guarantees for data privacy and security need to be strengthened. One is to establish and improve laws and regulations on data privacy protection, clarify the norms for data collection, storage, processing, and sharing, and protect users' privacy rights. Two is to use encryption technology in the process of data storage and transmission to ensure the security of user data. At the same time, implement data anonymization processing to reduce the risk of personal information leakage. Three is to introduce advanced security technologies, such as blockchain and artificial intelligence monitoring systems, to monitor data usage in real-time and identify and prevent security threats in a timely manner. Four is to carry out data privacy and security education to improve the awareness of teachers, students, and stakeholders about data security and help them understand their rights and responsibilities.

5. CONCLUSION

In China, higher education governance has generally gone through three stages: the period of "government leads universities in higher education governance" (1949-1997), the period of "government partially empowers universities in higher education governance"(1998-2011), and the period of "government-university collaborative governance in higher education"(since 2012). After 75 years of development, China's higher education governance has formed its own unique development path. However, there are also many problems: excessive government intervention in education management restricts the autonomy and personalized development of universities; neglecting the participation of teachers and students in governance leads to a lack of innovation vitality in higher education; and ignoring the collaborative governance of social subjects weakens the social function of higher education. In view of this, the author proposes to establish a "multi-subject co-governance" model to achieve the democratization, scientification, and high-efficiency of higher education governance. In the era of artificial intelligence, integrating "technological governance" into higher education governance can not only improve the scientific nature, efficiency, and transparency of the

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governance, but also enhance the credibility, inclusiveness, and innovation of the governance. In order to avoid the potential adverse effects of "technological dependence", the author also proposes that in the process of in-depth integration of technological governance and multi-subject co-governance, a balance should be struck between "technicality and humanity", "materiality and normativity", and "openness and security". The technology-empowered multi-subject co-governance model provides a new governance logic and tool for China's higher education.

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