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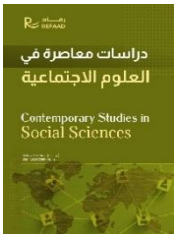

Vocational Education in the Context of the Fourth Industrial Revolution: An Analysis of the Current Situation and the Urgency of Enhancing the Quality of Vocational Education in Vietnam

التعليم المهني في سياق الثورة الصناعية الرابعة: تحليل للوضع الحالي والحاجة الملحة إلى تحسين جودة التعليم المهني في فيتنام

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Abstract:

Objectives: This study examines Vietnam's vocational education system in the context of globalization and the Fourth Industrial Revolution, highlighting challenges such as disparities in training quality, imbalanced program structures, and limited collaboration with businesses. Solutions focus on improving training quality, meeting labor market demands, and adapting to technological advancements.

Methods: Using a mixed-methods approach, the research analyzes data from official reports, statistics, and prior studies. Qualitative methods explore policies and management, while quantitative analyses evaluate trends in enrollment, employment, and infrastructure from 2010 to 2023, with a focus on vocational training and Industry 4.0.

Results: By 2023, Vietnam's vocational education system grew to 1,886 institutions with higher enrollment rates. However, challenges persist, including disparities between urban and rural areas, overreliance on elementary courses, underdeveloped advanced programs, and limited business collaboration. Gaps in soft skills, foreign language proficiency, and readiness for high-tech industries remain significant, while efforts to integrate technology and expand access in rural areas progress slowly.

Conclusions: Vietnam must modernize curricula, enhance business partnerships for practical training, and improve infrastructure and teaching quality. Promoting vocational education as a viable career path and leveraging international partnerships and digital learning platforms are essential. These measures will prepare a skilled workforce to meet globalization and Industry 4.0 demands, driving sustainable economic growth.

Keywords: *Human resources; international integration; labor market; training quality; vocational education.*

الملخص:

الأهداف: تدرس هذه الدراسة نظام التعليم المهني في فيتنام في سياق العولمة والثورة الصناعية الرابعة، وتسلط الضوء على التحديات مثل التفاوت في جودة التدريب، وهياكل البرامج غير المتوازنة، والتعاون المحدود مع الشركات. تركز الحلول على تحسين جودة التدريب، وتلبية متطلبات سوق العمل، والتكيف مع التقدم التكنولوجي.

المنهجية: باستخدام نهج الأساليب المختلطة، يحلل البحث البيانات من التقارير الرسمية والإحصاءات والدراسات السابقة. تستكشف الأساليب النوعية السياسات والإدارة، بينما تقيم التحليلات الكمية اتجاهات الالتحاق والتوظيف والبنية الأساسية من عام 2010 إلى عام 2023، مع التركيز على التدريب المهني والصناعة 4.0.

النتائج: بحلول عام 2023، نمى نظام التعليم المهني في فيتنام إلى 1886 مؤسسة بمعدلات التحاق أعلى. ومع ذلك، لا تزال التحديات قائمة، بما في ذلك التفاوت بين المناطق الحضرية والريفية، والاعتماد المفرط على الدورات الابتدائية، والبرامج المتقدمة غير المتطورة، والتعاون التجاري المحدود. تظل الفجوات في المهارات الناعمة، وإتقان اللغات الأجنبية، والاستعداد للصناعات التكنولوجية العالية كبيرة، في حين تتقدم الجهود الرامية إلى دمج التكنولوجيا وتوسيع الوصول إليها في المناطق الريفية ببطء.

الخلاصة: يجب على فيتنام تحديث المناهج الدراسية، وتعزيز الشراكات التجارية للتدريب العملي، وتحسين البنية الأساسية وجودة التدريس. يعد تعزيز التعليم المهني كمسار وظيفي قابل للتطبيق والاستفادة من الشراكات الدولية ومنصات التعلم الرقمية أمرًا ضروريًا. ستعمل هذه التدابير على إعداد قوة عاملة ماهرة لتلبية متطلبات العولمة والصناعة 4.0، ودفع النمو الاقتصادي المستدام.

الكلمات المفتاحية: *الموارد البشرية؛ التكامل الدولي؛ سوق العمل؛ جودة التدريب؛ التعليم المهني.*

Citation

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1 Introduction

Vocational education plays a vital role in human resource development, especially in the context of international integration and the rapid advancement of science and technology. In today's open and globally connected economy, countries are facing significant challenges in providing high-quality human resources capable of adapting to the fast-changing labor market. In Vietnam, vocational education has become a key solution for workforce development, helping workers acquire the necessary skills and contributing to the sustainable development of the country.

Since the Đổi Mới (Renovation) policy in 1986, Vietnam has transitioned from a centrally planned economy to a socialist-oriented market economy. Economic growth has led to a significant demand for highly skilled technical workers. Vietnam's vocational education system has continually developed, with the expansion and enhancement of vocational training institutions both in scale and quality. According to a report by the Ministry of Labor, Invalids & Social Affairs (2024), by 2023, the vocational education network had grown to more than 1,886 institutions nationwide, including 399 colleges, 429 intermediate schools, and 1,058 vocational training centers.

