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ENHANCING THE ROLE OF EDUCATION AND TRAINING IN THE SUSTAINABLE DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN VIETNAM: A CASE STUDY OF HO CHI MINH CITY

Fortalecendo o papel da educação e do treinamento no desenvolvimento sustentável da ciência e da tecnologia no Vietnã: um estudo de caso da cidade de Ho Chi Minh

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ABSTRACT

Education and training play a foundational role in the formation of high-quality human resources, thereby determining the effectiveness of sustainable science and technology development in the context of globalization and the Fourth Industrial Revolution. In Vietnam, enhancing the role of education and training in the development of science and technology is not only a strategic requirement of the country's industrialization and modernization process but also a key condition for achieving sustainable development goals. This article analyzes the role of education and training in promoting the sustainable development of science and technology in Vietnam through a case study of Ho Chi Minh City. Based on qualitative research methods, combined with policy analysis and the synthesis of empirical data, the article clarifies the achievements attained, existing limitations, and emerging issues in linking education and training with science and technology development in Ho Chi Minh City. The research findings indicate that education and training have made significant contributions to improving the quality of human resources, fostering innovation, and strengthening the application of science and technology in the city's socio-economic development. However, this process still reveals several shortcomings, including a lack of policy coherence, ineffective coordination mechanisms among stakeholders, and an insufficient alignment between training activities and the practical demands of sustainable science and technology development. On this basis, the article proposes several policy-oriented recommendations aimed at further enhancing the role of education and training, thereby promoting the sustainable development of science and technology in Vietnam in the current period.

Keywords: Education and Training, Science and Technology, Sustainable Development, Innovation, Development Policy, Ho Chi Minh City

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FORTALECENDO O PAPEL DA EDUCAÇÃO E DO TREINAMENTO NO DESENVOLVIMENTO SUSTENTÁVEL DA CIÊNCIA E DA TECNOLOGIA NO VIETNÃ: UM ESTUDO DE CASO DA CIDADE DE HO CHI MINH

Enhancing the role of education and training in the sustainable development of science and technology in Vietnam: a case study of Ho Chi Minh city

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RESUMO

A educação e a formação desempenham um papel fundamental na formação de recursos humanos de alta qualidade, que determina a eficácia do desenvolvimento sustentável da ciência e da tecnologia no contexto da globalização e da Quarta Revolução Industrial. No Vietnã, potencializar o papel da educação e da formação no desenvolvimento da ciência e da tecnologia não é apenas um requisito estratégico para o processo de industrialização e modernização do país, mas também é uma condição chave para alcançar os objetivos de desenvolvimento sustentável. Este artigo analisa o papel da educação e da formação na promoção do desenvolvimento sustentável da ciência e da tecnologia no Vietnã, através do estudo de caso da Cidade de Ho Chi Minh. Baseando-se em métodos de investigação qualitativa, combinados com a análise de políticas e a síntese de dados empíricos, o artigo esclarece os logros alcançados, as limitações existentes e os problemas emergentes na vinculação da educação e da formação com o desenvolvimento da ciência e da tecnologia na Cidade de Ho Chi Minh. Os resultados da investigação indicam que a educação e a formação contribuíram significativamente para a melhoria da qualidade dos recursos humanos, para o fomento da inovação e para o fortalecimento da aplicação da ciência e da tecnologia no desenvolvimento socioeconômico da cidade. No entanto, este processo ainda apresenta diversas deficiências, como a falta de coerência política, a ineficácia dos mecanismos de coordenação entre as partes interessadas e o alinhamento insuficiente entre as atividades de formação e as exigências práticas do desenvolvimento sustentável da ciência e da tecnologia. Sobre esta base, o artigo propõe diversas recomendações políticas destinadas a fortalecer o papel da educação e da formação, promovendo também o desenvolvimento sustentável da ciência e da tecnologia no Vietnã no período atual.

