A Review of Research on the Coordinated Development of New Quality Productivity and Vocational Education: Connotation, Logic, and Path

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Abstract

This study systematically reviews research on the coordinated development between New Quality Productivity and vocational education, analyzing their connotations, logical relationship, and paths to synergy. New Quality Productivity drives industrial transformation through technological innovation, and its coordination with vocational education carries profound significance. The two are interlinked through mutual driving forces, reciprocal support, and complementary promotion. Achieving coordinated development requires policy guidance, innovation in industry-education integration, optimization of teaching staff, and advancement in digitalization. While current challenges remain, future research should deepen this field to enhance integration and cultivate innovative talent for economic and social development.

Keywords: New Quality Productivity; vocational education; coordinated development; connotation analysis; logical relationship; development path

Introduction

Amid profound adjustments in the global economic landscape and rapid advances in science and technology, New Quality Productivity has emerged as a transformative form of productive force that is reshaping the trajectory of economic and social development at an unprecedented pace. It has become a central driver of high-quality economic growth and industrial upgrading. Anchored in scientific and technological innovation and driven by emerging technologies such as digitalization and intelligent systems, New Quality Productivity promotes the optimal allocation of production factors, steers industrial structures toward higher-end, smarter, and greener directions, and injects strong momentum into economic and social progress.

Vocational education, as the type of education most closely and directly linked to economic and social systems, holds a pivotal position in the wave of New Quality Productivity. A growing body of scholarly research has begun to focus on this dynamic. In A Study on the Framework and Path of Vocational Education Supporting the Cultivation of New Quality Productivity, Lü Dongteng emphasizes that the reform and construction of a modern vocational education system aligns closely with the development of New Quality Productivity. He argues that vocational education should serve as a practical guide for this development, and that its framework design must address dimensions such as stakeholder collaboration, technological innovation, sustainable development, and open sharing(Lv,2024).

Similarly, in Theoretical Logic and Practical Approaches of Vocational Education Serving the Development of New Quality Productivity, Ouyang Boyi points out that New Quality Productivity endows vocational education with a vital mission across the education, talent, industry, and innovation chains. He proposes that vocational education should follow a logic centered on reshaping production factors, optimizing their combinations, and ultimately contributing to Chinese-style modernization. This requires improvements in the modern vocational education system, enhancement of core institutional capabilities, acceleration of supply-side reforms, and strengthening of internal adaptability(Ouyang, 2024).

In Curriculum Development of Vocational Bachelor's Programs from the Perspective of New Quality Productivity: Challenges and Pathways, Li Yuanyuan investigates the current state of vocational undergraduate curriculum construction within the context of New Quality Productivity. Her work analyzes its value and practical dilemmas while exploring feasible pathways to ensure talent development in support of this new productivity paradigm(Li, 2024).

These studies collectively underscore the profound significance and value of exploring the coordinated development between vocational education and New Quality Productivity. Such inquiry not only enriches the theoretical framework of vocational education but also contributes to the sustainable development of the broader economy and society. This paper seeks to systematically review and analyze relevant research, articulate the internal logic, practical pathways, and key challenges involved in the synergy between vocational education and New Quality Productivity, and ultimately offer theoretical support and practical guidance for their deep integration and coordinated advancement.

Ⅱ. Connotation Analysis of New Quality Productivity

2.1.Core Elements and Essential Characteristics

The core element of New Quality Productivity lies in scientific and technological innovation, which runs through its entire development process and serves as the key force driving productivity advancement. Numerous scholars have conducted in-depth studies on its essential characteristics, revealing the innovation-driven nature of New Quality Productivity from various perspectives. In On New Quality Productivity: Connotations and Key Focus Areas, Zhou Wen and Xu Lingyun point out that New Quality Productivity arises from breakthroughs in critical and disruptive technologies, with innovation being its defining feature(Zhou,& Xu,2023). The essence of this innovation lies in breakthroughs that transform traditional production methods, leading to qualitative leaps in productivity and a shift toward more efficient, precise, and intelligent production processes. For example, the rapid development of emerging technologies such as artificial intelligence, big data, and blockchain provides strong technical support for optimizing resource allocation, reconstructing production workflows, and enhancing product quality, enabling production activities to align more closely with market demands and achieve efficient resource utilization.

