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Effective skills supply and grand vocational education: Interdisciplinary thinking on China's vocational education

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ABSTRACT

Vocational education, the product of specialized division of labor in modern society, seeks to address the challenges of modern life by offering vocational culture and technical education. There are two opposite theoretical judgments on the function of vocational education. One argues that it is merely a means to produce diplomas for occupational monopoly, lacking efficacy in skill formation. Conversely, the other views it as a crucial carrier of effective skills supply and a significant comparative advantage in shaping national competitiveness. In China, the ongoing tension between the supply of diplomas and that of effective skills has long influenced the evolution of the vocational education system. It is urgent for China to revive Yanpei Huang's Grand Vocational Education (GVE) to achieve high-quality development of vocational education. Although there is still a long journey ahead, we have a promising future ahead in building a skill-based society where "the state values skills, society promotes skills, and individuals possess skills", as it underscores the significance of GVE.

Key words: effective skills, credentialism, grand vocational education

INTRODUCTION

According to the historical law of social evolution, a significant indicator of the shift from traditional society to modern society is the increasingly intricate and extensive division of labor in society. In the view of Émile Durkheim, a French sociologist, there are two main changes in the shift from traditional society to modern society. For one thing, the solidarity mechanism for social order has shifted from value rationality to instrumental rationality. While traditional society relies on collective consciousness, modern society places more emphasis on professional ethics. For another, the fundamental structure of social organization has changed from blood and religious groups to corporate bodies and local organizations. "Corporate bodies and local organizations working in conjunction have the capability to fulfill all the societal requirements".[1] According to Durkheim's *The Division of Labour in Society*, the belief of "professional sacredness" runs through his analysis of modern social problems and his proposed solutions. This belief advocates the organization of professional groups (or corporate bodies) to completely save the declining ethics, thus building a new society with harmonious and complete functions.[2] The author holds that the rise of vocational education essentially stems from the growing intricate and extensive division of labor based on specialization in society. This aims to address the challenges faced by modern society by offering specialized education to train occupational groups and develop professional ethics. As Yanpei Huang, the founder of China Vocational Education

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Association, stated: "Vocational education is to address the livelihood issues within the society".[3] In this regard, the significance of vocational education extends beyond equipping individuals with the means to earn a living and navigate life's challenges, but more in serving and develop society and the state. This journey involves evolving from social welfare, to individual livelihood and integrity, to serving the needs of the society, and ultimately contributing to greater national productivity.[4]

So, how does vocational education address social livelihood issues? Despite the diversity of vocational education systems in different countries, it is generally accepted that vocational training is the core path for vocational education to address social livelihood issues. According to the theory of vocational education, vocational training includes two aspects: vocational culture and technical education. While the former emphasizes the development of occupational ideas and ethics, the latter focuses on acquiring vocational skills. In the practice of vocational education, they are like two sides of the same coin. Durkheim's *The Division of Labour in Society* states that vocational culture falls under the heading of moral science, while technical education forms the realistic basis for the establishment and operation of corporate associations. The author believes that vocational culture holds significance in vocational education, yet technical education serves as the fundamental basis. Vocational culture is not just the mission of vocational education but also that of compulsory education. In this sense, the labor education introduced during China's compulsory education stage has the nature of vocational culture. Therefore, in this paper, the author tends to understand vocational education from the perspective of skill formation, focusing on the role of vocational education in skills supply, especially effective skills supply. Objectively speaking, at different stages in various countries around the world, there are both general commonalities and different characteristics in the vocational education system. In terms of commonalities, the countries emphasize the cultural education and social reform functions of vocational education, hoping to cultivate workers with patriotism and national spirit who are "both virtuous and skilled".[5] In terms of characteristics, whether social expectation or policy orientation, the countries generally regard skill formation as the background of vocational education, and most vocational education schools often organize relevant educational actions focusing on technical skill training. So from a practical perspective, can vocational education really promote the formation of skills? In other words, from the perspective of industrial demand, is the skill training provided by vocational education in schools effective? In this regard, there are two completely opposite theoretical judgments in the academic community.

