

DIGITAL HUMAN RESOURCE DEVELOPMENT IN NINH BINH: CURRENT REALITY AND TRAINING DEMANDS

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ABSTRACT

In the national digital transformation process, digital human resources are identified as the central element, playing a decisive role in the success of all three pillars: digital government, digital economy, and digital society. While digital infrastructure and technology can be invested in, imported, and deployed relatively quickly, digital human resources require a long-term commitment to training and professional development to align with the specific cultural and institutional characteristics of each nation and locality. Therefore, digital human resources are not merely beneficiaries of digital transformation, but also the main driving agents shaping this process. For Ninh Binh province, with people placed at the center of development, the province has recently implemented a comprehensive set of practical and effective training and upskilling solutions tied closely to task requirements and real-world needs. Consequently, the quality of digital human resources has been significantly enhanced, contributing to higher operational efficiency in the administrative apparatus and promoting local socio-economic development.

Keywords:

Digital human resources, digital government, digital transformation, information security, artificial intelligence, digital management capacity, digital transformation training.

1. INTRODUCTION

In recent years, Vietnam has accelerated its digital transformation process in tandem with administrative reform and the reorganization of administrative units, guided by the policy of streamlining the organizational apparatus and enhancing operational efficiency and effectiveness. This shift has necessitated organizational restructuring, adjustments to business processes, and changes in public service execution methods. Against this backdrop, digital human resources have emerged as a pivotal factor determining the capacity to maintain the smooth operation of the administrative apparatus, ensuring continuity in public service provision and state management within the digital environment.

Digital transformation represents the comprehensive integration of digital technology into all socio-economic domains to establish a new development paradigm based on digital data, technology, and human innovative capacity. It is expected to serve as a vital tool in mitigating challenges arising from the reorganization of administrative units, such as increased workloads, expanded management scopes, data fragmentation, and disparities in civil servants' qualifications across departments. According to the World Bank, the application of digital technology in the public sector could assist Vietnam in reducing administrative costs by approximately 20–30% and significantly shortening processing times, particularly within a streamlined organizational structure. However, these benefits can only be realized if the workforce possesses sufficient digital competencies to operate systems, leverage data, and coordinate seamlessly across levels and units following reorganization.

Practical experience in Vietnam demonstrates that while the proportion of online public services and digitally processed records continues to rise, digital human resources remain unevenly developed. Approximately half of cadres and civil servants meet only basic digital skill requirements, whereas advanced competencies—such as data management, integrated digital platform utilization, and information security assurance—remain limited. These shortcomings become increasingly evident during administrative unit restructuring, when officials must rapidly adapt to larger administrative scales and novel workflows.

In this context, Ninh Binh province stands out as one of the proactive localities implementing digital transformation alongside administrative reform and organizational consolidation. The province has promulgated

numerous digital transformations plans and conducted training and upskilling programs in digital skills for cadres and civil servants to meet management demands amidst changes in territory, scale, and scope. Nevertheless, enhancing digital capacity continues to face hurdles, including the absence of a standardized job-position-based digital competency framework, evaluation mechanisms not closely tied to public service efficiency, and skill gaps among different groups of official's post-reorganization. Consequently, assessing the current status and proposing solutions to develop digital human resources in Ninh Binh province is essential, holding both theoretical significance and profound practical value.

2. MAIN CONTENT

2.1. Guidelines and policies of the party, state, and province on digital human resource development

2.1.1. Perspectives of the Party and State on Digital Human Resource Development

Human resource development in general, and digital human resource development in particular, has consistently been regarded by our Party as a strategic task in the cause of national industrialization and modernization, contributing significantly to poverty reduction and social security assurance.

On September 27, 2019, the Politburo issued Resolution No. 52-NQ/TW on several guidelines and policies for active participation in the Fourth Industrial Revolution. The resolution frankly acknowledged that the structure and quality of human resources did not yet meet requirements, emphasizing the need to execute strategic breakthroughs, robustly develop the digital economy, and achieve rapid and sustainable growth based on science, technology, innovation, and high-quality human resources.

