Research on Innovation of Guangdong Taiwan Vocational Education Cooperation Mechanism from the Perspective of Industry Education Integration——A Case Study of Modern Industrial Service Practice at Zhongshan Polytechnic

Yijiao Qian[1,a], Xuexue Pan[1,b,*], Shuizhen Fu[1,c,*]

[1]Zhongshan Advanced New Functional Materials Engineering Technology Research Center, Zhongshan Polytechnic, 528400, Zhongshan, China
[a]qianyijiao@zspt.edu.cn, [b]panxuexue@zspt.edu.cn, [c]fushuizhen@zspt.edu.cn
*Corresponding author

Abstract: *Under the "Outline of the Plan for Building a Strong Education Country (2024-2035)", deepening industry-education integration is crucial for aligning higher education reform with modern industrial development. This study examines Zhongshan Polytechnic as a case study, highlighting the innovation mechanisms in Guangdong-Taiwan vocational education cooperation. It explores how cross-strait higher education resources can empower regional industrial upgrading through practices such as elevator engineering training, teacher-student exchanges, and cross-border e-commerce collaboration. These initiatives demonstrate how vocational education breaks down barriers to industry-education integration and fosters new quality productivity via a triple mechanism: two-way empowerment between education supply and industry demand, digital transformation (e.g., AI and virtual training), and institutional breakthroughs (e.g., policy coordination and school-enterprise contracts). The study further proposes a "government-school-enterprise-Taiwan" collaborative ecosystem and suggests establishing a Guangdong-Hong Kong-Macao Greater Bay Area industry-education integration community, offering a replicable "Zhongshan Plan" for higher education to serve local socioeconomic development.*

Keywords: *Industry Education Integration, Guangdong Taiwan Higher Education Cooperation, Vocational Education Reform, Modern Industrial Development, Two-Way Empowerment Mechanism*

1. Introduction

Under the guidance of the strategy of building a strong education country in the new era, the "Outline of the Plan for Building a Strong Education Country (2024-2035)" clearly proposes the core task of "deepening higher education reform and promoting the deep integration of education and modern industrial system" [1]. Higher education, as an important combination of technology as the primary productive force, talent as the primary resource, and innovation as the primary driving force, urgently needs to break down barriers to industry education collaboration through structural reforms and empower the development of new quality productive forces [2-4]. Especially within the framework of cross-strait higher education cooperation, Guangdong and Taiwan have become natural testing grounds for exploring the modernization path of higher education due to their strong industrial complementarity and high cultural homology [5]. However, current vocational colleges still face challenges in serving local industries, such as a curriculum system lagging behind technological iteration, inefficient integration of school enterprise resources, and loose cross-border cooperation mechanisms, which restrict the deep coupling of the education chain, talent chain, and industry chain [6]. As a pioneer in vocational education in the Guangdong-Hong Kong-Macao Greater Bay Area, Zhongshan Polytechnic has initially established a collaborative innovation ecosystem for vocational education between Guangdong and Taiwan through cross-border training in elevator engineering technology, Taiwan teacher-student exchange programs, and cross-border e-commerce industry education integration bases in recent years.

This study takes this as a starting point and focuses on the core issue: how can vocational colleges innovate through the Guangdong Taiwan cooperation mechanism, break through the barriers of industry education integration, and achieve two-way empowerment of education and industry? Based on this, this

article aims to systematically analyze the practical logic of the university's Guangdong Taiwan cooperation in serving local industries, extract a replicable "education industry region" three-dimensional linkage model, and provide empirical reference for higher education reform across the Taiwan Strait. The full text is divided into six parts: the introduction explains the research background and problems; The second part constructs a theoretical framework for the integrated development of education, technology, and talent; The third part analyzes the practical cases of Zhongshan Polytechnic 's Guangdong Taiwan cooperation service industry; The fourth part reveals institutional barriers in current cooperation; The fifth part proposes countermeasures and suggestions for the four-dimensional coordination of "government school enterprise Taiwan"; Conclusion: Summarize the path value of Guangdong Taiwan vocational education driving regional industrial upgrading.

