DOI: 10.54631/VS.2025.91-677556

Nguyen Manh Dung

Evaluation of Vietnam's Science and Technology Human Resources in the Context of National Development Needs

Abstract. The ongoing trends of digital and green transformation are set to play a pivotal role in shaping Vietnam's development in the current context. The Fourth Industrial Revolution is significantly altering the economic development model, shifting countries away from reliance on natural resources and low-cost labor toward prioritizing innovation and creativity. As Vietnam engages in deeper international integration, it is essential for its science and technology human resources to possess globally relevant qualifications and skills while staying updated with emerging trends. This raises critical questions regarding the current state of Vietnam's science and technology workforce, the challenges and limitations it faces, and whether it can meet the pressing demands for skilled human resources. The purpose of this article is to explore these questions, highlighting that the foremost challenge facing Vietnam today lies in the effective implementation of the Party's resolutions and the State's strategies focused on human resource development, particularly in the field of science and technology.

Keywords: Vietnam, new context, management-governance, public policy, human resources, science and technology.

Author: Nguyen Manh Dung, Ph.D., Associate Professor, Senior Lecturer, Dean, Faculty of Management Science, University of Social Sciences and Humanities, Vietnam National University. ORCID: 0000-0002-7980-5578. Email: nmd@ussh.edu.vn

For citation: Nguyen Manh Dung (2025). Evaluation of Vietnam's Science and Technology Human Resources in the Context of National Development Needs. *The Russian Journal of Vietnamese Studies*, 9 (1): 67—79.

Нгуен Мань Зунг

Оценка человеческого потенциала Вьетнама в области науки и технологий в контексте потребностей национального развития

Аннотация. Современные тенденции цифровой и зеленой трансформации должны сыграть ключевую роль в развитии Вьетнама в 21 веке. Четвёртая промышленная революция существенно меняет модель экономического развития, переводя страну из зависимости от природных ресурсов и дешёвой рабочей силы к приоритету инноваций и творчества. Поскольку Вьетнам всё больше становится заложником международной интеграции, крайне важно придать его человеческим ресурсам в области науки, технологий современные навыки, квалификацию. Целью данной статьи является рассмотрение текущего состояния вьетнамской рабочей силы, проблем и ограничений в области науки и технологий, с которыми она сталкивается, её возможностей удовлетворить спрос на квалифицированных специалистов. По мнению автора, важнейшей задачей Вьетнама сегодня является эффективное выполнение партийных резолюций и государственных стратегий, направленных на развитие человеческих ресурсов, особенно в области науки и техники.

Ключевые слова: Вьетнам, новый контекст, управление, государственная политика, человеческие ресурсы, наука и техника.

Автор: Нгуен Мань Зунг, к. н., доцент, ст. преподаватель, декан, факультет менеджмента, Университет общественных и гуманитарных наук, Ханойский государственный университет. ORCID: 0000-0002-7980-5578.
Email: nmd@ussh.edu.vn

Для цитирования: *Нгуен Мань Зунг.* Оценка человеческого потенциала Вьетнама в области науки и технологий в контексте потребностей национального развития // Вьетнамские исследования. 2025. Т. 9. № 1. С. 67—79.

Introduction

The ongoing process of deepening international integration, particularly in science and technology (S&T), has significantly increased the demand for skilled S&T professionals. To remain competitive, they must develop global competencies and stay up to date with emerging trends in the field.

The term "S&T human resources" encompasses a broad range of meanings, including the higher education system (from undergraduate to doctoral levels [UNESCO 2011] and various professions such as scientists, engineers, and other specialized roles, as well as individuals who have the potential to advance, manage, and apply knowledge in S&T. Additionally, S&T human resources can be categorized based on research and development (R&D) areas and other specialized technical expertise within the workforce. To date, a range of viewpoints on S&T human resources have developed. The definitions most commonly recognized come from the OECD[1] and UNESCO.

In general, research on S&T human resources is an important topic that attracts the attention of many scientists, policymakers, and research organizations worldwide. Globally, reports such as those from the OECD, the UNESCO Science Report, the World Bank, and the OECD Frascati Manual, based on reports on STI (Science, Technology, and Innovation) and education and training, provide some general statistics on S&T human resources, including in-depth analyses of certain countries related to STI topics.

