

Academic Governance and Innovation Ecosystem in Chongqing: The Impact of Local Policies on R&D

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Abstract In order to improve the level of academic governance in Chongqing and build a good innovation ecosystem, this paper carries out correlation analysis from the perspective of local policies and research findings and obtains first-hand data in the form of questionnaires. Then, the internal relationship among academic governance, innovation ecosystem and overall development of R&D is found out, and the following assumptions are put forward. Academic governance in Chongqing can promote the improvement of the R&D level, and the innovation ecosystem is the objective environment for the development of R&D institutions in Chongqing University. Local policies, academic governance and innovation ecosystem are the influencing factors for the development of R&D institutions. The results show that academic governance and innovation ecosystem will promote the development of R&D, and local policies are the main influencing factors, which will play a directional role in the normal development of R&D. Therefore, local governments should formulate academic governance policies and create a good normal environment for innovation.

Keywords: • academic governance • innovation ecosystem • local policy • research and development • ecosystem

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1 Introduction

1.1 Background

Under the special background of China's implementation of the dual-track system of market and government resource allocation model, local policy support has become the key factor to promote local R&D development and improve local R&D performance. In order to obtain more R&D performance, regional governments have taken several approaches through policy measures, including building an innovation ecosystem on the one hand, and academic governance on the other hand, to create an environment that stimulates local R&D and improves local R&D performance. At the policy level, regional governments actively participate in and guide innovation activities by formulating regional strategies to promote the development of an innovative economy, promoting the construction of innovative cities and high-tech industrial development zones, increasing financial investment in science and technology, providing subsidies for innovative entities (Adebayo, 2023), and introducing preferential policies for innovation. Implementing this series of policies aims to create an innovation-friendly policy environment and provide strong support for local R&D. On the other hand, local governments have also taken effective measures regarding academic governance. Local governments are committed to standardizing R&D activities and improving the quality and level of R&D (Alkhaldi, 2023) by formulating clear academic policies, establishing a scientific evaluation mechanism, and establishing an academic dispute resolution mechanism. This academic governance instrument helps ensure transparency and standardization of the R&D process, thereby providing a more sustainable basis for innovation. Although local policy support is theoretically considered to be a key guarantee for the efficient operation of local R&D systems and the development of innovation activities, there is some controversy about its effectiveness. Some studies have shown that local policy support positively impacts local R&D performance. However, others have taken the opposite view. The existing empirical studies mainly focus on different local policy support methods, the impact of local policies on the heterogeneity of local R&D, and the influence of situational factors, emphasizing the nonlinear impact of local policy support (Allen, Berg, Lane, MacDonald, & Potts, 2023). In order to better understand the mechanism of local policy support, it is necessary to explore its impact on local R&D performance. Therefore, this paper chooses Chongqing as the research area (Anthony, 2023) focuses on academic governance and innovation ecosystem in policy support, and conducts a detailed analysis of the impact of local policies on R&D through empirical research, in order to provide a more scientific and effective reference for the formulation of local policies in the future.

1.2 Research implications

It is of theoretical significance and practical reference value to clarify the important role of government policies in promoting local R&D development (Bérubé, 2023). First of all, based on China's innovative national strategic goals, local governments have formulated local R&D strategies according to local conditions, increased financial investment in science and technology, and improved the innovation environment, playing the role of guides, funders and service providers. This paper identifies two different roles of local policies in local R&D (Beyer & Schmitz, 2023), and selects Chongqing as the study area through quantitative analysis, and summarizes its evolutionary characteristics. This study is helpful in gaining an in-depth understanding of the role of local policies in promoting local R&D development in China and provides a basis for explaining whether local policy support is effective (Chatzigianni & Mallen, 2023), which is of practical significance for local policies to promote local R&D development. Secondly, a theoretical logical framework is constructed based on the influence of local policy support on local R&D performance in Chongqing, which has theoretical value for clarifying the paradox of local policy support in the current academic community (Collet-Sabé & Adrián, 2023). At the same time, the theoretical logical framework based on the influence path of local policy support on local R&D performance in Chongqing enriches the theory of the local R&D system. This is helpful to clarify the mechanism of local policy support and provide a reference for local policy formulation and implementation (da Silva, Bizarrias, da Silva, & Penha, 2023).