VOCATIONAL EDUCATION SYSTEM AS A TOOL OF OCCUPATIONAL MONOPOLY

Randall Collins, an American sociologist, believes that the vocational education system is useless in skill formation, but a tool of occupational monopoly as other educational systems. Through the analysis of empirical data on vocational education in the United States, Collins believes that formal vocational training provided by vocational education is ineffective in workers' skill formation. Specifically, there are three aspects as follows. Firstly, most skilled workers acquire skills in their work rather than in schools. Vocational schools provide standardized knowledge in professional fields, while the key skills to improve job performance are gradually learned in the process of work. Most of the normative knowledge learned by workers through formal vocational education will be completely forgotten after graduation.[6] Secondly, with technological progress, most job skills can be quickly acquired without a long period of vocational education. In 1967, Collins used a survey data of 309 employers in San Francisco to prove that people could be competent for the work of 84% employers after just three months of training. In contrast, there is a widespread mismatch between skills and jobs among students who have undergone long-term vocational education before employment. It is quite common that what they do has nothing to do with what they have learned. Collins found that between 1950 and 1960, there was a growing surplus of education in the United States, especially in fields such as medicine, law, and business. Lastly, simplifying the production process in production organization to reduce skill dependency is a common trend for almost all industrial production innovations. Collins used organization theory to divide production into four types, including unit production, mass production, distributed production, and centralized production. Among the four types of organizations, there are differences in terms of size, degree of bureaucracy, and demand for skill sets provided by education. However, formal schooling always fails to meet the skill needs of different production organizations. Collins acknowledges the value of education for technological progress, but he was also surprised to find that of all four types of production organizations, the most educated were the least dynamic and least motivated for technological innovation. Noble holds a similar view. He believes that technological change is essentially a social choice, behind which lies the struggle for control of the production process. Therefore, social relations are the basis of all technologies. As a result, while business organizations complain about the shortage of skilled workers, they are also pinning their hopes on advances in automation rather than on skills

supply from formal vocational education.[7] Therefore, in Collins' view, in the context of specialized division of labor, vocational education is essentially a tool of occupational monopoly rather than a vehicle for skill formation, monopolizing high-paying jobs by providing diplomas and certificates. In other words, the vocational education system belongs to one of the diploma production mechanisms in the diploma society. A diploma society refers to a social pattern that relies on the diploma system to organize social structure: (1) Diploma, as a currency, is the product of formal education and the pass for social individuals to compete for professional identities and enter certain social strata. Highly credentialed occupations epitomize the stratification of modern society. (2) Diploma currency is valuable in the cultural market. Institutions offering formal diplomas enhance the value of their diplomas through brand building and provide a credit guarantee for the quality of the diplomas. (3) There is inflation risk in diploma currency. An oversupply of diplomas will result in diploma inflation and depreciation. (4) Credentialism has resulted in the expansion of diploma accreditation systems. Relying on the two functions of professional accreditation and certificate issuance, the diploma systems, especially the clerical departments engaged in personnel management, has been expanding, penetrating into almost all fields of work in modern industrial society. (5) Credentialism makes skill training a by-product of diploma acquisition, leading to the signal failure of diplomas in the labor market.[8]

According to Collins' perspective, vocational education is not a vehicle for skill formation, but the key to social stratification. This function is particularly evident in engineering to train engineers. In industrial society, skilled workers are important professional forces to provide skilled services and promote industrial production. In this regard, Collins argues that while engineers, technicians, and mechanics exhibit variations in skills, they are not hierarchically classified. But in reality, the United States has constructed a vertically-differentiated occupational structure in engineering through formal engineering education. In this occupational structure, for one thing, the three groups are distinguished based on the quantitative scores (non-practical skills) attained in schools of engineering. For another, the engineer group has established an engineer cultural community through the formal school system. They have also managed to maintain their privileged status among industrial skilled workers using their professional skills, further enhancing their occupational monopoly in industrial skilled posts.[8] Collins believes that for vocational education, the prevailing ideology of technology governance and the worship of professionalism in education will alienate the economic and social functions of vocational education. "Vocational education has little to do with job prospects, and most skilled workers' skills are acquired through work or informal learning." To this day, Collins maintains that vocational education is useless for skill formation. On August 3, 2018, ThePaper.cn conducted an exclusive interview with Collins. He highlighted that the inventors and entrepreneurs who pioneered industrial revolutions and mobile phone revolutions did not acquire their knowledge in engineering colleges, but rather during the actual operation of machinery. This then further inspires them to create and invent. In conclusion, Collins argues that credentialism causes the expansion of diploma accreditation systems, resulting in inflation of diploma depreciation, as well as making skill formation a by-product of diploma acquisition.[9]

VOCATIONAL EDUCATION SYSTEM AS A VEHICLE FOR EFFECTIVE SKILL FORMATION

Contrary to Collins's judgment that vocational education is useless, the capitalist diversity theory, with supporters represented by Peter Hall, David Soskice, Busemeyer and Thelen, regards the vocational education system as the core institutional component of national systems for skill formation. Skill formation systems are a "system package" that integrates various institutional arrangements, usually including financial system, vocational education and certification system, and labor process system. Main topics of skill formation are defined and arranged based on the "system package", involving training risk taking, skills standardization and certification degree, stratification and differentiation of vocational education degree system, role arrangement of training subjects, and connection with other socio-economic systems. According to the theory, providing vocational-technical education to social individuals is a means of accumulating human capital. Various types of vocational education systems offer valuable skills support for the transformation and innovation in diverse industries, serving as an important institutional force to promote national competitiveness. In previous studies, the author defined the skill formation of workers as a process. Specifically, it refers to the process of acquiring working competence through theoretical learning, practical operation, and event experience. It includes the knowledge learning and experience accumulation of skills. Among them, knowledge is learned in school, while experience is accumulated in work. Skill formation can be divided into different types by dimension.[10] According to the capitalist diversity theory, skill formation is not only an educational process, but also a complex social process involving multiple subjects and various institutional mechanisms, such as trainees (families), enterprise organizations, public departments, even trade unions and industry organizations. As an