2. Theoretical basis: Integrated development of education, technology, and talent

2.1 Policy Connotation and Era Requirements

The Outline of the Plan for Building a Strong Education Country (2024-2035) defines "education, technology, and talent" as the "three in one" core engine driving the construction of a modern industrial system for the first time, requiring higher education to achieve deep synergy among the three elements through structural reform. The essence of this framework is to break the traditional education closed loop and promote the dynamic adaptation of knowledge production (education), technology transformation (technology), human capital (talent) and modern industries. For vocational education, its core mission is to cultivate "technical application-oriented talents" and directly serve the needs of regional industrial chain upgrading. The establishment of the Cross Strait Higher Education Forum is based on the complementarity of industries between Guangdong and Taiwan (such as Guangdong's manufacturing industry and Taiwan's semiconductor and service industries), exploring how cross regional education collaboration can accelerate this process.

2.2 Education Chain Support: The Modern Industrial Role of Vocational Education

The core function of vocational education in modern industries is to bridge the 'skills gap'. Unlike traditional academic education, it directly embeds talent supply into local industrial demand through job oriented courses (such as the Elevator Engineering Technology major at Zhongshan Polytechnic) and dual education mechanisms between schools and enterprises. Taking the Guangdong Taiwan vocational education cooperation as an example, the coupling of Taiwan's vocational education system (such as the precision manufacturing course at Longhua University of Science and Technology) with Guangdong's industrial clusters (such as Zhongshan Intelligent Manufacturing) can optimize the efficiency of talent chain industry chain matching. This process needs to be linked by the integration of industry and education, and the current bottleneck is that curriculum updates lag behind technological iterations. For example, the popularization of artificial intelligence in the manufacturing industry has forced traditional mechanical majors to transform towards "electromechanical intelligent control".

2.3 Technology Chain Driven: Digitization Reshaping the Education Ecology

Digitization is systematically reshaping the vocational education ecosystem from three levels: tools, models, and values. At the tool level, intelligent technologies such as AI and VR/AR have reconstructed teaching scenarios. For example, Zhongshan Polytechnic has introduced a "virtual elevator fault maintenance system" in its overseas cooperative education project, significantly improving training efficiency and reducing safety risks. At the mode level, big data analysis has promoted the implementation of personalized learning, by collecting student operation data (such as the trajectory of CNC machine tool usage), dynamically adjusting course modules jointly developed by Taiwanese teachers, and forming a closed-loop optimization mechanism of "teaching feedback optimization". At the value level, digitalization has realized the feedback of technology to industrial innovation. A typical case is the "Cross border E-commerce Digital Intelligence Laboratory" jointly built by Zhongshan Polytechnic and Taiwanese enterprises. By converting student live streaming data into product design references, it effectively helps traditional lighting companies explore overseas markets, reflecting the transition of educational achievements to industrial value.

2.4 Talent Chain Upgrade: Integrated Training from the Perspective of New Quality Productivity

The essence of "new quality productivity" is talent driven innovation, which requires vocational education to break through the traditional single dimension of "skill training" and build a three-dimensional goal system with "technical literacy+innovative thinking+cross-cultural ability" as the core. In terms of technical literacy, emphasis is placed on cultivating the ability to transfer technology. For example, in the "Elevator Intelligent Monitoring System Development" project guided by teachers in Taiwan, students learned to apply IoT technology to local elevator maintenance enterprises, achieving the transformation of technology from learning to application. In terms of innovative thinking, through joint projects between Guangdong and Taiwan such as "Semiconductor Packaging Process Optimization", students' awareness of technological improvement and process optimization is stimulated. In terms of cross-cultural competence, relying on the Taiwan Exchange Student Program (29 participants in a single year in 2019, with a total of 204 students and 275 teachers from 2013 to 2019, divided into 10 and 18 batches of exchanges), students have effectively deepened their understanding of the industrial differences between the two sides of the Taiwan Strait, and enhanced their adaptability and competitiveness in employment and services in areas where Taiwan funded enterprises gather, such as the electronics industry cluster in Zhongshan City.