However, despite these achievements, vocational education in Vietnam still faces many limitations. One of the main issues is the disparity in training quality between regions, particularly between urban and rural areas. In urban areas and major economic centers, vocational education quality is typically higher due to better investment in facilities and teaching staff (Huynh, N. T, 2023). Meanwhile, in rural, mountainous, and remote areas, vocational education quality remains low, with challenging learning conditions. This disparity has created a significant gap in the ability to provide a high-quality workforce that meets the demands of local labor markets (Truong, T. H, 2023). Another issue facing the vocational education system in Vietnam is the unbalanced training structure. According to research by Hayden, M., & Lam, Q. T (2010); Trinh, T. N., & Nguyen, N. B (2015), most vocational programs currently focus on elementary-level and short-term courses, while programs at the college and intermediate levels, which supply highly skilled workers, have not been fully developed. This has led to a shortage of specialized labor in high-tech industries, making it difficult for businesses to recruit qualified personnel.

Furthermore, the lack of strong connections between vocational education institutions and businesses is a major obstacle. Although some institutions have begun collaborating with companies in designing curricula and providing internships for students, business participation remains limited. In addition, Vietnam's labor market is rapidly changing due to the impact of the Fourth Industrial Revolution. Information technology, artificial intelligence, and automation are creating new demands for worker skills and competencies. Businesses now require employees not only to have technical expertise but also to be proficient in technology, teamwork, creativity, and self-learning. However, the current vocational education system has not yet kept pace with these requirements. Training programs at many institutions remain overly theoretical and insufficiently aligned with real-world production, leaving graduates lacking the skills and experience needed to meet labor market demands.

According to a report by the Vocational Education Science Institute (2017), part of the problem stems from a lack of coherence in the planning and development of the vocational education system. The legal framework governing vocational education still contains ambiguities, making implementation difficult. Moreover, many vocational education institutions have not rigorously followed quality assurance regulations, leading to inconsistencies in training quality. This is especially evident when comparing public institutions with private vocational education centers, where teaching conditions and training quality vary significantly.

Additionally, the distribution of vocational education institutions is not well-planned. Most are concentrated in key economic areas such as Hanoi, Ho Chi Minh City, and major provinces, while rural, mountainous, and economically disadvantaged areas lack high-quality vocational training facilities. This limits access to vocational education for a large portion of the labor force, particularly for workers in difficult circumstances and those living in remote areas. Another major challenge is the shortage of both the quantity and quality of vocational education instructors. Although the number of instructors has increased, the quality of teaching staff still does not meet practical needs. Many instructors have not been adequately trained in modern teaching methods and practical skills, limiting their ability to effectively impart knowledge and skills to students. Tran, D (2023) pointed out that to improve the quality of vocational education, it is essential to focus on training and developing instructors, helping them stay updated with the latest knowledge and skills in their respective fields.

In the context of globalization and increasingly fierce competition in the international labor market, enhancing the quality of vocational education has become more urgent than ever. Improving vocational education quality not only helps meet the domestic labor market's needs but also opens up opportunities for Vietnamese workers to participate in international labor markets. Minh, H (2019) emphasized that to achieve this, Vietnam must focus on improving training quality, upgrading facilities, strengthening cooperation between educational institutions and businesses, and ensuring that training programs align with the requirements of the modern era. Thus, enhancing the quality of vocational education is not only the responsibility of training institutions but also a shared responsibility of the entire society, including the government, businesses, and the people. The government needs to provide stronger support for the vocational education system, from planning the network of training institutions to investing in facilities and developing teaching staff. Businesses need to actively participate in the training process, offering students internship opportunities and practical experience to equip them with the necessary skills for the labor market.

2 Literature Review

The research history on the management and evaluation of vocational education quality in Vietnam has undergone several stages alongside the development of the vocational education system. Numerous studies have significantly contributed to analyzing and assessing the factors affecting training quality, thereby proposing solutions for improvement within the context of international integration and the evolving labor market. Some notable research in this field includes Vu, D. H (2013) with the study titled "Management of Work-Study Training Programs from a Quality Assurance Approach." This research focuses on analyzing the management processes in work-study environments, particularly in ensuring quality. Vu proposed several solutions to improve training quality by enhancing teaching and learning processes, as well as emphasizing the management of teaching staff and facilities. Nguyen, T. H (2014), in the study "Quality Management in Education," delves into the concept of quality management in general education. The work not only analyzes the role of quality management in universities but also suggests methods and tools for managing quality in vocational education institutions. The research highlights that applying international standards in quality management will help improve training effectiveness, meeting the growing demands of the labor market. Bui, Q. C (2014), in the study titled "Evaluation of Quality Management in Vocational Training Institutions under the Ministry of Industry and Trade," is another notable contribution. Bui analyzed the factors affecting the training quality in vocational schools under the Ministry of Industry and Trade, including managing the teaching staff, facilities, and curricula. The study emphasized that strengthening collaboration between training institutions and enterprises is a crucial factor in enhancing teaching quality. Tran, K. D (2015) contributed to the field with the research "International Experience and Trends in Quality and Management Improvement in Higher Education in Some Asian Countries." This work focuses on comparing and learning from vocational education models from countries such as Japan, South Korea, and Singapore. Tran highlighted the necessity of applying international lessons to Vietnam, particularly in the context of the Fourth Industrial Revolution and rapid technological change.