institutional component of skill formation system, the vocational education system provides a formal institutional channel. For one thing, the state can get involved or even intervene in the practice of vocational education through activities including collecting and distributing educational resources, and evaluating administrative supervision, thus providing certain credit guarantee for the quality of formal and extensive skills training. For another, market forces such as enterprises, industries and capital can also step in to exert influence through school-enterprise cooperation, industry-education integration, and capital investment (mixed property rights).[11] So how does the vocational education system become a significant comparative advantage in shaping national competitiveness? What is the logical mechanism behind that? Capitalist diversity theory is convincingly argued through rigorous empirical research.

Firstly, the competitiveness of a country usually depends more on industrial efficiency and technological innovation than on comparative advantages in endowments of basic factors of production. According to the Heckscher-Ohlin (factor proportions) theory, comparative advantage depends on differences in relative resource endowments. For a country, choosing the comparative advantage development strategy is actually to find the comparative benefits suitable for its own resource endowment conditions within the global production (or trade) chain. Countries feature different comparative advantage structures due to their respective production factors, and realize their respective comparative benefits through the global market exchange.[12] However, while the comparative advantage model can provide a channel for a country, especially a backward one, to integrate into the global fragmentation of production, it can also lead to a lock-in effect. This effect hinders the industrial upgrading and endogenous power formation of backward countries, locking them in the middle and low-end links of the industrial value chain. Therefore, it is generally believed that the only way for a country to strengthen its competitiveness is from comparative advantage model to competitive advantage mode, with technological progress and the resulting industrial innovation as the key factors. Scholars such as Hall and Soskice distinguish the innovation models promoted by technological progress into two types: radical innovation and incremental innovation. In the process of productive labor, although these two innovative models show different characteristics, they can both form the advantage of national competitiveness.

Secondly, as the core of national endogenous driving force, technological progress, although related to capital stock and resource investment, is more determined by the institutional environment. Many studies have proved that institutional environment plays an important role in technological progress and production efficiency improvement. However, the existing theories focus on how the institutional environment plays a role in technological progress through the arrangement of nature of property right, the regulation of market externalities, and the guarantee of certainty expectations. There is little research on the role of national skill formation systems, including vocational education systems. The author believes that the reason for this is the convergence of high-quality economic development models. These models assume that all countries follow a uniform path for industrial upgrading, starting from production in the lower-end of value chain to research and development (R&D) and branding in the high-end of value chain. Global value chain theory states the unequal distribution of benefits in global production networks.[13] This seems indisputable. However, this often creates a misconception that production is low-end and should be abandoned during the process of industrial upgrading, while R&D and branding are high-end and our only pursuit for industrial transformation and upgrading. In fact, the American distributed production method is the development strategy adopted following this concept. Facts have proved that this has had many negative impacts on American social stability and national competitiveness, especially the competitive advantage of manufacturing industry.[14] Within this understanding, the higher education system, which excels in scientific and technological R&D, attracts more attention. In contrast, the vocational education system, which provides skills support for production, is often positioned as a livelihood education, seemingly disconnected from scientific and technological innovation. In fact, the capitalist diversity theory holds that in a highly refined production network, technological progress in different stages may bring excessive innovation profits and form diversified competitive advantages. In the process of industrial transformation and upgrading, education systems cannot be ranked as superior or inferior, but rather they exist in various types. As a result, it is necessary to re-understand the relationship between skill formation systems (including vocational education systems) and national industrial innovation models as well as competitiveness development.

Thirdly, the skill formation system is the institutional basis for a country to gain competitiveness. Different skill formation systems shape different national innovation models, thus forming their respective comparative institutional advantages. Capitalist diversity research finds that industrial innovation is not homogeneous and linear. Hall and Soskice believe that technology industries such as information software and biotechnology usually follow the radical innovation, while traditional industries such as equipment manufacturing and processing and manufacturing focus more on