Theoretical Logic of Guangdong Taiwan Cooperation: Resource Sharing and Institutional Complementarity

The theoretical basis of Guangdong Taiwan higher education cooperation stems from the triple complementarity of resources, culture, and institutions. At the resource level, Guangdong's strong industrial scale (such as the manufacturing cluster in the Guangdong-Hong Kong-Macao Greater Bay Area) and Taiwan's mature experience in vocational education (such as the "dual teacher system" teacher system) form a synergistic advantage, promoting the deep integration of the education chain and the industrial chain. Cultural identity constitutes the soft support for cooperation, and language homogeneity and geographical proximity significantly reduce communication costs. For example, the frequent visits of Taiwanese teachers and students in 2023 (reaching 33 people) reflect a low friction interactive ecology. At the institutional level, the two sides have effectively overcome structural barriers such as credit recognition and qualification exchange caused by cross-strait policy differences through contractual cooperation through the "school enterprise association", providing cross-border institutional guarantees for the integrated cycle of "education technology talent", thereby consolidating the institutional foundation for sustainable cooperation.

3. School Practice Analysis: The Experience of Zhongshan Polytechnic

3.1 Practical Framework: Collaborative Logic of Bi directional Empowerment and Local Service

Based on the industrial development needs of the Guangdong-Hong Kong-Macao Greater Bay Area, Zhongshan Polytechnic has established a practical framework for the integration of the "education supply chain industry demand chain regional value chain" (as shown in Figure 1), aiming to achieve two core functions of two-way empowerment and service to the local area through cooperation between Guangdong and Taiwan. In the two-way empowerment, on the one hand, the college leverages industrial technology to support educational upgrading, such as introducing enterprise engineers to participate in course development; On the other hand, using educational resources to drive industrial innovation and promote the transformation of student research and development achievements. In terms of serving the local community, the college closely connects with the three major industrial clusters of "smart home, optoelectronic manufacturing, and cross-border e-commerce" in Zhongshan City, and aims to cultivate technical and skilled talents and provide industrial solutions. The cooperation between Guangdong and Taiwan plays a catalytic role in the overall framework, effectively accelerating the process of local industry education integration by introducing Taiwan's vocational education experience (such as the precision manufacturing course at Longhua University of Science and Technology) and the technical standards and industrial resources of Taiwanese funded enterprises.

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┌─────────────────────┐      ┌─────────────────────┐      ┌─────────────────────┐
│ Education supply chain│ ◄──► │  Guangdong Taiwan   │ ◄──► │ Industrial demand   │
│ (curriculum/faculty) │      │ Cooperation Platform │      │ chain (technology/job)│
└─────────────────────┘      └─────────────────────┘      └─────────────────────┘
          ▲
          │
          ▼
┌─────────────────────┐
│ Regional value chain (talent│
│  output/technical services) │
└─────────────────────┘
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Figure 1: The "Three Chain Integration" Practice Framework of Zhongshan Polytechnic.

3.2 Key practice areas

3.2.1 Section Titles

The Taiwan exchange student program launched between 2013 and 2025 is the core carrier for schools to promote cross-strait education and mutual learning. This project is based on course co research, inviting Taiwanese teachers to participate in the development of six courses including "Semiconductor Packaging Technology" and "Smart Home Design", and integrating them into the technical standards of electronic enterprises in the Torch Development Zone of Zhongshan City. For example, in 2019, 29 Taiwanese exchange students participated in course co construction. In terms of skill co training, the project collaborates through the "mixed training of students from both sides of the Taiwan Strait" model, such as the "Robot System Integration" project with Taiwan Universal University of Science and Technology in 2024, which enables Zhongshan students to master Taiwan's precision carving technology, while Taiwanese students learn about Zhongshan's intelligent lighting solutions, thus enhancing the adaptability of industrial skills in both directions. At the same time, the project actively promotes teacher sharing and has introduced a total of 12 Taiwanese university teachers as industry mentors to participate in guiding practical training modules such as elevator safety testing and cross-border e-commerce operations, effectively shortening the job adaptation cycle for students after employment.