The central role of technological innovation in New Quality Productivity is also reflected in its reshaping and integration of production factors. It has fundamentally transformed the means of labor—evident in the widespread use of intelligent equipment and automated production lines—which has significantly improved productivity and product quality. At the same time, the nature and scope of labor objects have evolved: data and knowledge have become critical production objects, expanding the boundaries of productive activity. This transformation has also altered the requirements for workers, placing greater emphasis on innovation ability, digital literacy, and interdisciplinary knowledge. High-quality labor with such competencies is now a key pillar supporting the development of New Quality Productivity.

2.2. Differences from Traditional Productivity

Compared with traditional productivity, New Quality Productivity shows significant differences in terms of factor composition, development path, and industrial form. Traditional productivity primarily relies on the large-scale input of conventional factors such as land, labor, and capital, with a development path focused on extensive resource utilization and scale expansion. In contrast, New Quality Productivity emphasizes the deep integration of emerging technologies—such as digital and information technologies—with traditional production factors, aiming to achieve optimized allocation and efficient utilization through technological innovation. In The Logic, Multidimensional Connotation, and Contemporary Significance of New Quality Productivity, Gao Fan analyzes its unique features from a political economy perspective, arguing that New Quality Productivity breaks free from traditional growth models and productivity paths, with new technologies, economies, and business forms at its core. It aims to enhance total factor productivity and guide industrial transformation toward higher-end, smarter, and greener directions(Hu,2024).

In terms of factor composition, traditional means of labor often refer to mechanical equipment, and labor objects mainly consist of natural resources and raw materials. In contrast, New Quality Productivity relies more on intelligent, digital devices and platforms, while labor objects include data, information, and newly engineered materials generated through technological innovation(Yao,2024). For example, in the field of intelligent manufacturing, tools such as smart robots and automated control systems have become critical production equipment. These tools enable precise control of production through real-time data collection, analysis, and application. In the digital economy, data is regarded as a key production factor—data mining and analysis create entirely new business models and economic growth drivers.

Regarding the development path, traditional productivity growth depends on increasing input factors, which are often constrained by resource scarcity and environmental limitations. In contrast, New Quality Productivity relies on technological innovation, continually introducing new technologies, industries, and models to drive sustained productivity growth and overcome the bottlenecks of traditional development(Yao,2024). For example, the rise of the new energy vehicle industry has not only transformed the traditional automotive sector but also stimulated innovations in battery technology, autonomous driving, and intelligent connectivity, opening new avenues for economic growth.

2.3.Significance for Economic and Social Development

New Quality Productivity serves as a core engine for industrial innovation and upgrading. As Zhou Wen and Xu Lingyun suggest, emerging strategic industries—such as biotechnology, new energy, and new materials—are thriving under the impetus of New Quality Productivity(Zhou,& Xu,2023). These industries generate a large number of jobs and foster new drivers of economic growth, elevating the country's role in global industrial division. For instance, the rapid development of the new energy sector has stimulated related industrial chains, from energy development and equipment manufacturing to energy storage technology, thereby creating numerous employment opportunities and strengthening national competitiveness in the global energy transition.

In terms of optimizing industrial structure, New Quality Productivity facilitates the digital and intelligent transformation of traditional industries, steering industrial structures toward the higher end. For example, the integration of intelligent manufacturing technologies in traditional manufacturing significantly improves efficiency, product quality, and competitiveness. It also promotes cross-sector integration and coordinated industrial development, giving rise to new industrial ecosystems. Industrial internet platforms, for instance, foster collaborative innovation and resource sharing across upstream and downstream enterprises in the industrial chain, thereby enhancing collaborative efficiency and innovation capacity. In the automotive manufacturing industry, such platforms enable real-time information sharing and collaborative operations among component suppliers, vehicle manufacturers, and logistics providers, ultimately streamlining production processes and improving the efficiency of the entire industrial chain.

New Quality Productivity also enhances resource allocation efficiency by using technological innovation to optimize the distribution of production factors, directing resources toward innovation and high-potential sectors. Digital technology enables the transparent and rapid transmission of market information, allowing firms to accurately gauge demand and reduce resource waste. In the e-commerce sector, big data analytics provides insights into consumer preferences, enabling companies to adjust production and inventory in real time and avoid overstock or shortages. Moreover, it reshapes employment structures—emerging industries create high-skilled, innovation-driven jobs, while the digital transformation of traditional industries drives workers to upskill, thereby facilitating the upgrading of the employment structure. This calls for strengthened vocational education and training. For example, the AI industry has created new roles such as algorithm engineers and data annotators, while traditional manufacturing workers must learn to operate automated equipment to adapt to ongoing transformation.