incremental innovation. Of the two, radical innovation is more efficient and tends to purchase general skills through a flexible labor market mechanism. In this case, the matching skill formation system is characterized by liberalism. In comparison, incremental innovation takes longer to yield results but requires continuous improvement in the technology of production process. It is crucial to support and reserve industry- and enterprise-specific skills. In this case, the matching skill formation system is characterized by collectivism or separatism.[15] According to this theoretical framework, a study of capitalist diversity has shown that, surprisingly, the United States has exactly the opposite advantages in specialized technology as Germany. American enterprises have made great breakthroughs in the fields of radical innovation, including medical engineering, biotechnology, communications, and semiconductor. In contrast, German enterprises have excelled in the fields of incremental innovation like mechanical manufacturing and machine tools. Of course, the research literature on capitalist diversity does not deny that institutional arrangements such as financing systems and property right systems play an important role in the formation of national innovation models. By analyzing the differences in innovation models and types of competitive industries in different capitalist countries, the literature strongly suggests that this diversity is closely related to the differences in skill formation systems. Undoubtedly, this finding has important implications re-understanding and evaluating the role of vocational education system in industrial innovation and the formation of national competitiveness.

Lastly, the relationship structure between vocational education system and other institutional systems epitomizes the diversity of skill formation systems in capitalist countries. Going beyond the field of pedagogy, the Western theory of skill formation adopts the perspective of Grand Vocational Education (GVE) (as proposed by Yanpei Huang) to examine and explore the vocational education system within the framework of economic governance, further analyzing the complex and diversified interactive process of the participants such as vocational education, labor process, and corporate governance. According to Western theory of skill formation, based on the distinction between state involvement and enterprise involvement, there are four different skill formation systems: the statist, the market-oriented, the collective, and the segmentalist, analyzing in detail the characteristics, functions, and economic and social consequences of vocational education systems in these four types. In the statist skill formation system, the state gives strong support for vocational training, with vocational schools assuming a primary role in skill training, while enterprises play a secondary role. Currently, most of the skills supplied are general skills, resulting in a low level of alignment with the demand for specific skills in the market. In the market-oriented skill formation system, the state shows less inclination and efforts to invest in vocational education, and enterprises also show a relatively weak motivation to engage in skill training. Instead, they prefer to buy skills directly from the labor market. As the primary source of skills supply, vocational schools heavily focus on market demands, resulting in efficient supply yet predominantly providing general skills. The collective skill formation system emphasizes a balance between state intervention and market autonomy. A primary method for achieving this balance is through a dual-track skill training system that combines the efforts of vocational schools and business organizations. This system ensures a high degree of alignment between skills supply and industries' or enterprises' demands for specialized skills. In this case, the skill formation process relies heavily on intermediary organizations like trade unions and industry associations. Additionally, the labor-capital relationship is stable, motivating workers to continuously acquire specific skills. The segmentalist skill formation system is an enterprise-led skill formation mechanism, which does not rely heavily on vocational schools and supply skills that have limited applicability. In this case, skill segmentation is common among enterprises, and even different enterprises in the same industry are usually not interchangeable in technical standards. This approach effectively limits the incentives for enterprises to poach workers and for skilled workers to switch jobs, ultimately fostering labor loyalty and encouraging workers to acquire special skills.[10] It is widely accepted that France represents the statist skill formation system, Germany embodies the collective system, the United States embodies the liberal system, and Japan epitomizes the segmentalist system.[16] The variety of skill formation systems gives us a deeper insight into the institutional causes behind the competitive advantages of Germany and the United States in different fields of technological innovation.

EFFECTIVE SKILLS SUPPLY AND GVE IN THE DEVELOPMENT OF CHINA'S VOCATIONAL EDUCATION

By comparing Collins' theory on vocational education with the theory of skill formation in the study of capitalist diversity, we can find that although the two are completely opposite in theoretical judgment, they both focus on the relationship between vocational education and effective skills supply. Both theories agree that from the perspective of industrial skills demand, it is challenging to adequately address the skills demand of business organizations, particularly for special skills, solely relying on formal vocational schools. Collins' extreme and weird theoretical judgment may be better

understood if we combine the research findings on capitalist diversity. In fact, Collins does acknowledge the role of vocational education in fostering civic awareness and vocational culture. However, considering the United States' adherence to a liberal skill formation system, Collins finds that American vocational school graduates not only face challenges in meeting companies' demand for (special) skills, but they are also equally as prone to unemployment as average high school students. In light of the theory of capitalist diversity, within a liberal skill formation system, the limited involvement of enterprises often leads to highly standardized general skills in vocational education. Consequently, this situation results in a high level of occupational mobility among skilled labor and an increased likelihood of "unemployment". As a sociologist, Collins is disgusted by the occupational segregation and social segregation that resulted from the excessive worship of professionalism. In his eyes, the reason why formal vocational schools are more marketable and popular than other socialized training institutions is that these schools are qualified to issue certificates. According to the theory of capitalist diversity, the skill formation systems in different capitalist countries are actually diverse. In comparison to the liberal skill formation system in the United States, both the collective skill formation system in Germany and the segmentalist skill formation system in Japan exhibit superior capacity in meeting the demand of industries and enterprises for special skills. Moreover, these systems serve as an important institutional basis for high-skill-dependent manufacturing industries in Germany and Japan to gain international competitive advantages. In the author's opinion, the realistic way to reconcile the conflict between the two theoretical judgments lies in strengthening the effective skills supply of vocational education. In other words, vocational education can only shake off the perception of "uselessness" when the graduates trained under the system are favored in the labor market based on their skill quality and meet the skill needs of industrial upgrading and enterprise development.

