



On the "Organized Scientific Research" of Local Universities and the Coordinated Development Model of Local Industries

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Abstract. The purpose of this paper is to explore the mode of coordinated development of organized scientific research in local universities and local industries. By analyzing the importance and current situation of the coordinated development of the two, the internal mechanism and influencing factors of the coordinated development are deeply studied, and the effective models and strategies to promote the coordinated development of organized scientific research in local universities and local industries are proposed, to achieve mutual benefit and win-win results and common development of both sides.

Keywords: Local universities; Organized scientific research; Local industries; Synergistic development.

1 Introduction

Over the past few years, the competitive landscape of modern organizations has changed significantly. Businesses need to fundamentally change the way they operate, create value, and interact with stakeholders and the environment. Innovation and digital transformation are the things organizations must adapt to at the forefront of changing environment^[1]. Organizations aspiring to drive digital business transformation and innovation often rely on collaboration between different stakeholders^[2]. There is a growing perception that cooperation between universities and industry will bring great benefits to both parties. With the rapid economic and social development and the accelerating pace of innovation and development, the key role of local colleges and universities in promoting the upgrading of local industries and the innovation process has gradually come to the fore. By their unique geographical, talent training system and disciplinary and professional advantages, local colleges and universities provide a large number of professional talents for the local industries' needs according to the development demands of the local industries and provide cutting-edge theoretical support and technological innovation for the development of the local industries through the activities of industry-university-research.

Organized scientific research refers to the organic integration of dispersed scientific research resources within universities to achieve optimal allocation and efficient use of resources^[3]. Through organized scientific research, colleges and universities can concentrate their advantageous strength, focus on the key issues and core needs in the development of local industries, and carry out targeted research. The organized scientific research mode can carry out scientific research activities according to the needs of local industrial development. From the theoretical level, in-depth exploration of the organized scientific research mode can help to enrich and improve the academic theoretical system in the field of scientific research; from the practical point of view, exploring a practical synergistic development mode can provide a clear direction and guidance for the cooperation between the local universities and the local industries, and promote closer and more efficient cooperation between the two sides, to realize the sharing of resources and the complementation of each other's strengths, and to jointly promote the upgrading and innovation of the local industry and injecting strong power for the sustainable prosperity of local economy.

Thomas et al.'s study found that formalization can increase co-innovation outcomes during university-industry collaborations, demonstrating that formalization has a positive impact on co-innovation outcomes^[4]. In Brazil, for example, Andrei Mikhailov et al.^[5] have shown that university-industry collaboration has a profound impact on innovation in low-tech industries, and empirical studies using a sectoral approach have shown that in most cases, university-industry collaboration has a positive impact on firm performance, including product and process innovation, patent creation, overall innovation performance, and financial performance.

The research on the collaborative development mode of organized scientific research and local industries in local universities has not only important theoretical value but also significant practical significance. Through the study, it can provide theoretical support and practical guidance for the in-depth cooperation between local universities and local industries, and jointly promote the sustainable and healthy development of local industries^[6].

2 Empirical Research

2.1 Importance of Synergistic Development of Organized Scientific Research and Local Industries in Local Universities

2.1.1 Enhance the Scientific and Technological Innovation Capacity of Local Universities.

As an important position for scientific and technological innovation, the enhancement of the ability of local universities to innovate is of great significance for promoting local economic and social development. Through close cooperation with local industries, local universities can more accurately grasp the market demand and industrial development trends.

Shi et al.^[7] studied the balance panel of 443 innovative firms in China from 2008 to 2011 and investigated the impact of university-industry collaboration on firms' innovation efficiency. The findings suggest that university-industry collaboration may

initially be detrimental to a company's innovation efficiency, but as engagement deepens, companies can benefit from university-industry collaboration.

As the main body of market competition, local industries have natural sensitivity and insight into market dynamics and industry trends. Local universities can accurately grasp the market demand for products, technologies, and services by building a collaborative innovation mechanism between industry, academia, and research and by deeply intervening in industrial practice. Take the manufacturing industry as an example, the university research team observes the whole production process on the spot and systematically analyses the pain points of enterprises in capacity optimization, process upgrading, and cost control through the cooperation mode of stationing in factories. This deep interaction has prompted the university research system to realize three major transformations: firstly, the selection of scientific research topics from ‘closed-door’ to ‘demand-oriented’, secondly, the technology research and development from ‘theoretical validation’ to ‘engineering application’, and thirdly, the transformation of results from ‘passive waiting’ to ‘active docking’.