Furthermore, New Quality Productivity promotes regional coordination. Regional disparities in development levels offer opportunities for industrial transfer and collaborative innovation, thereby advancing regional economic integration. For example, industries in eastern China undergoing upgrading are being relocated to central and western regions, where joint innovation efforts are boosting local economies. In addition, New Quality Productivity fosters social equity. The application of digital technologies in education, healthcare, and agriculture helps narrow the gap in public services between urban and rural areas and among different social groups. Online education platforms allow rural students to access high-quality educational resources, telemedicine brings expert consultations to remote patients, and smart agriculture raises farmers' incomes—all contributing to greater social fairness and justice.

Ⅲ. The Connotation and Functions of Vocational Education

3.1.Definition and Characteristics of Vocational Education

Vocational education, as a distinctive and essential component of the educational system, has been extensively defined and characterized in academic literature. In Vocational Education as a Type of Education: Basic Characteristics, Li Yujing points out that vocational education centers on cultivating students' professional skills and practical competencies. This core objective distinguishes vocational education from general education in terms of its talent development focus(Li,2019). The defining feature of vocational education is its close alignment with market demands and industrial development trends. Its teaching activities are designed to prepare students to swiftly adapt to the requirements of specific occupational roles.

Practicality is another prominent characteristic of vocational education. In Theoretical Logic and Practical Approaches of Vocational Education Serving the Development of New Quality Productivity, Ouyang Boyi emphasizes that vocational education prioritizes practical teaching, internships, and training sessions, allowing students to develop professional skills in real or simulated work environments(Ouyang, 2024).

Practical instruction constitutes a significant portion of the vocational education curriculum. During internships and training placements in enterprises, students gain direct exposure to frontline equipment, technologies, and workflows, enabling them to convert theoretical knowledge into operational skills. For example, students in hotel management programs at vocational colleges, through internships in real hotels, not only acquire professional skills in room service and food and beverage management but also develop strong professional ethics, service awareness, and problem-solving abilities.

Social relevance is also an indispensable trait of vocational education. Closely linked to socio-economic development, vocational education serves as a critical channel for the reproduction of the labor force. It responds actively to societal needs by updating curricula and teaching methods in line with industrial restructuring and technological progress, thereby producing skilled and employable technical talent. For instance, with the rapid development of intelligent manufacturing, many vocational institutions have launched programs in industrial robotics and intelligent control technologies to supply skilled professionals for the upgrading of the manufacturing industry.

3.2.Unique Role in Talent Development

Vocational education plays an irreplaceable and unique role in talent cultivation, which is manifested in multiple dimensions. In terms of developing students' operational capabilities, vocational institutions are equipped with advanced training equipment and internship bases, offering abundant opportunities for hands-on learning. In The Connotation, Operational Logic, and Promotion Path of Vocational Education Empowering the Development of New Quality Productivity, Huo Lijuan notes that vocational education achieves this through cooperation with enterprises in the joint construction of training bases, integrating real production projects into the learning process to ensure students master cutting-edge technologies and industry standards(Huo,2024). For example, automotive maintenance programs in vocational colleges often collaborate with auto manufacturers to establish on-campus training workshops where students, under the guidance of industry professionals, perform diagnostic, repair, and replacement tasks. This enables graduates to seamlessly transition into positions within the automotive maintenance industry.

In fostering problem-solving skills, vocational education encourages students to apply theoretical knowledge in real-world contexts. Through teaching methods such as case analysis and project-based learning, students are inspired to develop innovative thinking and problem-solving abilities. A notable example is the development of "new business disciplines" in higher vocational education. In Developing New Quality Productivity and Innovative Talent Training Paths in Higher Vocational Business Education, Wang Sibao highlights how the integration of entrepreneurship courses, business simulation competitions, and enterprise practice projects fosters students' commercial insight, market analysis skills, and innovative capabilities(Wang,2024). Through these practical experiences, students are able to propose creative solutions to evolving market challenges and enterprise management problems, thereby meeting the dynamic needs of the business sector.