Foreign authors have conducted a limited number of studies and assessments on Vietnam's S&T human resources. These studies generally focus on several key aspects: (i) Quality of S&T human resources, according to research by Martin Gainsborough [2010], Jonathan D.London [2010], Vietnam's higher education system remains highly academic and has not yet fully met the demands of an innovation-driven economy; (ii) On S&T human resource development policies, at the 2019 World Economic Forum, Chairman Klaus Schwab pointed out that while Vietnam has implemented policies to encourage innovation, their effectiveness remains limited due to a lack of

[1] S&T human resources consist of individuals who have completed higher education or have been recruited into scientific and technical roles that demand high qualifications and creative potential. R&D human resources refer to those who are directly engaged in research and development activities or provide direct support to such endeavors.

connection between research and businesses; (iii) On integration of S&T human resources, Stéphanie Balme and Mark Sidel [2007] emphasized that although Vietnamese government has introduced various policies to support scientific and technological development, implementation challenges persist, particularly in attracting and retaining talent. Overall, there has not yet been much in-depth research on Vietnam's S&T human resources. S&T human resources are often examined in relation to other fields. For example, Darryl S.L.Jarvis and Ka Ho Mok [2019] authored Transformations in Higher Education Governance in Asia: Policy, Politics, and Progress, which focuses on higher education governance (particularly university faculty) in the Asian context. However, their study is comparative and does not specifically address STI human resources.

In Vietnam, S&T human resources are mainly reported in the Science and Technology Reports published annually by the Ministry of Science and Technology. These reports considered the most important primary data on S&T, including S&T human resources, with the latest available statistics updated until 2023. Some ministries (such as the Ministry of Education and Training, the Ministry of Industry and Trade and so on) also compile statistics on human resources, but these only cover specific sectors. Some state-level research projects have studied S&T human resources, but they mainly approach the topic from a sociological perspective (such as social mobility of S&T human resources).

Current statistics on S&T human resources reflect the overall number of qualified personnel. Generally, Vietnam's S&T workforce consists of main components [Trần Văn Ngợi 2017], including: officials engaged in research activities within public service entities; officials in technological roles employed by public service units and scientific and technological enterprises; Vietnamese intellectuals residing abroad and foreign experts contributing to Vietnam's S&T sector, and more . Researchers such as Chu Thi Bich Ngoc [2018], Dao Thi Thu Thuy [2020], Dao Thanh Truong [2021], Dinh Viet Phuong [2022], Nguyen Thi Bich Loan [2022], Le Minh Thong [2022], Le Van Loi [2023], etc. have explored this topic. However, these studies are critiqued for adhering to traditional frameworks, primarily focusing on aspects such as the current status, trends, influencing factors, international experiences, and development solutions.

On the other hand, there is still no consensus among scholars on the factors influencing intellectuals and individuals in S&T fields indeed. Various researchers [Nguyễn Viết Thông, Lê Thị Sự 2019; Lê Văn Lợi 2023; Biền Quốc Thắng 2017; Lê Minh Thông 2022] have identified a range of factors affecting intellectuals, their collaborative teams, and the formation and development of these 'intellectual teams'. For example, the influencing factors include: the process of training intellectuals; working environment and dedication of intellectuals; national development requirements and relevant policies; cultural identity as a spiritual foundation; tradition of respecting intellectuals and promoting talent; policies to encourage independence, creativity, and social criticism; impact of the market economy; quantity, quality, and structure of the intellectual workforce...

Regarding legal documents, the assessment is guided by several key documents, including Party's Resolution N029-NQ/TW issued on November 4, 2013, Government's Resolution N044/NQ-CP from June 9, 2014; Government's decrees

N024/2010/NĐ-CP, N029/2012/NĐ-CP, N040/2014/NĐ-CP, and N087/2014/NĐ-CP... These documents highlight the importance of training and utilizing S&T human resources, particularly emphasizing the need for high-quality personnel and talented individuals.

After the Government issued Decision N0569/QĐ-TTg of the Prime Minister in May 2022, titled the Strategy for the Development of Science, Technology, and Innovation until 2030, a series of issues were raised regarding S&T human resources, such as the lack of comprehensive and updated data on S&T personnel, especially data on international integration capabilities and research productivity; the mismatch between the labor demand of enterprises and the training capacity of universities, leading to an imbalance in the supply and demand of S&T human resources; and the lack of in-depth studies (in the form of monographs, Government reports, etc.) on the impact of the Fourth Industrial Revolution on S&T human resources in Vietnam.

Resolution N045-NQ/TW, issued on November 24, 2023, by the 8th Party Session of the 13th Party Central Committee, focuses on further enhancing and leveraging the role of intellectuals to address the needs of rapid and sustainable national development in this new era. Most recently, General Secretary of the Party Central Committee Tô Lâm signed and issued Resolution N057-NQ/TW on December 22, 2024, by the Politburo, regarding breakthroughs in the development of STI and national digital transformation.

Thus, a series of issues arise regarding S&T human resources to meet Vietnam's development needs in the new context: comparative data, whether S&T human resources can support national development when considering environmental impacts, and the new demands outlined in the Party and Government's resolutions issued in recent years. This article seeks to address the most general observations while implicitly raising a number of important questions that pose challenges and policy implications for Vietnamese policymakers.

Science and technology human resources: Increasing the number and enhancing metrics, indicators, and evaluation standards

Between 2015 and 2019, the distribution of research and development (R&D) personnel remained relatively balanced across key fields. In 2019, approximately 35.37 % of the research workforce was engaged in science, engineering, and technology, a proportion comparable to the 32.6 % in social sciences and humanities. Meanwhile, medical and pharmaceutical sciences accounted for nearly 14 %, while natural sciences and agricultural sciences each made up about 9 %. Additionally, the agricultural, forestry, and fishery sectors employed 13,226 R&D staff, representing 9 % of Vietnam's total R&D workforce [Nguyễn Thành Trung et al. 2023].