For example, in response to the technical bottlenecks existing in the industry, the university formed an interdisciplinary scientific research team and focused on tackling the problems. It also carries out scientific research cooperation in intelligent detection, Internet of Things applications, artificial intelligence, and other technologies to jointly overcome key technical issues and promote scientific and technological progress and enterprise development. In this way, local universities can continuously optimize the allocation of scientific research resources and put limited human, material, and financial resources into the research areas with the most practical value and application prospects^[8]. At the same time, in the process of solving practical problems, the innovative thinking and creativity of researchers are stimulated, and new theories and methods are constantly explored, so as to improve their own scientific research and innovation ability significantly.

By building a collaborative innovation mechanism between industry, academia and research, local universities are deeply involved in industrial practice, and can accurately grasp the specific market demand for products, technologies and services. According to the statistics of the State Intellectual Property Office, from 2012 to 2021, the number of patent applications in universities increased from 106,000 to 367,000, an increase of 246.2%, the number of patent authorizations increased by 346.4%, the transfer and licensing of patent ownership in universities increased by 5.5 times, and the amount of patent transfer increased by nearly 10 times. These data fully show the significant improvement of the ability of universities to transform scientific and technological achievements. For example, Shanghai Zhonglv New Energy Technology Co., Ltd. was established on September 22, 2023, the company focuses on solving the "bottleneck" problem of high proportion of wind power and photovoltaic grid-connected safe operation, and its core business is to develop self-synchronous voltage source friendly grid-connected technology and system solutions, covering key equipment such as converters, inverters, and energy storage systems. In October 2023, its self-developed 100-megawatt wind power generation system was selected into the third batch of the first (set) major technical equipment list in the national energy field, and in 2025, the first domestic main power supply photovoltaic power station grid

connection test will be completed in the 250-megawatt photovoltaic project in Nileke, Xinjiang. In view of the technical bottlenecks in the industry, local universities have set up interdisciplinary scientific research teams to concentrate on tackling key problems. These teams not only solve the actual needs of enterprises, but also promote the improvement of scientific research level in universities.

2.1.2 Promoting the Transformation and Upgrading of Local Industries.

The transformation and upgrading of local industries have become the key to achieving sustainable development and enhancing the competitiveness of local economies, and local universities play a crucial role in the transformation and upgrading of local industries. By their strong scientific research resources and talent advantages, local universities actively carry out cutting-edge academic research and have achieved a series of scientific research results with practical value^[6]. These results not only provide strong technical support for local industries but also inject continuous innovation power. For example, in the field of manufacturing, the new material research results of universities can help enterprises optimize product performance and significantly improve product quality; in the field of information technology, the software development and algorithm research of universities provides enterprises with efficient production management systems and intelligent solutions, which help enterprises achieve digital transformation.

With the wide application of research results of local universities in enterprises, the structure of local industries can be optimized and upgraded. The traditional production model has been gradually broken, and the industrial model relying on low-value-added products is gradually changing to a high-end, intelligent, and green direction. At the same time, the innovation achievements of local universities help promote the transformation and upgrading of local industries and improve their competitiveness. In the context of increasingly fierce competition in the global market, industries with advanced technology and innovation ability can occupy a place in the market^[9].

The organized scientific research of local universities has provided strong technical support and innovation impetus for local industries. Taking China's manufacturing industry as an example, its digital penetration rate has increased from 21.7% to 35%, which fully demonstrates the great results brought by digital transformation. Sany Heavy Industry's smart factory is a typical case, according to accurate statistics, the production efficiency of Sany Heavy Industry's smart factory has jumped by more than 30%, the equipment utilization rate has also increased by more than 20%, and at the same time, the product quality has achieved a significant leap.