Skill is a concept with rich connotations. There are numerous types of skills by job and industry. In this paper, the author will not explore how each skill type, such as industrial skills and agricultural skills, differs in terms of connotation and formation process. Instead, skill will be regarded more broadly as a general academic concept. According to the theory of human capital, skill is part of human capital composed of a worker's attributes such as knowledge, skills, and health. A skill is a kind of intangible capital, with elasticity and heterogeneity completely different from other types of capital.[17] In the previous research literature, skills, as an indicator to measure the quality of labor, were generally not divided into effective skills and ineffective skills. According to Adam Smith, skills are all the useful abilities that people acquire in society and are part of social accumulation. However, in the classical sociological theory, whether skills are effective is a key issue in the labor process: Skills are not only the capital for economic development, but also an important factor shaping labor-capital relationship. According to the labor process theory, "skilling-deskilling" leads the evolution of automation technology in the whole industrial society. In the industrial society, while effective skills are the only way for the working class to construct "skill barriers" to maintain control over the labor process, the bourgeoisie strives to promote the degree of deskilling of the labor process through technological upgrading. On the one hand, they increase the risk of workers' skills from "effective" to "ineffective" through technical automation, and weaken the bargaining power of workers, especially skilled workers, and their control over the labor process. On the other hand, they aim to make the labor process more objective through deskilling, promoting the expansion of production scale and reduce the skills demand and skill dependence of enterprise production. Indeed, advances in automation technology has changed the dependence of processes on skills. However, they haven't diminished the skills demand of the whole industrial production process, but rather intensified the level of dependence on skills. In addition, many studies on skill mismatch in labor economics and pedagogical economics also prove that there are both effective and ineffective skills.

According to the theory of capitalist diversity, the research on "effective or ineffective" skills in sociology enlightens us that the structure of labor relations in the workplace will have a direct impact on the quality of skills supply for vocational education. Whether skills are effective or not is often assessed not solely by skill providers, like vocational schools, but rather by the skill trainees themselves and those who make use of the skills. Therefore, in the process of skill training for vocational students, the participation of industry organizations, business organizations, and even the public sector is particularly important. In fact, in addition to the labor process theory and capitalist diversity theory, many theoretical studies have proved that it is reasonable to judge whether skills are effective from the perspective of industries and enterprises. For example, the theory of technology-based learning states the significance of production practice in forming technical competences of enterprises and countries. In terms of technical competence formation, mere mastery of normative technical knowledge is not enough, whether for an enterprise or a country, since technical knowledge only describes in principle the conditions for generating technical capabilities. Autonomous technical competence can only be created and developed by

thoroughly understanding technical knowledge, and by gaining relevant skills and experience through engaging in production practice.[18] Technical competence refers to the ability to use technical knowledge effectively and, in terms of structure, is a collection of work organization's knowledge and worker's skills and experience. Most of the knowledge closely related to technical competence is non-standard tacit knowledge, which is hidden in the routine operations of enterprise production. In conclusion, almost all technical competences are developed by solving specific problems in practical activities such as R&D and production.[19] It is from this perspective that South Korean scholar Linsu Kim defines technical competence as "the ability to use technical knowledge effectively".[20] According to the theory of skill formation, there is some similarity in principle between the skill formation of individual workers and the technical competence formation of enterprises and countries. In the process of skill formation among workers, knowledge-based learning and cumulative experience are closely connected. Effective skill formation requires an organic interaction between the vocational schools where knowledge is learned and the training workshops where experience is accumulated.[10] For a worker, besides mastering normative theoretical knowledge and obtaining diplomas, the more important indicator for a worker to determine whether his/her skills are effective is whether he/she has the ability to solve problems in the production process. In this regard, Feng Lu gives a vivid demonstration about BOE in his book *The Great Change of Light*. BOE encountered many problems after introducing the Hyundai Display Technology Inc. (HYDIS) production line from South Korea. Some parameters that have worked well in South Korea failed to work in China. Engineers and operators at BOE invested one or two years to acquire the practical skills in margin and design rules, allowing them to gradually overcome challenges within the production process.[21]

