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Challenges and Paths for Vocational Education Empowering Regional High-Quality Development from the Perspective of New Quality Productive Forces: An Empirical Study Based on Guangdong Vocational Education City

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ABSTRACT
Drawing upon ERG Theory and Social Capital Theory, this study examines 10 higher vocational colleges in Guangdong Vocational Education City (GVEC) to explore the practical dilemmas and optimization paths of vocational education in empowering regional New Quality Productive Forces. Through a combination of questionnaires, interviews, and statistical data analysis, the research identifies several critical issues: a low local employment rate among graduates in Qingyuan, a misalignment between academic programs and Qingyuan's "Eight Major Industry Clusters," and the superficiality of industry-education integration. The study reveals the internal mechanism by which vocational education empowers New Quality Productive Forces through talent supply, technical synergy, and engagement of all parties involved. From the collaborative perspective of "Exogenous Support" and "Endogenous Development," this paper proposes a four-dimensional collaborative framework encompassing "Industry-Education-Policy-City." It suggests specific implementation paths -- such as dynamic adjustment of majors, deepening industry-education integration, and optimizing the "youth ecosystem" -- to enhance the adaptability and contribution of vocational education to regional high-quality development, providing a reference for similar regions.

Keywords: *Vocational education, New quality productive forces, High-quality development, ERG theory, Social capital theory, Guangdong Vocational Education City*

1. INTRODUCTION: RESEARCH BACKGROUND AND PROBLEM STATEMENT

The cultivation of New Quality Productive Forces serves as the core driver for regional high-quality development, with its essence lying in the innovative allocation of productive factors such as technology, talent, and data [1]. For Qingyuan, such allocation must be grounded in the demands of the "Eight Major Industry Clusters" to achieve a deep integration between labor factors and the local modern industrial system through the precise supply of high-quality technical and skilled talents from the GVEC. As the educational form most directly linked to industry, vocational education plays a vital role in cultivating high-caliber technical talents and driving regional industrial upgrading [2].

Guangdong Vocational Education City hosts 10 higher vocational colleges with a student population exceeding 100,000, and is strategically positioned as a vital talent hub for Qingyuan's industrial growth. However, empirical data reveal a stark structural misalignment: the local employment rate of the 2022 graduates from the Vocational Education City was only 4.2% [3], underscoring the phenomenon of "training in Qingyuan but working in the Greater Bay Area." While existing literature predominantly focuses on macro-level discussions

of New Quality Productive Forces [4][5], there is a lack of empirical analysis based on regional data, particularly regarding how vocational education specifically empowers local productivity. This deep-seated issue of insufficient adaptability and inefficient transformation mechanisms reflects significant implementation obstacles between vocational education and the development of local New Quality Productive Forces.

To address these challenges, this paper constructs a three-dimensional analytical framework: "Theory - Empirical Analysis - Path." First, it applies ERG Theory to analyze factors influencing students' intentions to remain in Qingyuan, while utilizing Social Capital Theory to elucidate the systemic barriers to industry-education integration. Second, through survey data and statistical methods, it identifies the practical "decoupling points" between vocational education and New Quality Productive Forces. Finally, from the dual perspective of "Exogenous Support" (policy guidance and industrial pull) and "Endogenous Development" (optimization of educational supply and construction of urban ecosystems), the study proposes practical paths for vocational education to adapt to New Quality Productive Forces. This research seeks to enhance the support effectiveness of vocational education for Qingyuan's high-quality development and provide a reference for similar regions in promoting the deep integration of vocational education and industry.

2. PRACTICAL LINKAGE BETWEEN VOCATIONAL EDUCATION AND NEW QUALITY PRODUCTIVE FORCES: EMPIRICAL INVESTIGATION AND FINDINGS BASED ON GUANGDONG VOCATIONAL EDUCATION CITY

2.1 Research Design and Data Sources

This study was conducted between March and October 2025. The research subjects included current students and recent graduates (within the past three years) from 10 higher vocational colleges in GVEC, as well as career guidance counselors and Human Resources (HR) managers from relevant enterprises in Qingyuan. A triangulation strategy was employed to ensure the validity of the research findings through multiple data sources.