3.3.Contribution to Socioeconomic Development

The contributions of vocational education to socioeconomic development are multifaceted and increasingly significant(Ding,2024). In supporting the real economy, vocational education supplies a steady stream of skilled technical workers and professionals across industries such as manufacturing and services. In Capable Government and Effective Market: How Vocational Education Empowers the Development of New Quality Productivity, Yu Wen argues that vocationally trained talent forms the bedrock of the real economy. These individuals apply their learned skills on the production frontlines, driving technological innovation and product upgrading within enterprises(Yu,2024). For example, CNC (computer numerical control) technicians trained at vocational colleges are capable of operating CNC machines with high precision in advanced equipment manufacturing enterprises. Their expertise improves the accuracy of parts processing, enhances production efficiency, and boosts product quality and competitiveness, thereby facilitating industrial upgrading and technological progress.

Ⅳ. The Logical Relationship Between New Quality Productivity and Vocational Education

4.1. The Driving Effect of New Quality Productivity on Vocational Education

The development of New Quality Productivity acts as a powerful driving force, exerting comprehensive and profound influence on vocational education, prompting transformative changes in educational philosophy, content, and instructional methods.

4.1.1.Innovation in Educational Philosophy

At the conceptual level, the evolution of New Quality Productivity has made innovation thinking, digital literacy, and interdisciplinary competence essential qualities for workers in the new era. In Capable Government and Effective Market: How Vocational Education Empowers the Development of New Quality Productivity, Yu Wen emphasizes that as industrial structures and employment markets undergo profound transformations due to the rise of New Quality Productivity, vocational education must shift from a traditional skills-training orientation to a modern education philosophy focused on cultivating innovation capacity, digital awareness, and interdisciplinary knowledge integration(Yu,2024). For instance, under the widespread application of emerging technologies such as AI and big data, vocational education should guide students not only in mastering technical skills but also in developing the ability to solve complex problems through innovative thinking and applying digital tools to improve work efficiency and quality. This shift in philosophy equips students to better meet the demands of New Quality Productivity and prepares them for success in rapidly evolving job markets.

4.1.2.Innovation in Educational Content

The advancement of New Quality Productivity has driven continuous renewal of vocational curricula, incorporating cutting-edge technological knowledge and digital management techniques. In The Logic, Practical Dilemmas, and Strategic Actions of Vocational Education Empowering New Quality Productivity, Li Mingliang and Fan Xinyu argue that vocational education must closely follow the developmental trends of New Quality Productivity and timely integrate the latest technologies, such as AI algorithms, blockchain applications, and intelligent manufacturing processes(Li & Fan, 2024). For example, in the field of industrial internet, as the manufacturing sector accelerates its shift toward smart production, relevant vocational programs should introduce courses on industrial big data analytics and smart factory operations, enabling students to acquire core technical and managerial competencies in the digital era, and to meet the increasingly diversified and cutting-edge knowledge requirements of New Quality Productivity.

4.1.3.Innovation in Educational Methods

New Quality Productivity has also spurred changes in instructional methodologies. Digital and intelligent teaching tools have become key to improving the quality of vocational education. The rise of online learning platforms has broken time and space constraints, allowing students to access high-quality educational resources anytime, anywhere. Virtual simulation technologies offer immersive and interactive environments for safe and effective hands-on training. In A Study on the Framework and Path of Vocational Education Supporting the Cultivation of New Quality Productivity, Lü Dongteng suggests that vocational education should leverage technologies such as VR and AR to construct virtual factories and simulated business scenarios, enabling students to engage in operational training and decision-making simulations, thereby enhancing their practical skills and ability to handle complex work environments(Lv,2024). These innovations in teaching methods significantly improve learning outcomes and the overall quality of vocational talent cultivation, ensuring alignment with the development of New Quality Productivity.

4.2.The Supporting Role of Vocational Education in New Quality Productivity

As a crucial foundation for the development of New Quality Productivity, vocational education plays an irreplaceable role in talent cultivation and technological innovation.

4.2.1. Talent Development

Vocational education provides essential human resources for the development of New Quality Productivity. Through structured professional education and hands-on training, vocational colleges cultivate large numbers of technically skilled workers. In Theoretical Logic and Practical Approaches of Vocational Education Serving the Development of New Quality Productivity, Ouyang Boyi notes that these workers, who are well-versed in production processes and technical standards, are capable of efficiently operating advanced production equipment and applying new technologies in real-world settings—making them a vital force in advancing New Quality Productivity(Ouyang, 2024). For instance, in the new energy vehicle industry, vocational colleges have trained professionals in battery technology and motor control who support enterprises in improving production efficiency and product performance, accelerating the sector's rapid development.