From 2016 to 2020, the number of international articles published by Vietnam on platforms like WoS and ISI/Scopus grew at an average annual rate of 20 %. Between 2015 and 2020, Vietnamese scholars produced 56,558 articles in international journals. Notably, by 2020, this figure had quadrupled from the beginning of the period, rising from 4,510 to 18,197 articles, with a strong upward trend continuing into the following

year [Bộ Khoa học và Công nghệ 2021: 63—80, Annexes]. In 2022, Vietnamese researchers published over 20,000 articles in domestic S&T journals and more than 18,500 in international journals, reflecting an increase from the previous year. Between 2018 and 2022, the number of international publications surged from 8,874 in 2018 to 18,587 in 2022. Despite this impressive growth, Vietnam ranked fifth in ASEAN for international scientific publications [Bộ Khoa học và Công nghệ 2023: 75—85, Annexes].

In 2019, Vietnamese individuals filed 720 patent applications, accounting for nearly 25 % of Indonesia's total and 42 % of Singapore's [Bộ Khoa học và Công nghệ 2021: 63—80]. However, the majority of patent filings in Vietnam came from foreign applicants, with Vietnamese applications comprising only 13.26 % of the 7,694 total submissions. Between 2016 and 2022, Vietnamese applicants accounted for just 11.2 % of all patent applications filed in the country. Based on this metric, Vietnam ranked third in ASEAN in 2021, behind Singapore and Indonesia [Bộ Khoa học và Công nghệ 2023: 25—28, Annexes]. The contribution of total factor productivity (TFP) to economic growth rose significantly, from an average of 33.6 % during the 2011—2015 period to 45.2 % in 2016—2020, surpassing the 35 % target. Additionally, the share of high-tech product exports as a percentage of total goods exports grew from 19 % in 2010 to approximately 50 % in 2020. S&T accounted for over 30 % of the added value in overall agricultural production, and 38 % in the production of plant and animal breeds. This advancement has helped position Vietnam among the leading exporting nations globally for rice, coffee, pepper, rubber, cashew nuts [Trung tâm Nghiên cứu... 2021], and health protection and care.

Between 2016 and 2020, Vietnam's average labor productivity growth rate was 5.8 % per year, exceeding the 4.3 % recorded from 2011 to 2015 [Đinh Viết Phương 2022]. In the 2022 Startup Blink Global Startup Ecosystem Index, Vietnam ranked 54th globally and 5th in Southeast Asia for its innovation startup ecosystem. The country is home to approximately 3,000 active startups, along with 208 investment funds, 84 incubators, and 35 business promotion organizations.

According to the Vietnam National Agency for S&T Information 2020 survey, the number of research personnel in Vietnam, measured in full-time equivalents (FTE), reached 72,991 in 2019. This equates to an average of 7.6 FTE researchers per 10,000 people or 1.27 FTEs per 1,000 workers. In terms of FTE-based research personnel, Vietnam ranks third in Southeast Asia, behind Thailand and Malaysia, and fourth when measured per 10,000 people, following Singapore, Malaysia, and Thailand.

The share of research personnel holding postgraduate degrees within the total research workforce increased from nearly 50 % in 2015 to approximately 57.3 % in 2019. Notably, the proportion of researchers with doctoral degrees rose from around 11 % to 15 % during the same period. In 2020, about 1.5 million individuals in leadership positions held university or college degrees or higher. This group included approximately 2,000 professors and associate professors, over 14,000 Ph.D. holders, and more than 11,000 individuals with master's degrees. Additionally, the S&T workforce comprised over 34,000 professionals, along with more than 42,000 lecturers at universities, colleges, and vocational high schools. Furthermore, tens of thousands of S&T experts were employed across various economic sectors and fields [Ibid.]. By 2021,

the R&D workforce totaled approximately 187,298 individuals, including 156,588 researchers. Among them, 15.62 % held doctoral degrees [Bộ Khoa học và Công nghệ 2023: 26, Annexes].

In 2019, total national expenditure on R&D reached VND 32,102 billion, accounting for 0.53 % of GDP. By 2021, this figure had increased to VND 36,066.5 billion (approximately USD 4.78 billion in purchasing power parity), but its share of GDP declined to nearly 0.42 %. This decrease was due to a 25 % upward adjustment in the country's GDP starting in 2021[Bộ Khoa học và Công nghệ 2023: 21—45, Annexes]. Within the R&D expenditure structure, the share of state funding has gradually declined over the years, making up only 44.79 % of total national R&D expenditure by 2021. Meanwhile, the proportion of R&D funding from non-state sources rose to 43.84 % [Bộ Khoa học và Công nghệ 2023: 56—75, Annexes].