3.2.2 Case of Industry Education Integration: Breaking down Barriers and Developing New Quality Productivity

The school has effectively broken through the barriers of school enterprise collaboration by using "technology research and development" projects as a link. In terms of the integration and innovation of elevator engineering technology, the school has jointly established the "Elevator Application Scenario Training Room" and "Elevator Component Training Room" with Laos Babba Technical College and Laos Best Elevator Co., Ltd., and developed a VR maintenance system based on real fault data provided by enterprises (such as Hitachi Elevator Zhongshan Company). By 2023, 59 enterprise employees will have completed training. At the same time, the "Elevator Door Machine Frequency Conversion Control Module" developed by the student team has been adopted by Tongli Elevator, reducing the failure rate by 40% and achieving effective feedback from educational achievements to the industry. In addition, the school also targeted the pain points of "difficult digital transformation" for small and medium-sized enterprises in Zhongshan. In July 2024, it conducted "AI quality inspection technology" training for 10 lighting companies, organized 60 students to participate in data annotation, and helped enterprises improve quality inspection efficiency by 200%. The participating students further established an "Intelligent Inspection Studio" to provide customized low code quality inspection solutions for local enterprises, reflecting the positive role of vocational education in incubating new quality productivity.

3.2.3 Serving Local Industries: Localized Application of Cross border Resources

In the process of deepening the integration of international cooperation projects with the industrial chain needs of Zhongshan City, the project has made substantial progress in multiple directions. In terms of cooperation with Hong Kong, in 2023, the "Hand Model Making Experience" event was successfully held to promote Zhongshan Redwood Carving Intangible Cultural Heritage skills to nearly 100 Hong Kong teachers and students, effectively driving a 15% increase in local handicraft orders; The talent diversion effect will further manifest in 2024, with 33 students from the Hong Kong Institute of Vocational Education (Sha Tin) participating in the "Smart Home Installation" training program, of which 8 have officially signed contracts with Zhongshan Enterprises. At the same time, cross-border live streaming e-commerce services have effectively empowered the local traditional manufacturing industry. For example, in December 2024, the project organized 16 students to conduct TikTok multilingual live streaming for Zhongshan Lighting Enterprise under the joint guidance of Guangdong and Taiwan teachers, helping the enterprise explore the Southeast Asian market and achieve monthly turnover

exceeding 500000 yuan. This successful model has also been replicated in the international exchange program in Laos, training localized marketing teams for Zhongshan foreign trade enterprises and achieving effective output of experience.

3.2.4 Digitized Applications: Technology Reshaping the Education Ecology

In the practice of fully empowering collaborative processes with digitalization, the project has achieved multidimensional results. In terms of teaching, through the "Chinese Bridge" project in 2022 and 2023, a total of 541 students from Laos, Vietnam, and Tanzania have been provided with "Chinese+Vocational Skills" training that integrates AI language accompaniment systems. Among them, the "Chinese" section helps students master the basics of Chinese language and listening, speaking, reading, and writing skills through language exchange and cultural cognition courses, and deepens their understanding of Chinese culture; The "Vocational Skills" module enables students to be exposed to cutting-edge Chinese technology and master practical skills such as industrial robots. In terms of management, the development of the "Guangdong Taiwan Credit Bank" blockchain platform has achieved mutual recognition of credits for 36 course modules across the Taiwan Strait, improving management efficiency. In terms of industry integration, elevator training data has been integrated into the Zhongshan Special Equipment Monitoring Platform, which can provide real-time fault warnings to maintenance enterprises. By 2023, it will save local enterprises 1.2 million yuan in maintenance costs, achieving an effective combination of industry education collaboration and safety management.