1.3 Purpose of the study

The purpose of this paper is to find out the problems existing in academic governance in Chongqing, to reveal the relationship between academic governance and local policies of the innovation ecosystem, and to study the impact of local policies of the academic governance ecosystem on the innovation and development of R&D institutions through questionnaires and then put forward effective countermeasures and measures to improve the level of academic governance (Brillo, 2023), promote the overall development of R&D institutions, and form a good innovation ecosystem. At the same time, it also provides theoretical support and case support for related domestic research and enriches the relevant content of academic governance in Chongqing.

2 Literature review

2.1 Academic governance

Academic governance encompasses a wide range of complex contents. First of all, in terms of the organization and management of the academic system, academic

governance aims to ensure that the academic institution's organizational structure and leadership system can function efficiently. By standardizing decision-making mechanisms and the division of responsibilities among leaders, academic governance can help improve the flexibility and adaptability of the academic system to better respond to the changing research environment. Second, academic governance emphasizes the ethical norms and codes of conduct of academic research, including the supervision of integrity and impartiality in the research process, to ensure that academic activities are not affected by misconduct (Dai & Xu, 2023). By establishing a transparent ethical framework, academic governance provides scholars with a clear code of conduct that helps maintain the reputation and trust of the academic community as a whole. In addition, academic governance is also concerned with the allocation and utilization of academic resources. Through the equitable distribution of research funds, experimental equipment, and library resources, academic governance promotes balanced development among various disciplines and research teams (Davidson, Wessel, Winter, & Winter, 2023). It helps to ensure that every researcher has access to adequate support to promote the sustainable development of the entire academic system. The perspective of the concept of academic governance, academic governance aims to establish a healthy academic ecosystem, through the efficient management of the organization, the emphasis on ethical norms and the fair distribution of resources, academic governance provides a good research environment for scholars, can help scholars stimulate innovation, improve academic quality, and promote the development of the academic community to a higher level (Ezechukwu, 2023).

2.2 Innovation ecosystem

An innovation ecosystem is a complex and interconnected network with a core component of corporations, entrepreneurs, investors, governments (Fussy, 2023), and other stakeholders. This vast ecosystem is designed to encourage innovation, foster collaboration, and drive sustainable development. In this close-knit network, all parties work together to bring about positive economic and societal change (Gonzales-Iwanciw, Karlsson-Vinkhuyzen, & Dewulf, 2023). In this ecosystem, entrepreneurs are the spark of change (Harris, Dowling, & Washington, 2023); they challenge tradition with new ideas and courage, and investors step in to fund innovation and help potential ideas proliferate. At the same time, governments, as regulators and policymakers (He, Xu, & Zhou, 2023), provide strong support for innovation by developing regulations and policies that support innovation. Companies play a vital role in the innovation ecosystem, and forming industry alliances strengthens collaboration between different organizations to solve industry challenges and achieve win-win results by establishing R&D departments (Hou, 2023), collaborating with research institutes, and continuously driving the evolution of technologies and business models. Education and talent development also play an important role in this network, with innovation education cultivating

forward-thinking and innovative skills, while talent exchange promotes the cross-border dissemination of knowledge and enables the integration of expertise in different fields. Digitalization and technology adoption is one of the driving forces of the innovation ecosystem, through which emerging technologies such as artificial intelligence and blockchain become catalysts for innovation. Data sharing also facilitates the flow of information and supports the incubation and development of new business models (Kaur & Kehal, 2023). Ultimately, the innovation ecosystem drives the emergence of new ideas, technologies, and business models through the synergy of many key players. It not only promotes economic prosperity (Kirschner, Clark, & Boustras, 2023) but also positively impacts society and achieves the goal of sustainable development. In this evolving ecosystem, the interdependence and complementarity of all parties form the driving force behind the entire system towards an innovative future (Kligyte, 2023).