Other prominent studies in vocational education include Chinh, T (2010) with the study titled "Some Issues in Managing Vocational Training Centers," which analyzed the challenges in managing vocational training centers. This research particularly focused on ensuring quality during training processes and managing facilities at vocational schools, providing solutions for improvement. Ngo, P. A. T (2013), in the work "Ensuring the Quality of Training at Public Vocational Centers in the Southeast Region," evaluated the role of public vocational centers in ensuring training quality. The author pointed out that despite efforts to improve training quality, these centers still face many challenges in meeting the demand for high-quality human resources. Another notable study is Nguyen, C. T (2013), with the research titled "Analysis of Factors Affecting Vocational Training in Vietnam: Solutions for Improving Quality from 2013–2020." Nguyen analyzed factors such as facilities, teaching staff, and enterprise involvement in vocational training. The research proposed specific solutions to enhance vocational education quality, ranging from improving curricula to developing support policies for workers. An important contribution is Khong, H. L (2017) with the study titled "Management of Information Technology Vocational Training at the College Level from a Quality Assurance Approach." Khong focused on managing IT vocational training, particularly the quality assurance requirements in response to the high demand for IT labor in Vietnam. Nguyen, M. H (2019), in the research "Improving the Quality and Efficiency of Vocational Training through Cooperation between Training Institutions and Enterprises in Hung Yen," proposed enhancing collaboration between enterprises

and vocational institutions. The study emphasized the importance of cooperation in designing curricula and providing practical opportunities for students. Additionally, Nguyen, T. K (2019), with the study titled "Improving the Management of Quality in Vocational Training for Automobile Driving in Vocational Institutions in the Binh Tri Thien Region," identified the factors affecting the management of vocational training for driving and proposed quality management solutions. Other authors, such as Le, T (2018) in the article "Vocational Education – Challenges in the Context of International Integration" and Minh, T (2019) in the article "Continuing to Focus Intensely on Vocational Education," emphasized the need for stronger improvements in vocational education to meet labor market demands. These articles also discussed the role of government policies in promoting the development of vocational education.

In summary, research on vocational education in Vietnam has covered many important aspects such as quality management, business collaboration, training quality assurance, and the factors affecting training effectiveness. These studies contribute to analyzing the current state and challenges of Vietnam's vocational education system in the context of international integration and the Fourth Industrial Revolution.

3 Materials and Methods

This research is based on official reports and statistical data from various sources, including documents from the Ministry of Labor, Invalids & Social Affairs, the General Statistics Office, the Vocational Education Science Institute, and other relevant agencies. These reports provide a comprehensive picture of the development of Vietnam's vocational education system during the period from 2010 to 2023, covering aspects such as the scale of the vocational education network, the number of graduates, the quality of training, and the employment rate of graduates. Additionally, previous studies by scholars such as Chinh, T (2010), Doan, D. T (2012), Nguyen, C. T (2013), Bui, Q. C (2014), Nguyen, T. H (2014), Tran, K. D (2015), and Trinh, T. N., & Nguyen, N. B (2015) have been used as important references. These works focus on analyzing factors affecting vocational education quality, ranging from management policies and training structure to strategies for improving the system's effectiveness. These studies provide a foundational understanding of the historical development, achievements, and current limitations of the vocational education system. In addition, data related to labor market trends and skill requirements in various industries during the Fourth Industrial Revolution have been collected and analyzed. This information helps assess the relevance of current vocational training programs to the actual needs of the labor market, thereby proposing suggestions for improvements and further development.

To comprehensively evaluate the current state and challenges of Vietnam's vocational education system, this study employs a mixed research method, combining both qualitative and quantitative approaches. The qualitative method is used to analyze policies, vocational training programs, and factors affecting vocational education quality. Through the review of documents, reports, and previous studies, this paper draws important conclusions about the current state of vocational education. This method also delves into qualitative aspects such as management structures, the role of enterprises in supporting training, and the implementation of practical training programs. The quantitative method is used to collect and analyze statistical data from official reports by the Ministry of Labor, Invalids & Social Affairs and the General Statistics Office. Data on the number of students participating in training programs, the employment rate of graduates, and statistics on the quality of instructors and vocational school facilities are analyzed and compared over time from 2010 to 2023. This helps provide an objective assessment of the development of the vocational education system during this period.

The scope of the study focuses on Vietnam's vocational education system, from elementary-level to intermediate and college-level vocational training institutions. These institutions include public, private, and foreign-invested vocational training centers. The study examines policies related to vocational education development, training programs, and the current quality of training at vocational institutions across the country. Moreover, the study analyzes factors affecting vocational education quality, such as facilities, teaching staff, training program structure, and the involvement of enterprises in the training process. Special attention is given to the current challenges facing the vocational education system in the context of international integration and the development of the Fourth Industrial Revolution. The research period spans from 2010 to 2023, a time marked by significant changes in both policies and the labor market, providing a comprehensive picture of the vocational education landscape in Vietnam.

4 Results and Discussion

4.1 Results

The vocational education system in Vietnam has made remarkable progress in recent years, particularly in expanding the network of training institutions and strengthening policies that support vocational training for workers, especially in rural and economically disadvantaged areas. According to the General Statistics Office, by the end of 2018, there were a total of 1,886 vocational education institutions nationwide, including 399 colleges, 429 intermediate schools, and 1,058 vocational education centers. This expansion shows that the vocational education network has not only grown but is also fairly distributed across the country, improving access to vocational education for many workers, particularly in rural and remote areas.