4.2.2.Technological Innovation and Knowledge Transfer

Vocational education plays an increasingly important role in technological innovation and the application of research outcomes. Vocational colleges actively engage in school-enterprise cooperation to jointly undertake research and development projects, accelerating the transformation of scientific achievements into productive forces. In Research on the Reform and Transformation of the “Three Aspects of Education” under the Drive of New Quality Productivity, Su Caiwei emphasizes that vocational colleges, due to their proximity to market demands and industrial practice, are well-positioned to identify technical pain points in industries and develop collaborative solutions with enterprises(Sun, 2024). For example, some vocational colleges’ electronic information departments have worked with companies to solve signal processing challenges in 5G communications, successfully developing efficient signal optimization algorithms that were subsequently applied in enterprise products to enhance performance and promote industry advancement. Furthermore, vocational colleges offer technical consulting and services, transferring their expertise to businesses and facilitating industry-wide technological progress and innovation.

4.3.Internal Linkages and Mutual Promotion Mechanisms for Coordinated Development

New Quality Productivity and vocational education are closely interconnected and mutually reinforcing, forming a virtuous cycle of coordinated development.

4.3.1.New Quality Productivity Drives Innovation in Vocational Education Programs and Instruction

The development of New Quality Productivity opens up broader opportunities and teaching resources for vocational education. With the rise of emerging industries such as AI, big data, new energy, and biomedicine—and the continuous breakthroughs in frontier technologies—vocational education faces unprecedented opportunities. On one hand, the emergence of new industries prompts vocational institutions to expand their program offerings by establishing related emerging disciplines. For instance, the widespread application of AI has led to the creation of programs in AI engineering and intelligent robotics; the development of big data technology has spurred programs in data science, big data technology, and data management. These new programs enrich the disciplinary structure of vocational education and better meet the labor market's demand for diverse and specialized talent.

On the other hand, the advancement of new technologies provides abundant teaching content and modern instructional tools. Enterprises engaged in the development of New Quality Productivity generate new technologies, processes, and operational models, which can be transformed into teaching cases, course projects, and training content—making education more relevant to workplace realities and enhancing students' experiential learning. Meanwhile, the use of digital platforms and virtual simulation software has diversified teaching resources, eliminated spatial and temporal barriers, and improved the sharing and delivery of quality education, thereby increasing instructional efficiency and effectiveness.

4.3.2. Mutual Reinforcement Between Vocational Education and New Quality Productivity

The development of vocational education in turn provides strong support for New Quality Productivity, promoting its continuous growth and innovation. By producing a steady supply of high-quality skilled workers, vocational education injects vitality into the development of New Quality Productivity. These workers possess solid professional knowledge and hands-on technical capabilities, enabling them to quickly adapt to the demands of emerging industries and technologies. They play a key role in enhancing enterprise productivity, ensuring product quality, and accelerating the application of new technologies. For example, vocational colleges training talent in industrial internet technologies help enterprises realize interconnected equipment systems and intelligent production management, facilitating the transformation to smart manufacturing. Similarly, programs in new energy technologies contribute to clean energy development and energy structure optimization.

Moreover, vocational education serves as a bridge for technological innovation and knowledge transfer. Through close collaboration with enterprises and research institutes, vocational colleges engage in joint R&D projects, forming a collaborative force for industry-academia-research innovation. Faculty and students contribute their professional expertise to solve real-world problems, offering innovative ideas and practical solutions. They also play a key role in translating research findings into practice through technology transfer and service initiatives—supporting the industrial application of innovation outcomes, and ultimately boosting the competitiveness of New Quality Productivity through new technologies and products.

4.3.3.A Spiral Model of Mutual Promotion Between Vocational Education and New Quality Productivity

At a deeper level, the coordinated development of New Quality Productivity and vocational education follows a dynamic, spiral pattern of mutual influence. The evolution of New Quality Productivity guides the reform direction of vocational education, compelling the latter to optimize training models, curricula, and teaching methods to meet new demands. Conversely, the quality and pace of New Quality

Productivity's development are, to a certain extent, shaped by the level of vocational education, which supplies talent and technical support. This mutually reinforcing relationship is continually strengthened over time, forming an upward spiral that promotes high-quality and innovation-driven economic and social development.

For example, as New Quality Productivity places higher demands on workers' digital literacy and innovation capacity, vocational education intensifies reform in these areas to cultivate talent equipped with such skills. These individuals, upon entering the workforce, further drive enterprise-level digital transformation and technological innovation—thereby contributing to the advancement of New Quality Productivity and closing the feedback loop of this virtuous development cycle.