2.3 Regional R&D performance

Regional R&D performance is a comprehensive evaluation index that aims to comprehensively consider the achievements and benefits of a specific region in terms of scientific research, technological innovation and knowledge output. First, scientific research output is a key component of a region's R&D performance, and the region's impact and level of innovation in the academic field can be objectively measured by assessing the number and quality of scientific research papers and the filing of relevant patents. Secondly, technological innovation occupies an important position in regional R&D performance (Kok & Shahgholian, 2023), and the region's technological innovation ability can be reflected through the launch of new products, the growth of the number of technology patents and the continuous breakthrough in the field of technology, which not only reflects the scientific and technological level of the region but also is directly related to the upgrading of the regional economic structure and the sustainable development of the industry. At the same time, R&D investment, as another important indicator of regional R&D performance (Liang et al., 2023), is directly related to the scale and depth of R&D activities, and a high level of R&D investment usually means more human, material and financial investment, which provides a sufficient guarantee for scientific and technological innovation, and there is a direct positive relationship between this investment and regional R&D performance. In addition, regional R&D performance also needs to consider the situation of industrial upgrading, whether a region can cultivate emerging industries and promote the technological upgrading of traditional industries, which are important aspects of evaluating R&D performance, and whether the success of industrial upgrading can not only promote the transformation of the regional economy, but also provide a broader development space for R&D. When evaluating regional R&D performance, the introduction and training of high-level talents is another aspect that cannot be ignored, and a high-level talent team is an important source of

power for R&D activities, which is directly related to the construction of regional innovation environment and the improvement of R&D performance. Finally, when examining regional R&D performance, it is also necessary to comprehensively consider factors such as intellectual property protection and international cooperation, as a good intellectual property environment can help stimulate innovation, while international cooperation can broaden regional R&D horizons and promote the internationalization of scientific research results (Liang et al., 2023). Generally speaking, regional R&D performance is a multi-dimensional and comprehensive evaluation index, which needs to comprehensively consider scientific research, technological innovation, R&D investment, industrial upgrading, talent introduction and training, and other factors. Only when synergistic results are achieved in these aspects can regional R&D performance be improved in an all-round way.

2.4 Linkages between academic governance, innovation ecosystems, and regional R&D performance

Referring to previous studies, there is a close interrelationship between academic governance, innovation ecosystems, and regional R&D performance, which together form a comprehensive framework for promoting innovation and improving R&D performance.

The impact of academic governance on regional R&D performance. Academic governance involves the formulation and implementation of research policies, the establishment of evaluation mechanisms, and the resolution of academic disputes. A sound academic governance system helps to regulate R&D activities and improve the quality and level of research. Through clear academic policies, regions can guide research directions and optimize the allocation of research resources, thereby influencing the direction and quality of regional R&D. The role of innovation ecosystems in promoting regional R&D performance. The innovation ecosystem includes multiple participants such as governments, enterprises, academic institutions, and entrepreneurs, and collaborates with each other to form an environment conducive to innovation. In this system, all parties work together to promote scientific and technological innovation and R&D activities. A good innovation ecosystem can help provide resources, build partnerships, and stimulate innovation, directly contributing to the region's R&D performance—the interaction between academic governance and the innovation ecosystem. There is a strong interaction between academic governance and the innovation ecosystem. Academic governance influences and guides the behavior of all parties in the innovation ecosystem by formulating clear policies and establishing evaluation mechanisms. At the same time, the health of the innovation ecosystem in turn affects the role of academic institutions, researchers, etc., in academic governance. The two complement each other and form a mutually reinforcing cycle. The overall impact of the innovation ecosystem on

regional R&D performance. The innovation ecosystem is not just a framework, it has a direct overall impact on regional R&D performance. Through the construction of innovation ecosystems, regions can promote knowledge flow, technology transfer, resource sharing, and the formation of innovation chains. This will help improve the overall level of R&D in the region, and promote industrial upgrading and commercialization of innovative results. In summary, a complex and interrelated network of relationships between academic governance, innovation ecosystems, and regional R&D performance has formed. Academic governance regulates research activities through policies and institutional construction, and innovation ecosystems provide the soil for innovation through the synergy of all parties, which together shape the pattern of regional R&D performance. This comprehensive framework helps to create an environment conducive to innovation and R&D and promotes the continuous development of the region in the field of science and technology.