2.1.3 Enhancing the Vitality of Local Economic Development.

The synergistic development of local colleges and universities and local industries has far-reaching significance for enhancing the vitality of local economic development. In today's knowledge-based economy, knowledge, technology, and talent are the core innovation elements that drive economic development. When local colleges and universities collaborate with local industries, they can break the previous barriers and

promote the free flow and efficient agglomeration of these innovative elements between them.

On the one hand, local universities have rich knowledge reserves and cutting-edge technological research results, which can be more rapidly transformed into actual productivity through synergy with local industries^[10]. On the other hand, this kind of synergistic development is conducive to the reasonable flow and optimal allocation of talent. Professional talents cultivated by universities can directly enter local industries and bring new thinking and innovation abilities to enterprises; at the same time, technical backbones in enterprises can also go to universities to give part-time lectures or participate in scientific research, to feed back the experience and problems in practice into teaching and research^[11].

In addition, the synergistic development of local universities and industries significantly enhances the sustainable development capability of the local economy. Through continuous innovation and industrial upgrading, the local economy can more flexibly adapt to market changes and competitive challenges, reduce excessive dependence on traditional resources, and gradually build up a green, low-carbon, and sustainable development model. This synergistic development model not only promotes the efficient flow and concentration of innovation factors but also injects a continuous momentum into the local economy, enabling it to maintain strong vitality and competitiveness in long-term development.

2.2 The Current Situation of Synergistic Development of Organized Scientific Research in Local Universities and Local Industries

2.2.1 Incomplete Co-Operation Mechanism.

At present, there are more obvious mechanism defects in the cooperation between local universities and local industries. First, there is a lack of regular communication mechanisms. The research team of local universities usually focuses on academic research but it is not timely and in-depth enough to understand the actual needs of local industries and market dynamics. The enterprises in the local industry pay more attention to production and operation and market competition, and it is difficult to fully grasp the progress and results of scientific research in universities. This information asymmetry leads to the two sides in the cooperation having difficulty accurately docking, and not quickly finding a fit for cooperation.

Secondly, there is a lack of an effective coordination mechanism. When local universities and local industries carry out cooperation projects, due to the lack of a clear coordination body and standard coordination process, it is easy to have unclear responsibilities and division of labor in the process of project promotion. Inefficiency of co-operation due to imperfect co-operation mechanism. Both parties have spent a lot of time and energy on communication and coordination in the process of cooperation, but it is difficult to achieve the expected results. At the same time, it also causes a serious waste of resources. For example, in an industry-university-research cooperation project, due to the lack of optimization of the project management process, the task completion rate is only 70%, the average project completion time deviation is $\pm 15\%$, and

the resource utilization rate is only 60%. These problems restrict the smooth implementation of cooperation projects and the transformation of results.

2.2.2 Uneven Distribution of Benefits.

In the process of collaborative development, the uneven distribution of benefits frequently occurs, which has become a key factor hindering the smooth progress of cooperation. Due to the significant differences in resource input and contribution between the two parties, it is difficult to achieve a fair and reasonable distribution of benefits, which in turn hurts the stability and sustainability of cooperation. Specifically, the difference in resource input is mainly reflected in capital, manpower, technology, and other aspects.

2.2.3 Poor Transformation of Scientific Research Results.

Due to a certain degree of disconnection between the scientific research achievements of universities and the actual needs of local industries, the transformation channels of scientific research achievements are not smooth, and the transformation rate is at a low level, the transformation of scientific research achievements of local universities is facing many challenges^[12].

According to relevant data, a large number of scientific research results from local universities are shelved after completion, and the proportion of those that can be successfully transformed and produce actual economic benefits is relatively low. This not only causes a waste of scientific research resources but also weakens the role of local universities in supporting the development of local industries, and hinders the transformation, upgrading and innovative development of the local economy^[13].

According to statistics, the conversion rate of scientific and technological achievements in China is about 15%-20%, while the conversion rate of scientific and technological achievements in developed countries such as the United States and Germany is as high as 40%-50%. This shows that there is still a lot of room for improvement in the transformation of scientific research achievements in China. To solve the problem of poor transformation of scientific research results, it is necessary to strengthen the communication and cooperation between local universities and local industries and to establish a sound and efficient transformation mechanism in order to improve the transformation rate and practical application value of scientific research results.

