Technology Governance: an Analytical Framework for the Classified Development Model of Provincial Colleges and Universities — Taking Henan Province as an Example*

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Abstract—**According to the strategic deployment of the Central Party Committee, the State Council and the Ministry of Education, in the next few years, the main tasks of colleges and universities nationwide are as follows: optimizing the structure of higher education, running distinctive universities and exploring the classification system of higher education. Therefore, this paper proposes the idea of higher education technology governance in Henan province based on the classification development model.**

Keywords—classification development; technology governance; higher education

I. INTRODUCTION

In the report of the 19th National Congress of the Communist Party of China, Xi Jinping emphasized that "building a strong educational country is the basic project of the great reviving of the Chinese nation. We must make education a priority, accelerate the modernization of education, and run a satisfactory education for the people." In fact, the "National Medium and Long-Term Education Reform and Development Plan (2010-2020)", released on July 29th, 2010, also emphasized that "higher education should optimize its structure and develop its own characteristics. Besides, it should combine the modern university system with Chinese characteristics, and carry out reform in modern university system." On January 25, 2017,

the Ministry of Education's Opinion on the Setting up of Higher Education Institutions during the 13th Five-year Plan Period (Teaching [2017] No. 3) pointed out that the aim is to explore and establish higher education classification system. It also aims to guarantee the guidance of higher education scientific orientation, the guarantee of their position, the development of their connotation and distinctive features by comprehensively improving the quality, structure, and personal training of higher education.

Henan, the central plains of China, has nurtured thousands of years of civilization. It is one of origins of Chinese civilization, but it has become a small and backward province in modern higher education. Its progress could not match with its status of being a populous and economic province. The history and current situation of different countries and regions show that if Henan Province wants to become a strong economic, scientific and technological province, it must become a strong province of higher education first. However, according to the resource-based theory [1], the current higher education resources in Henan Province could not make Henan a strong higher educational province. Therefore, the Henan Provincial Government actively followed the requirements of the National Development and Reform Commission, the Ministry of Education and other governmental ministries, and proposed the general idea of developing provincial universities by classifying, evaluating, guiding, and appropriating, and divided them into high-level comprehensive universities, university with distinctive majors, applied technology universities, and higher vocational colleges. It is expected to focus on the guidance and financial support on the basis of

classification, which could promote the universities' connotation construction, quality and level, solve education asymmetry problems and realize the dream of becoming a strong educational province.

How to implement the above classification development objectives? Where are the university classification criteria from? What kind of data does each provincial university rely on in the process of classification? How to make a budget and allocate financial funds for each type of university? These problems are rarely studied in existing documents. This study will focus on the discussion based on the aspects of technical governance and economic governance. Look forward to bringing more ideas.

II. Domestic and Foreign Research Status

Technical governance means that the governments use the methods of quantification and indexation to achieve its management objectives in the economic and social fields (Su Yongjian, 2017) [2]. Research on technology governance is scattered across all aspects of social governance. The principle of technical governance proposed by government is to balance technology empowerment with technical supervision and enhance the resilience and load of the system. However, the best technology governance system should be the simultaneous innovation of technology and system (Zhang Bingxuan, 2018) [3]. Typical institutionalized technical governance includes "Target Responsibility System", "Multiple Quantitative Indicators", "Performance Evaluation", "Competition Mechanism" and "Project System". Especially under the framework of emerging technology governance, the procedures and environment for public deliberation should be established (Chen Yu, Ding Kun, 2018) [4]. "The Project 211", "The Project 985", the Undergraduate Teaching Evaluation which are carried out by China's higher education in the past 20 years, and the "National Data Platform for Quality Monitoring of Higher Education" carried out in recent years are successful models under this system. HOECHT A (2006) found that trust, control, accountability and professional autonomy are effective means of quality governance in higher education in the UK [5]. In recent years, university rankings have also become one of the technical methods in which the public participates in the governance of higher education. It has brought widespread attention in the society and includes both advantages and disadvantages. Ali C. Tasiran (2011) and G Harman (2011) believed that university rankings can improve the quality of higher education, but at the same time it is easy to lead it to an unhealthy direction [6, 7].

III. Theoretical Basis

A. The Principal-agent Theory

The principal-agent theory created by scholars such as Wilson (1969), Spence and Zeckhauser (1971) is an important theoretical analysis tool in the new institutional economics. It is used to analyze the inconformity and information asymmetry and to realize the incentive and supervision mechanism between the client and the agent. Although the principal-agent theory is mostly used to study

the interests and coordination of the company's ownership and management rights, it exists in colleges and universities when they implement the classification development policy [8]. During the implementation, relevant beneficiaries such as students and parents, governments, provincial colleges and universities have conflicts due to different interests and information asymmetry, competitions therefore exist, each of them will analyze others to benefit themselves. David Easton believes that the state legally allocates the value of the whole society through public policy, and the government integrates and balances the interests of the relevant subjects according to the national interest in the distribution process. There is no exception when universities implement this policy. This paper will use the principal-agent theory to analyze the principal-agent relationship between the governments and the schools, and the technical governance and economic governance problems.