Palavras-chave: Educação e Formação, Ciência e Tecnologia, Desenvolvimento Sustentável, Inovação, Política de Desenvolvimento, Cidade Ho Chi Minh

INTRODUCTION

In the context of deepening globalization and the rapid advancement of the Fourth Industrial Revolution, sustainable development has become a central objective in the development strategies of many countries. Within this process, education and training play a foundational role in shaping the knowledge, skills, and qualities of human resources, thereby determining the effectiveness of science and technology development as well as national innovation capacity. The close linkage between education and training and the development of science and technology not only enhances competitiveness but also ensures a harmonious balance among economic, social, and environmental objectives.

In Vietnam, the Party and the State consistently identify education and training, together with science and technology, as top national priorities and as key driving forces of industrialization, modernization, and sustainable national development. Numerous important guidelines and policies have been promulgated to develop high-quality human resources, promote scientific research, and advance technological application and innovation in alignment with socio-economic development requirements in the new period. However, in practice, the leading role of education and training in fostering science and technology development toward sustainability has not yet been fully realized. The linkages among training, scientific research, and practical development still need to reveal certain shortcomings, reflected in policy incoherence, ineffective coordination mechanisms, and the limited transformation of knowledge from educational institutions into science and technology activities.

Ho Chi Minh City is a major national center of economic activity, science and technology, and education and training, and is also a pioneer in innovation and international integration. With a dense network of higher education institutions, research institutes, science and technology organizations, and innovative enterprises, the city possesses favorable conditions to promote the role of education and training in advancing sustainable science and technology development. Nevertheless, rapid growth and urbanization pressures also pose significant challenges related to the quality of human resources, the effectiveness of linkages between training and research, and the need to ensure sustainability amid ongoing economic, social, and environmental transformations.

Based on these theoretical and practical considerations, this article analyzes the role of education and training in promoting sustainable science and technology development in Vietnam through a case study of Ho Chi Minh City. Accordingly, it clarifies the major achievements attained, identifies existing limitations, and proposes several solutions aimed at strengthening the linkage between education and training and science and technology development, thereby contributing to sustainable development in the current period.

1 LITERATURE REVIEW

At the international level, numerous studies have affirmed that education and training, together with science and technology, constitute core drivers of sustainable development in the context of the knowledge economy and globalization. The study *Impact of Global Government Investment on Education and Research Development: A Comparative Analysis and Demystifying the Science, Technology, Innovation, and Education Conundrum* by Okoye et al. (2022), based on a cross-national comparative analysis, demonstrates that the level of government investment in education and science and technology has a direct impact on research capacity, innovation performance, and socio-economic development outcomes. The findings underscore the foundational role of education and training in enhancing the quality of human resources, thereby creating favorable conditions for science and technology to function as engines of sustainable growth.

Using a case-study approach, Wang and Ruan (2024), in *Education Helps to Achieve Shared Prosperity: Evidence from China*, show that improving educational quality and ensuring equity in education not only enhances the knowledge structure of the workforce but also serves as a crucial mechanism for achieving shared prosperity. Education is viewed as a bridge linking economic growth, inequality reduction, and technological innovation, thereby contributing directly to sustainable development. More broadly, many studies regard investment in education as the cornerstone of the knowledge economy, strengthening national competitiveness, improving quality of life, and generating momentum for science and technology development in a globalized context.

Alongside academic research, reports by UNESCO, UNDP, and the OECD consistently emphasize the central role of education in human resource development, innovation capacity building, and the formation of values

underpinning sustainable development. Education is not merely a means of knowledge transmission but also a foundation for cultivating critical thinking, creativity, and social responsibility, key attributes for guiding science and technology toward sustainability in the twenty-first century. At the same time, many studies point out that science and technology, particularly innovation and technology transfer, play a decisive role in enhancing productivity, improving resource efficiency, and addressing environmental and social challenges arising in the development process.

