

Liangjiang New Area Led by Science and Technology and Talents: Education System Innovation and Industrial Transformation

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Abstract: Although Liangjiang New Area has achieved remarkable results in attracting scientific and technological innovation and high-end talents, there is still a lack of detailed research and specific cases on how to cultivate compound talents closely integrated with industry needs through the education system. To this end, this paper proposes a specific strategy study on the innovation reform of the education system and the regional industrial transformation in Liangjiang New Area under the leadership of science and technology and talents. This study first point out that the service guarantee mechanism for the introduction of talents in Liangjiang New Area has the problems of insufficient benefits and limited guarantee means. Then, from the perspective of science and technology and industrial development of Liangjiang New Area, this study found that the number of high-tech enterprises in Liangjiang New Area has increased sharply, traditional industries have been transformed, and emerging industries have emerged. Subsequently, this study proposes specific strategies for achieving innovation in the education system through innovative talent introduction and cultivation mechanisms, innovative evaluation mechanisms, coordinated development of talent chains and innovation chains, and school-enterprise cooperation, and for achieving industrial transformation through innovative investment attraction and talent introduction and cultivation mechanisms and cultivating the core competitiveness of new industries. Finally, the experiment collects data on the implementation of education policies related to Liangjiang New Area, the effects of talent introduction and training, and economic data related to industrial transformation to conduct specific research. The experimental results show that Liangjiang New Area has achieved certain results in talent introduction, education reform and industrial transformation. The role of industrial transformation in promoting economic development is particularly prominent in the path diagram, with a path coefficient of 0.80 ($p < 0.01$).

Keywords: education system; scientific and technological innovation; industrial transformation; teaching reform; regional development

1. Introduction

Although Liangjiang New Area has issued a series of policies for the introduction of innovative talents and education reform measures, in the specific practice process, the matching degree between the education system and industrial needs, the implementation effect of the policy, and the flow and retention of talents still need to be discussed in depth. Therefore, this paper aims to explore how to promote the industrial transformation of Liangjiang New Area through innovation in the education system under the guidance of science and technology and talents. First, this study analyzes the challenges and shortcomings of the current talent introduction and education system in Liangjiang New Area, and then explores how to promote the deep integration of education and industry through strategies such as innovative talent introduction and cultivation mechanisms, school-enterprise cooperation, and coordinated development of talent chains and innovation chains. Finally, through data analysis and case studies, the experiment evaluates the interactive relationship between educational innovation and industrial transformation, and provides a reference for Liangjiang New Area and other regions.

This paper first reviews the current situation and challenges of Liangjiang New Area in scientific and technological innovation and talent attraction and cultivation, and analyzes the matching problem between the education system and industrial needs. Next, this paper explores the key role of education

system innovation in promoting industrial transformation, focusing on the talent introduction and cultivation mechanism, school-enterprise cooperation model, and the coordinated development strategy of the talent chain and innovation chain. Subsequently, combining data analysis and case studies, this paper evaluates the interactive relationship between educational innovation and industrial transformation, and puts forward specific policy recommendations for the future development of Liangjiang New Area. Finally, the paper summarizes the main findings of the study and looks forward to future research directions.

2. Related Works

This paper conducts a literature review from the perspectives of comparative studies on education systems in different countries, educational innovation and policy impact, the development of education systems in Chile and South Korea, the application of digital technology in education, and theoretical research on scientific innovation and industrial transformation, in order to understand the solutions to the existing industrial transformation problems led by science and technology and talents. Kilag and Zarco compared the education systems of Finland and the Philippines and found that there were significant differences between the two countries in teaching policies, teacher quality and curriculum settings [1]. Akramovich pointed out that Uzbekistan has undergone tremendous changes in its demographic, economic and ecological environment in recent years, which has provided opportunities for transformation to an agricultural-industrial complex[2]. Aithal and Maiya collected and analyzed relevant data through systematic research, explored the global innovation development trends and their impact on education models, and particularly emphasized the importance of cooperation for innovation [3]. Dexqonov studied the preparation of future physical education teachers for creative activities and proposed the importance of scientifically organizing the content of physical education courses, modernizing the technical basis of organization, and determining future development directions [4]. Mukhtasar et al. proposed a similar study, focusing on the preparation of creative activities of future physical education teachers, the scientific organization of physical education curriculum content, the modernization of technological bases and innovation in development directions, which are aimed at social benefits and guide young people to integrate into social relations [5].