B. Technology Governance

According to Weber (1978), China has successfully applied the Confucianism to control the country's morality for thousands of years, but nowadays, it has gradually become less useful. Instead, a technological governance model characterized by measurement plays a more important place. The root of modern China's backwardness is due to using of morality governance when western countries develop and implement the technology governance (Huang Renyu 1997) [9]. The technical governance method mentioned by Huang Renyu refers to the informatization of management (1997), that is, under the bureaucratic system, the lower level of information can be reproduced and reported to the upper level, and the upper policies can be transmitted to the grassroots timely and accurately, so it can effectively solve the problem of information asymmetry between the upper and lower levels. Huang Renyu believes that computability is the core of information management, emphasizing that all the private and public should be digitized, calculated and rational decided. The computability, efficiency, assessment and controllability are typical features of information management (Rizel 2014). Information management is governed by pre-established processes or rules, eliminating irrational and emotional factors (Weber 2010).

C. Informatization

The essence of information management is the informatization of social governance. It digitizes the processes and results of various social management activities, and realizes information collection, distribution, calculation, analysis, scientific prediction and decision-making through the network. Taking China's poverty alleviation and development in the past 3 decades as an example, in the process of poverty alleviation and development, the central government transmitted the tasks to the lower level department. When it is implemented at the grassroots level, there is a serious information asymmetry problem, which leads to deviations in policy implementation and is hard to meet the original intention of the policy. However, since the implementation of precise poverty alleviation in 2016, Policy designers considered to establish file card system, digitized

the governance object, process and effects, and decomposed the tasks into 26 indicators. By using the annual assessment, the policy designers evaluate whether the supporting department has completed the task, and effectively solve the problem of information asymmetry between the policy maker, the principal and the execution agent. This digital governance technology, which is constructed and implemented layer by layer from the grassroots society to the upper governments, helps the Party Central Committee to achieve a precise poverty alleviation in the village and individual family, which fully demonstrates the advantages of information technology governance.

D. The Third-party Evaluation Mechanism

Another effective method of technical governance is to set up a third-party evaluation mechanism. Starting from the Third Plenary Session of the 18th Central Committee of the Communist Party of China, the government began to explore the marketization direction of certain services and management affairs. One of the market-oriented examples is the government's assessment to higher education institutions, where the independent third-party evaluation mechanism is introduced [10]. Higher education does not need to repay government financial investment, which leads to inefficient allocation and supervision of higher education resources. To some extent, it has promoted the arbitrariness and blindness use of educational financial funds. In Western countries, education funds are often evaluated and supervised by third-party agencies, such as consulting firms and accounting firms, which are independent of the financial or educational authorities and higher education institutions. For example, Canada, the United States, the United Kingdom, France, Germany, Australia, the Netherlands, New Zealand and other countries have done a good job in this field. The performance evaluation results of third-party organizations provide important data for the government's policy formulation, financial funds allocations, and management in universities. Besides, it also plays an important role in promoting the university fairness and efficiency.

IV. TECHNICAL GOVERNANCE IN THE PROVINCIAL UNIVERSITIES ON THE BASIS OF THE CLASSIFICATION MODEL

A. The Principal Agent

In the process of implementing the classification policy, there is a one-to-many principal-agent relationship between the government and the provincial universities; it therefore leads to inconsistencies and information asymmetry between the principal and the agent. The government who represents the public and national interests hopes that the decision and action of the provincial universities shall be consistent with the classification development objectives; however, the provincial university leaders who act as agents prefer to maximize their own interests within the framework. At the same time, there is also information asymmetry between the government and provincial universities. For example, the information on the universities' majors and subjects are not known to the government. It is hard for the government to go

deep into the universities and deal with certain matters agreed by the two parties. In addition, the supervision cost is too high, which may cause some provincial universities to deviate from the previous agreed development goals, so universities could achieve their own interests without being monitored by government.

B. Improving the Information Management Level

As for how to use technical governance method to solve the problem of information asymmetry in the implementation of classification development policy, one effective method is to use higher education informatization. Building a university information collection system and regularly obtaining information on provincial teaching quality, discipline and subject construction, and faculty allocation will become the best practice of technical governance. The construction of the National Data Platform for Quality Monitoring of Higher Education (hereinafter referred to as the National Data Platform) is a successful application case. The Ministry of Education has jointly developed a national data platform with Sun Yat-sen University to achieve the goal of monitoring higher educational teaching quality, promoting the intensive development of higher education, improving the quality of talents, and establishing a five-in-one higher education quality assurance system. Each university needs to report the educational quality data of the previous academic year in November. Through the national data platform, the Ministry of Education collects 7 types of basic school information, such as school conditions, faculty and staff information, subjects and majors, talent training, student information, teaching quality management and supervision which are related to the basic teaching status of higher education institutions.