In 2023, Vietnam's total budget expenditure on science and technology reached 0.82 %, with 0.23 % allocated for investment and 0.58 % for recurrent expenditures [Bộ Khoa học và Công nghệ 2024: 23—26]. For the 2025 budget estimate, in a directive issued in February 2025, General Secretary Tô Lâm instructed an adjustment to the 2025 budget, requiring at least 3 % of total budget expenditure to be allocated for the STI development, and digital transformation, with a goal to increase this allocation to 2 % of GDP over the next five years. Previously, Resolution N057-NQ/TW (December 22, 2024) had already set a target of allocating at least 3 % of the state budget for the STI development, and national digital transformation.

The growth of S&T human resources has lagged behind the country's demands for rapid and sustainable economic and social development

The proportion of professionals in science, technology, and innovation employed by enterprises remains low. This shortage of highly skilled technical workers limits businesses' ability to adopt and master new technologies. Consequently, most enterprises are small, medium, or micro-sized, with low competitiveness and difficulty meeting international standards. They often participate only in specific stages of the production network and global value chain, lacking key products with national and international recognition [Huỳnh Huy Hòa 2022].

The distribution of high-level S&T human resources across different regions is highly uneven, with a majority concentrated in five centrally-run cities. In many other areas, there are very few individuals holding doctoral degrees. This disparity has resulted in a significant shortage of researchers engaging in S&T activities, particularly in remote and mountainous regions. Despite recent successes in universal education, as evidenced by impressive PISA assessment results, access to post-compulsory education remains restricted. There is a notable lack of career guidance and skills training, which has exacerbated inequalities, particularly affecting ethnic minorities and areas that are geographically isolated [Nguyễn Thị Bích Loan 2022].

The employment conditions of workers in roles misaligned with their training, qualifications, and skills remain a concern. Among them, 81.1 % of college graduates, 60.4 % of high school graduates, and 23.8 % of individuals with university degrees or

higher are employed in positions requiring lower technical or skill qualifications than their training. Conversely, approximately 35.1 % of workers hold jobs that demand higher skills than their degrees indicate [Chí Hoàng 2020].

Research by the International Labor Organization (ILO, 2020) and the Asian Development Bank (ADB, 2019) highlights a growing skills mismatch from 2012 to 2019. Findings indicate a decline in job-training alignment, with more workers occupying positions requiring either higher or lower qualifications than their training provides [Nguyễn Thị Bích Loan 2022]. Moreover, the quality of higher education remains inadequate, failing to meet labor market demands. The 2018 Global Competitiveness Report ranked Vietnam the 84th out of 137 countries for university graduates' skills and the 79th out of 134 for innovation capacity, reflecting a significant gap in research output compared to Thailand and Malaysia [Chí Hoàng 2020].

The distribution of human resources in the fields of science and technology is unbalanced, impacting both the training and use of these resources

S&T human resources account for only a small fraction of the total labor force, representing just 17.5 % of social employment. Additionally, 2.2 % of qualified workers are unemployed, and sector growth has remained sluggish in recent years, failing to meet the demands for S&T advancement [Vietnam Ministry of Science and Technology 2018].

The distribution of S&T human resources varies significantly across organizations and administrative divisions, including ministries, sectors, and regions. Weak linkages between public S&T organizations, businesses, and the education sector have led to misallocated investments in research and technology. As a result, many public S&T organizations struggle with inadequate and poorly structured human resources, particularly among state employees. Additionally, numerous regions face both quantitative and qualitative shortages of scientific personnel, with some organizations employing fewer than 20 individuals.

The development of S&T human resources in remote, border, and island regions, as well as economically disadvantaged and ethnic minority communities, remains a pressing concern for the Government. According to the Ethnic Committee's report, efforts to nurture S&T human resources in these areas remain inadequate. A staggering 86.21 % of the working-age population lacks professional and technical qualifications, with some ethnic groups exhibiting alarmingly high rates of untrained workers. Although in certain provinces, 77.26 % of S&T human resources hold university degrees or higher, their actual working abilities and qualifications remain significantly lower than those in lowland areas [Viện Khoa học Tổ chức Nhà nước 2015: 67].

A significant number of highly skilled S&T professionals are not actively engaged in research. This issue arises from the widespread practice of appointing leaders and managers primarily based on academic titles and degrees. As a result, many leaders focus on management and operational duties rather than scientific research. Vietnam faces a growing risk of a shortage of proficient scientists and top-tier researchers. While the number of S&T personnel with postgraduate degrees has increased, a lack of suitable

successors persists. Additionally, the pool of highly qualified and experienced scientists is shrinking due to retirements, particularly in core S&T sectors such as high-tech industries and other priority fields [Đinh Viết Phương 2022].