Bellei and Munoz explored the development of the Chilean education system since 1980. They argued that, although marketization and the national evaluation model were effective, they also had negative effects, and proposed policy recommendations to improve the quality of education, promote innovation, and reduce inequality [6]. Lee and Fanguy found through a qualitative case study of a top university in South Korea that although online exam monitoring technology appears to be a solution for fairly evaluating students' online learning performance, it actually reflects incorrect assumptions about educational fairness and authoritative teaching methods [7]. Jobirovich discussed useful means of reforming the educational system and mentioned the use of various forms of digital technology in the teaching process, while analyzing the difficulty of implementing digital technology [8]. Jiahui pointed out that the Guilin government approved the establishment of the Guilin Economic and Technological Development Zone in 2016. Although it has made certain achievements in human capital, industrial structure and financial support, it still faces problems such as high ecological and environmental risks, unbalanced park development, and a lack of high-quality enterprises and talents[9]. Deng used a multivariate measurement method to study the convergence of the industrial structure of the new areas and revealed its evolution law. The results showed that the leading industries of Pudong New Area and Liangjiang New Area are mainly capital-intensive and technology-intensive, while the leading industries of Binhai New Area are resource-intensive, technology-intensive and capital-intensive[10]. Safina et al. used Chongqing Liangjiang New Area, Gansu Lanzhou New Area and Henan Zhengbei New Area as examples to study the role of infrastructure in driving development and urban-rural relations under the Belt and Road Initiative. They pointed out that the Belt and Road Initiative should not be viewed as a unified whole, but should focus on spatial transformation and regional urbanization differences [11]. Leahey explored scientific innovation from both theoretical and empirical research perspectives, including new results, new theories and new methods and their role in scientific development[12]. Although the application of digital technology in education has become an important issue, how to effectively integrate it into the education system and measure its long-term impact remains a challenge. In addition, research on industrial transformation is more focused on theoretical analysis, lacking specific cases and operational solutions for the combination of education reform and industrial transformation in practice [13].

3. Methods

3.1 Analysis of the Current Status of the Service Guarantee Mechanism for Talent Introduction

At present, Liangjiang New District still has the phenomenon of "focusing on management and neglecting service". The convenience of talents handling related affairs needs to be improved urgently, and the sense of honor and gain of talents has not yet been enhanced. The existing talent service windows are mainly focused on personnel file agency, professional title evaluation and other businesses, while the service in areas such as children's enrollment, spouse's employment, and medical insurance is relatively weak, and the number of people covered by the services is also relatively small. These problems, especially difficulties in spouse's employment and children's schooling, directly affect the employment willingness and long-term stability of talents in Liangjiang New Area.

In addition, the housing security for talents is insufficient, the security methods are relatively single, the supply of talent apartments is small and unevenly distributed, and they cannot meet the needs of high-level talents. There is also a lag in policy implementation. The procedures for policies such as tax refunds and tax exemptions are cumbersome and time-consuming, causing inconvenience to talents. Although big data and Internet technologies have been applied to a certain extent, the "one-stop" service platform has not yet been fully built, there is a lack of "green channels", and the "talent service certificate" has not yet realized the "one-card" function.