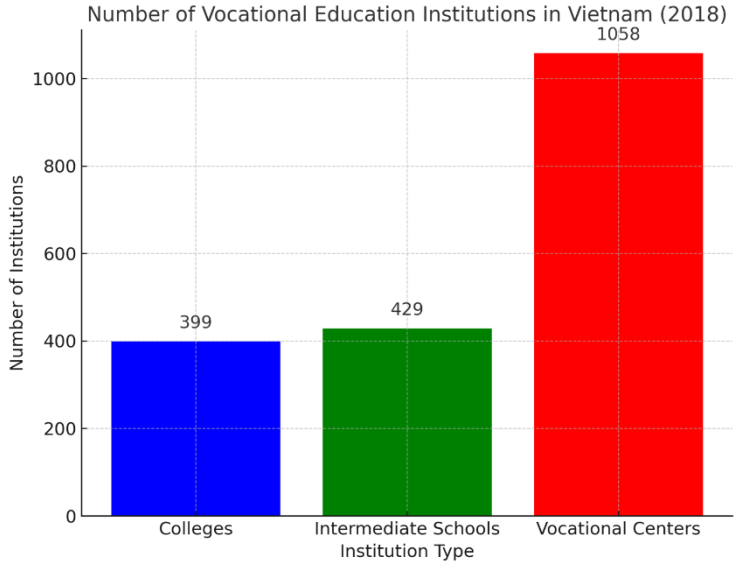

Figure 1: Number of Vocational Education Institutions in Vietnam (2018)

In addition to expanding the network, the vocational education system has also seen significant investment in training quality. However, quality remains a major challenge for vocational education in Vietnam. Despite the increase in quantity, many vocational education institutions have yet to meet international quality standards. According to research by Trinh, T. N., & Nguyen, N. B (2015), many training programs in vocational schools remain too theoretical, lacking a connection to real-world production and the needs of businesses. This results in graduates lacking practical skills and the ability to work effectively in modern industrial environments.

Another noteworthy achievement is the significant increase in the number of students participating in vocational training programs. From 2015 to 2023, the number of people enrolling in vocational courses surged. In 2023, it was estimated that over 2 million people had graduated from vocational education programs, indicating the growing appeal of vocational training to the younger workforce. This suggests that workers' awareness of the importance of vocational education has improved.

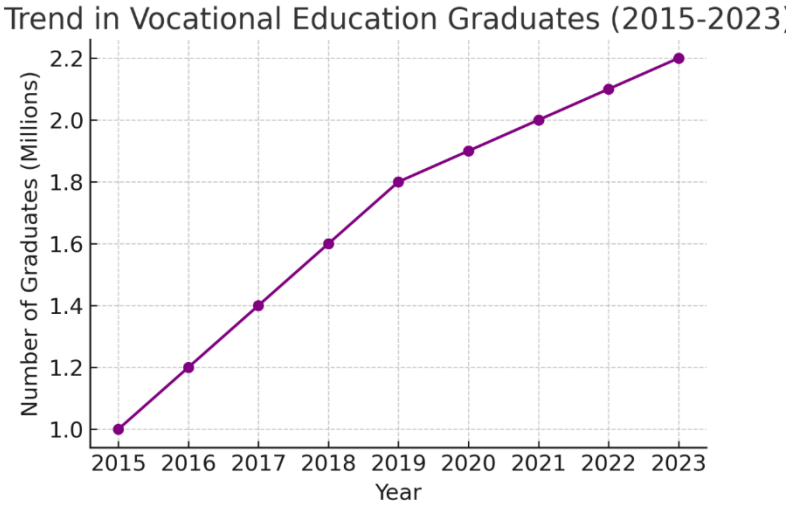

Figure 2: Trend in Vocational Education Graduates (2015-2023)

However, despite these advances, the current training structure remains inadequate. According to Trinh, T. N., & Nguyen, N. B (2015), most vocational education programs focus on elementary-level and short-term courses, while college and intermediate-level programs, which provide higher-skilled workers, have not been fully developed. This has led to a shortage of highly skilled technical workers in industries requiring deep expertise, such as mechanics, electronics, and information technology. As a result, businesses face difficulties in recruiting highly skilled labor, negatively affecting labor productivity and the competitiveness of the economy.

The distribution of vocational education institutions also requires closer attention. According to the Vocational Education Science Institute (2017), most vocational education institutions are concentrated in urban areas and large industrial zones, while rural areas, where the population is dense and a significant portion of the labor force resides, lack high-quality vocational training facilities. This reduces access to vocational education for a large segment of the workforce in these areas, leading to inequality in access to learning opportunities and skill development.

Another key challenge is the disparity in vocational training quality between urban and rural areas. Teachers in urban centers generally have better qualifications and more access to modern teaching facilities, whereas rural institutions often suffer from a lack of skilled instructors and outdated infrastructure.

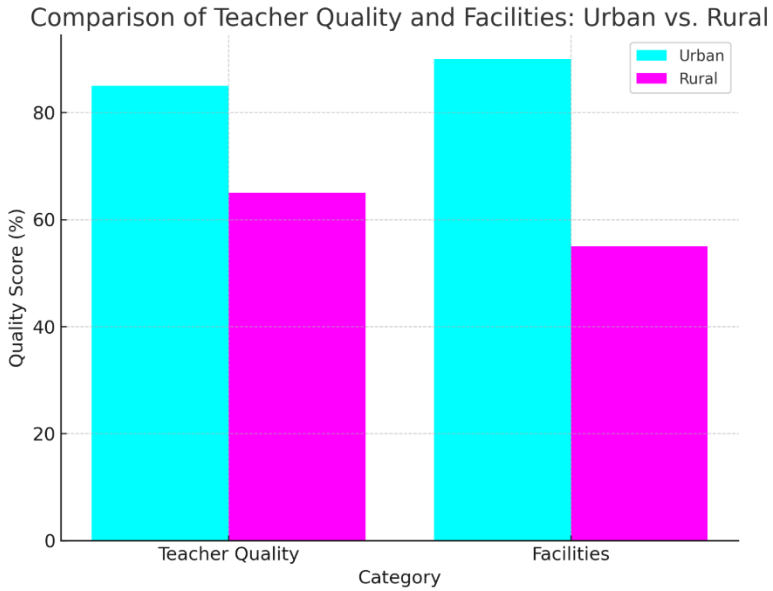

Figure 3: Comparison of Teacher Quality and Facilities: Urban vs. Rural

In recent years, vocational education facilities have also improved. Many vocational schools have been equipped with modern laboratories and workshops, meeting the specific demands of various industries. However, many institutions in rural and mountainous areas still lack the necessary equipment for practical training, making it difficult for students to gain hands-on experience with modern technology during their studies.