The quality of science and technology human resources, along with awareness of their roles, responsibilities, and the importance of their training, remains insufficient

The phenomenon of having diverse viewpoints but no clear direction, having established policies yet no decisive actions, and formulating policies without adequate resources remains widespread. While education and training are recognized as essential components of national policy, their effective organization and implementation remain a challenge. In the context of project investment decisions, stakeholders often prioritize such factors as land, capital, and technology, while neglecting the critical aspect of human resources and labor. There is a notable deficiency in comprehensive human resource planning, particularly with regard to personnel in the S&T field[1].

Vietnam is undergoing a transformation of its growth model, shifting toward a knowledge-based economy, a digital economy, and a culture of innovation. The Fourth Industrial Revolution, driven by rapid digital transformation, is reshaping skill demands at an unprecedented pace. Many jobs may become obsolete, while new opportunities arise as industries undergo significant changes. However, many educational and training institutions have struggled to adapt to these evolving challenges.

Driven by career demands and various incentives, many doctoral degree holders prefer lecturing over other roles. This preference stems from disparities in status and treatment, as lecturers often receive professional allowances, seniority-based bonuses, and an enhanced reputation. In some academic institutions, a cultural bias elevates lecturers above other S&T personnel. Lecturer positions offer stable, relatively higher incomes while allowing for scientific research. However, this emphasis on lecturing may hinder the development of dedicated research teams, leaving many institutions — if not the majority — without a strong cadre of specialized researchers.

A considerable number of scientists with expertise in S&T have transitioned into leadership and management roles without adequate professional development geared toward effective leadership and management in their respective fields. Among civil servants and public employees, it remains a prevalent issue that individuals may find themselves in professions that do not align with their qualifications or, conversely, in the right profession but lacking the requisite competencies [Bùi Tiến Dũng 2015].

The 2020 Provincial PCI Report highlights foreign direct investment (FDI) investors' dissatisfaction with the quality of vocational training in various localities, often requiring additional retraining expenditures. Moreover, vocational education and training remain imbalanced, with 75 % of programs concentrated at the elementary level or lasting under three months, while intermediate and college-level programs account

[1] Intellectual capability, physical prowess, stamina, productivity, awareness of work tasks, adherence to workplace standards, proficiency in technology, professional integrity, interpersonal skills, and adaptability in a multicultural setting...

for only 25 % of enrollments. Enrolling students in vocational education remains challenging, particularly in high-tech sectors, high-risk industries, and specialized fields [Đào Ngọc Dung 2016].

The institutional framework for the use of S&T human resources

Despite existing policies to attract and incentivize high-caliber S&T personnel, intellectuals, and exceptional talent, regulatory inconsistencies hinder the creation of an open environment for research and innovation. Moreover, scientists' contributions are not sufficiently recognized or valued. While frameworks for the strategic planning and rewarding of S&T experts have been established, their practical implementation remains challenging. Additionally, the current compensation structure for S&T[1] officials is inadequate for retention and professional growth. Salary disparities across different levels and positions do not accurately reflect variations in qualifications and job expectations. Moreover, salary increments are primarily tenure-based, with little consideration for research effectiveness or substantive outcomes. The current recruitment process for research personnel lacks alignment with expertise-based selection principles. Additionally, operating fund allocations to agencies are tied to payroll numbers rather than a scientific rationale.

Despite increasingly cohesive policies aimed at developing S&T human resources, many preferential regimes and policies outlined in existing regulations remain ineffectively implemented. For instance, Decree 40/2014/ND-CP mandates that young scientists — regardless of whether they hold master's or doctoral degrees and have published scientific works domestically or internationally — receive salaries based on state standards and coefficients within a basic salary framework. However, numerous public institutions in science, technology, and education face significant challenges with reward policies, failing to foster an environment conducive to creativity and innovation. Furthermore, government financial support for researchers is often inconsistent, insufficient, and hindered by bureaucratic obstacles.

The current remuneration framework, which relies primarily on salary, has weakened commitment among S&T personnel, particularly younger scientists. Many are compelled to seek additional employment — often unrelated to their fields — to supplement their income. This creates a paradox in the workforce: highly qualified human resources are simultaneously abundant, scarce, and underperforming.

Considerations for discussions and conclusions

The development of intellectuals is shaped by a complex interplay of factors, further complicated by the ambiguity surrounding terms such as 'intellectuals,' 'talent,' 'high-quality human resources,' and 'high-quality S&T human resources.' However, S&

[1] Circular N005, issued by the Ministry of Science and Technology on May 23, 2023, outlines various aspects related to the recruitment, use, and encouragement of individuals engaged in science and technology.

T human resources represent a broader category, encompassing intellectuals and a subset that qualifies as 'talents'.

Up to now, and certainly in the future, debates continue regarding the factors influencing S&T human resources. While the various factors identified by researchers, as presented in the introduction of this study, are noteworthy, three core factors stand out: (i) Working environment (infrastructure, services, and support from stakeholders to ensure high-quality S&T human resources); (ii) Salary and financial incentives (compensation and benefits play a crucial role in attracting and retaining talent); (iii) Total measurable contribution to practice (the ability to quantify and recognize contributions, along with intellectual property rights, is essential for motivating and sustaining innovation).