3.2 Technology and Industry

3.2.1 Analysis of the Development Status of High-tech Enterprises

In recent years, the economy of Liangjiang New Area has achieved remarkable growth. By 2023, the GDP of the area is expected to grow at a rate of 5.5%. Although its land area accounts for only 1.5% of the city's total, its GDP accounts for 15% of the entire city, and it accounts for 20% of the city's industrial output value, 30% of the total imports and exports, 30% of the actual use of foreign capital and 30% of the added value of the digital economy. In addition, the total service trade volume accounts for 40% of the national total service trade volume, the proportion of the world's top 500 companies concentrated here reaches 50%, the proportion of automobile production is 60%, and the cross-border e-commerce transaction volume accounts for 70%, making a vital contribution to Chongqing's economic growth.

Especially since the 18th National Congress of the Communist Party of China, Liangjiang New Area has actively promoted innovation-driven development, promoted in-depth industrial transformation along the route of "science and technology innovation + industry", and improved production efficiency through new product supply and new technology application. At the same time, the district will increase the optimization of resource allocation, promote the close integration of innovation chain, industrial chain, capital chain and talent chain, and help improve industrial capacity, accelerate industrial innovation and digital transformation.

3.2.2 Key areas of industrial transformation

In the fields of digital economy, intelligent manufacturing, automobile manufacturing, etc., the main way to promote high-quality economic development is the transformation and upgrading of traditional industries and the rise of emerging industries. Promoting the coordinated development of innovation chain, industrial chain, capital chain and talent chain is the core driving force for promoting the optimization of industrial structure.

As an important node city in the Yangtze River Economic Belt, the development of digital economy in Liangjiang New Area is not only the key to implementing innovation-driven development but also a breakthrough in resolving the contradiction of unbalanced and insufficient development. In recent years, relying on the Liangjiang Digital Economy Industrial Park, which has gathered more than 6,000 digital economy companies, Liangjiang New District has seized the opportunities of scientific and technological revolution and industrial transformation, continuously delivering innovative vitality to Chongqing and contributing to the high-quality development of the Yangtze River Economic Belt.

3.3 Education System Innovation and Industrial Transformation Strategy

3.3.1 Education system innovation strategy

(1) Innovative talent introduction and cultivation mechanism

In response to the current reality of talent shortage in the digital economy, the study proposes a co-construction, sharing and cultivation mechanism of "university identity in school, scientific research in institutes, and results in enterprises". With talent as the link, it will promote in-depth cooperation between universities, new R&D institutions and enterprises, build an integrated development model of industry, academia and research, and achieve the goal of "school-enterprise cooperation, and win-win situation for industry and academia".

(2) Innovating the talent evaluation mechanism

While promoting the "breaking the four criteria" and "establishing new standards", Liangjiang New District explored and implemented the talent evaluation method of "selecting people by quantity". According to the development needs of key industries and the structure of the talent team, the talent work leading group will formulate an annual allocation quota, and the industry departments will select key enterprises and employers to assess industrial talents. The recognized talents will receive the "Liangjiang Talent Card" and will be provided with corresponding talent services according to their level.

(3) Coordinated development of talent chain and innovation chain

Optimizing the talent introduction, cultivation and entrepreneurship support system to create a good innovation ecological environment. The construction of synergy and innovation platform is also particularly critical. Different types of innovation platforms (such as science and technology parks, industrial incubators, etc.) provide a venue for technical exchanges and cooperation for enterprises and related personnel, accelerating the transfer and industrialization of scientific and technological achievements.

3.3.2 Industrial transformation strategy

Liangjiang New Area is unswervingly promoting the reform of investment methods, completely changing the previous investment model that solely relies on policy and financial support, and accelerating the reform of the investment system and process reengineering. With the support of actively guiding investment and introducing, the industrial development in 2023 will achieve remarkable results.

Specific measures include:

(1) All-staff investment promotion: Continuing to promote "all-staff investment promotion", insist on leaders at all levels taking the lead, implement the integration of "investment promotion, investment promotion, and investment attraction", and provide services to enterprises in all aspects.

(2) Efficiency first: Investment promotion must emphasize "efficiency first" to avoid blind investment, ensure that investment promotion is in line with the industrial structure of the park, and maximize the advantages of the industrial chain.