In Vietnam, research on education and training, science and technology, and sustainable development has largely focused on analyzing the Party's guidelines and the State's policies. Many studies reaffirm the consistent view that education and training, together with science and technology, constitute top national priorities and serve as both the foundation and driving force of industrialization and modernization. The report *Science, Technology and Innovation in Vietnam 2023* (Ministry of Science and Technology, 2024) provides important empirical evidence of the strategic role of science, technology, and innovation in economic restructuring and sustainable development, especially in the context of deep international integration.

From the perspective of industrialization and modernization theory and practice, the monograph *Industrialization and Modernization based on Science, Technology, and Innovation,* edited by Hoa and Dong (2024), analyzes international experience and draws valuable lessons for Vietnam in setting development goals and selecting science and technology policies aligned with sustainable development requirements. However, these works tend to approach science and technology as the central driving force, while the leading and foundational role of education and training in fostering sustainable science and technology development has not been systematically examined.

At the local level, particularly in Ho Chi Minh City, studies directly addressing the relationship between education and training and science and technology remain relatively limited. Most existing works take the form of reports, research projects, or practice-oriented review articles. Representative studies such as *Sustainable Socio-Economic Development of Cities toward Modernity* (2012) and Thang's *Science and Technology in the Process of Industrialization and Modernization in Ho Chi Minh City* (2016) have contributed to clarifying the role of science and technology in urban development. Nevertheless, these studies have not sufficiently highlighted the role of education and training as a foundational factor determining the effectiveness of sustainable science and technology development.

Overall, the review of domestic and international literature reveals a notable research gap in the comprehensive analysis of the organic relationship between education and training and science and technology within sustainable development strategies, particularly through concrete case studies in Vietnam. This article seeks to help fill that gap by examining the case of Ho Chi Minh City, thereby clarifying key theoretical and practical issues and proposing solutions to enhance the role of education and training in promoting sustainable science and technology development in the current context.

2 METHODOLOGY

This article adopts a qualitative research approach, combining theoretical analysis with a case study to clarify the role of education and training in promoting sustainable science and technology development in Vietnam, through the case of Ho Chi Minh City. This approach enables an examination of the relationship between education and training and science and technology as an integrated whole, situated simultaneously within the theoretical framework of sustainable development and the socio-economic context and governance practices at the local level.

Concerning specific research methods, the article employs the following main approaches:

First, policy analysis is used to assess the degree of institutionalization and the effectiveness of implementing policies on education and training in relation to science and technology development in Vietnam in general and in Ho Chi Minh City in particular. This method focuses on analyzing policy objectives, content, implementation instruments, and the extent to which education and training policies are aligned with the requirements of sustainable science and technology development in the current context.

Second, the case study method is applied to Ho Chi Minh City, a major national center for education and training, science and technology, and innovation. Selecting Ho Chi Minh City as the case study allows for an in-depth analysis of practical experiences in leveraging education and training to develop human resources and to

promote scientific research, technological application, and innovation oriented toward sustainable development in a special urban setting.

Third, methods of analysis, comparison, and generalization are employed to contrast policy objectives with implementation outcomes, as well as theoretical requirements with practical realities in the deployment of education and training for science and technology development. On this basis, the article formulates generalized assessments and proposes scientifically grounded and practically feasible solutions.

Regarding data sources, the study primarily relies on secondary data, including statistical reports, summary reports, and policy documents issued by central government agencies and the authorities of Ho Chi Minh City, along with published academic research. These data sources are carefully selected, cross-checked, and analyzed to ensure objectivity, reliability, and the scholarly value of the research findings.

Based on the above approach and methods, the article aims to provide a comprehensive picture of the role of education and training in fostering sustainable science and technology development in Vietnam, while also drawing policy implications that are relevant to policy formulation and implementation in the current period.

3 RESULTS AND DISCUSSION

Achievements in Enhancing the Role of Education and Training in Sustainable Science and Technology Development in Ho Chi Minh City

Ho Chi Minh City is a major national center for education and training, science and technology, and innovation. In recent years, strengthening the role of education and training has made an important contribution to the formation and improvement of the quality of science and technology human resources, fostering innovation, and disseminating science and technology across all areas of social life, thereby serving the City's sustainable development goals.