Exploring the formation of effective skills provides us with two valuable insights into vocational education. Firstly, vocational education is just one aspect in the skill formation process. There is a "time lag" between the emergence of new skill demands that arise from industrial upgrading and technological change, and the renewal of skill education in vocational schools. This time delay may lead to a common situation where the skills supply of vocational education does not perfectly align with the actual skill demand. Secondly, effective skills supply is an inherently mission of vocational education. Vocational education is another type of education different from general education.[22] General education typically refers to school-based education that provides knowledge of basic sciences for further education, while vocational education focuses on equipping students with specific skills for industries, playing a key role in ensuring national employment. This implies that vocational education may indeed fail in skill formation if the ideology of credentialism described by Collins becomes the prevailing concept in the development of vocational education. In modern society, developing vocational education system is an inevitable requirement for social division of labor. Vocational schools, as formal institutions devoted to offering specialized courses, play a vital role in disseminating professional knowledge and enhancing the level of social specialization. Moreover, with scale advantages in skills supply, vocational education can better meet the demand for skills in industrialized mass production. In conclusion, while vocational education may not keep pace with the specific skill demands of industries and enterprises, it is undoubtedly essential for vocational education to enhance the quality of skill training and the provision of effective skills for high-quality development.

While Collins sees vocational education as useless in skill formation, he does not negate the function of formal vocational education diplomas in social stratification and mobility. Undoubtedly, in the modern society with a high degree of division of labor, the diploma system is the institutional basis for ensuring the normal operation of the economy and society. As Parkin argued, the technical certificate system, equally significant to the property system, serves as the basic system of stratification in capitalist society. It determines the social position or rank individuals achieve within this stratification.[23] However, the situation is more complicated in China. A growing number of studies have found that China's vocational education not only has a limited effect on skill formation among workers but also falls short in promoting the social status of vocational graduates. In contrast to the higher education system, the diplomas awarded by the vocational education system hold less functional value in terms of social recognition, as well as in facilitating social mobility and stratification. In terms of skill formation, China's vocational education always faces many doubts regarding the supply of skills. First of all, many enterprises complain that students graduated from vocational schools are unable to meet the demands of skilled positions in factories, and often require additional training before taking up their posts.[24] Meanwhile, at a macro level, China has already become the country with the world's most extensive vocational education system. According to the data released by the Ministry of Education, as of 2018, there were 11,700 vocational schools of various types in China, with an annual enrollment of 9,282,400 students and 26,855,400 students at school. Moreover, the number of graduates in recent 20 years has exceeded 130 million. Another

undeniable fact is that, however, the long-standing shortage of skilled workers in the labor market has not been effectively mitigated, despite the expansion of vocational education. In 2017, the *Manufacturing Talent Development Planning Guide* was issued, predicting the demand for talents in ten key areas in the future. According to the guide, by 2025, there will be a talent gap exceeding 4 million in four areas: the new-generation of information technology, electronic equipment, high-end computer numerical control (CNC) machine tools, and new materials, reaching 9.50 million, 9.09 million, 4.50 million, and 4.00 million respectively. In addition, statistics from the Ministry of Human Resources and Social Security show that in recent years, the selection ratio (the number of job positions to the number of job applicants) of skilled workers in China has remained above 1.5. In particular, the selection ratio for senior artisans, senior engineers, and senior technicians has even exceeded a level of 2. Certainly, multiple factors come into play when considering skill formation, ranging from skills training within schools to application of skills in factories. However, this also indicates that there is still a large gap between the supply of effective skills from vocational education and the actual skills required by industries and enterprises. In view of this phenomenon, according to the analysis of a large number of empirical data, some scholars bluntly pointed out that China's vocational education, especially secondary vocational education, has not only ineffective but even negative effects on China's human capital accumulation.[25] Yao *et al.* also proved the rationality of Loyalka *et al.*'s research findings from the perspective of labor economics. They found that skill training within companies is more effective than that at vocational schools, which not only helps workers to obtain higher salaries but also promotes their career development. In terms of gaining social status, as everyone knows, human capital is an important basis for individuals to acquire social status and realize class mobility. In reality, China's vocational education is a kind of "second-class education", even if it only provides diploma currency according to Collins. Sociological studies have found that vocational education is less relevant to the acquisition of social status than general academic education. Since 1994, the return on investment in vocational education has been declining. In recent years, there is almost no difference between the returns of secondary vocational education and general high school education. In terms of employment, as many as 96.4% of vocational education graduates find jobs outside the public sector, with diploma as the main factor in this social stratification. On November 18, 2021, the Office of the State Council Academic Degrees Committee issued the Opinions on Authorizing and Conferring Bachelor's Degrees in Undergraduate-Level Vocational Schools. According to the Opinions, vocational undergraduates will be incorporated into the current bachelor's degree system. They will be conferred bachelor's degrees based on discipline categories, with the same standard format for bachelor's degree certificates. More importantly, the degree certificates of vocational undergraduates and general undergraduates are of equal value, and have the same effect in employment, postgraduate entrance examination, and civil servant examination. Some scholars have found that while professional certificates do lead to higher incomes for workers, there are significant differences between the public and private sectors. In the public sector, holding professional certificates leads to a 13.8% increase in earnings. However, this effect is almost negligible in the private sector and may even exhibit a negative correlation.[26] Significantly, over 90% of vocational education graduates find employment in the private sector. This suggests a failure in accurately valuing labor skills associated with professional certificates. As for the more mobile industrial workers, there is a big gap between skilled industrial workers and white-collar workers in various aspects such as Party membership, household registration, income, and access to basic public services. As a result, migrant workers, the main body of industrial workers in China, lack a strong motivation for professional certificates through vocational education. According to a survey by Yuzhao Liu and others, only 17.4% of migrant workers obtained a nationally recognized professional certificate in 2010.[27] Qiang Li surveyed 1899 migrant workers from various provinces and cities, revealing that 29.9% of those with professional certifications gained them via self-study, 24.6% acquired skills through mentoring, and 14.5% learned from relatives, fellow villagers, or friends.[28] This "ineffectiveness" of professional certificates in terms of social inclusion has a negative impact on the attractiveness of vocational education. A study by Shi *et al.* in 2016 found that 4.23%-7.40% of rural poor students who enrolled in secondary vocational schools and general high schools dropped out before graduation. Specifically, the dropout rate for secondary vocational schools ranged from 29% to 32%. They believe that most secondary vocational schools have morphed into "childcare institutions" or "admission institutions" and deviated from the mission of vocational education.