2.1.1 Questionnaire Survey

A total of 409 valid questionnaires were collected, utilizing a five-point Likert scale for measurement. Data analysis was performed using SPSS 25.0, demonstrating robust reliability and validity (Cronbach's Alpha > 0.8 and KMO value > 0.7).

2.1.2 In-depth Interviews

Semi-structured interviews were conducted with 20 participants, including corporate HR managers, career guidance counselors, and graduates employed in Qingyuan. These interviews aimed to explore specific issues and experiences regarding talent cultivation and collaborative mechanisms.

2.1.3 Official Statistical Data

Panel data for Qingyuan from 2013 to 2023 were collected. Primary sources included the Qingyuan Statistical Yearbook published by the Qingyuan Municipal Bureau of Statistics, as well as annual reports from the Bureau of Science and Technology, the Bureau of Industry and Information Technology, and the Bureau of Human Resources and Social Security. These data provide an authoritative basis for constructing the development index of regional New Quality Productive Forces.

2.2 Core Findings: Survey Results Derived from Data

2.2.1 Significant Trend of "Training in Qingyuan, Working in the Greater Bay Area"

The questionnaire survey reveals a dual low status of both graduates' intention and actual retention rate in Qingyuan. Only 18.34% of students express a willingness to develop their careers in Qingyuan after graduation, while over 80% prefer the Pearl River Delta (PRD) region. This intention is directly reflected in the actual employment data: the average local employment rates for graduates from the Vocational Education City in the 2022 and 2023 cohorts were only 4.2% [3] and 3.7% [6], respectively. Even among students born and raised in Qingyuan, the intention to remain for work is merely 36.11%. A statement from a local accounting student reflects a common contradiction: "I have an emotional bond with my hometown, but local positions offer low salaries

and poor professional alignment. Seeing my roommates receive high-paying offers from Foshan, I feel I should also venture out."

Disparities in economic and career development prospects are the core drivers of this brain drain. More than 80% of graduates eventually migrate to core cities in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), such as Guangzhou, Shenzhen, and Foshan, while 30.07% explicitly refuse to stay in Qingyuan. Respondents generally reported that the average starting salary for similar technical positions in the GBA is significantly higher than in Qingyuan, with the gap reaching as much as 50% for certain roles. A graduate who left after an internship in Qingyuan confessed: "The internship experience in Qingyuan lacked innovation and room for growth; whereas in Shenzhen, I felt a clear sense of professional hope and promotion possibilities." This points to a multi-dimensional gap in Qingyuan's comprehensive urban attractiveness. Regarding the reasons for leaving, 61.86% of students chose "limited personal development space," 60.15% cited "few high-quality local employment opportunities," and 56.48% pointed to "low salary and benefits." Public service facilities (39.85%) and family/social networks (51.83%) were also identified as significant factors.

Despite limited knowledge of local industries, students generally hold high expectations for vocational education to empower New Quality Productive Forces. Their strongest demand is for colleges to provide more opportunities to connect with local emerging enterprises (mean score of 4.12), and they believe that a clear industrial orientation can effectively guide their learning and career planning.

2.2.2 Structural Mismatch Between Program Offerings and the Demands of Qingyuan's Industrial Upgrading

A significant structural deviation exists between educational supply and industrial demand. Within the survey sample, females accounted for 80.44%, reflecting the general orientation of the surveyed higher vocational colleges, which predominantly oriented toward finance, economics, and liberal arts. The professional distribution of graduates is highly concentrated in finance, trade, and commerce (64.30%), while engineering majors — directly related to Qingyuan's key industrial clusters such as advanced manufacturing, biomedicine, and the digital economy — account for less than 20%. This supply structure has led to the simultaneous dilemma of "enterprise recruitment difficulties" and "student employment challenges." A recruitment manager from a smart manufacturing firm in the Qingyuan High-tech Zone noted: "We provide numerous technical positions annually in electromechanics and robotics to the Vocational Education City, yet most resumes we receive are from marketing or accounting majors, resulting in extremely low alignment."