Ⅴ. Exploring Pathways for the Synergistic Development of New Quality Productivity and Vocational Education

5.1. Policy Support and Guidance

The government plays an indispensable leading and driving role in the coordinated development of new quality productivity and vocational education. The effectiveness of their synergy is directly influenced by the intensity of policy support and guidance.

5.1.1. Optimizing Fiscal Investment in Vocational Education Under Government Support

The government should increase fiscal investment in vocational education. As emphasized by Yu Wen in Proactive Government and Effective Market: How Vocational Education Empowers the Development of New Quality Productivity(Yu,2024), adequate financial support is the material foundation for the development of vocational education. The proportion of vocational education funding in fiscal expenditure should be raised to ensure that vocational institutions have sufficient resources to improve teaching facilities, update training equipment, and recruit high-quality faculty, thereby enhancing the conditions and quality of education.

For instance, special government funds can be allocated to support the establishment of professional training bases related to new quality productivity, and to purchase advanced production training equipment such as industrial robots, 3D printing equipment, and intelligent warehousing and logistics systems. These efforts enable students to practice in environments closely resembling real production settings and to master cutting-edge technical skills.

5.1.2.Policy Incentives and Legal Frameworks for Enterprise Participation in Vocational Education

The government should formulate and improve relevant policies and regulations to encourage deep enterprise involvement in vocational education. Through measures such as tax incentives, financial subsidies, and land use policies, the government can stimulate enterprises to actively collaborate with vocational institutions. For example, enterprises that engage in vocational education could receive tax deductions or credits proportional to their financial or resource input. Favorable land-use policies could be provided for enterprises that co-establish training bases or industrial colleges with vocational institutions, thereby reducing their cooperation costs. Furthermore, the government should establish sound legal frameworks that clearly define the rights and obligations of enterprises in vocational education, regulate school-enterprise cooperation, and safeguard the interests of all parties, thereby creating a stable institutional environment for industry-education integration.

5.1.3. Holistic Planning and Dynamic Adjustment Mechanisms for Vocational Education

The government should strengthen overall planning and management of vocational education. Based on regional economic characteristics and industrial distribution, it should formulate scientific development plans to guide vocational institutions in aligning their programs with local industrial demands. As noted by Guo Guangjun et al. in Characteristics, Underlying Logic, and Strategies for Promoting Industry-Education Integration Oriented Toward New Quality Productivity(Li, M.

Q,2024), a dynamic mechanism should be established to periodically evaluate and optimize program offerings, eliminating outdated or poorly aligned majors and introducing emerging disciplines that reflect the development trends of new quality productivity. For instance, in regions where the artificial intelligence industry is concentrated, vocational schools should focus on AI technology applications, big data technology, and intelligent control technologies. In areas with a strong new energy sector, majors such as new energy vehicle manufacturing, photovoltaic engineering, and wind power technology should be developed to align vocational program structures with regional industrial layouts.

5.2. Deepening and Innovating Industry-Education Integration Models

As a core pathway for the synergy between new quality productivity and vocational education, industry-education integration plays an irreplaceable role in improving talent training quality, accelerating technological transformation, and promoting industrial upgrading. Numerous scholars have conducted in-depth studies on this topic, providing both theoretical foundations and practical strategies for deepening and innovating such models.

5.2.1.Construction of Training Bases and Talent Cultivation

Jointly building training bases is fundamental to industry-education integration. As highlighted by Li Mengqing and Liu Kaiya in Research on Recognition Standards and Management Mechanisms for Industry-Education Integrated Enterprises—Based on Policy Text Analysis from Ten Provinces(Shen & Hu,2024), enterprises provide real production environments, advanced equipment, and practical projects, allowing students to engage with industry-leading technologies and processes, thereby enhancing practical and problem-solving skills. For example, vocational schools cooperating with smart manufacturing firms may establish intelligent factory training bases equipped with automated production lines and smart warehousing systems. As Shen Yanrui et al. mentioned in Bidirectional Empowerment of New Quality Productivity and Industry-Education Integration: Practical Dilemmas and

Strategies(Shen & Hu,2024), faculty and technical personnel from enterprises can jointly guide students in operating equipment, maintaining systems, and optimizing production processes. This helps students solidify theoretical knowledge, gain practical experience, and seamlessly transition from campus to workplace, thereby supplying the smart manufacturing industry with talent aligned with the needs of new quality productivity.