(3) Industrial chain investment: Focusing on the industrial chain, especially in the fields of big data, artificial intelligence, and intelligent manufacturing, eight industrial chain integration investment promotion teams have been proactively established. Based on the industrial map, investment promotion is carried out for high-growth, specialized and innovative enterprises to further enhance the core competitiveness of the new district's industries.

Chongqing Liangjiang New Area has accelerated industrial transformation and upgrading and promoted the development of emerging industries, mainly digital economy, by innovating talent introduction mechanisms, deepening industry-university-research cooperation, and improving investment promotion mechanisms.

4. Results and Discussion

4.1 Analysis of the Impact of Talent Introduction and Industrial Transformation Strategies

This experiment aims to explore the actual effects of talent introduction mechanisms,

industry-university-research cooperation, and industrial transformation strategies on the economic and industrial development of Liangjiang New Area. To this end, the experiment will design a series of empirical studies, combine multiple variables, and verify the impact of these strategies on the new district economy, corporate innovation capabilities, and talent flow through data analysis. The following is the design of the experiment.

4.2 Data Collection and Analysis

The data sources mainly include official statistical data released by Liangjiang New Area government departments (such as the Human Resources and Social Security Bureau, Science and Technology Bureau, Statistics Bureau, etc.), covering information on talent introduction, industry-university-research cooperation, industrial structure and economic growth. In addition, we will also use corporate financial reports, industry research reports, patent application data and industry data released by market research companies to analyze indicators such as corporate innovation capabilities, market share and profit margins. To further verify the effectiveness of policy intervention, we will also combine the government implementation report to explore the impact of various policies on regional economic and industrial development.

This study covers multiple experimental research projects, including talent introduction and professional background analysis, industrial innovation and patent quantity analysis, industrial structure and economic growth analysis, enterprise market share and profit margin analysis, marginal contribution analysis, as well as path analysis and policy intervention effects. Through these projects, the study explored the impact of factors such as talent introduction, industrial innovation, and industrial transformation on the economic and social development of Liangjiang New Area, revealing the key role of policy intervention in promoting regional industrial upgrading, technological innovation, and economic growth.