The lag in curriculum updating further exacerbates the contradiction between supply and demand. The curriculum systems of certain majors have failed to incorporate cutting-edge knowledge and skills, such as the Industrial Internet, big data analysis, and artificial intelligence, in a timely manner. For instance, a technical supervisor at a local auto parts enterprise reported that while their intelligent production lines require employees to possess basic industrial data analysis capabilities, most graduates only master traditional equipment operations and lack a systematic understanding of IoT architecture or intelligent diagnostics, necessitating substantial corporate retraining. Career guidance counselors also pointed out that students possess a vague understanding of emerging industries, with their skill sets largely confined to traditional domains.

The slow transformation of teaching resources remains a deep-seated constraint. Although colleges recognize the trend of industrial upgrading, adjusting professional directions faces practical hurdles. An electromechanics instructor confessed: "We are aware that Qingyuan's manufacturing is shifting toward smart manufacturing, but professional restructuring cannot be achieved overnight. Establishing new directions requires substantial investment in new equipment and the recruitment of qualified faculty — goals that are difficult to attain through the university's unilateral efforts alone." This underscores a fundamental disconnection between the pace of educational resource renewal and the speed of industrial technological iteration.

2.2.3 Significant Mismatch Between Corporate Recruitment Needs and Graduate Competencies

From the perspective of corporate feedback, a distinct gap exists between graduate competencies and job requirements. When recruiting, enterprises prioritize comprehensive qualities (91.67%), professional skills (83.33%), and practical

experience (72.92%). However, 75% of the enterprises surveyed believe that graduates exhibit deficiencies in soft skills such as communication and teamwork, while 66.67% indicate that their innovation and complex problem-solving abilities require further enhancement. These market signals provide a clear direction for higher vocational colleges to optimize their cultivation models.

A more deep-seated issue lies in the "superficiality" of industry-education integration. Although 56.25% of enterprises have previously recruited local vocational graduates, collaboration is predominantly confined to the shallow stage of providing internship positions. A significant 87.50% of enterprises expressed a strong desire to co-build internship and training bases, jointly develop curricula, or even collaborate on technological research and development (R&D) with these colleges. As one human resources manager from a new materials company stated: "We are highly willing to transform technical challenges from actual production into joint school-enterprise research projects, yet there is currently a lack of stable cooperation mechanisms and benefit-sharing models."

Consequently, corporate policy demands point strongly toward systemic support rather than simple subsidies: 91.67% of the surveyed enterprises explicitly called for "strengthening the construction of school-enterprise cooperation platforms." This reflects that the core crux lies in systemic barriers such as information asy mmetry between talent supply and demand, as well as obstructed collaboration channels. There is an urgent need to construct a collaborative ecosystem capable of efficiently integrating government, industry, and educational resources, thereby transforming the corporate expectation of "deep synergy" into sustainable educational practices.

3. ANALYSIS OF EXISTING PROBLEMS AND CAUSES

3.1 Comprehensive Assessment of the Development Level of New Quality Productive Forces

To objectively assess the actual level of New Quality Productive Forces in Qingyuan and facilitate the subsequent analysis of industry-education alignment, this study constructs a localized comprehensive evaluation index system. Drawing upon relevant theories and the frameworks proposed by Wang and Wang (2024) [7] and Ren et al. (2024) [8], the Entropy Weight Method was employed to measure panel data spanning from 2013 to 2023.

The evaluation framework is constructed across three dimensions: "Innovation Factor Accumulation," "Quality of Industrial Structure," and "Technical Equipment Foundation." Specifically, the "proportion of employees with a junior college degree or higher" and "R&D expenditure as a percentage of GDP" were selected to represent innovation factor inputs. The "added value of high-tech industries as a percentage of GDP" and the "reduction rate of energy consumption per unit of GDP" were used to measure the levels of industrial advancement and green development. Furthermore, the "digitalization rate of production equipment in industrial enterprises above designated size" and "number of invention patents per 10,000 people" reflect the degree of technical equipment modernization. Data were sourced from the Qingyuan Statistical Yearbook and official statistical reports from relevant government departments [9].

Measurement results indicate that from 2013 to 2023, the comprehensive index of New Quality Productive Forces in Qingyuan rose steadily from 0.312 to 0.478, with an average annual growth rate of approximately 4.3%. This suggests continuous progress in industrial transformation, upgrading, and innovative development. Further analysis of the contributions of each dimension reveals that "Innovation Factor Accumulation" (weight: 0.402) and "Technical Equipment Foundation" (weight: 0.351) are currently the primary constraints and bottlenecks.