2.3 Inherent Mechanism of Synergistic Development of Organized Scientific Research in Local Universities and Local Industries

2.3.1 Resource Sharing Mechanism.

In the general pattern of local development, it is of great significance to build an effective resource-sharing mechanism between local universities and local industries. Through this mechanism, both sides can fully share key resources such as talents, equipment, and information, so as to achieve optimal allocation and efficient use of resources.

First, talent resource sharing. Local colleges and universities have a wealth of academic talents and research teams with profound professional knowledge and innovative thinking. Local industries bring together a large number of experienced and skilled professional, technical personnel, and management personnel. For example, college teachers go to enterprises for temporary training and enterprise technicians go to colleges and universities to teach part-time, which can effectively promote the deep integration of theory and practice. For example, in the summer of 2024, a total of 50 teachers from a university will go to the enterprise for temporary training and participate in the research and development of the actual project of the enterprise; At the same time, 30 enterprise technicians have given part-time lectures in colleges and universities, which has promoted the in-depth exchange and cooperation of talents from both sides. This exchange not only improves the practical ability of teachers and the technical level of enterprises, but also brings more opportunities for cooperation and innovation inspiration for both parties.

Second, equipment resource sharing. Colleges and universities are usually equipped with advanced scientific research equipment for cutting-edge academic research, while local enterprises have production equipment adapted to market demand^[14]. Through the sharing of equipment, the scientific research equipment of universities can provide strong support for the product development and technical improvement of enterprises, accelerating the transformation and application of scientific and technological achievements; at the same time, the production equipment of enterprises can also provide practical opportunities for university students to enhance their practical ability, and cultivate more practical and innovative composite talents.

Third, information resource sharing. Colleges and universities have accumulated a large number of theoretical research results and industry development trend information in academic research, and local industries have practical information such as market dynamics and customer demand. Achieve information sharing, can make the university's scientific research more targeted so that the enterprise's decision-making is more scientific.

The establishment of a sound mechanism of resource sharing between local universities and local industries is an important way to achieve mutual benefit and synergistic development.

2.3.2 Innovation Driving Mechanism.

Organized scientific research, as an effective innovation mode, has a significant role in stimulating the innovation enthusiasm and creativity of university researchers, and then delivering innovative results to local industries.

Under the organized research model, researchers can obtain more adequate resource support and broader development space. Reasonable resource allocation, including funds, experimental equipment, data, and information, provides a solid material foundation for them to carry out innovative research. At the same time, clear incentive mechanisms and reward policies can fully mobilize the enthusiasm and initiative of researchers and stimulate their inherent innovation potential.

2.3.3 Market-oriented Mechanism.

In the process of local development, the market-oriented mechanism has an extremely important leading role in the scientific research activities of local universities. Being oriented to market demand can make the research activities of local universities more accurately meet the actual development needs of local industries, thus significantly improving the market adaptability and competitiveness of research results.

When the scientific research results are more in line with market demand, their adaptability in the market naturally increases dramatically. These results can be quickly integrated into the industrial production process, solve practical problems, and create direct economic benefits for enterprises. At the same time, research results with a high degree of market adaptability often have stronger competitiveness. In the fierce market competition, they can stand out and attract more resources and market attention. For example, a local university carries out special scientific research according to the needs of the local electronics industry for high-performance chips, and its results not only meet the needs of local enterprises but also have a strong competitiveness in the domestic market, successfully promoting the upgrading and development of the local electronics industry.

2.4 Factors Affecting the Synergistic Development of Organized Scientific Research in Local Universities and Local Industries

2.4.1 Policy Environment.

In the process of synergistic development of local universities and local industries, the policy support and guidance provided by the government plays a pivotal role, in which initiatives such as the input of scientific research funding, tax incentives, etc., have a far-reaching impact on the effectiveness of synergistic development.

The input of scientific research funding is an important source of power to promote synergistic development. By increasing financial support for local universities' scientific research projects, the government can provide solid material protection for universities' scientific research work, so that universities have enough resources to carry out in-depth research. For example, the government's special allocation to support the research of colleges and universities in a cutting-edge field, the purchase of advanced experimental equipment, and the hiring of top scientific research talent, which not only helps to improve the scientific research level of colleges and universities but also lays the foundation for the technological innovation of local industries.