First, education and training have gradually contributed to the formation and enhancement of the quality of science and technology human resources. At present, Ho Chi Minh City hosts nearly 100 universities and research institutes, forming a diverse education and training ecosystem that is increasingly closely linked with enterprises and socio-economic development needs. These institutions offer a wide range of modern training programs in key fields such as engineering, information technology, artificial intelligence, and logistics, with a strong emphasis on professional knowledge, occupational skills, professional ethics, and creative thinking to meet the requirements of digital transformation.

The City has also issued and implemented various policies prioritizing investment in and innovation of education and training, with particular attention to expanding access to modern education for disadvantaged groups. The implementation of the "digital literacy for all" program, targeting small traders, workers, and older adults, aims to equip citizens with basic digital skills, enabling them not only to adapt to the digital environment but also to create new livelihood opportunities. At the same time, the City has provided training for more than 20,000 cadres and civil servants and educated hundreds of outstanding students in artificial intelligence (Saigon Giai Phong Online, 2025). These efforts have helped narrow educational opportunity gaps, improve human resource quality, enhance living standards, and increase the effectiveness of public governance.

In parallel, Ho Chi Minh City has implemented the "Smart Education" program, focusing on integrating digital technologies into teaching and educational management through systematic investment in information technology infrastructure, specialized software, and modern equipment. The expansion of online learning platforms has enhanced interaction between teachers and learners and supported closer integration between theory and practice. To date, the City has completed digital capacity training for 100% of education sector staff, including more than 81,000 teachers, administrators, and employees (Binh, 2023). Moreover, over 90% of schools in the City have integrated information technology and digital transformation into management, teaching, and learning activities, with more than 500,000 students participating in online classes (Ho Chi Minh City Party Committee, People's Council, People's Committee, and Vietnam Fatherland Front Committee, 2025, p. 897).

These achievements demonstrate that education and training have established a crucial foundation for the diffusion of science and technology into socio-economic sectors, contributing to enhanced competitiveness and sustainable development in Ho Chi Minh City. Although the period 2020–2022 was heavily affected by the COVID-19 pandemic—reducing the City's growth rate to 1.39% in 2020 and −6.78% in 2022, lower than the

national average the average growth rate during 2016–2020 still reached 6.41%, 1.62 times higher than the national average, contributing over 22% of GDP and 27% of total state budget revenue nationwide (Ho Chi Minh City Party Committee, 2020, p. 98). In 2024, the City's GRDP was estimated to increase by 7.2% compared to 2023 (Thuy, 2024), and in the first six months of 2025 alone, the science and technology sector attracted USD 1.6 billion in FDI, accounting for 40% of the City's total FDI inflows (Saigon Liberation online, 2025). Per capita income in 2024 reached approximately USD 7,600 per year, higher than the national average (Xa, 2024), while the proportion of poor and near-poor households declined to 0.9% of total households (Phong, 2024).

Second, education and training constitute a key factor in developing science and technology human resources in Ho Chi Minh City. Currently, Ho Chi Minh City has more than 21,000 science and technology personnel and over 135 strong and dynamic research groups that actively participate in international cooperation programs and generate products capable of competing in both domestic and international markets. The City's startup ecosystem has continued to expand, with more than 2,000 startups alongside dozens of innovation spaces, incubators, and venture capital funds (Saigon Giai Phong Online, 2025). This workforce represents a direct productive force that contributes significantly to improving labor productivity and maintaining the City's role as the economic engine of the country.

At present, the City hosts 371 science and technology organizations, 78 research institutes, and 279 laboratories across diverse fields. Through policies supporting research activities, Ho Chi Minh City has established more than 135 strong research groups that actively engage in international collaborative projects (Ho Chi Minh City Party Committee, 2022). At the same time, the City has implemented a program to develop a pool of young leaders and managers, with 1,527 candidates approved, including outstanding university graduates and young cadres, civil servants, and public employees with high development potential (Ho Chi Minh City Party Committee, 2022b). These initiatives contribute to ensuring the continuity and sustainable development of the science and technology human resource base.