In China, there has always been a tension between skills supply and diploma supply throughout the development of vocational education. This tension not only influences the decision-making of vocational schools in terms of their actions but also has an impact on various policy measures within the construction of the vocational education system. In recent years, China's vocational education sector has made great efforts to reconcile the tension between skills supply and diploma supply. There were two cases. One is to continuously explore

innovative ways to cultivate skilled talents, including reforms in school-enterprise cooperation and industry-education integration. This aims to improve the effective skills supply capacity of the vocational education system by creating an institutional mechanism of multi-subject participation. The other is to strengthen the construction of discipline system in vocational education. This includes efforts to promote the multi-level integration of secondary and higher vocational education, strengthen the type positioning of vocational education in the discipline system, and enhance the effectiveness of vocational education diplomas to enhance the social appeal of vocational education. In practice, besides the rational efficiency logic, legitimacy mechanism and power mechanism are also important forces shaping the evolutionary track of institutional change. Usually, a specific institutional change is gradually advanced during the process of solving realistic problems. The author believes that the principle of institutional change is also applicable to China's vocational education system. In this sense, the endeavors and explorations within China's vocational education sector are a reflection on and response to the core issues faced by the current vocational education in the country, as well as valuable experience gained during the process of modernizing China's vocational education system. However, the skill formation theory in capitalist diversity research and Collins' credentialism theory also tell us that the vocational education system is embedded in the social system. In addition to the institutional innovation of the education system itself, the construction of relevant matching systems is equally important for the development of vocational education. For example, it is generally recognized that school-enterprise cooperation is an important way for vocational education to achieve effective skills supply, and the German dual vocational education system serves as a successful model in this regard. This system lays the skills foundation for Germany's manufacturing industry to excel in the global market and serves as an important comparative institutional advantage that supports Germany's incremental innovation. However, looking at the development history of the German vocational education system, we will find that it has experienced a change from "ineffective" to "effective" in the supply of skills. In the mid-19th century, especially after 1869, Germany vigorously implemented laissez-faire measures regarding economic governance to achieve the economic equality of the bourgeoisie. However, excessive laissez-faire was incompatible with the historical tradition of German nationalism and deviated from the social foundation of skills education for German workers to a certain extent. These measures had led to a surge in apprentice abuse and an increase in "overtraining" (Lebrlingszücbterei) to secure cheap apprentices. At the same time, apprentice labor force began to flow freely, and a large number of apprentices had little interest in long-term and arduous skill training.[29] It was not until the early 20th century that the basic framework of the current German dual vocational education system was established. As pointed out by Soskice, Thelen and other scholars, the reason why the dual vocational education system can gain a foothold in Germany and become an important comparative institutional advantage is closely related to Germany's long tradition of nationalism. Germany's widely implemented labor community mechanism and de-commercialized social protection mechanism have laid a matching institutional environment for that. The constructive nature of Germany's dual vocational education system serves as a reminder for China that when contemplating aspects like school-enterprise collaboration and industry-education integration within the construction of the vocational education system, it is crucial to consider them within a broader framework of national economic and social governance. Only by promoting the innovation and construction of the matching systems according to China's historical traditions and current realities can we "effectively enhance the adaptability of vocational education".[30] In terms of discipline construction in the vocational education system, improving the value of diplomas is an important measure for China's vocational education to consolidate its type positioning. According to the author, the value of vocational education diplomas primarily hinges upon the quality of skills supply. As a signal of skill quality, the credibility of these diplomas is not unilaterally determined by vocational schools or certificate issuing departments, but comes from the trusted consensus established among multiple participants. In the process, we need to be vigilant and avoid what Collins calls credential inflation. Credential inflation is the increasing level of education required for the same job over a period of time. "As more and more people obtain higher degrees, the level of education required for jobs are also rising."[31] Credential inflation will lead to the devaluation of diplomas, which will lead to a vicious circle, that is, when individuals studying for degrees are faced with the risk of degree devaluation, the rational choice is to obtain more education in order to seek higher diplomas. Therefore, we need to understand the logical mechanism behind improving the diploma level of vocational education and enhancing its attractiveness, in order to prevent an overemphasis on obtaining diplomas in the process of discipline construction. All of these matters may emerge as practical challenges that require careful consideration in the future development of China's vocational education system.