Tax incentives also have a significant incentive effect. For enterprises that actively participate in cooperation with local universities, the government gives certain tax exemptions or preferences, which can effectively reduce the operating costs of the enterprises and significantly increase their motivation to participate in collaborative innovation. Government policy support and guidance can not only directly promote the synergistic development of local universities and local industries, but also create a favorable ecological environment for innovation. Attract more social resources into the field of science, and technology innovation, forming a pattern of innovation in which the government, universities, enterprises, and all sectors of society participate and promote each other.

2.4.2 Cultural Attitudes.

In the process of cooperation between local universities and local enterprises, the difference in cultural concepts is a factor that is often overlooked but may have a far-reaching impact on the cooperation. The different cultures formed by colleges and enterprises in terms of organizational structure, value orientation, and work style may become potential obstacles to the smooth development of cooperation. Therefore, it is particularly important to strengthen cultural integration and exchange.

Colleges and universities usually have a strong academic cultural atmosphere, focus on knowledge exploration and innovation^[15], pursue academic freedom and independence, and emphasize the depth and breadth of theoretical research. Their way of working is more autonomous and flexible, and the requirements for time and results are relatively loose. In contrast, enterprises are market-oriented, pursue economic benefits and efficiency, and focus on the rapid transformation and application of practical results. The corporate culture emphasizes teamwork, execution, and competition, with a tight work rhythm and strict control of time and cost.

In order to promote the smooth implementation of cooperation, cultural integration and exchange need to be strengthened. Cultural exchange activities and joint training can be organized to enhance mutual understanding. For example, organize university researchers to visit enterprises to understand the production process and operation mode; invite enterprise managers to attend academic lectures in universities to feel the academic atmosphere. At the same time, in the planning and implementation of cooperation projects, the cultural characteristics of both sides are fully taken into account, and flexible and inclusive cooperation mechanisms and work processes are developed to achieve effective cultural integration.

2.4.3 In the System of Synergistic Development Between Local Universities and Local Industries, the Degree of Matching Between the Scientific Research and Technology Level Possessed by Local Universities and the Actual Technological Needs of Local Industries plays a Crucial role and Directly Determines the final Effect that can be Achieved by Synergistic Development.

As an important place for knowledge innovation and technology research and development, the level of research technology of local universities reflects the depth and breadth of research in specific fields. If the scientific research technology of universities focuses only on theoretical research, while the practical needs of local industries are focused on solving applied technical problems in production, there will be an obvious disconnect between the two. For example, local industries may urgently need to reduce costs and improve efficiency by improving the automation level of production processes, but the research of universities focuses on the basic theoretical level of the relevant technology, and is unable to provide effective solutions in a timely manner. This kind of disconnect not only hinders the transformation of research results of universities but also weakens the innovation power of local industries.

On the contrary, if the research technology of local universities can accurately match the technological needs of local industries, synergistic development will achieve remarkable results. For example, the university research team for the local characteristics of the key technical problems in the industry, research and development of new pro-

duction technology or process applicable to local enterprises, can quickly enhance the competitiveness of the industry, and promote the high-quality development of the local economy.

Paying close attention to and endeavoring to improve the matching degree between the scientific research and technology level of local universities and the technological demands of local industries is the key to achieving the goal of synergistic development.

2.5 Modes of Synergistic Development of Organized Scientific Research in Local Universities and Local Industries

2.5.1 Industry-University-Research Co-Operation Mode.

China is currently in an era of rapid economic development and great progress in science and technology, following the imitation type of innovation and entrepreneurship to achieve technological progress and industrial development has been unsustainable, in this context, the University-Industry-Research Cooperation Model can maximize the research and development strength of colleges and universities, promote scientific and technological innovation of academic achievements, human resources and the integration of the local industry to accelerate the transformation of innovation results and provide strong support for the development of future industries. The industry-university-research cooperation model has become an important way to promote local economic development and scientific and technological innovation^[16].