3.3 Effectiveness Analysis: The Practical Value of Bi directional Empowerment

The Guangdong Taiwan cooperation project has effectively promoted the two-way value-added of education and industry through the three in one output mechanism of "talent technology standards". In terms of talent enhancement, 85% of the participating students in the Taiwan exchange student program were given priority employment by Taiwanese funded enterprises. For example, 12 students who signed with Zhongshan Taisheng Smart Home Company in 2024 led the completion of the intelligent transformation of the production line within six months of joining. On the technical level, six technologies, including the elevator virtual maintenance system incubated in the project, have obtained national patents and have been purchased and applied by three Zhongshan enterprises. In terms of standard construction, the "Cross border E-commerce Talent Certification Standard" jointly established with Taiwan's Angelis College has become the employment benchmark for 500 enterprises in the 1688 Industrial Belt of Zhongshan City. The core breakthrough of this project lies in breaking the limitations of traditional vocational education that emphasizes skills over innovation. Through cross-border resource integration, it promotes the school to upgrade from a "talent supplier" to an "industry innovation partner", highlighting the core value of higher education in modern industrial development.

4. Issues and Challenges: Deep Barriers to the Integration of Industry and Education in Guangdong and Taiwan

Although Zhongshan Polytechnic has achieved significant results in the cooperation between Guangdong and Taiwan, practice has shown that institutional barriers, technological transformation bottlenecks, and cross-border cooperation contradictions still constrain the deepening development of industry education integration, directly hindering the incubation of new quality productive forces, and urgently requiring systematic solutions in higher education reform. Specifically, the stability of cooperation faces dual challenges of policy fluctuations and resource imbalances: on the one hand, differences in education policies between the two sides of the Taiwan Strait lead to difficulties in project implementation, such as conflicts between the credit recognition standards of Taiwanese universities and the vocational education system in Chinese mainland, significantly reducing the willingness of mainland students to study in Taiwan; During the COVID-19 in 2020, the number of exchange students in Taiwan dropped sharply to zero, which also exposed the lack of emergency mechanism, resulting in the stagnation of alternative projects such as "live broadcast e-commerce" due to the lack of interaction between Taiwanese teachers. On the other hand, there is a gap in resource supply, and the motivation for enterprise participation is generally insufficient. For example, in elevator training projects, only 30% of cooperative enterprises (such as Hitachi Elevator) are willing to open core data for teaching and research and development. Most enterprises refuse to share fault databases due to technical confidentiality, resulting in insufficient training samples for VR maintenance systems, which in turn affects the actual effectiveness of technology transformation.

4.1 Pain points of the disconnect between industry and education: the triple contradiction of the implementation of digitalization and intelligence

The digitalization empowerment industry is facing a clear disconnect between teaching and production, mainly reflected in three contradictions: first, the contradiction between technological advancement and job lag. For example, although the AI quality inspection course developed by Taiwanese teachers introduces machine learning algorithms, small and medium-sized lighting enterprises in Zhongshan still rely on manual quality inspection, which makes it difficult for students to directly apply the skills they have learned (only two enterprises will deploy AI quality inspection lines in 2024); Secondly, there is a mismatch between education investment and industry return cycles. For example, the research and development of elevator intelligent monitoring requires continuous investment (with an annual maintenance cost of over 500000 yuan for sensor networks), while enterprises tend to purchase mature solutions, resulting in a low conversion rate of student patents (only 1 out of 6 patents will be commercially available in 2023); Thirdly, data barriers constrain ecological collaboration. Although the "Guangdong Taiwan Credit Bank" blockchain platform has been established, the cross-border flow of data between the two sides of the Taiwan Strait is restricted (such as the inability to transmit training data of Taiwanese students), which limits the personalized promotion of teaching optimization.