In recent years, the author has been advocating the establishment of a community with a shared future for China's vocational education development to promote systematic institutional reform. For China, vocational

education is not only a livelihood education and employment education, but also an institutional basis for the cultivation of national competitiveness. At present, China has embarked on a journey of high-quality development based on the real economy. According to the German model clarified by capitalist diversity theory, the author thinks that such strategic positioning of China's vocational education is essential for better modernizing the vocational education system and for more effectively meeting the skills demand in the process of developing China's real economy. In this sense, there is an urgent need to revitalize Yanpei Huang's concept of "Grand Vocational Education" for the development of vocational education in China. The modernization of China's vocational education system involves not only the reform of educational system, but also that of labor-capital relationship system, social protection system, and even macro-industrial policies. Therefore, multi-sectoral cooperation is particularly important for building policy systems and arranging higher-level top-level systems. As Yanpei Huang pointed out, "Vocational education plays a direct role in advancing various industries and has an indirect impact on critical matters like people's livelihood and national economy".[32] However, "Vocational education cannot be developed by focusing only on the development of vocational schools, educational circles, or sectors like agriculture, industry and business". To develop vocational education requires attention to the interests of the whole. In addition to solving the internal challenges of vocational education, it is also necessary to "contribute to the overall development of society", as "society is a whole unit". Moreover, Yanpei Huang is particularly interested in studying the relationship between vocational education and specialized division of labor in modern society. He has always stressed that "vocational education must be set up in the occupational society" to "develop in harmony with society".[33]

CONCLUSION: TOWARDS A SKILL-BASED SOCIETY

In fact, towards the end of the 20th century, the vigorous advocacy of vocational education in China by prominent figures like Yanpei Huang, Hengyuan Jiang, and Yuanpei Cai was driven not only by a sense of mission as public intellectuals but also by the direct motivation derived from their practical field observations. They believed that the main reason for China's industrial backwardness lies in "although there are good workers, they have no skills to use".[34] Hengyuan Jiang also held a similar view. He believed that the "separation between theory and practice" is the root cause of the inability of traditional education to solve the difficulties of social livelihood, "I think the general reason for today's backward society is that education does not focus on practice. This results in a situation where manual workers are unable to engage in mental work, while mental worker are unable to engage in manual labor". Therefore, "the solution to China's social problems lies in cultivating everyone's practical ability".[35] In that turbulent era, Yuanpei Cai and Hengyuan Jiang both issued a call for "sacred labor", urging society as a whole to attach importance to vocational education. Undoubtedly, compared with other types of education such as compulsory education and higher education, skill formation is the most important mission of vocational education. In October 12, 2021, the General Office of the CPC Central Committee and the General Office of the State Council issued the *Opinions on Promoting the High-Quality Development of Modern Vocational Education*, stating that vocational education is an important part of the national education system and human resources development.[30] Vocational education plays an important role in cultivating diverse talents, passing on technical skills, and promoting employment and entrepreneurship. Moreover, the Opinions clearly points out that we must "accelerate the construction of a modern vocational education system for a skill-based society, carry forward the spirit of craftsmanship to cultivate more high-quality technical and skilled personnel, skilled craftsmen and great craftsmen, thus providing strong talent and skills support for building a modern socialist country in an all-round way". This shows that providing skills support for the country's high-quality development is the basic direction of building a vocational education system. According to the document *Opinions on Promoting the High-Quality Development of Modern Vocational Education*, "China will rank among the top in the world in terms of the overall level of vocational education by 2035, while simultaneously establishing a skills-based society".[30] In the author's opinion, although there is still a long journey ahead, we have a promising future ahead in building a skill-based society where "the state values skills, society promotes skills, and individuals possess skills". In terms of construction concept and system design, this underscores the significance of GVE.

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