Furthermore, cooperation between vocational education institutions and businesses in training remains limited. Although there have been efforts to promote collaboration between the two, business participation in the training process is still mostly superficial, without strong ties. As a result, vocational training programs in many schools are not fully aligned with the practical needs of the labor market, leading to graduates who do not meet job requirements. Bui, Q. C (2014) pointed out that many businesses still complain about the quality of labor trained by vocational education institutions, particularly regarding the lack of practical skills and the ability to adapt to rapidly changing work environments.

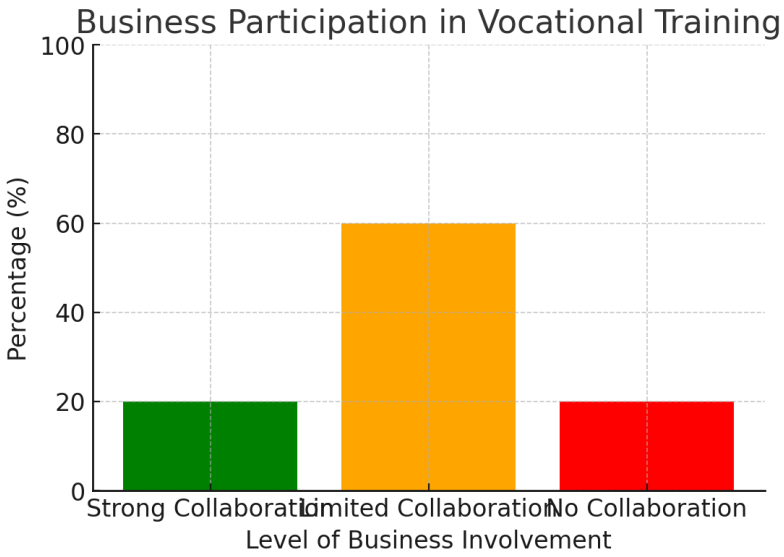

Figure 4: Business Participation in Vocational Training

In addition to issues related to training quality, another important aspect highlighted in the research results is recruitment and the development scale of the vocational education system. Although the number of vocational education institutions increased significantly between 2010 and 2023, recruitment numbers and training scale remain limited. According to the General Statistics Office (2018), while the number of students enrolled in vocational training programs has been increasing, especially in key industries such as mechanics and electronics, the figures have yet to meet the actual labor market demands.

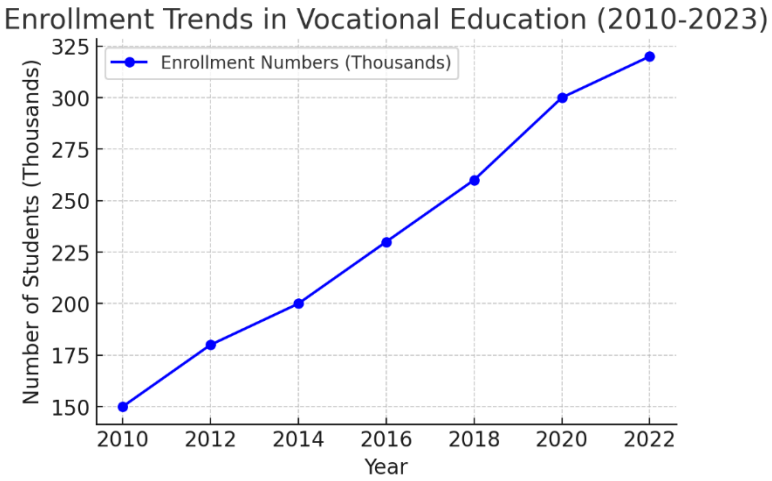

Figure 5: Enrollment Trends in Vocational Education (2010-2023)

One reason for this limited enrollment is the public's perception of vocational education, which has not fundamentally changed. Many still view vocational education as a secondary option when university admission is not possible, rather than as a potential career development path. The mindset of valuing university education over vocational education remains prevalent in society, making it difficult for vocational schools to attract students, particularly those with strong academic abilities. This also explains why college and intermediate-level programs, which provide highly skilled labor, have not developed strongly.

For industries such as precision mechanics, information technology, and automated production, the demand for highly skilled workers is enormous, yet the current vocational education system has not met these needs. This poses a challenge for businesses, as they must spend considerable time and resources retraining workers after hiring, reducing production efficiency and affecting their competitiveness.