These assessment results corroborate the micro-level survey findings discussed previously: the development of New Quality Productive Forces in Qingyuan urgently requires the support of high-quality laborers and advanced technical equipment. This precisely identifies the critical target for the reform of higher vocational colleges. Consequently, subsequent research will focus on how vocational education can precisely compensate for these shortcomings through talent supply and technical services, thereby effectively empowering regional high-quality development.

3.2 Existing Problems

3.2.1 Significant Talent "Siphon Effect" and Low Local Conversion Rate of Vocational Education

Survey data indicate that the intention of graduates from the GVEC to remain in Qingyuan for employment is only 18.34%, with the actual local retention rate remaining below 5% for two consecutive years. This has led to a prominent contradiction characterized as "training in Qingyuan, but working in the Greater Bay Area." Such results reflect that the technical and skilled talents cultivated by higher vocational colleges have failed to effectively serve local industries, resulting in a severe decoupling between the talent reserve and the developmental needs of regional New Quality Productive Forces. More than 80% of graduates migrate to core cities in the Guangdong-Hong Kong-Macao Greater Bay Area, primarily driven by disparities in salary, career development opportunities, and public services. This underscores Qingyuan's significant shortcomings in satisfying graduates' Existence, Relatedness, and Growth (ERG) needs.

3.2.2 Structural Mismatch in Talent Supply and Demand with "Superficial" Industry-Education Integration

A significant deviation exists between the supply of vocational education and the industrial development demands of Qingyuan. Program offerings are highly concentrated in finance, trade, and commerce (accounting for 64.30%), while engineering majors related to local key industrial clusters -- such as advanced manufacturing, biomedicine, and the digital economy -- account for less than 20%. Furthermore, a lag in curriculum updates has resulted in a failure to integrate cutting-edge knowledge and skills like the Industrial Internet and Artificial Intelligence in a timely manner, leading to a gap between graduate competencies and job requirements. Most school-enterprise collaborations remain at the shallow stage of providing internship positions. The lack of deep integration mechanisms, such as joint curriculum development and collaborative technical R&D, restricts the organic connection between the education, talent, and industrial chains.

3.2.3 Inadequate Policy Synergy and Youth Development Ecosystems Restricting Systemic Empowerment

Policy resources involving talent cultivation, incentives, and retention are scattered across multiple departments, lacking high-level coordination and linkage. This has led to a "fragmentation" of policy supply, failing to form a comprehensive support chain covering the "recruitment, cultivation, retention, and utilization" of talent. Simultaneously, gaps exist between Qingyuan and core cities in the Pearl River Delta regarding career development space, innovation and entrepreneurship atmosphere, and public service facilities. A common perception among youth is that the city is "suitable for living but not for professional growth," indicating that Qingyuan's ecological resource advantages have not yet been transformed into a sustainable driver for attracting and retaining young talent.

3.3 Causal Analysis

Based on ERG Theory and Social Capital Theory, this study attributes the identified problems to their root causes and reveals the deep-seated mechanisms at play.

3.3.1 Based on ERG Theory: Unmet Multi-level Individual Needs as the Direct Motive for Brain Drain

According to ERG Theory, the needs for Existence, Relatedness, and Growth constitute the fundamental driving forces of individual behavior [10], yet the investigation demonstrates that Qingyuan exhibits significant shortcomings in satisfying these three levels of needs for vocational talent. At the existence level, generally low local salaries and the insufficient supply of high-quality public services have weakened the city's ability to provide basic livelihood security for graduates. Regarding relatedness needs, more than half of the surveyed students gravitate toward the Greater Bay Area -- where interpersonal capital is more concentrated -- due to family and social networks, leading to a profound lack of a sense of belonging and social support networks within Qingyuan. Most critically, growth needs are frustrated by a vague understanding of local emerging industries and a widespread perception that personal career development space is limited (61.86%), resulting in insufficient expectations for future advancement,

which serves as the core "push factor" driving the brain drain from Qingyuan.