C. Using Big Data Platform

The national data platform has powerful data analysis, statistics and report generation functions to meet the needs of different users. The service includes providing service to the public, helping the public know the objective information of higher education, supervising the quality of personal training to serve the country; realizing the routine monitoring of the educational quality, improving the scientific and effective policy formulation; serving the local education management department, improving the regional quality assurance system for higher education, making a well-directed standard and policy; serving higher education institutions, helping higher education institutions establish undergraduate quality monitoring mechanisms, promoting the construction of informatization of university management, and improving the scientific management and decision-making. Therefore, the provincial education departments and other relevant administrative departments should make full use of the national data platform to obtain basic classified information of provincial universities. On this basis, it needs to determine the classification criteria and development goals, make appropriation and budget according to the development needs of each type of school, so each type of university and each university has a clear guideline to prioritize their key fields and breakthrough their inexperience fields.

D. Improving the Third-party Evaluation Mechanism

The third-party evaluation mechanism as shown in "Fig. 1" is the second effective mechanism for the technical management of higher education classification. The third-party evaluation agency is an intermediary service organization that is independent of the government, financial departments and so on. It has no economic interest with higher education institutions. In the third-party evaluation model, the first party is a higher education institution, which is the user of education financial funds. It should use the educational financial funds effectively, which is the object of the evaluation (the evaluated); the second party is the financial department and education department that represents the government, which is the investor of education funds and the evaluation subject (the client); the third-party evaluation agency is the specific implementer (the evaluator) of the evaluation activity, as the "referee", who objectively, fairly and independently evaluates the efficiency, effectiveness and effects of the use of higher education funds, forming a triangular relationship with the client and the assessed person, effectively eliminating the interests of the stakeholders, and avoiding the double identities for both being an "athlete" and a "referee" [4], enhancing the authority of the evaluation results. At the same time, in the process of evaluation, the third-party professional evaluation agencies will make full use of their own professional knowledge and technology, design a more comprehensive and objective indicator system, and adopt more abundant evaluation approaches to evaluate parents, students and employers, and enhance the scientificalness of evaluation.
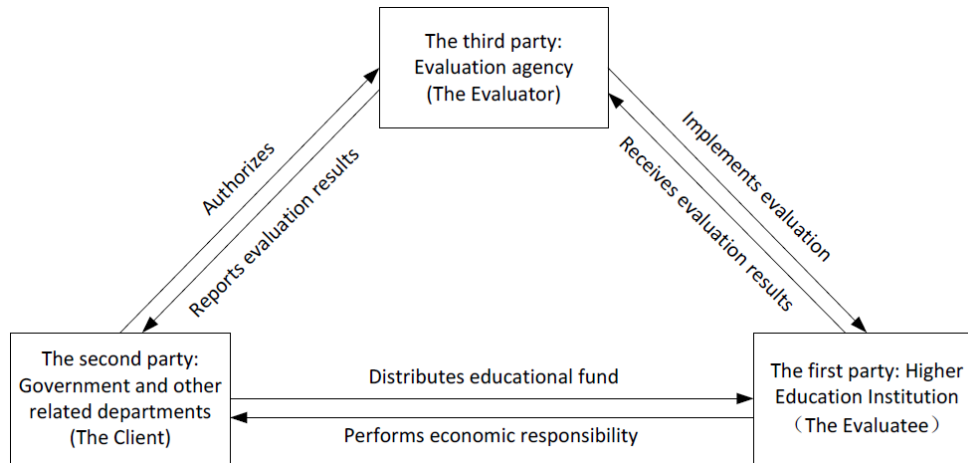

Fig. 1. Third-party evaluation model.

E. Flexible Use of Dynamic Adjustment Mechanism

The dynamic adjustment mechanism is also an important part of the technical governance. In order to avoid losing motivation due to non-changeable identity (non-changeable classification), a dynamic adjustment mechanism should be adopted in the process of implementing the classification mechanism. The dynamic adjustment should follow the following principles: first, it needs to obtain the university performance information from the National Data Platform. Second, it needs to obtain the university performance information from third-party evaluation agencies. By Combining the information from these two sources, and adjusting the classification of colleges and universities every five years, universities could be motivated and overcome the "pessimistic and negative" sentiment, continuously optimize the development goals and structure of provincial universities, and train more qualified people for local economic development.

V. CONCLUSION AND SUGGESTION

Based on the principal-agent theory, the thesis mainly discusses the technical governance problems of provincial colleges and universities under the classification development mode. The construction of informatization, the introduction of third-party evaluation mechanism and the staged dynamic adjustment mechanism are the main means of technical governance.

Different from the project "211", project "985" and "Double First-class Initiative", even though each type of colleges and universities under the classified development model emphasis on different aspects, they all need balanced development. All four types of colleges and universities need to receive enough financial support. The classification mode should adhere to the principles of overall planning, classification support, independent development, and should be implemented gradually and be achieved in different years. The overall plan requires the Henan Provincial Development and Reform Commission, the Education Department and the Department of Finance to work together to develop a practical five-year plan for classified development. Each university has to make its own five-year development plan. Education Department and the Department of Finance need to support the four types of universities in terms of policy and finance. Independent development requires less interference with the internal affairs from administrative department. We need to fully believe that universities can develop independently according to the established policy. The annual implementation requires that the administrative department and each university must have an annual development plan, annual budget, financial support plan and measures.

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