4.2 Special bottleneck of Guangdong Taiwan cooperation: imbalance between cultural identity and institutional nesting

The cooperation between Guangdong and Taiwan in higher education hides deep conflicts beneath the cultural surface. On the one hand, implicit cultural barriers are becoming increasingly apparent: Taiwanese teachers and students often feel uncomfortable with the "efficiency first" work pace of mainland enterprises, such as Zhongshan enterprises requiring 24-hour response to equipment failures; However, mainland students generally believe that Taiwan's curriculum emphasizes theory over practical experience. Taking semiconductor packaging technology as an example, the teaching content lacks support from actual production line cases. On the other hand, there is also a phenomenon of ineffective nested systems at the institutional level: although universities on both sides of the Taiwan Strait have frequently held "collective signing ceremonies" in recent years, only 5 out of the 14 cooperation projects signed in the past three years have actually been implemented. The lack of mutual recognition of qualifications is one of the important obstacles, for example, the certification of Taiwanese elevator engineers is not recognized in the special equipment industry in Chinese mainland, resulting in students having to repeat the certification process; At the same time, there is a vacuum in the mechanism for safeguarding rights and interests, and the compensation standards for work-related injuries of interns in Taiwan funded enterprises are vague. The definition of school enterprise responsibilities is also unclear - disputes arose in 2024 as a result, leading to the suspension of related cooperation projects. If these structural problems cannot be effectively resolved, they will continue to constrain the deepening of education cooperation between Guangdong and Taiwan.

4.3 The Common Essence of Challenges: Systemic Fracture of Industry Education Integration

The above issues reflect the rupture of the integration of production and education at the institutional level (policy coordination), technical level (supply-demand matching), and cultural level (value consensus) (Figure 2). The fundamental crux of the problem lies in the fact that vocational education is still positioned as a vassal of the industry, rather than a co construction subject of new quality productivity. For example, the confidentiality of enterprise data in elevator projects is essentially an imbalance in property rights distribution, and schools have failed to share industrial innovation benefits through mechanisms such as technology investment; The failure of the Guangdong Taiwan signing project exposes the conflict between the lack of a third-party arbitration platform coordination system across the Taiwan Strait.
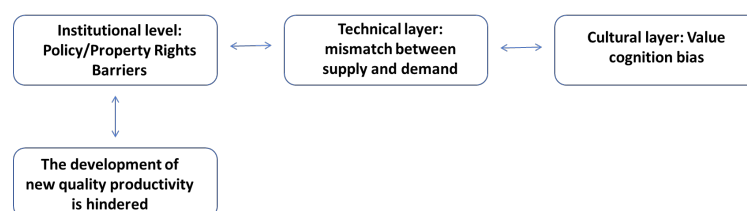

Figure 2: Systematic Fracture Model of Industry Education Integration.

5. Countermeasure suggestion: Build a new ecology of Guangdong Taiwan industry education integration

Based on the bottleneck in the practice of Zhongshan Polytechnic, this study proposes a four-dimensional collaborative framework of "system industry technology policy" (Figure 3), aiming to break through the barriers of industry education integration, strengthen two-way empowerment, and provide a replicable action path for cross-strait higher education cooperation.
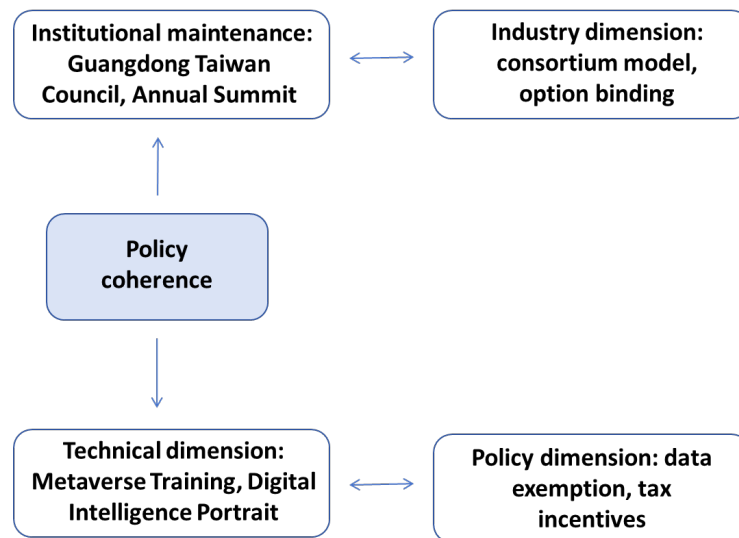

Figure 3: Systematic Fracture Model of Industry Education Integration.