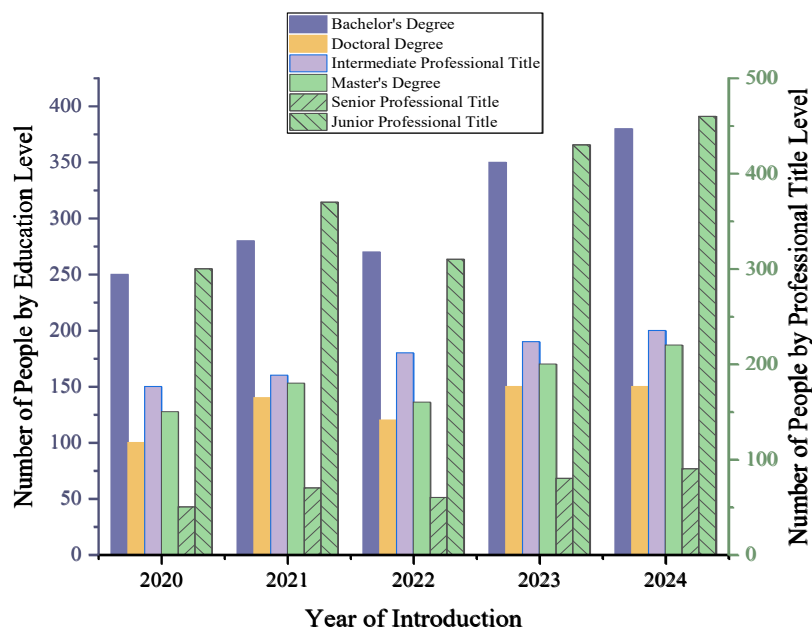


Figure 1: Talent introduction

The number of undergraduate students admitted in 2020 is 250, and it increases to 380 in 2024, with an average annual increase of about 13.3%. The growth rate of undergraduate students is relatively stable, but the overall number is large, indicating that Liangjiang New Area has a high demand for technical and basic-level talents. The number of talents with a master's degree increases from 150 in 2020 to 220 in 2024, an increase of about 46.7%. This change shows that the new district is increasing its efforts to attract mid- and high-level skilled talents year by year, especially in the fields of scientific and technological innovation and corporate management, where the demand for talents with a master's degree or above is increasing. Although the number of doctoral-level talents introduced is relatively small, its growth rate shows that the New District is increasing its efforts to introduce high-end talents, especially in the fields of scientific research and technological innovation. The number of talents with

senior professional titles introduced increases from 50 in 2020 to 90 in 2024, an increase of 80%, as shown in Figure 1.

Table 1: Background and industry proportion of talent introduction

Year	Educational Background	Industry Distribution (Percentage)
2020	Engineering, Computer Science, Economics, etc.	Digital Economy 30%, Intelligent Manufacturing 25%, Automotive Manufacturing 20%, Others 25%
2021	Electronic Information, Mechanical Engineering, Biomedical, etc.	Digital Economy 35%, Intelligent Manufacturing 30%, Automotive Manufacturing 15%, Others 20%
2022	Software Engineering, Artificial Intelligence, Internet of Things, etc.	Digital Economy 40%, Intelligent Manufacturing 28%, Big Health 10%, Others 22%
2023	Information Technology, Automation, Financial Engineering, etc.	Digital Economy 42%, Intelligent Manufacturing 30%, Environmental Protection Industry 8%, Others 20%
2024	Computer Science, Data Analysis, Energy Studies, etc.	Digital Economy 45%, Intelligent Manufacturing 32%, Big Data 15%, Others 8%

As time goes by, the professional backgrounds of the talents introduced have gradually tilted towards cutting-edge technologies and digital fields. In 2020, the first batch of talents introduced mainly has backgrounds in engineering, computer science, economics, etc., covering basic and technical disciplines. By 2024, the professional backgrounds of introduced talents involves more cutting-edge technology fields such as computer science, data analysis and energy, which is highly consistent with the strategic development direction of digital economy, intelligent manufacturing and energy industry in Liangjiang New Area. For example, the digital economy accounts for 30% in 2020, and this proportion increases to 45% by 2024. The attractiveness of the smart manufacturing industry is also increasing year by year, from 25% in 2020 to 32% in 2024 (as shown in Table 1).

According to the data, from 2019 to 2024, the number of industrial innovation projects and patents in Liangjiang New Area shows a clear growth trend, reflecting the region's positive progress in promoting industrial innovation and technological research and development.

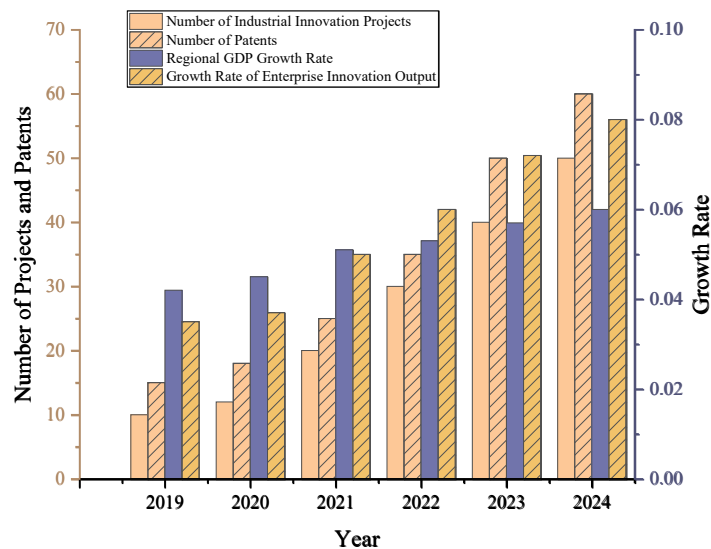


Figure 2: Comparative data table of the effectiveness of talent introduction mechanism (policy to be implemented in 2021)