Third, education and training provide the foundation for science and technology activities and innovation in Ho Chi Minh City. The renewal of training curricula toward experiential learning, together with the expansion of STEM and STEAM education from general education to higher education, has contributed to shaping scientific thinking among younger generations. In parallel, digital transformation in education has created new environments and tools that foster innovation, ranging from online learning platforms and open educational resources to the application of artificial intelligence in academic management.

These transformations have expanded access to knowledge, enhanced learners' digital competencies, and promoted a culture of innovation. As a result, the contribution of science and technology to the City's total factor productivity (TFP) growth has reached 56%, while the value of the startup ecosystem has been estimated at USD 5.6 billion (Ho Chi Minh City Party Committee, People's Council, People's Committee, and Vietnam Fatherland Front Committee, 2025, p. 148). Notably, Ho Chi Minh City has been ranked 110th globally for innovation-driven startup ecosystems, placed in the Top 5 in Southeast Asia and the Top 30 worldwide in blockchain development, with 18 centers, 55 incubators, 10 innovation spaces, and more than 140 science and technology enterprises ranking second nationwide (Saigon Giai Phong Online, 2025).

These achievements demonstrate that education and training in Ho Chi Minh City increasingly affirm their role as a foundational source of knowledge and a critical driving force for the sustainable development of science and technology, making positive contributions to the socio-economic development of both the City and the country as a whole.

Limitations in Enhancing the Role of Education and Training in Sustainable Science and Technology Development in Ho Chi Minh City

Despite the achievements attained, efforts to enhance the role of education and training in promoting sustainable science and technology development in Ho Chi Minh City over recent years have revealed a number of limitations. These shortcomings are evident in the quality of training, the development of science and technology human resources, and the effectiveness of linkages within the innovation ecosystem.

First, the quality of education and training remains uneven, and a gap persists between training outcomes and the practical demands of science and technology development and the labor market. Although Ho Chi Minh City hosts many reputable higher education institutions, disparities in training quality among universities remain

pronounced. Leading universities benefit from substantial investment in facilities, faculty, and curricula, while many other institutions face resource constraints, slow curriculum renewal, theory-heavy teaching methods, and weak links with practice.

The mismatch between training and labor market demand continues to be a major bottleneck. According to the Ho Chi Minh City Center for Forecasting Manpower Needs and Labor Market Information, the City requires approximately 320,000–350,000 workers annually, of whom 87% are trained workers (Nhan, 2025). However, the quality of human resources has not fully met enterprise requirements, particularly in high-technology sectors such as information technology, digital engineering, and logistics. Many graduates still lack practical skills, teamwork, and problem-solving abilities, as well as foreign language and digital competencies.

Notably, education and training have not paid sufficient attention to the formation of ethical qualities, political awareness, and social responsibility among learners. In the context of the Fourth Industrial Revolution, insufficient value orientation and political resilience may lead to distortions in perception and behavior, adversely affecting the quality of human resources serving sustainable science and technology development.

In addition, the absence of a long-term strategy and effective coordination mechanisms among education and training authorities, enterprises, and municipal government agencies has resulted in training programs that are insufficiently aligned with practical needs, leading to inefficient resource use and reduced returns on investment in education and training.

Second, the training and development of science and technology human resources, as well as the cultivation of a research culture, still face considerable constraints. Although the number of science and technology personnel in the City has increased, their overall quality and international influence remain limited. Ho Chi Minh City still lacks a strong cohort of science and technology intellectuals capable of providing strategic advice and policy consultation. Insufficient attention has been given to identifying and nurturing successor generations, while the number of research groups and individuals with regional and international standing remains modest. The gap between training and research-and-development practice continues to be a significant barrier, especially in emerging technology fields. A survey on AI workforce demand in Ho Chi Minh City indicates that nearly 60% of enterprises consider current AI personnel to meet only part of their needs, and nearly 30% believe that training has not kept pace with market requirements. Many graduates possess solid theoretical foundations but lack practical experience and require extended periods to adapt to enterprise R&D environments.