A clearer understanding of the dynamics shaping Vietnam's S&T human resources — driven by both subjective and objective factors — is essential. A thorough analysis of current conditions and influencing factors has led to several strategic proposals. These include developing macro-level policies for S&T human resources, enhancing mobility in attracting and utilizing talent, innovating education and training management, and prioritizing key sectors such as high technology, core technology, source technology, and spearhead technology. Additionally, aligning scientific research topics with the strategic goals of ministries, agencies, localities, and enterprises ensures that scientific theories effectively address Vietnam's socio-economic realities.

Building on the perspectives set out at the 12th Congress regarding investment in human resources for science and technology (S&T), the 13th Party Congress, held in February 2021, articulated a clear guiding ideology, direction, and key objectives for the development of the Vietnamese workforce under new conditions. This includes a strong emphasis on cultivating high-quality human resources aligned with the demands of the Fourth Industrial Revolution and international integration processes [Đảng Cộng sản Việt Nam-1 2021: 231]. The Congress underscored the importance of developing a cohort of leading experts and scientists while prioritizing human resources in technical fields, digital transformation, technology management, business management, and social governance, as well as services that enhance quality of life and social welfare.

To effectively enhance and leverage S&T human resources, the Congress emphasized the need to implement policies that support training, attract top talent, and foster professional development. These policies should cultivate creativity, responsibility, and an appreciation for diversity in social science research. Additionally, the Congress called for the removal of policy barriers related to the training, recruitment, and utilization of S&T professionals — especially in attracting highly qualified experts and leading scientists.

In summary, Resolution № 45-NQ/TW, issued on November 24, 2023, during the 8th Party Meeting of the 13th Party Central Committee, emphasizes the continuous enhancement of intellectual contributions to meet the demands of rapid and sustainable national development in the modern era. It outlines specific tasks and strategies to strengthen resources for cultivating a proactive intellectual workforce actively engaged in international integration.

With these documents, in the new context, I believe that several new issues are being introduced for the first time and could be discussed in the draft content of the 14th Party

Congress, scheduled to take place in early 2026. Overall, I see a notable shift in philosophy as follows: (i) STI as the core driving forces of national development: Vietnam must rely on science, technology, and digital transformation to achieve rapid and sustainable growth and avoid falling behind. Innovation should be placed at the center of all socio-economic strategies; (ii) Advanced institutions and modern governance as decisive success factors: Strong policy, legal, and administrative reforms are needed to create a favorable environment for innovation. The development of a digital government, digital economy, and digital society is essential to enhance governance efficiency and public services; (iii) People and international cooperation as the key elements of digital transformation — High-quality human resource development, especially in technology, engineering, and artificial intelligence, is crucial. Strengthening international cooperation and knowledge exchange will help enhance Vietnam's global competitiveness.

Regarding human resources, I believe there is a shift in vision, particularly in the new context. That shift is the importance of developing human resources in STI and digital transformation. Specifically, it identifies human resources as one of the key focal points, along with institutions, infrastructure, data, and strategic technologies. It also highlights the widespread implementation of the 'digital learning' movement, the popularization and enhancement of scientific, technological, and digital knowledge among officials, civil servants, and the public. Additionally, it promotes entrepreneurship, creativity, and innovation to improve work efficiency and labor productivity.

From this perspective, in the new context, the overarching theme of the 14th Party Congress documents is how to propel Vietnam's development in the new era, aiming to achieve the goal of becoming a developed, high-income country by 2045.

References

Balme, S., Sidel, M. (2007). *Vietnam's New Order: International Perspectives on the State and Reform in Vietnam*. Palgrave Macmillan.

Biền Quốc Thắng (2017). *Vai trò đội ngũ trí thức Thành phố Hồ Chí Minh trong giai đoạn hiện nay* [Bien Quoc Thang. *The role of Ho Chi Minh City intellectuals in the current period*], Doctoral Dissertation, Graduate Academy of Social Sciences, Vietnam Academy of Social Sciences. (In Vietnamese)

Bộ Khoa học và công nghệ (2021). Khoa học, công nghệ và đổi mới sáng tạo Việt Nam 2020 [Ministry of Science and Technology. Vietnam's Science, Technology and Innovation in 2020]. Hà Nội: Nxb. Khoa học và kỹ thuật. (In Vietnamese)

Bộ Khoa học và công nghệ (2023). Khoa học, công nghệ và đổi mới sáng tạo Việt Nam 2022 [Ministry of Science and Technology. Vietnam's Science, Technology and Innovation in 2022]. Hà Nội: Nxb Khoa học và kỹ thuật. (In Vietnamese)

Bộ Khoa học và công nghệ (2024). Khoa học, công nghệ và đổi mới sáng tạo Việt Nam 2023 [Ministry of Science and Technology. Vietnam's Science, Technology and Innovation in 2023]. Hà Nội: Nxb Khoa học và kỹ thuật. (In Vietnamese)