3.3.2 Based on Social Capital Theory: Structural Imbalance in Supply and Demand Caused by Imperfect Industry-Education Integration Mechanisms

As Robert Putnam noted, Social Capital Theory emphasizes that trust, norms, and social networks are the critical foundations for enhancing collaborative efficiency [11]. Currently, a close and reciprocal social capital linkage has failed to form between vocational education and local industries. First, network relationships are weak. School-enterprise cooperation remains largely confined to temporary, project-based, and superficial interactions, lacking stable and institutionalized collaboration platforms and communication networks. This leads to information friction between talent supply and demand, as well as high cooperation costs. Second, there is a lack of trust and reciprocal norms. Curriculum updates at higher vocational colleges lag behind technological iterations, while insufficient protection of rights and lack of incentives deter enterprises from deeply participating in talent cultivation. Consequently, it is difficult for both parties to establish deep trust and cooperation norms based on "shared interests and responsibilities." Third, the transformation of social capital is obstructed. The advantage of vocational institutions as "structural holes" -- serving as hubs for knowledge, technology, and talent -- has not been fully leveraged. Their potential social capital, such as faculty-student innovation teams and technical achievements, has not been effectively integrated or transformed within the local industrial ecosystem, resulting in a persistent misalignment between the supply side of talent cultivation and the demand side of industry.

3.3.3 Regional Development Gradients and Lack of Institutional Synergy as Deep-Seated Structural Causes

From a macro perspective, the objective disparities in industrial tier, salary levels, and innovation platforms between Qingyuan and core cities in the Greater Bay Area constitute the fundamental regional economic causes for the talent "siphon effect." Concurrently, the absence of a cross-departmental policy system amplifies micro-level contradictions. Internally, the rigidity of program adjustments within the education system has failed to respond sensitively to job profile shifts driven by New Quality Productive Forces. Externally, the lack of a coordination mechanism to integrate resources across various government departments has led to the fragmentation of talent policies. This makes it difficult to provide systemic incentives and protections for deep school-enterprise cooperation and graduate retention in Qingyuan. Ultimately, the absence of a youth-friendly development ecosystem prevents the city's livability advantages from being fully transformed into sustainable professional attractiveness and a sense of institutional identity.

4. PRACTICAL PATHS: CONSTRUCTING A FOUR-DIMENSIONAL COLLABORATIVE EMPOWERMENT SYSTEM

Based on the dilemmas and causal analysis revealed in the preceding empirical study, this research proposes that efforts should be coordinated across four dimensions: "Industrial Pull, Educational Supply, Policy Synergy, and Urban Ecosystem." The goal is to construct an endogenously driven, closed-loop, and sustainable empowerment system that effectively transforms the talent and intellectual advantages of the GVEC into the core kinetic energy driving the development of New Quality Productive Forces in Qingyuan.

4.1 Industrial Dimension: Strengthening the Pull of New Quality Productive Forces to Create High-Quality Jobs for "Attracting Talent"

The first is expanding emerging industrial clusters. Closely aligning with Qingyuan's "Eight Major Industry Clusters," resources should be concentrated on developing industries such as advanced manufacturing and new materials. By attracting and cultivating key enterprises within the industrial chain, the city can create high-quality positions characterized by high technical content and strong growth potential, thereby enhancing the local labor market's capacity to absorb talent.

The second is developing supporting producer services. Centering on manufacturing upgrades, the city should coordinately promote high-value-added service industries such as industrial design, digital technology application, and modern logistics. This will expand technical and managerial career paths

for graduates of higher vocational colleges and facilitate a higher level of alignment between talent and industry.

The third is establishing a dynamic talent demand disclosure mechanism. The Municipal Bureau of Industry and Information Technology and the Human Resources and Social Security departments, in conjunction with industry associations, should periodically publish the Catalogue of Urgently Needed Skilled Talents for Key Industries in Qingyuan. This catalogue should specify positions, quantities, and competency requirements, and be made accessible to institutions within the Vocational Education City and the public. Such a mechanism aims to guide disciplinary adjustment and curriculum reform, thereby mitigating the information asymmetry between corporate recruitment needs and institutional cultivation.

4.2 Educational Dimension: Deepening Supply-side Structural Reform to Achieve Precise Talent Alignment

First, it is to establish a dynamic adjustment mechanism for program offerings. Educational administrative departments should collaborate with industrial authorities to guide institutions within the Vocational Education City in constructing professional warning and response systems. This involves reducing enrollment in majors with weak correlations to local industries and prioritizing the establishment of specialized programs such as smart manufacturing and new energy equipment, thereby alleviating structural mismatches at the source [12].