Financial mechanisms and policies for training and developing science and technology human resources also exhibit shortcomings. The City's budget lacks flexible mechanisms to support training for intellectuals outside the civil service, while the majority of science and technology personnel and young talents fall outside this group. Some higher education institutions do not sufficiently prioritize scientific research, and the proportion of expenditure on education and training relative to GRDP remains inconsistent with the City's role as the country's economic engine. Administrative procedures in science and technology management remain complex and insufficiently transparent, reducing attractiveness for mobilizing social resources.

Furthermore, the influence of the market economy has given rise to deviations among a segment of science and technology intellectuals, such as pragmatism, diminished community responsibility, and erosion of professional ethics. Regular dialogue between City leadership and domestic and international intellectuals and experts has not been adequately emphasized, thereby limiting the effective linkage between scientific knowledge and the practical demands of development.

Third, the foundational role of education and training in science, technology, and innovation has not been fully realized in line with the City's potential. The autonomy mechanisms concerning finance, organization, and human resource management of public educational institutions and public science and technology organizations remain constrained, adversely affecting the effectiveness of designing and implementing medium- and long-term research programs. Social resources and mechanisms for mobilizing non-budgetary funding for science, technology, and innovation are not commensurate with the City's potential, thereby limiting the transformation of knowledge generated through education and training into products, services, and socio-economic value.

Linkages between education and training institutions, enterprises, and research institutes, although improved, remain largely formalistic and have yet to form a complete value chain from research and technology transfer to commercialization. The startup ecosystem has expanded in quantity but lacks depth; the number of large-scale startups and university spin-offs remains limited, while intellectual property regimes, venture capital funds

associated with educational institutions, and startup support networks are insufficiently synchronized. As a result, many research outcomes have not been effectively commercialized, constraining the practical role of education and training in promoting sustainable science, technology, and innovation.

In sum, the above limitations indicate that the role of education and training in advancing sustainable science and technology development in Ho Chi Minh City has not yet matched the City's potential and standing as a major economic and scientific hub of the country. This constitutes an important practical basis for the continued improvement of mechanisms, policies, and integrated solutions in the period ahead.

Solutions to Enhance the Role of Education and Training in Sustainable Science and Technology Development in Ho Chi Minh City

Ho Chi Minh City is a major national center for education and training, science and technology, and innovation, playing a leading role in the development of the knowledge-based economy and international integration. However, the analysis of current conditions indicates that the role of education and training in promoting sustainable science and technology development in the City has not yet been fully realized in line with its potential. Therefore, proposing comprehensive solutions tailored to the specific characteristics of Ho Chi Minh City is an urgent requirement in both theoretical and practical terms.

First, unifying awareness and development perspectives on the role of education and training in sustainable science and technology development. A foundational solution is to raise awareness and unify perspectives within the political system, among managers, educators, scientists, and the broader community regarding the central role of education and training in sustainable science and technology development. In the context of Ho Chi Minh City's aspiration to become a regional innovation hub, education and training should be regarded not merely as a social sector but as a direct driving force for scientific and technological advancement and human resource quality improvement. This unified perspective helps overcome the separation between education and training and science and technology in development thinking. When education and training are properly positioned as the foundation for creative capacity and scientific culture, science and technology can develop sustainably, aligned with human and social development goals.

Second, innovating education and training in close connection with science and technology, and sustainable urban development. Ho Chi Minh City needs to continue promoting comprehensive reforms in education and training toward a modern, open approach closely linked to the requirements of sustainable development in a special urban context. The focus should shift from knowledge transmission–oriented education to capacity development, scientific thinking, and innovation capabilities of learners. Integrating emerging science and technology, digital transformation, green economy, environmental protection, and sustainable urban development into educational curricula, especially at the undergraduate and postgraduate levels, will contribute to forming a scientific and technological workforce capable of meeting the City's long-term development needs. This also provides a basis for education and training to play a genuine guiding and leading role in science and technology development.