Bùi Tiến Dũng (2015). Chống "chảy máu chất xám", chống "lãng phí" nguồn trí tuệ Việt Nam [Bui Tien Dung. Anti "brain drain" and anti the "waste" of Vietnam's intellectual resources]. *Tạp chí Cộng sản*, December 3. URL: https://www.tapchicongsan.org.vn/web/guest/tri-thuc-doanh-nhan/-/2018/36484/chong-"chay-mau-chat-xam"%2C-chong-"lang-phi"-nguon-tri-tue-viet-nam.aspx. (In Vietnamese)

Chí Hoàng (2020). Phát triển nguồn nhân lực chất lượng trong bối cảnh mới [Chi Hoang. Development of quality human resources in the new context]. *Tạp chí Tài chính*, May 23. URL: https://tapchitaichinh.vn/phat-trien-nguon-nhan-luc-chat-luong-trong-boi-canh-moi.html. (In Vietnamese)

Chu Thị Bích Ngọc (2018). Nâng cao chất lượng nguồn nhân lực Việt Nam trong cuộc Cách mạng Công nghiệp 4.0 [Chu Thi Bich Ngoc. Enhancing the quality of Vietnam's workforce in the Fourth Industrial Revolution]. *Tạp chí Tài chính,* 2 (5): 44—46. (In Vietnamese)

Đảng Cộng sản Việt Nam (2021). Văn kiện Đại hội đại biểu toàn quốc lần thứ XIII [Vietnamese Communist Party. Documents of the 13th National Congress], T. 1. Hà Nội: Nxb Chính trị quốc gia Sự thật. (In Vietnamese)

Đào Ngọc Dung (2016). Đổi mới và nâng cao chất lượng giáo dục nghề nghiệp đáp ứng yêu cầu phát triển và hội nhập của đất nước [Dao Ngoc Dung. Innovate and improve the quality of vocational education to meet the requirements of national development and integration]. Retrieved on 02.07.2024 from URL: http://www.molisa.gov.vn/Pages/tintuc/chitiet.aspx?tintucID=26182. (In Vietnamese)

Đào Thanh Trường (2021). *Di động xã hội của nguồn nhân lực khoa học, công nghệ và đổi mới tại Việt Nam trong bối cảnh cuộc Cách mạng công nghiệp lần thứ tư* [Dao Thanh Truong. *Social mobility of science, technology, and innovation human resources in Vietnam in the context of the Fourth Industrial Revolution*]. Hà Nội: Nxb Chính trị Quốc gia Sự thật. (In Vietnamese)

Đào Thị Thu Thủy (2020). Chính sách phát triển nguồn nhân lực khoa học và công nghệ của Việt Nam: Góc nhìn từ thực tiễn [Dao Thi Thu Thuy. Policy on developing Vietnam's science and technology human resources: A practical perspective]. *Tạp chí Khoa học — Nghiên cứu chính sách và quản lý*, 2: 32—42. (In Vietnamese)

Darryl, S.L.J., Ka Ho Mok (2019). *Transformations in Higher Education Governance in Asia. Policy, Politics and Progress*. Springer.

Đinh Viết Phương (2022). Phát triển nguồn nhân lực khoa học và công nghệ ở Việt Nam thích ứng với bối cảnh mới [Dinh Viet Phuong. Development of human resources for science and technology in Vietnam to adapt to the new context]. Tạp chí Chất lượng Việt Nam, July 29. URL: https://vietq.vn/phat-trien-nguon-nhan-luc-khoa-hoc-va-cong-nghe-o-viet-nam-thich-ung-voi-boi-canh-moi-d202586.html. (In Vietnamese)

Gainsborough, M. (2010). Present but not Powerful: Neoliberalism, the State, and Development in Vietnam. *Globalizations*, 7 (4): 475—488.

Huỳnh Huy Hòa (2022). Phát triển vùng kinh tế trọng điểm miền Trung: Thực trạng và khuyến nghị chính sách [Huynh Huy Hoa. Development of the Central Key Economic Zone: Current situation and policy recommendations]. *Tạp chí Cộng sản*, March 17. URL: https://tapchicongsan.org.vn/web/guest/nghien-cu/-/2018/825117/phat-trien-vung-kinh-te-trong-diem-mien-trung--thuc-trang-va-khuyen-nghi-chinh-sach.aspx. (In Vietnamese)

Lê Minh Thông (2022). Nhận diện về trí thức, đặc điểm và các nhân tố ảnh hưởng tới việc xây dựng và phát huy đội ngũ trí thức [Le Minh Thong. Identification of intellectuals, characteristics and factors affecting the building and development of intellectual teams]. *Trang thông tin điện tử Hội đồng Lý luận Trung ương*, November 13. URL: https://hdll.vn/vi/nghien-cuu---trao-doi/nhan-dien-ve-tri-thuc-dac-diem-va-cac-nhan-to-anh-huong-toi-viec-xay-dung-va-phat-huy-doi-ngu-tri-thuc.html. (In Vietnamese)