In 2019 and 2020, before the policy is implemented, the number of industrial innovation projects is 10 and 12, respectively. Since the policy is implemented in 2021, the number of innovation projects begins to increase significantly, increasing to 20 in 2021 and reaching 50 in 2024, an increase of 400%

(as shown in Figure 2). This growth shows that the innovation environment and policy support in the new district are getting stronger year by year. More enterprises and scientific research institutions are beginning to participate in innovation projects, which has promoted the deep transformation and upgrading of the industry. The number of patents also shows an increasing trend year by year. From 2019 to 2024, the number of patents increases from 15 to 60, an increase of 300%. The increase in the number of patents is not only a direct reflection of innovation activities but also lays the foundation for the long-term development of the regional economy and the improvement of industrial competitiveness.

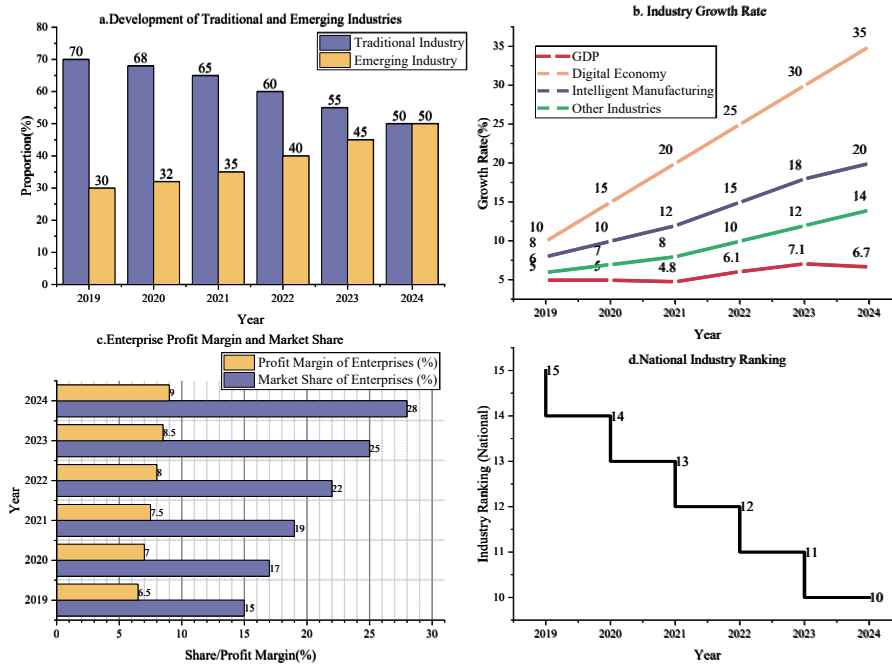


Figure 3: Liangjiang New Area economic and industrial structure data

The proportion of emerging industries increases from 30% in 2019 to 50% in 2024. This is an important achievement made by Liangjiang New Area in strengthening the development of emerging industries such as digital economy and intelligent manufacturing. This change shows that emerging industries have become a new driving force for economic growth, especially in the fields of information technology, artificial intelligence, and digital services, where significant progress has been made (as shown in Figure 3a). The GDP growth rate of Liangjiang New Area shows a trend of fluctuating growth. In 2019 and 2020, the GDP growth rate is 5%, but from 2021 to 2024, the GDP growth rate increases, especially in 2023 (7.1%) and 2024 (6.7%). This shows that with the rise of emerging industries and the optimization and upgrading of industrial structure, the regional economic growth rate has gradually accelerated, especially driven by industrial transformation and innovation-driven, economic growth has maintained a high level. The growth rate of the digital economy has increased year by year, from 10% in 2019 to 35% in 2024, a significant increase. The growth rate of intelligent manufacturing has also shown a strong growth momentum, rising from 8% in 2019 to 20% in 2024, as shown in Figure 3b. This growth shows that while promoting the development of diversified industries, the new district also pays attention to innovation and development in other fields, further optimizes the industrial structure, and enhances the risk resistance of the regional economy. The market share of enterprises increases from 15% in 2019 to 28% in 2024. The increase in the market share of enterprises reflects the increasing competitiveness of enterprises in the new area in the domestic market. The specific data is shown in Figure 3c. The industry ranking increases from 15th in the country in 2019 to 10th in the country in 2024 (as shown in Figure 3d).