On January 28, 2022, the Prime Minister issued Decision No. 146/QĐ-TTg approving the Scheme on “*Awareness Raising, Skill Popularization, and National Digital Transformation Human Resource Development through 2025, with Orientation to 2030.*” The scheme highlighted that human resource development, especially digital workforce development, plays a key role in executing effective and sustainable digital transformation, thereby ensuring the successful realization of the goals set forth in the National Digital Transformation Program.

Through successive Party Congresses, the issue of digital human resource development has been understood with increasing depth, accompanied by sound guidelines and orientations tailored to the national context and each development stage:

The 13th National Party Congress identified high-quality human resource development -with particular emphasis on developing a workforce equipped with digital skills, as well as human resources for science, technology, innovation, and digital transformation-as a strategic breakthrough of the Party. Specifically: “*Develop human resources, especially high-quality human resources; prioritize human resource development for leadership, management, and key sectors on the basis of enhancing and creating a fundamental, comprehensive, and strong shift in education and training quality, linked with recruitment, utilization, and talent remuneration mechanisms; promote research, transfer, application, and robust development of science, technology, and innovation; ignite the aspirations for a prosperous and happy nation, and leverage cultural values, Vietnamese human potential, solidarity, and national pride in the cause of national construction and defense.*”

The 14th National Party Congress emphasized enhancing human resource quality and developing high-quality, highly-skilled personnel, highlighting workforce development closely linked with innovation, digital transformation, science, and technology, considering this a strategic breakthrough for the Party.

On December 22, 2024, General Secretary To Lam signed and issued Resolution No. 57-NQ/TW of the Politburo on breakthroughs in national science, technology, innovation, and digital transformation development. The resolution advocated ensuring a highly qualified workforce for science, technology, innovation, and national digital transformation, while introducing special mechanisms and policies for talents in the digital economy sector. On May 24, 2025, the Prime Minister approved the Scheme on *Human Resource Training for High-Tech Development for the 2025–2035 period*. The decision stated: “*Training high-quality human resources to serve national science, technology, innovation, and digital transformation is a pivotal task requiring breakthrough policies, special mechanisms, adequate investment resources, urgent and long-term solutions, and a suitable implementation roadmap.*” The decision also specified the role of the State, as well as training methods and international cooperation for digital human resource development.

2.1.2. The Province's Guidelines on Digital Human Resource Development

Following the administrative unit restructuring implemented from July 1, 2025, Ninh Binh Province entered an operational phase of its government apparatus characterized by an expanded management scale, larger geographical coverage, and increasingly high demands for seamless coordination among administrative agencies. In this context, Ninh Binh Province identified digital transformation as a key solution to ensure seamless management and operations while maintaining the quality of public service delivery. Within this effort,

developing high-quality human resources is a strategic task of decisive significance for enhancing competitiveness, driving socio-economic growth, and ensuring sustainable development.

For the 2025–2030 tenure, the 1st Congress of the Ninh Binh Provincial Party Committee identified: “Focusing on high-quality human resource development; accelerating talent attraction and utilization” as one of three strategic breakthroughs throughout the tenure. To implement this breakthrough, on January 30, 2026, the Standing Committee of the Ninh Binh Provincial Party Committee issued Resolution No. 15-NQ/TU on the development of high-quality human resources in Ninh Binh Province through 2030, with a vision toward 2045. This strategically significant resolution establishes human resource development as a breakthrough, central, and overarching task that determines the province's competitiveness and growth quality in the new phase.

Accordingly, the target by 2030 focuses on building and developing high-quality human resources in key sectors such as science and technology, innovation, and digital transformation; healthcare; education and training; culture tied to heritage conservation and promotion; tourism; urban development; green economy; and spearhead local industries. Specific goals include:

- 100% of cadres, civil servants, and public employees meeting job position standards (with over 30% exceeding standards, and 33% of teachers exceeding standards).
- 100% of cadres, civil servants, and public employees trained to master digital skills and apply technology in administration and management.
- 50% of university and college graduates meeting international foreign language standards.
- Higher education institutions completing synchronized digital infrastructure and platforms interconnected with national databases.
- Vocational training provided to over 63,000 people annually, raising the proportion of trained workers to over 82% (with over 37.5% holding degrees or certificates).
- Approximately 80% of the workforce equipped with basic digital skills before 2030, prioritizing the training of experts, engineers, and technicians in AI.
- Generating employment for approximately 382,000 person-times and providing agricultural vocational training to 7,500 rural workers during 2026–2030.