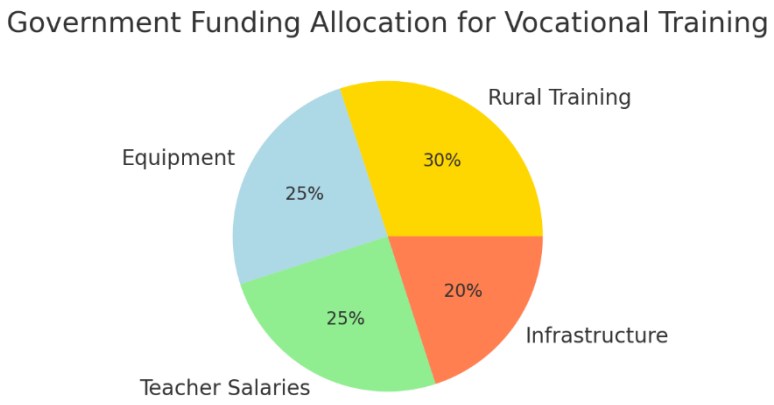

Figure 6: Government Funding Allocation for Vocational Training

In terms of policy, the Vietnamese government has introduced significant support policies to promote vocational education, such as the "Vocational Training for Rural Workers" initiative and vocational training support programs for those under policy. Notably, the government's Project 1956, aimed at providing vocational training for approximately 1 million rural workers annually, has achieved positive results in improving skills for the rural workforce, helping them access higher-paying jobs and reducing poverty rates (Prime Minister, 2009). However, the implementation of this policy has faced challenges due to limited facilities, funding, and teaching staff in many localities.

Another aspect of the research results is the application of technology in vocational education. In the context of the Fourth Industrial Revolution, the integration of technology into vocational training has become an inevitable trend. Many vocational education institutions have started implementing online training models, combined with hands-on practical training, to enhance the quality of teaching and meet the digital skills requirements of learners. However, the adoption of technology in vocational education is still relatively slow compared to actual needs. The digital infrastructure in many vocational schools, especially in rural areas, is underdeveloped, with a lack of modern equipment and resources to maintain advanced training programs. This poses a significant challenge in aligning vocational education with technological development and the demands of the modern labor market.

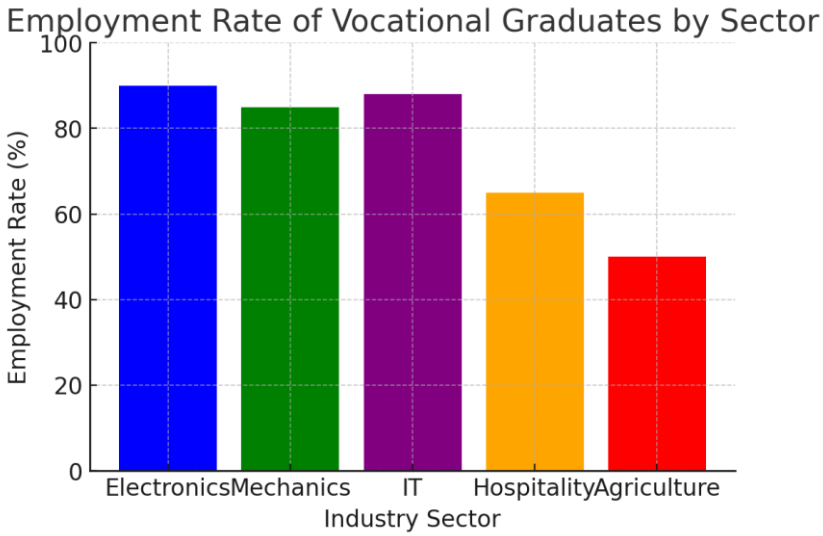

Figure 7: Employment Rate of Vocational Graduates by Sector

Additionally, financial issues play a critical role in influencing the quality of training at vocational education institutions. Despite several support policies, the budget allocated for vocational education remains limited compared to other levels of education. According to Bui, M. D (2024), many vocational schools still face difficulties in maintaining facilities, purchasing teaching equipment, and paying instructors' salaries. This financial shortfall prevents vocational institutions from fully investing in improving training quality, which in turn affects their ability to supply high-quality labor to the job market.

Beyond quality and infrastructure challenges, another crucial factor contributing to the development of vocational education is international collaboration programs. In recent years, many vocational education institutions have begun collaborating with foreign organizations and educational institutions to implement training programs that adhere to international standards. These programs not only provide learners with access to advanced knowledge and skills from developed countries but also help elevate the reputation and quality of domestic vocational schools. However, the number of international collaborative training programs remains limited and primarily concentrated in large vocational schools in cities, with minimal outreach to rural and remote areas.

Apart from the challenges mentioned above, one of the key indicators of the vocational education system's success in Vietnam is the post-graduation employment rate. This rate is considered a direct measure of the effectiveness of vocational training programs. According to the Vocational Education Science Institute (2017), in industries such as electrical engineering, electronics, and mechanics, the employment rate of graduates reached 80-90%, particularly in major industrial centers like Hanoi and Ho Chi Minh City. However, in other sectors, especially tourism, hospitality, and agriculture, the employment rate remains low, particularly in rural and mountainous areas, where job opportunities are fewer and less developed compared to urban areas.

Some fields have also made significant achievements in developing training programs that link schools and businesses. A prime example is the information technology sector, where many vocational colleges have partnered with major tech companies to design specialized training programs tailored to the labor market's needs. This not only provides students with practical experience during their studies but also facilitates job opportunities immediately after graduation. Several large companies have directly participated in the training process, providing instructors, facilities, and paid internships, thereby bridging the gap between theory and practice.

Additionally, there has been a positive shift in public perceptions of vocational education. In the past, many Vietnamese workers, especially parents, tended to view university education as the only path to a successful career. However, in recent years, with the government's support and media campaigns, perceptions of the value of vocational education have changed significantly. More people now recognize vocational education as an attractive option for quickly entering the labor market, offering stable job opportunities and competitive incomes. The government's efforts to increase financial support, scholarships, and incentives for vocational students have also contributed to the development of the vocational education system.

However, there remain issues to be addressed to ensure that vocational education not only attracts but also retains students until graduation. A major challenge is the high dropout rate, particularly in long-term training programs. According to the General Statistics Office (2018), many students drop out due to financial difficulties, lack of internship opportunities, and unmet expectations regarding vocational education. This suggests a need for policies that support students not only financially but also in providing practical learning opportunities and connections with businesses during their vocational training.