The marginal contribution of talent introduction is 9% in 2019 and reaches 14% in 2024. This means that the role of talent introduction in regional economic growth has increased year by year, especially in the introduction of high-level and innovative talents. The marginal contribution of talent introduction has increased year by year, indicating that the continuous improvement of the new district's talent policies and the accumulation of high-quality talents are becoming key factors in promoting industrial innovation, technological progress and economic transformation. The marginal contribution of transformation of innovative achievements increases from 1.5% in 2019 to 2.7% in

2024, an increase of 80%. The marginal contribution of industrial chain optimization increases from 0.8% in 2019 to 1.8% in 2024. This growth shows that through industrial chain integration, technological innovation and optimal resource allocation, the industrial structure of the new district has been effectively optimized, especially the synergy effect of upstream and downstream of the industrial chain has gradually emerged. The marginal contribution of emerging industry transformation increases from 1.2% in 2019 to 2% in 2024, as shown in Figure 4.

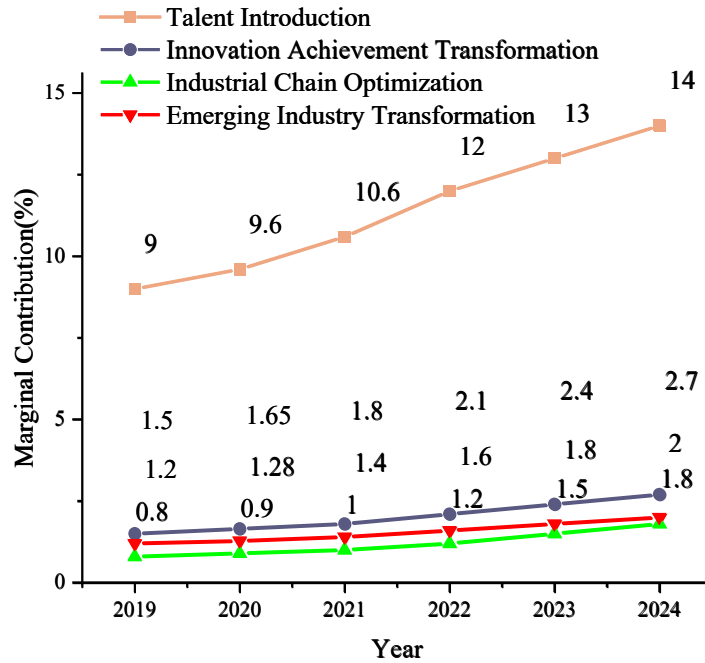


Figure 4: Economic marginal contribution of different variables

The experiment uses structural equation modeling to analyze the causal relationship and synergy among various factors and verify the direct and indirect impact paths of policy intervention. This study constructed a path diagram based on the structural equation model to explore the causal relationship between factors such as talent introduction, industry-university-research cooperation, and industrial transformation on the economic and social development of Liangjiang New Area. By calculating the path coefficients, the experiment revealed the interrelationships among the latent variables and analyzed their role in promoting regional economic and social progress.

The role of industrial transformation in promoting economic development is particularly prominent in the path diagram, with a path coefficient of 0.80 ($p < 0.01$). This high path coefficient reflects the strong positive correlation between industrial upgrading and economic growth. It can be seen from the path diagram that the path coefficient of the impact of economic development on social development is 0.75 ($p < 0.01$), showing a strong positive effect. With economic growth, employment opportunities in the region have increased, per capita income has improved, and the social security system has been further improved. The impact of talent introduction on industrial transformation is relatively strong, with a path coefficient of 0.65 ($p < 0.01$), which shows that talent introduction has significantly promoted the optimization of industrial structure (as shown in Figure 5).