5.1 Macro Mechanism Innovation: Building a Guangdong Taiwan Higher Education Community

Deepening cooperation between Guangdong and Taiwan requires going beyond fragmented signing models and building institutionalized collaborative mechanisms. To this end, a Guangdong Taiwan Industry Education Integration Council can be established, jointly led by the Guangdong Provincial Department of Education, Dongguan Taiwan Business Seedling Foundation, and Taiwan University Association, to establish a permanent institution to coordinate the functions of the three parties: promoting the exchange of credit recognition and professional qualification evaluation standards between the two sides of the Taiwan Strait, such as establishing a unified framework for cross-border certification in fields such as elevator engineers; integrating enterprise technology requirements with university patent resources to achieve precise matching and scheduling of research and development projects; and establishing a dispute arbitration mechanism to effectively resolve performance disputes in school enterprise cooperation and reduce cooperation risks. At the same time, a Guangdong-Hong Kong-Macao-Taiwan Industry Education Integration Forum should be established and upgraded to an annual summit, with a closed-loop process of "school enterprise signing achievement roadshow policy release" added to promote the conversion of cooperation intentions into substantive projects, striving to achieve a project landing rate of 80% within three years.

5.2 Deep integration of industries: promoting the "three chain coupling" Zhongshan model

Taking mature projects such as elevator engineering and cross-border e-commerce as examples, a standardized industrial empowerment path can be constructed, with the core of promoting and replicating the model and designing a mechanism for interest binding. In terms of promoting the model, the focus is on extracting and replicating the successful experience of the "Elevator Industry Education Alliance" to industries such as Zhongshan Smart Home and Optoelectronic Manufacturing. The specific path is: first, identify the pain points of the enterprise (such as low efficiency of manual quality inspection of lighting fixtures), then import targeted technical resources from the school (such as offering AI quality inspection courses), and then have the student entrepreneurship team undertake actual projects (establish intelligent testing studios), ultimately achieving a significant improvement in industrial efficiency (such as a 200% increase in quality inspection efficiency). On the mechanism of interest binding, on the one hand, technology can be used to invest, that is, schools can invest in joint ventures with intellectual property such as patents at a price (such as elevator intelligent monitoring modules holding 10% of the shares),

thereby continuously sharing the benefits of industrial value-added; On the other hand, talent option incentives can be established, such as Taiwanese funded enterprises pre signing student employment agreements and promising to grant technical backbone options to students upon entry, in order to achieve deep binding and long-term win-win among schools, students, and enterprises.

5.3 Educational Digitalization Innovation: AI Driven Teaching Revolution

In the context of digital transformation, the construction of an intelligent system covering the entire chain of "teaching training evaluation" is being comprehensively upgraded. The virtual training session utilizes the development of the "Elevator Fault Metaverse Laboratory" to integrate the rich experience of Taiwanese teachers with practical cases from mainland Zhongshan enterprises (such as Hitachi Elevator Fault Database), achieving cross temporal and collaborative training; Simultaneously utilizing generative AI to simulate industry emergencies (such as a surge in cross-border e-commerce orders), effectively training students' emergency decision-making and problem-solving abilities. In terms of digital profiling, the system constructs a "ability position" matching model based on the learning data of Taiwanese exchange students, and dynamically recommends suitable enterprise internship projects. The system generates accurate "talent adaptation reports" for Taiwanese funded enterprises (such as matching students majoring in mechatronics for smart home enterprises), significantly reducing recruitment costs by 50%, empowering personalized talent cultivation and meeting the needs of enterprises for efficient employment.