Quality assurance in vocational education is another important aspect that needs improvement, as highlighted by several reports. According to the Vocational Education Science Institute (2017), although some vocational institutions have begun implementing self-assessments of their quality, the number of institutions conducting thorough quality assessments remains low. Many institutions, particularly in rural and mountainous areas, lack the resources or mechanisms to carry out rigorous quality control processes. The lack of quality assurance makes it difficult to assess training quality, which in turn affects the ability to meet labor market demands.

Moreover, there are concerns about the relevance of vocational training programs to the actual needs of the labor market. Some studies have shown that vocational training curricula in many schools have not been updated in time to reflect technological advancements and the requirements of businesses. This is particularly true in high-skill sectors such as information technology, industrial manufacturing, and automation, where new technologies like artificial intelligence and robotics are changing the way production operates. Delays in adjusting and upgrading training programs have made it difficult for many graduates to find jobs in these fields.

Another key factor is the investment in vocational education by the government and society. Although there have been efforts to allocate budgets for the development of facilities and teaching staff, the current level of investment still falls short of the labor market's demands. Uneven investment across regions has also contributed to disparities in the quality of vocational education. In urban areas and major economic centers,

vocational training institutions are often well-equipped and staffed with high-quality teachers, while in rural and mountainous areas, learning conditions remain challenging. This requires adjustments in resource allocation to ensure the uniform development of vocational education quality nationwide.

4.2 Discussion

The quality of vocational education in Vietnam still requires significant improvement to meet the increasingly stringent demands of both domestic and international labor markets. One of the most notable issues is the disparity in training quality between regions and institutions. In urban areas, where major industrial centers like Hanoi, Ho Chi Minh City, and Da Nang are located, vocational training quality tends to be higher due to better investments in facilities and teaching staff (Phan, A, 2023). In contrast, rural and remote areas face significant teaching limitations, resulting in a considerable gap in training quality between localities (Trinh, T. N., & Nguyen, N. B, 2015).

This disparity poses major challenges in providing a consistent, high-quality workforce for the labor market. In key economic regions, the demand for highly skilled labor in technical industries, high-tech sectors, and modern manufacturing is growing. However, vocational education institutions in these areas are still unable to fully meet labor market demands, especially regarding practical skills and technological application (Doan, D. T, 2012). As a result, many businesses continue to report shortages of well-trained labor capable of working efficiently in industries that require advanced skills, despite the growing number of vocational graduates.

A significant weakness in the current vocational education system is the lack of flexibility in training programs to meet the actual needs of businesses. Many training programs are still too theoretical and lack a strong connection to the labor market's needs, particularly in high-tech industries such as information technology, electronics, and mechanics (Dao, V. T, 2023). According to Appadurai, A (1996); Huang, F (2007); Minh, H (2019), to address this issue, stronger cooperation between vocational institutions and businesses is essential. Businesses need to play a more active role in curriculum development and provide internships and real-world experiences for students, helping them acquire the necessary skills to enter the labor market.

Promoting cooperation between businesses and vocational education institutions not only enhances training quality but also ensures that graduates can meet job requirements immediately after completing their studies (Knight, J, 1997); Nayyar, D, 2008). Nguyen, C. T (2013) pointed out that some businesses have already started participating in the teaching process by providing instructors, offering internships at workplaces, and even contributing to curriculum development. This not only gives students practical experience but also helps them better understand corporate culture and how to operate in modern work environments. However, despite efforts to foster collaboration between vocational institutions and businesses, the level of business participation remains limited. One reason for this is that businesses do not yet fully recognize the long-term benefits of investing in vocational education, and they still see it as the responsibility of the training institutions (Phan, T. K, 2024). As a result, many collaborative programs remain formalities and have not effectively improved training quality (Nguyen, M. H, 2019).

Another issue to discuss is the management and allocation of resources within the vocational education system. As mentioned earlier, Vietnam's vocational education system is still fragmented and overlapping. Many vocational institutions offer training in similar fields without clear specialization, leading to unhealthy competition in recruitment and training. This not only wastes resources but also reduces the overall efficiency of the vocational education system.

The distribution of vocational education institutions is also unbalanced. Most vocational institutions are concentrated in urban areas and large industrial zones, while rural areas, where there is a significant need for vocational training for young workers, lack high-quality training facilities. This not only reduces learning and skill development opportunities for workers in these areas but also increases the inequality of employment opportunities between regions. According to the Vocational Education Science Institute (2017), a restructuring of the vocational education network is needed to ensure balanced development across regions and enhance the competitiveness and effectiveness of vocational institutions.

One of the biggest challenges for graduates from vocational institutions is their lack of soft skills and foreign language proficiency. In the context of international integration, soft skills, especially communication, teamwork, and problem-solving, are becoming increasingly important. However, according to Bui, Q. C (2014), most vocational graduates still lack soft skills, making it difficult for them to succeed in modern corporate environments.

Additionally, foreign language proficiency, especially English, is a key factor where Vietnamese students still fall short. As Vietnam joins more free trade agreements and more foreign businesses invest in the country, the demand for foreign language skills in the workforce is growing. However, most vocational graduates still do not have adequate language skills, which hampers their ability to communicate and work with international partners (Vo, T. P, 2023). This not only diminishes their competitiveness in the international labor market but also limits their job opportunities in foreign-invested enterprises in Vietnam.