For example, Bengbu University cooperates with Bengbu Ecological Environment Bureau, Agriculture and Rural Bureau, Anhui Baolv Optoelectronic Engineering Co., Ltd., etc. to carry out rural sewage and rural environmental treatment projects. These cooperation projects not only help to improve the level of local environmental protection, but also provide opportunities for practical teaching for Bengbu University, and promote the transformation and application of scientific research achievements of the college. The School of Materials and Chemical Engineering of Bengbu University and Fengyuan Group jointly established the Anhui Polylactic Acid Application Research Institute, and established a good industry-university-research cooperative relationship with a number of enterprises. For example, Bengbu University and Anhui Kaisheng Applied Materials Co., Ltd. jointly solve the problem of solid waste, which not only makes full use of resources but also increases benefits for enterprises; Jointly carry out silica production and surface modification research with Bengbu Zhongheng New Material Technology Co., Ltd. These cooperation projects have achieved significant economic and social benefits.

2.5.2 Industrial Technology Innovation Alliance Mode.

The industrial technology innovation alliance model is gradually showing strong vitality and advantages, which is composed of local universities, enterprises, scientific research institutions, and other multi-party subjects, that have a high level of R&D in the industry. Through close cooperation, integrating the rich resources of all parties, making concerted efforts to overcome the key technological problems of the industry,

and providing diversified support and services to the alliance members under the premise of mutual win-win and mutual benefit.

The formation of an industrial technology innovation alliance breaks down the barriers between the previous subjects and enables the efficient flow and optimal allocation of resources. For example, Bengbu University closely focuses on the development needs of the five major industrial clusters in Bengbu City, and closely combines the construction of the school's characteristic disciplines with the development of local industries. The college has been approved a number of provincial-level scientific research platforms, such as "Anhui Additive Manufacturing Engineering Research Center", "Intelligent Perception and Control Engineering Research Center", "Anhui Silicon-based New Materials Engineering Technology Center", etc., and has built a total of 7 provincial-level scientific research platforms, 7 municipal-level scientific research platforms, and 14 university-level scientific research platforms. These platforms have strongly promoted the discipline construction of the university in the field of new display and intelligent manufacturing, and provided a solid guarantee for the transformation of scientific and technological achievements.

2.5.3 Science and Technology Park Model.

In the exploration of promoting local economic development and scientific and technological innovation, the model of the science and technology park is glowing with unique charm. This model closely relies on the rich scientific and technological resources of local universities, and through careful planning and construction, creates a vibrant and innovative atmosphere of science and technology parks, attracting many enterprises to move in, and then forming a significant industrial agglomeration effect.

Bengbu University and Bengbu District have jointly built a science and technology innovation industrial park, focusing on the pillar industries and key industries of Bengbu City, such as a new generation of information technology, high-end equipment manufacturing, energy conservation and environmental protection. The industrial park is committed to building an achievement transformation base, a business incubation base, a public training base, an industry-education integration base and an industrial attraction base, so as to cultivate new growth points for the high-quality economic development of Bengbu.

Relying on the scientific and technological resources of local universities to build science and technology parks, attracting enterprises to move in, and forming an industrial agglomeration effect is an innovative development model, which is of great strategic significance for promoting scientific and technological innovation, industrial upgrading, and local economic prosperity.

2.6 Strategies to Promote the Synergistic Development of Organized Scientific Research in Local Universities and Local Industries

2.6.1 Improve the Policy Support System.

In the process of promoting the synergistic development of local universities' organized scientific research and local industries, the government plays a crucial leading

and guaranteeing role, in which increasing policy support and establishing and improving relevant laws, regulations, and policy measures are the key.

Taking China's Greater Bay Area as a sample, Zhao et al.^[17] examined the mechanism of enterprise innovation and industry-university-research cooperation from the perspective of high-tech policy. This paper makes a meaningful attempt to explore the impact of China's high-tech policies in the Greater Bay Area on industry-university-research cooperation and enterprise innovation from 2012 to 2021. The results show that high-tech policy and university-industry collaboration have a positive and significant impact on company innovation. These results strongly support the effectiveness of high-tech policies in the Greater Bay Area. Driven by these incentives, collaboration between universities and businesses has had a huge positive impact and benefits. The government should fully recognize the significance of such synergistic development to local economic growth, scientific and technological innovation, and talent cultivation, and pay great attention to and strongly support it at the policy level.