3 Method

3.1 Research subjects

In this paper, 300 people from universities in Chongqing were surveyed. Among them are 195 teachers, 20 students, 45 administrative staff, 25 government agencies, and 15 experts. A total of 300 questionnaires were distributed, with a recovery rate of 297 and a recovery rate of 99 per cent. 1 questionnaire was missing, 1 questionnaire was incomplete, and 1 questionnaire was duplicated. All questionnaires were sent to experts for scoring to test the reliability and validity of the questionnaires. The questionnaire was divided into three parts: explanatory variables, explanatory variables and control variables. The explanatory variables were: the amount of innovation patents and local support policies, the explanatory variables were academic governance and innovation ecosystem, and the control variables were scientific research expenditure, the level of theory transformation and the cost of innovation. Each variable was measured on a 5-point scale, with 1 = agree, 2 = fully agree, 3 = very agree, 4 = very much agree, and 5 = completely agree. Table 1 shows the test results of each indicator. All respondents were randomly selected this year, and the inclusion criteria were cadres with intermediate titles or above, deputy section level or above, and the exclusion criteria were those who refused to complete the survey, those who gave up halfway, and those who did not cooperate. All investigators signed an informed consent form and completed the relevant investigation according to the process. The content of the questionnaire is divided into three aspects, and the questions are mainly set based on hypothetical content. Hypothesis 1: Academic governance in Chongqing can promote the improvement of R&D level, Hypothesis 2: Innovation ecology is the objective environment for the development of R&D institutions in Chongqing University, and Hypothesis 3: Academic governance in Chongqing can promote the improvement of R&D level, and local policies,

academic governance and innovation ecosystem are the influencing factors for the development of R&D institutions. At the same time, set the corresponding variables according to the assumptions, as shown in Table 1.

Table 1: Select variables

Variable type	The name of the variable	Denote
Hypothesis 1	The number of innovative patents	TEC
	Local support policies	HER
Hypothesis 2	Academic governance	INN
	Innovation ecosystem	SEC
Hypothesis 3	Expenditure on scientific research	EDU
	Level of theoretical transformation	CPI
	The cost of innovation	TEC

The contents of the questionnaire were all fed back by experts, and the reliability and validity were both greater than 0.7, and the overall results were good, as shown in Table 2.

Table 2: Reliability and validity of questionnaire

Variable type	The name of the variable	Reliability	Validity
Hypothesis 1	The number of innovative patents	0.77	0.81
	Local support policies	0.82	0.78
Hypothesis 2	Academic governance	0.79	0.80
	Innovation ecosystem	0.78	0.83
Hypothesis 3	Expenditure on scientific research	0.81	0.78
	Level of theoretical transformation	0.78	0.82
	The cost of innovation	0.77	0.81
Overall reliability = 0.79			
Overall validity=0.80			

The regression equation between the individual indicators is shown in Equation 1.

$$\ln \text{pat}_{i,t} = A + \alpha_{i,t} \ln \text{aca}_{i,t} + \beta_{i,t} \ln \text{inn}_{i,t} + \lambda_{i,t} \ln \text{sec}_{i,t} + \rho_{i,t} \ln \text{edu}_{i,t} + \mu_{i,t} \ln \text{CPI}_{i,t} + \varepsilon_{i,t} \quad (1)$$

The following table shows the expressions of each variable. *i* represents the region, only Chongqing, *t* represents the year, and ε represents its error term.

3.2 Descriptive statistics

A total of 300 questionnaires were distributed in this paper, all of which were recovered, mainly because the questionnaires were distributed 1-to-1, and the questionnaires were filled in by the transfer guidance, so all the questionnaires were collected. The questions in the questionnaire are 1~5 points, the higher the

score, the more serious the problem, and the overall result of the questionnaire score is shown in Table 3.