Second, it is to promote the upgrading of curriculum and pedagogical systems. Cutting-edge technologies and standards, such as Artificial Intelligence and green manufacturing, should be integrated into the curricula, alongside the promotion of modular teaching based on real-world enterprise projects. Colleges are encouraged to transform actual technical challenges from leading enterprises into practical training projects. By co-establishing “Order-based Classes,” students can master advanced processes in advance, thereby strengthening their engineering practice capabilities.

Finally, it is to strengthen the development of “Dual-qualified” faculty and technical service capabilities. It is essential to refine the systems and incentive mechanisms for teachers to undergo practical training in enterprises and to establish “Industrial Mentor” positions. Furthermore, support should be provided for colleges and enterprises to co-build technical service centers aimed at conducting process improvements and tackling technical bottlenecks for small and medium-sized enterprises (SMEs), thereby enhancing the effectiveness of vocational education in directly serving industrial innovation.

4.3 Policy Dimension: Strengthening Systemic Integration and Departmental Coordination to Construct a Robust Support System

The first is establishing a municipal-level coordination mechanism. It is recommended to establish a specialized working group led by municipal leadership to regularly coordinate departments such as Education, Human Resources and Social Security, and Science and Technology. This mechanism aims to integrate resources, break down administrative barriers, and form a powerful policy synergy.

The second is launching pragmatic and operational talent retention policies. Existing regulations should be integrated to formulate and release the Measures for Promoting Employment and Entrepreneurship of Vocational College Graduates in Qingyuan. Policies must be specific and actionable, such as: providing one-time employment subsidies for fresh graduates who sign contracts with key enterprises for over one year; offering full reimbursement for training costs to those who obtain senior worker or technician certificates while employed; and granting corresponding subsidies to enterprises that consistently recruit students from “Order-based Classes.”

The third is intensifying incentives for corporate cooperation. Enterprises that actively participate in co-building industry colleges, hosting internships/practical training, and jointly developing curriculum resources should receive priority support in project applications, tax breaks, and financing services. These measures are designed to effectively mobilize the enthusiasm of enterprises to engage in school-enterprise cooperation.

4.4 Urban Dimension: Optimizing the Youth Development Ecosystem to Enhance Belonging and Long-term Attractiveness

First, it is to implement a graduate growth tracking program. Career development profiles should be established for graduates who remain in Qingyuan for employment. This includes providing continuous support for vocational skills training, professional certifications, and academic advancement to delineate a clear local career growth path for them.

Second, it is to accelerate the construction of youth-friendly communities. Near the GVEC and key industrial parks, integrated communities featuring apartments, commercial spaces, and cultural or sports facilities should be systematically planned and constructed. By improving supporting infrastructure such as transportation, healthcare, and education, the city can lower the cost of living and enhance the overall quality of life for young talent [13].

Third, it is to deepen the promotion of city branding and industrial identity. Activities such as industry open days and innovation/entrepreneurship competitions should be held on a regular basis, and youth should be organized to visit and engage with local benchmark enterprises. Utilizing new media to promote Qingyuan's industrial opportunities and development prospects will help strengthen emotional identification and transform ecological resource advantages into sustainable attractiveness.

5. CONCLUSION

Based on the empirical analysis of the GVEC, this study points out that the primary constraints hindering vocational education from empowering the New Quality Productive Forces in Qingyuan are manifested in talent outflow, the superficiality of industry-education integration, and insufficient policy synergy. The root causes lie in the failure to fully respond to the growth needs of students and the relatively loose nature of school-enterprise collaboration networks. In response, this paper constructs a four-dimensional collaborative system of "Industry-Education-Policy-City." By strengthening demand traction, deepening supply-side reform, refining incentive integration, and optimizing the development environment, the system aims to drive the transformation of vocational education from scale-based agglomeration to deep integration. Looking forward, Qingyuan should continue to explore the developmental path of "promoting industry through education, revitalizing the city through industry, and retaining talent through the city." The relevant experiences can serve as a reference for similar regions. Subsequent research could conduct long-term tracking and evaluation of this system and expand it to other regions for further validation.

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