5.4 Precise Policy Supply: Releasing Local Service Momentum

To strengthen the function of vocational education in serving local economic development, it is suggested that the Guangdong Provincial Government introduce special policies to promote deep cooperation in vocational education between Guangdong and Taiwan. Firstly, a "whitelist" mechanism for cross-border data flow can be piloted in Guangdong Taiwan cooperation demonstration zones (such as Zhongshan Torch Development Zone), allowing Taiwanese teachers and students' training data to be used for teaching optimization after anonymization, in order to break through the data barriers of blockchain platforms. Secondly, the provincial government should implement coordinated fiscal and tax incentive measures: in the education sector, enterprises participating in Guangdong Taiwan cooperation projects will be subject to value-added tax reductions and exemptions, such as deducting 30% of their training expenses from their taxable amount; On the industrial side, the technical service income of vocational schools is exempt from income tax to incentivize the transformation of patent achievements. At the same time, it is suggested to establish a talent special zone policy, granting Taiwanese teachers a "technology talent visa" and allowing them to work part-time as enterprise technical consultants in places such as Zhongshan; And the zone administration should provide "Greater Bay Area Employment Allowance" to Taiwanese students who have signed contracts with Zhongshan enterprises, further enhancing the support of vocational education for local industrial development.

6. Conclusion: The Path of Guangdong Taiwan Vocational Education Cooperation Empowering an Education Strong Country and Its Implications

This study uses Zhongshan Polytechnic as an empirical carrier to systematically demonstrate the strategic value of Guangdong Taiwan higher education cooperation in deepening industry education integration and driving modern industrial upgrading. Practice has proven that vocational education has effectively broken through the barriers between the education chain and the industry chain through a triple mechanism of institutional collaboration (such as the joint laboratory of elevator engineering), technological integration (such as the development of AI quality inspection courses), and talent co education (such as the mixed training of exchange students in Taiwan), achieving two-way empowerment of higher education and modern industries. The "three chain integration" model explored by Zhongshan Polytechnic, which connects the education supply chain with the industrial demand chain and activates the regional value chain through the Guangdong Taiwan cooperation chain, provides a replicable action framework for vocational colleges in the Guangdong-Hong Kong-Macao Greater Bay Area to serve the local economy. Its universality is reflected in the promotability of the curriculum co construction mechanism, such as the semiconductor packaging and smart home courses participated by Taiwanese teachers, which have been exported to 12 vocational colleges in the Pearl River Delta; The replicability of technology transformation paths, such as the successful implementation of elevator virtual maintenance systems in manufacturing training bases in Foshan and Dongguan; And the referenceability

of cross-border governance experience, such as the inclusion of the Guangdong Taiwan Credit Bank blockchain platform in the "Guangdong-Hong Kong-Macao Greater Bay Area Education Cooperation Action Plan (2026-2030)". In order to achieve the goal of building a strong education country, future research needs to further explore the construction of a new quality productivity evaluation system to quantify the contribution of vocational education in industrial innovation. The central and provincial governments should promote the institutional design of deep integration between the two sides of the Taiwan Strait, establish a "negative list" for the integration of industry and education between Guangdong and Taiwan, and solve policy bottlenecks such as cross-border data and mutual recognition of qualifications; And improve the ethical framework for digitalization, defining key issues such as data property ownership in AI education applications. The continuous holding of the Cross Strait Higher Education Forum has provided a top-level dialogue platform for solving the above-mentioned problems. Only by adhering to the principle of "convergence, assimilation, differentiation, mutual benefit and win-win", and promoting the transition from resource complementarity to institutional co creation between the two sides, can higher education truly become the engine of an educational powerhouse. As demonstrated by the experience of Zhongshan, when vocational colleges can transform elevator maintenance workers into intelligent monitoring system designers and upgrade lighting quality inspectors into AI trainers through Guangdong Taiwan cooperation, education will achieve a leap from "adapting to industries" to "defining industries" - this is exactly the core mission of higher education in the new era given by the "Outline of the Plan for Building an Education Strong Country".

Acknowledgements

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