The context of the Fourth Industrial Revolution is creating new challenges for Vietnam's vocational education system. Technologies like artificial intelligence, robotics, automation, and big data are gradually transforming production and management methods in many industrial sectors. This requires a workforce with new skills capable of working in modern industrial environments and adapting quickly to new technologies and production processes (Marginson, S., Kaur, S., & Sawir, E, 2011). However, according to Bui, X. D (2023), Vietnam's vocational education system has not yet caught up with this trend. Most current training programs have not been updated to reflect technological changes and labor market demands in the context of Industry 4.0. Many emerging fields, such as data management, robotics engineering, or artificial intelligence expertise, are still not included in vocational training programs, leaving graduates ill-equipped to meet the demands of these jobs.

To address this issue, a strong reform of the vocational education system is necessary. This includes updating training programs, investing in modern facilities, and building a teaching staff with the knowledge and skills to train students in high-tech fields. Additionally, there needs to be increased international cooperation to learn from the effective vocational education systems of developed countries. This will help broaden perspectives and improve training quality, while also enhancing students' ability to integrate into the global labor market.

Another important aspect of the reform is the integration between educational institutions and businesses.

Promoting close cooperation between schools and businesses will provide students with practical opportunities, enabling them to access advanced technologies and production processes. Internship programs, business-driven training, and hybrid learning models that combine theory and practice are crucial elements that help students not only grasp knowledge but also master professional skills.

Moreover, the development of online learning and distance education must be emphasized. This approach not only meets students' flexible learning needs but also allows them access to a wealth of learning materials from around the world. Online courses, international certificates, and digital learning platforms will serve as essential bridges that help students stay up-to-date with the latest knowledge in the digital age.

Finally, raising public awareness of the value of vocational education is essential. Society needs to change its preconceived notions about vocational education and recognize it as a viable career path, on par with traditional academic disciplines (Nguyen, P. H, 2024). To achieve this, media, the government, and social organizations must engage in clear advocacy campaigns that guide young people.

In conclusion, the reform of vocational education is an urgent task that must be comprehensively implemented. From improving curricula, investing in facilities, and developing the teaching workforce to partnering with businesses and enhancing online learning, all efforts aim to create a high-quality workforce capable of meeting the stringent demands of the future labor market. This not only addresses the shortage of skilled labor but also promotes the sustainable development of the national economy.

5 Conclusion

Vocational education in Vietnam has made significant achievements in providing basic human resources for the labor market. However, there are still many challenges the system must address and overcome to meet the growing demand for higher-quality labor. The progress achieved in recent years reflects the collective efforts of the government, training institutions, and businesses. Still, there remain considerable gaps in training quality, infrastructure, and effective collaboration among stakeholders.

One of the key findings of the study is that Vietnam's vocational education system still faces gaps in training quality and adaptability to the rapidly changing labor market, particularly in the context of the Fourth Industrial Revolution. This calls for regular updates to training programs to equip students with skills aligned with technological advancements, along with investments in modern facilities. Currently, many training institutions lack appropriate teaching equipment, reducing the effectiveness of both learning and practical exercises. This directly impacts the quality of labor when they enter the workforce.

Furthermore, the shortage of qualified teaching staff is another critical issue. Despite many efforts to improve, the majority of teachers still do not meet the requirements for technical expertise and practical teaching skills in high-tech fields. This limits their ability to effectively impart knowledge and practical orientation to students, making it challenging for them to grasp and apply the latest technologies in their jobs after graduation.

Another key issue is that the relationship between educational institutions and businesses is still not sufficiently close. Many businesses have not been deeply involved in the training process, leading to graduates lacking practical skills and struggling to integrate into the working environment. The study shows the need for a sustainable collaboration mechanism between training institutions and businesses, particularly in creating internships and training programs that meet the specific needs of companies. This will help students not only learn theory but also gain hands-on experience, making it easier for them to enter the labor market after graduation.

Although there is potential for development, vocational education in Vietnam still lags behind international standards. Integration with global education systems remains limited, especially in terms of collaborative training with countries that have advanced vocational education systems. To meet the increasingly demanding requirements of the global labor market, improving vocational education quality must be aligned with international standards, particularly in high-tech fields like artificial intelligence, automation, and big data. Strengthening international cooperation will not only enhance teaching quality but also open up more learning and employment opportunities for students in international markets.

Additionally, developing and implementing online vocational education programs to leverage technology and offer more flexible, accessible courses for learners is crucial. This form of education will help students, especially those already working, to update their knowledge and skills without being restricted by time and location. However, to develop an effective online education system, substantial investment is required in technology infrastructure and in training teachers capable of designing and delivering courses that meet international standards.

Another gap that requires thorough research is the impact of Industry 4.0 on traditional occupations. Many professions are being replaced or transformed by technology, and vocational training needs to quickly adjust to accommodate these changes. Future studies should focus on analyzing which industries will be most affected and how vocational education can help workers transition to new, higher-value jobs.

Finally, the issue of changing societal perceptions of vocational education also requires further research. While there have been campaigns to raise awareness of the importance of vocational education, societal prejudice still exists, leading many people to undervalue this career path. This can influence the choices of many young people when deciding on vocational education. In the future, in-depth studies are needed to determine how to change social attitudes and encourage more people to pursue vocational education.

In conclusion, for Vietnam's vocational education system to reach its full potential, there must be strong and consistent reforms, from improving training quality and upgrading facilities to fostering international cooperation and building stronger links with businesses. Additionally, there needs to be investment in research to address current gaps and ensure vocational education can adapt to future changes. Addressing these current challenges will help Vietnam create a high-quality workforce that not only meets domestic needs but also competes globally.

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