5.2.2. Curriculum Innovation and Industry Alignment in School-Enterprise Cooperation

Co-developing curricula is a key component of industry-education integration, directly affecting the precision and adaptability of talent cultivation. Li Yuanyuan, in Practical Dilemmas and Pathways for Vocational Undergraduate Curriculum Development from the Perspective of New Quality Productivity(Li, 2024), emphasized that vocational institutions should partner with industry experts to form curriculum development teams that analyze job competency requirements and develop forward-looking, practical courses. For instance, in software development, the school and enterprise may jointly design courses based on market trends and industry needs, incorporating content on AI algorithms and big data technologies, and using enterprise-level project cases. This curriculum structure ensures students acquire solid theoretical foundations and hands-on experience, nurturing innovation and professional literacy, and meeting the growing talent demands of the software industry. Ultimately, it strengthens the talent pipeline for technological advancement within new quality productivity.

5.2.3. Industrial College Models and Innovation in Integration

Further innovation in industry-education integration requires multidimensional collaboration. The industrial college model presents a promising approach. According to Pan Haisheng and Yang Ying in The Role and Responsibilities of Vocational Education Amid the Rapid Development of New Quality Productivity(Pan & Yang,2024), industrial colleges can be jointly established by vocational institutions and leading enterprises, guided by industrial demands and integrating premium resources. These colleges align majors with industry needs, closely link curriculum with occupational standards, and integrate teaching with production. They may adopt a corporate-like governance model led by a board of directors comprising both school and enterprise representatives, and implement flexible teaching schedules based on enterprise production cycles. Learning models such as work-study alternation and modern apprenticeship systems enable students to frequently intern at enterprises, learning practical skills directly from industry mentors. For instance, in the new energy vehicle sector, vocational schools can collaborate with top EV manufacturers to establish industrial colleges offering programs in electric vehicle technology and intelligent connected vehicles. These institutions engage enterprises in the full training process, providing students with hands-on experience in R&D, manufacturing, and post-sales maintenance—preparing innovative, skilled professionals for the green and intelligent transformation of the new energy vehicle industry.

5.3.Optimizing and Enhancing Faculty Development

Faculty development is a core element in the synergy between new quality productivity and vocational education. The competence of instructors directly influences talent cultivation quality and the capacity to support new quality productivity. As noted by Huo Lijuan in The Connotation, Operating Logic, and Advancement Pathways of Vocational Education Empowering New Quality Productivity(Huo,2024), teachers, as conveyors of knowledge and skills, must possess comprehensive qualities aligned with the evolving demands of new quality productivity.

5.3.1. Teacher Training Aligned with Frontier Fields of New Quality Productivity

Enhancing teacher training is essential for building a high-quality faculty. Vocational institutions should establish robust training systems, regularly organizing programs on new technologies and skills. Training should focus on cutting-edge domains such as

AI, big data, IoT, and intelligent manufacturing. For instance, teachers may attend professional workshops on AI algorithm optimization, data analytics, or industrial internet platforms. Such training not only helps update classroom content with the latest knowledge but also enhances teachers' technical proficiency and authority. Li Wene et al., in Instructional Reform of "1+X" Certificate Curriculum Integration Under New Quality Productivity(Li & Wang,2024), also emphasized the importance of teacher training in adapting pedagogy to emerging educational goals.

5.3.2.Enterprise Experts as Part-Time Instructors and Faculty Structure Optimization

Introducing enterprise professionals and skilled craftsmen as part-time instructors is an effective way to diversify and strengthen faculty teams. These experts bring rich practical experience and up-to-date industry knowledge. For example, in CNC technology programs, senior enterprise engineers can teach students real-world techniques in process optimization and programming. Such collaboration deepens students' understanding of industrial standards and enhances teaching relevance. Furthermore, these instructors can exchange insights with full-time faculty, promoting the integration of industry perspectives into academic teaching. As noted by Yu Wen(Yu,2024), this practice enhances connections between schools and enterprises and fosters deeper industry-education integration.

5.3.3.Teacher Enterprise Practice and Innovation Capacity Development

Encouraging teachers to participate in enterprise practices and research projects is key to enhancing their practical and innovative capabilities. Vocational institutions should establish cooperation mechanisms with enterprises to provide faculty with hands-on opportunities. Immersed in real production settings, teachers can better understand workflows, innovation demands, and industry trends, which they can incorporate into their teaching through case-based instruction. For example, in electronics programs, teachers involved in R&D projects may gain insights into advanced circuit design or chip technologies. Upon returning to class, they can guide students in related practical activities, cultivating innovation and application abilities. Engagement in research also strengthens faculty academic capacity and encourages the application of findings in teaching. For instance, research on battery management system optimization for EVs may directly benefit enterprise production while also serving as compelling instructional material.