Table 3: Descriptive statistical analysis

Variable	Definition	Number of observations	Average value	Standard deviation	Minimum	Maximum
TEC	Local support policies	300	-5.360	1.340	-8.592	-1.811
HER	Academic governance	300	2.381	2.083	-3.779	6.631
INN	Innovation ecosystem	300	-1.303	0.695	-3.074	0.040
SEC	Expenditure on scientific research	300	-2.091	0.247	-2.853	-1.292
EDU	Level of theoretical transformation	300	-4.014	0.279	-4.846	-3.395
CPI	The cost of innovation	300	1.023	0.015	0.977	1.063

As shown in Table 3, the mean value of the number of innovation patents is 1.539, and the standard deviation is 1.111, indicating that the data are relatively discrete. The average value of local support policies is -5.360, and the standard deviation is 1.340, which reflects that the overall trading volume of the technology market is in the negative range, indicating that there may be some disadvantages. The mean of academic governance is 2.381, and the standard deviation is 2.083, indicating that the average level of management and governance in the academic field is 2.381, but the data is relatively widely distributed. The mean value of the innovation ecosystem is -1.303, and the standard deviation is 0.695, indicating that the overall level of the innovation ecosystem is low. The average value of scientific research expenditure was -2.091, and the standard deviation was 0.247, indicating that the overall level of government financial support was low, and the data distribution was relatively narrow. The mean value of EDU was -4.014 and the standard deviation was 0.279, indicating that the overall level of government promotion in education was low. Finally, the mean value of CPI is 1.023, and the standard deviation is 0.015, which is less varied.

4 Regression analysis and discussion of results

For the results of this study, the evaluation of the results is mainly to calculate the stochastic validity of each result, as well as the stability of the results.

4.1 Selection of fixed and random effects

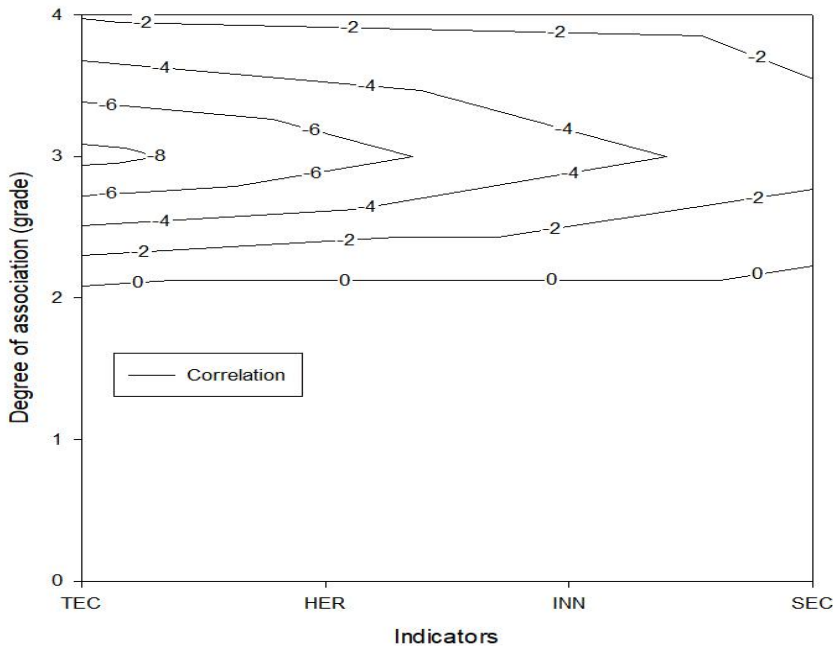
The stability of the results is whether each factor is the main factor, the normal influence of the judgment factors, and the random validity, mainly to sample the random effect, to avoid abnormal factors, to ensure the overall effectiveness of the results, the specific results are shown in Table 4.