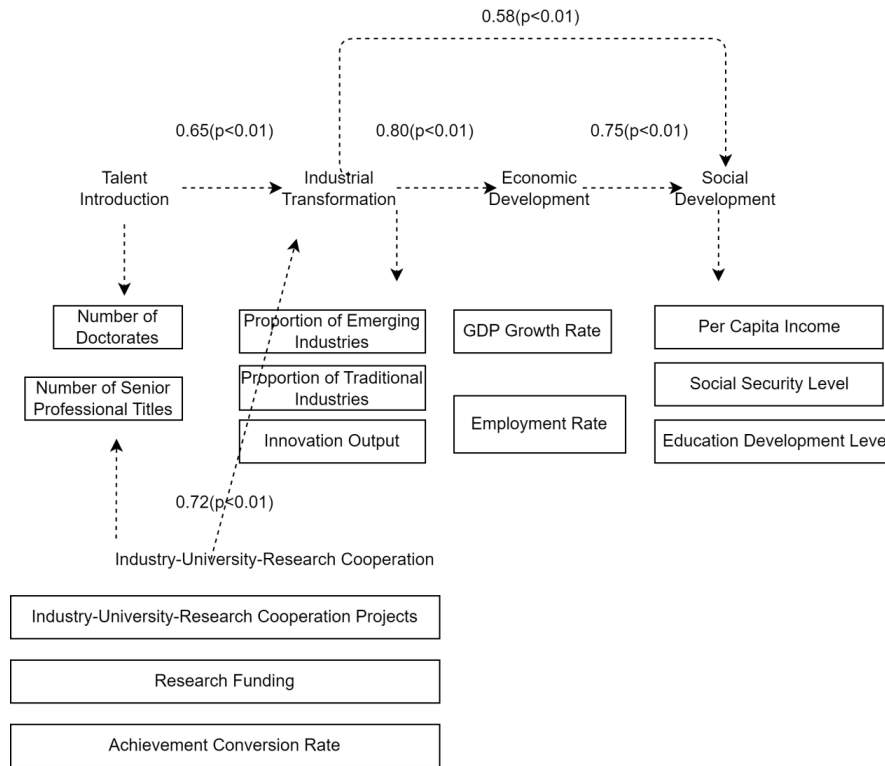


Figure 5: Cause and effect relationship of the path diagram

5. Conclusion

This study analyzes the key strategies implemented by Liangjiang New Area in the process of education system innovation and industrial transformation, and combines quantitative data analysis and qualitative interviews to deeply explore the regional development model led by science and technology and talents. Research shows that Liangjiang New Area has achieved remarkable results in talent introduction and training, educational innovation and industrial structure optimization. In particular, in terms of innovating talent introduction and training mechanisms, deepening industry-university-research cooperation, and optimizing industrial chain investment promotion, the policy execution and implementation effects have been continuously enhanced, providing strong support for the high-quality development of the regional economy. Through regression analysis of the collected data, the study found that there is a significant positive correlation between the education innovation index and the GDP growth rate, and the number of high-level talent recruitment is also closely related to regional economic growth. This shows that the effective implementation of education innovation and talent introduction policies can directly promote industrial transformation and economic growth. Further field research and qualitative analysis also verified the positive interaction between education policy and industrial demand, which promoted scientific and technological innovation and industrial upgrading. However, although this study has achieved certain results, there are still some limitations. First, due to the relatively short time frame of data collection, it is not possible to fully reflect the effects of long-term policy adjustments. Second, the availability and accuracy of some data may be affected by factors such as policy changes and industrial development cycles. Therefore, future research can be extended to a longer time span and increase comparative analysis of different regions and industrial backgrounds.

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