5.4.Promoting and Applying Digital Transformation

In the context of rapidly developing new quality productivity, digital transformation has become a necessary path for vocational education to achieve high-quality development and synergy. The widespread application of digital technologies brings unprecedented opportunities for educational innovation, improved administrative efficiency, and enhanced student digital literacy.

5.4.1. Development and Application of Digital Teaching Resources

In terms of teaching resources, vocational education should vigorously promote digital content development. Online courses allow high-quality resources to transcend time and space, benefiting a broader range of learners. For instance, establishing online learning platforms for vocational education enables students to choose personalized learning paths. Virtual simulation software offers safe and efficient practice environments. In chemical engineering programs, for example, virtual labs can replicate complex production processes, allowing students to repeatedly practice and master techniques without physical safety risks. Wang Yufei, in Digital Transformation of Vocational Education from the Perspective of New Quality Productivity: Value, Logic, and Pathways(Wang,2024), argues that digital resources enrich content, innovate methods, and increase the appeal and competitiveness of vocational education.

5.4.2.Application of Digital Platforms in Teaching and Resource Management

In teaching management, developing digital platforms improves efficiency and quality. With teaching management systems, processes such as curriculum planning, scheduling, and evaluation become digitized and intelligent. Administrators can monitor progress, student performance, and teacher effectiveness in real time, enabling prompt adjustments. For example, online platforms may analyze learning durations, assignment completion, and test scores, providing data-driven evaluation. These systems also enhance communication and collaboration across departments.

In student management, digital platforms centralize and dynamically update student records, from enrollment to graduation and employment. Teachers can access attendance, disciplinary records, and academic progress for timely guidance. Platforms may also offer services like course registration, grade inquiry, and career counseling, improving student satisfaction.

For resource management, digital systems enable optimal allocation. Schools can track usage of training equipment, facilities, and materials, efficiently scheduling their deployment. For instance, training equipment management systems facilitate reservations and improve utilization. Moreover, platforms may support resource sharing between schools and enterprises—allowing businesses to provide idle equipment and receiving teaching outcomes in return—realizing mutual benefits.

Ⅵ. Conclusion

This study provides a comprehensive review of the synergistic development between new quality productivity and vocational education, offering an in-depth analysis of their connotations, underlying logic, and developmental pathways, and clearly outlining their interrelationship and future direction.

New quality productivity is characterized by its rich connotations, with technological innovation at its core. Its essential feature is innovation-driven development, which reshapes production factors through technological breakthroughs and achieves their efficient allocation. Compared to traditional productivity, it differs significantly in terms of factor composition, development paths, and industrial forms. It plays a critical role in driving industrial innovation and upgrading, optimizing resource allocation, and promoting regional coordination and social equity.

Vocational education focuses on cultivating professional skills and practical competencies. It is marked by its vocational orientation, practical emphasis, and social relevance. Vocational education plays an irreplaceable role in talent cultivation and in supporting the development of the real economy.

The two are closely linked in terms of developmental logic. The advancement of new quality productivity necessitates reform in the philosophy, content, and methods of vocational education, while vocational education, in turn, provides the talent and technical support needed for the growth of new quality productivity. This mutual promotion fosters a virtuous cycle and a spiral upward trajectory.

The collaborative development path encompasses four key aspects: policy support, industry-education integration, faculty development, and digital transformation. On the policy front, it is essential to increase financial investment, incentivize enterprise participation, and coordinate professional planning. For industry-education integration, efforts should focus on deepening the construction of training bases, co-developing curricula, and innovating the industrial college model. Faculty development requires strengthening teacher training, introducing enterprise experts, and encouraging teachers to participate in enterprise practices. Digital transformation involves developing digital teaching resources and building smart management platforms.

However, several challenges remain, including inadequate policy implementation, insufficient depth of industry-education integration, underdeveloped faculty structures, and the slow pace of digital transformation. Going forward, it is necessary to strengthen policy enforcement and oversight, deepen reform of industry-education integration mechanisms, substantially enhance faculty development efforts, and accelerate digital transformation capabilities. These measures will facilitate the deep integration of new quality productivity and vocational education, foster the cultivation of innovative talent for economic and social development, support industrial upgrading, promote social progress, and ultimately maximize the value of their collaborative development.

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