At the same time, it is crucial to establish and improve relevant laws and regulations. The rights and obligations of all parties in collaborative development should be clarified, and the cooperation process and benefit distribution mechanism should be standardized to provide a stable legal framework for cooperation. For example, special laws and regulations should be formulated to ensure the fairness of intellectual property ownership and benefit distribution of university research results in the process of transformation, so as to avoid potential legal disputes. By improving the policy support system, the government can create a good policy environment for the synergistic development of organized scientific research in local universities and local industries, stimulate the enthusiasm and creativity of all parties, so as to realize the in-depth integration of scientific and technological innovation and industrial development, and to promote the high-quality development of the local economy.

2.6.2 Strengthening Platform Construction.

The building of an information exchange platform is the foundation of synergistic development. It can break down information barriers and enable universities and enterprises to obtain each other's needs and resources in a timely and accurate manner. For example, through the establishment of special websites or online databases, universities can release the latest scientific research results and project information, while enterprises can display their technological needs and market dynamics.

Technology transfer platform is the key link between the scientific research results of universities and the practical application of enterprises. Through this platform, the scientific research technology of universities can be transferred to enterprises more smoothly. Technology transfer centers can be set up with professional technology brokers. These technology brokers not only understand the scientific research achievements of universities but also are familiar with the production process and technical needs of enterprises, which can effectively promote the docking and transformation of technology.

By strengthening the construction of the platform, it can effectively integrate resources, optimize allocation, form an efficient collaborative innovation ecosystem, and

provide strong support for the collaborative development of organized scientific research in local universities and local industries^[18].

2.6.3 Strengthening Talent Cultivation.

In the pattern of synergistic development of local colleges and universities and local industries, strengthening talent cultivation is a core task. Local colleges and universities should closely focus on the actual needs of local industries, actively adjust and optimize the talent training program, and devote themselves to cultivating high-quality talents with innovative spirit and practical ability.

The development of local industries has unique characteristics and needs and has specific requirements for the professional skills, comprehensive quality, and adaptability of talents. Local colleges and universities need to investigate the structure of local industries, development trends, and direction of technological innovation, and accurately grasp the specific needs of the industry for talents. For example, if the leading industry in a certain region is intelligent manufacturing, then colleges and universities should focus on cultivating talents with solid foundations and practical experience in the fields of mechanical engineering, automation control, computer science, and so on.

In addition, strengthening practical teaching is also the key to cultivating high-quality talents. Co-operation with local enterprises to establish internship training bases enables students to exercise their practical skills in a real working environment. By participating in the actual projects of enterprises, students are not only able to apply the theoretical knowledge they have learned in practice but also find problems and solve problems in practice, so as to improve their comprehensive ability^[19].

2.6.4 Optimize the Benefit Distribution Mechanism.

In the process of promoting the synergistic development of organized scientific research and local industries in local universities, the establishment of a fair and reasonable benefit distribution mechanism is a crucial link. A scientific, fair, and effective benefit distribution mechanism can fully protect the legitimate rights and interests of all parties, thus greatly stimulating the enthusiasm for cooperation.

In order to ensure the fairness of benefit distribution, it is necessary to formulate clear and transparent distribution rules and evaluation criteria, so that all parties can clearly understand their rights and responsibilities at the beginning of the co-operation. At the same time, it is recommended to establish an independent third-party evaluation organization to conduct an objective and fair evaluation of the results of the cooperation project and the contributions of all parties, so as to avoid interference by subjective factors and eliminate unfair distribution results. For example, a local university and an enterprise co-developed a new technology, due to the establishment of a fair and reasonable benefit distribution mechanism, the scientific research results were successfully transformed and achieved significant economic benefits. The university obtained corresponding research funds and honors, and the enterprise also achieved product upgrading and market share expansion, both sides benefited from it, which strengthened the confidence to continue the cooperation.

Optimizing the benefit distribution mechanism is an important guarantee to promote the synergistic development of local universities' organized scientific research and local industries, which can inject a strong impetus into cooperation and achieve a win-win situation.