Table 4: Selection of fixed and random effects

Test method	Chi(2)	p-value	Model selection
Hausman	78.44	0.00001	Fixed-effect model

As shown in Table 3 below, the Chi(2) test verifies the relationship between the two variables, while the Hausman test compares random-effect and fixed-effect models. Based on the test results, the Hausman p-value was 0.0000, indicating that the probability of rejecting the null hypothesis in the Hausman test was very low, indicating that the fixed-effect model was more suitable for the data. The relevant changes in the different indicators are shown in Figure 1.

Figure 1: Correlation changes between different indicators



The results in Figure 1 show that the correlation between the different indicators shows positive and negative variations, and the overall result is 0, indicating that there is no correlation between the indicators. Among them, there is a strong positive and negative correlation between HER, INN and TEC, indicating that there is a correlation between the three indicators in terms of data structure, mainly because the three indicators have a strong impact on the R&D of Chongqing University, which is the key indicator of concern.

4.2 Analysis of the impact of local policies on R&D

Table 5: Analysis results of the impact of local policies on R&D

Model	1	2	3	4	5
TEC	1.187*** (5.04)	1.315*** (5.07)	1.206*** (4.78)	1.190*** (5.02)	1.285*** (5.34)
HER	4.133*** (5.17)	1.322* (1.83)	1.162* (1.66)	4.153*** (5.16)	4.470*** (5.47)
INN	7.747*** (4.02)	8.909*** (4.33)	6.431*** (3.48)	-53.206*** (- 3.64)	-
SEC	-22.755*** (- 6.42)	-23.109*** (- 6.48)	-24.096*** (- 6.64)	-	-
EDU	0.323** (2.21)	0.366** (2.33)	0.141 (0.99)	-	-
CPI	-81.341*** (- 4.21)	15.992*** (3.02)	-0.944 (-0.06)	-85.050*** (- 4.29)	-
F	47.55	60.01	42.38	55.27	50.91
R-sq	0.519	0.403	0.444	0.511	0.49
Individual fixed effects	YES	YES	YES	YES	YES

As can be seen from the data in Table 4, TEC as a key influencing factor shows a positive impact across all models, indicating that the number of innovation patents increases at a higher level of academic governance, which means that among local policies, policies conducive to academic governance help promote R&D. HER also showed a positive impact in all models, indicating that a better innovation ecosystem would promote technological innovation and patent generation, reflecting that local policies that favor the innovation ecosystem also have a positive impact on R&D. Among the control variables, INN has a positive impact on innovation in the first three models, but has a negative impact in models 4 and 5, indicating that fiscal expenditure has a positive effect on innovation at a moderate level, but has a negative effect in too many cases. SEC showed a negative effect across all models, suggesting that increasing the level of theory transfer would lead to a decrease in the number of patents granted, which involved other factors related to the level of education, such as brain drain or changes in employment structure, which are not discussed in detail in this paper. CPI positively impacts innovation in models 1 and 2, but has no significant impact in

model 3, suggesting that higher consumer price levels can help stimulate technological innovation to a certain extent.

4.3 Discussion of empirical results

From the empirical analysis of Chongqing, academic governance and innovation ecosystem, as key influencing variables, have a significant positive impact on the explanatory variables in different models, which undoubtedly indicates that the positive impact of effective local policies on R&D performance has been empirically confirmed. At the same time, in the scientific research expenditure, theory transformation level and innovation cost as control variables, except for the level of theoretical transformation, there is no obvious positive effect, and the other two positively impact the R&D performance of the explanatory variables. At the same time, the intrinsic linkages between academic governance, innovation ecosystems, and regional R&D performance mentioned above have also been empirically clarified. Therefore, the results of this paper are summarized in Table 6.

Table 6: Summary of study results

Variable type	Denote	Outcome
Hypothesis 1	TEC	Establish
	HER	Establish
Hypothesis 2	INN	Establish
	SEC	Establish
Hypothesis 3	EDU	Establish
	CPI	Establish
	TEC	Establish

From the summary of the results in Table 6, it can be seen that the results of this paper are reasonable, and the validity of the hypothesis in this paper is verified. Therefore, the local government and the academic structure of Chongqing University can formulate relevant measures based on the above results.