Lê Văn Lợi (2023). Trí thức — đặc điểm nhận diện và các nhân tố ảnh hưởng tới việc xây dựng và phát triển đội ngũ trí thức Việt Nam hiện nay [Le Van Loi. Intellectuals — Remarks of recognition and factors influencing the building and development of the current Vietnamese intellectuals]. *Tạp chí Tuyên giáo*, February 13. URL: https://tuyengiao.vn/tri-thuc-dac-diem-nhan-dien-va-cac-nhan-to-anh-huong-toi-viec-xay-dung-va-phat-trien-doi-ngu-tri-thuc-viet-147891. (In Vietnamese)

London, J.D. (2010). Globalization and the Governance of Education in Viet Nam. *Asia Pacific Journal of Education*, 40 (4): 361—379.

Nguyễn Thành Trung et al. (2023). Hoàn thiện chính sách đối với trí thức trong lĩnh vực khoa học và công nghệ: Thực trạng và một số giải pháp trọng tâm [Nguyen Thanh Trung et al. Perfecting policies for intellectuals in the field of science and technology: Current situation and some key solutions]. *Tạp chí Cộng sản*, May 30. URL: https://www.tapchicongsan.org.vn/media-story/-/asset_publisher/V8hhp4dK31Gf/content/hoan-thien-chinh-sach-doi-voi-tri-thuc-trong-linh-vuc-khoa-hoc-va-cong-nghe-thuc-trang-va-mot-so-giai-phap-trong-tam. (In Vietnamese)

Nguyễn Thị Bích Loan (2022). Một số giải pháp nhằm phát triển nguồn nhân lực chất lượng cao phục vụ sự nghiệp công nghiệp hóa, hiện đại hóa đất nước đến năm 2030, tầm nhìn 2045 [Nguyen Thi Bich Ngoc. Some solutions to develop high-quality human resources to serve the cause of industrialization and modernization of the country by 2030, vision for 2045]. *Trang thông tin điện tử Hội đồng Lý luận Trung ương*, July 12. URL: https://hdll.vn/vi/nghien-cuu---trao-doi/mot-so-giai-phap-nham-phat-trien-nguon-nhan-luc-chat-luong-cao-phuc-vu-su-nghiep-cong-nghiep-hoa-hien-dai-hoa-dat-nuoc-den-nam-2030-tam-nhin-2045--%E2%80%8B.html. (In Vietnamese)

Nguyễn Viết Thông, Lê Thị Sự (2019). *Trí thức và vai trò của trí thức trong quá trình phát triển của Việt Nam hiện nay* [Nguyen Viet Thong, Le Thi Su. *Intellectuals and the role of intellectuals in the development process of Vietnam today*]. Hà Nội: Nxb. Chính trị quốc gia Su thật. (In Vietnamese)

Trần Văn Ngợi (2017). Thực trạng nhân lực khoa học công nghệ trong các cơ quan nhà nước ở Việt Nam hiện nay [Tran Van Ngoi. Present condition of science and technology personnel in Vietnam's state agencies]. *Tạp chí Tổ chức nhà nước*, March 5. URL: https://tcnn.vn/news/detail/36061/Thuc_trang_nhan_luc_khoa_hoc_cong_nghe_trong_cac_co_quan_nha_nuoc_o_Viet_Nam_hien_nayall.html. (In Vietnamese)

Trung tâm Nghiên cứu và Phát triển truyền thông KH&CN (2021). Phát triển mạnh mẽ khoa học, công nghệ, tạo bứt phá về năng suất, chất lượng, hiệu quả và sức mạnh cạnh tranh của nền kinh tế [Center for Science and Technology Research and Communication Development. Significantly develop science and technology to achieve breakthroughs in productivity, quality, efficiency, and economic competitiveness]. Retrieved on 16.06.2024 from URL: https://www.most.gov.vn/vn/tin-tuc/14825/khoa-hoc-va-cong-nghe-dong-gop-tren-30--gia-tri-gia-tang-cua-san-xuat-nong-nghiep.aspx. (In Vietnamese)

UNESCO (2011). International standard classification of education — ISCED-2011. URL: https://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf

Viện Khoa học Tổ chức Nhà nước (2015). Hoàn thiện chính sách về công chức, công vụ trong lĩnh vực KH&CN [Institute of State Organizational Science. Perfecting policies on public officials and public service in the field of science and technology]. Hà Nội: Nxb. Thống kê. (In Vietnamese)

Vietnam Ministry of Science and Technology (2018). Results of the survey on Science research and technology development in 2018. Hanoi.

Дата поступления статьи: 06.08.2024
Дата поступления в переработанном виде: 06.02.2025
Принята к печати: 03.03.2025

Received: August 6, 2024
Received in revised form: February 2, 2025
Accepted: March 3, 2025