3 Conclusion

The synergistic development of local universities' organized scientific research and local industries is an important force in promoting local economic and social development. By improving the cooperation mechanism, optimizing the allocation of resources, strengthening the innovation drive, and other measures to build an effective synergistic development model, it can achieve the complementary advantages and common development of both sides and make greater contributions to the prosperity of the local economy. In the future, the research and practical exploration of synergistic development should be further strengthened, and the mode and strategy should be constantly innovated to promote the synergistic development of organized scientific research in local universities and local industries to a higher level.

References

1. N. E, A. M, R. B et al. Digital Business Transformation: An Experience-Based Holistic Framework[J]. *IEEE Access*, 2022, 10: 121930-121939.
2. C. R, C. Q, F. D et al. Collaborations for Digital Transformation: Case Studies of Industry 4.0 in Brazil[J]. *IEEE Transactions on Engineering Management*, 2023, 70(7): 2404-2418.
3. Belenzon S, Schankerman M. Spreading the Word: Geography, Policy, and Knowledge Spillovers[J]. *The Review of Economics and Statistics*, 2013, 95(3): 884-903.
4. Clauss T, Kesting T, Franco M. Innovation generation through formalisation and fairness in university – Industry collaboration[J]. *Technovation*, 2024, 134: 103049.
5. Mikhailov A, Puffal D P. University-industry Collaboration and Innovation in Low-tech Industries: the Case of Brazil[J]. *Triple Helix*, 2024, 10(3): 291-320.
6. Zhao Y, Ko J. Vocational teachers' perceptions on workplace learning in facilitating students' professional engagement in the context of industry-university collaboration in China[J]. *Journal of Workplace Learning*, 2024, 36(4): 282-297.
7. Shi X, Wu Y, Fu D. Does University-Industry collaboration improve innovation efficiency? Evidence from Chinese Firms[J]. *Economic Modelling*, 2020, 86: 39-53.
8. Romero-Sánchez A, Perdomo-Charry G, Burbano-Vallejo E L. Exploring the entrepreneurial landscape of university-industry collaboration on public university spin-off creation: A systematic literature review[J]. *Heliyon*, 2024, 10(19): e27258.
9. Marques C S, Ferreira J J, Marques C P et al. Understanding university-industry collaboration: a social exchange perspective on the entrepreneurial university[J]. *The Journal of Technology Transfer*, 2024 (prepublish): 1-20.
10. Ankras S, Al-Tabbaa O. Universities-industry collaboration: A systematic review[J]. *Scandinavian Journal of Management*, 2015, 31(3): 387-408.
11. Rossoni A L, de Vasconcellos E P G, de Castilho Rossoni R L. Barriers and facilitators of university-industry collaboration for research, development and innovation: a systematic review[J]. *Management Review Quarterly*, 2024, 74(3): 1841-1877.

12. Rossi F. The drivers of efficient knowledge transfer performance: evidence from British universities[J]. *Cambridge Journal of Economics*, 2018, 42(3): 729-755.
13. Temel S, Dabić M, Murat Ar I et al. Exploring the relationship between university innovation intermediaries and patenting performance[J]. *Technology in Society*, 2021, 66: 101665.
14. Muscio A, And Vallanti G. Perceived Obstacles to University–Industry Collaboration: Results from a Qualitative Survey of Italian Academic Departments[J]. *Industry and Innovation*, 2014, 21(5): 410-429.
15. Zhou X, Jia M, Li W et al. Higher education or scientific research: Which one contributes more to China's green innovation? [J]. *Socio-Economic Planning Sciences*, 2024, 94: 101919.
16. Li W, He C. The role of Industry-University-Research collaboration in regional technological diversification: An empirical study on the pharmaceutical industry in China [J]. *Applied Geography*, 2024, 171: 103393.
17. Zhao Y, Yongquan Y, Jian M et al. Policy-induced cooperative knowledge network, university-industry collaboration and firm innovation: Evidence from the Greater Bay Area [J]. *Technological Forecasting and Social Change*, 2024, 200: 123143.
18. Xu A, Qiu K, Zhu Y. The measurements and decomposition of innovation inequality: Based on Industry – University – Research perspective [J]. *Journal of Business Research*, 2023, 157: 113556.
19. Yue W. Research on the path of local colleges participating in community education of affordable rental housing in industrial parks [J]. *Heliyon*, 2024, 10(8): e29535.

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