5 Discussion

5.1 Support from local policies can help improve R&D performance

Hypotheses 1 and 2 are true, indicating that local policies are the key to the development of R&D institutions, so relevant intervention policies should be improved. The significant improvement of local policy support on R&D performance highlights the strategic importance of local policies in local R&D. To ensure its effectiveness, it is necessary to clarify and refine the role of local policies in R&D. First, local governments should have a deep understanding of R&D needs and formulate more precise support policies to meet the R&D needs

of different fields and industries. Secondly, it is suggested that the implementation of the policy be strengthened, efficiency and operability in the process of policy implementation be ensured, and the role of local policies in promoting R&D performance be further improved. The positive policy guidance of academic governance and innovation ecosystem has also been verified to drive local R&D performance. In this regard, local governments should be more proactive in leading the way, especially in planning and constructing innovation ecosystems. Strengthen cooperation with universities, research institutions and other academic institutions, promote intellectual property protection and the transformation of scientific research achievements, and organically combine academic governance with innovation ecosystems to improve the overall R&D environment. In addition, by referring to the positive impact of scientific research expenditure and innovation cost, it is suggested that local governments should formulate differentiated policies according to local economic development models when promoting the construction of innovation ecosystems. This includes a more flexible allocation of fiscal expenditures and attention to residents' consumption status to form innovation policies with more local characteristics and differences and better guide R&D performance.

5.2 Create a reasonable innovation ecosystem

The establishment of hypothesis 3 shows that government guidance and an innovative ecological environment are the main aspects of R&D development, so the joint role of the two should be played. According to the empirical research in Chongqing, it is an effective means to promote the improvement of local R&D performance in order to improve the R&D performance of local regions and to lead the construction of an R&D environment with active local policies. As a service provider, the key for local governments is to give full play to the guaranteed role of the industry-university-research collaborative R&D system in the policy formulation and promulgation stage. Local governments can provide necessary software and hardware support for local R&D by focusing on infrastructure construction and service quality improvement, thereby creating a good R&D environment.

After the policy is promulgated, local governments need to focus on improving the quality and efficiency of services. On the one hand, this helps to reduce information asymmetry, make policy implementation more transparent and predictable, and improve the trust of enterprises and institutions in policies. On the other hand, improving service efficiency can help reduce institutional friction and enable R&D activities to be carried out more smoothly, thereby improving local R&D performance. In particular, since this study is based on the Chongqing region, it is necessary to promulgate corresponding policies according to local conditions and flexibly respond to the development needs of different regions in view of the differences between different regions. When building the R&D

environment, local governments should pay more attention to the differences between different regions in China and improve the inclusiveness and flexibility of construction so as to promote the development of local R&D. This includes taking into account the local industrial structure, scientific and technological level and development characteristics in a more differentiated manner in policy formulation, to ensure the effectiveness and universality of local policies.

6 Conclusion

Taking Chongqing as the research area, this study chooses to empirically analyze the impact of local policies on R&D from the perspective of academic governance and innovation ecology-related policies, and draws the following conclusions:

- 1) Government policy intervention and innovation ecosystem are the key influencing factors, which have a significant and positive impact on the development of R&D institutions in Chongqing University, indicating that local policies have a positive impact on R&D performance, and provide empirical evidence for the improvement of local policies.
- 2) The innovation ecological environment is also an important factor in R&D, which has a positive impact on R&D expenditure and innovation cost. Through the research of Hypotheses 1, 2 and 3, factors such as local policy, academic governance, and innovation ecosystems play an active role in the impact of R&D.

Therefore, local governments should strengthen policy formulation and create a good innovative ecological environment. There are also some shortcomings in this study, which are mainly reflected in the data collection and data processing, mainly because a large number of qualitative data cannot be effectively converted into quantitative data. Therefore, the collection of quantitative data will be increased in the future.

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