Third, strengthening the linkage between education and training and the science, technology, and innovation ecosystem of Ho Chi Minh City. One of the key solutions is to enhance the organic linkage between educational institutions and research institutes, high-tech parks, science and technology enterprises, and innovation centers in the City. Although Ho Chi Minh City has a relatively developed science and technology ecosystem, the connections among education, research, and application remain insufficiently robust. Strengthening these linkages reflects the dialectical relationship between theory and practice. When education and training are directly connected with scientific research and urban development needs, science and technology can evolve toward application-oriented innovation that effectively serves sustainable development goals. Therefore, the City should promote cooperation models among universities, research institutes, and enterprises as an important channel for enhancing the role of education and training in science and technology development.

Fourth, improving specific mechanisms and policies to create incentives for sustainable education, training, and science and technology development. Practical experience shows that institutional and policy constraints are among the major barriers to fully realizing the role of education and training in science and technology development in Ho Chi Minh City. Accordingly, it is necessary to further refine specific mechanisms and policies that genuinely incentivize innovation and sustainable development. The focus should be on reforming investment mechanisms and resource allocation for education, training, and scientific research, prioritizing key scientific and technological

fields aligned with the City's sustainable urban development strategy. At the same time, policies to attract, retain, and effectively utilize high-quality lecturers, scientists, and technology experts should be strengthened. From a social-philosophical perspective, these measures are essential conditions for promoting human creative agency in science and technology development.

Fifth, promoting the value-oriented role and ensuring the humanistic nature of education and training in science and technology development. In the context of rapid scientific and technological advancement with profound impacts on urban life, education and training in Ho Chi Minh City should place greater emphasis on value orientation, scientific ethics, and social responsibility for intellectuals and learners. Sustainable science and technology development cannot be separated from a solid foundation of humanistic values and scientific culture. This solution helps ensure harmony between the objectives of scientific and technological development and comprehensive human development. When education and training place human beings at the center, science and technology will be oriented toward serving community interests, environmental protection, and the improvement of citizens' quality of life.

Sixth, strengthening the role of state management and the participation of social stakeholders. To effectively implement the above solutions, the municipal government of Ho Chi Minh City needs to enhance its role in state management toward a development-oriented and enabling approach, while actively mobilizing the participation of enterprises, social organizations, and the community. State management should focus on creating a transparent and favorable legal environment that encourages innovation and strengthens the linkage between education and training and science and technology. The participation of social stakeholders not only supplements resources but also helps align education, training, and scientific and technological activities with the practical needs of urban development. Through this process, the role of education and training in sustainable science and technology development in Ho Chi Minh City can be promoted more comprehensively and effectively.

CONCLUSION

Education and training play a fundamental and decisive role in the sustainable development of science and technology in Vietnam today. Through a case study of Ho Chi Minh City, this article clarifies the organic relationship between education and training and science and technology development in the sustainable development strategy, while also highlighting the achievements and challenges in the implementation process in a major urban area. The research results show that promoting the role of education and training has significantly contributed to improving the quality of human resources, fostering innovation, and enhancing the application of science and technology in the socio-economic development of the city. However, the integration process between education and training and science and technology development still reveals limitations, manifested in a lack of synchronization in the policy system, ineffective coordination mechanisms among relevant stakeholders, and an inadequate level of connection between training, research, and the practical needs of sustainable science and technology development. Therefore, this article emphasizes the need to continue promoting the leading role of education and training through institutional reform, improving the quality of education linked to innovation, and strengthening governance capacity and multi-stakeholder linkages. This will contribute to promoting sustainable science and technology development and achieving sustainable development goals in Vietnam in the current period.

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