With a vision toward 2045, Ninh Binh aims to turn high-quality human resources into the province's core competitive advantage, forming a team of highly qualified experts, scientists, S&T personnel, management professionals, and entrepreneurs capable of deeply engaging in national and regional value chains-contributing to elevating the province's standing in the Red River Delta and nationwide.

On April 23, 2026, the Provincial People's Committee issued the Ninh Binh Digital Transformation Scheme for the 2026–2030 period. The scheme targets developing high-quality digital human resources, aiming for 100% of cadres, civil servants, and public employees to master digital skills and apply technology in governance toward a data-enabling government model, and 100% of specialized IT and digital transformation personnel across departments, boards, sectors, and commune/ward-level People's Committees to be certified in basic data governance.

In terms of digital society, Ninh Binh aims to ensure that all citizens possess digital skills, enjoy equal access to digital services, and actively participate in socio-economic life. The province is extensively implementing the “Popular Digital Literacy Movement,” creating opportunities for the entire population to learn and access technology while universalizing basic digital and information security skills-particularly for vulnerable groups, farmers, and the elderly. By 2030, 80% of the adult population will possess basic digital skills, and 70% will hold personal digital signatures or electronic identities. Ninh Binh views digital resource development as a strategic breakthrough to rank among the top 10 localities nationwide in digital government maturity and data innovation by 2030.

Currently, the province is implementing mechanisms and policies to enhance state management efficiency to encourage and promote science, technology, and innovation. The Provincial People's Committee is continuing research to advise the Provincial Party Committee, Provincial People's Council, and Provincial People's Committee on issuing:

- The Scheme for the Establishment of the Intelligent Operation Center (IOC) of Ninh Binh Province (2026–2030).
- The Scheme for the Development of Ninh Binh Province's Innovation Ecosystem (2026–2030).
- The Scheme for the Development of Human Resources in Science, Technology, Innovation, and Digital Transformation in Ninh Binh Province (2026–2030).
- A Technology Innovation Roadmap through 2035 for the province's spearhead economic sectors.

2.2. *Current status of digital human resource development in Ninh Binh province*

2.2.1. Current Status of the Province's Digital Human Resources

Over the past years, the Provincial Party Committee and its Standing Committee have consistently focused on directing and implementing various mechanisms, policies, programs, and schemes for human resource development. The province's cadre of officials, civil servants, and public employees has been gradually standardized in terms of professional qualifications, political theory, and state management, with special emphasis on training and upgrading skills in digital transformation, information technology, and foreign languages. Education and training have developed fairly comprehensively; vocational training, employment generation, and public health care and protection have received regular attention. Currently, Ninh Binh is considered one of the pioneer localities in integrating digital transformation with human resource development. The province has deployed models such as "Grassroots Digital Citizen," "Rural Digital Enterprise," and "Smart School," while partnering with domestic technology corporations to provide digital skills training for commune-level cadres, civil servants, and rural residents. Specifically:

Digital human resource quantity: The proportion of civil servants with postgraduate degrees reached 26.08% (including 15 doctorates, accounting for 0.15%); the proportion of public employees with postgraduate degrees reached 21.39% (including 135 doctorates, specialist doctors, nurses, and pharmacists, accounting for 0.02%). The current labor force aged 15 and above across the province stands at 2,053.2 thousand people (53.8% of the province's total population). Currently, 100% of agencies and units have assigned at least one full-time IT and digital transformation officer suited to their workload.

Digital human resource quality: Quality has been gradually enhanced, playing a vital role in maintaining political stability, elevating the efficacy and efficiency of state administration, and driving the province's socio-economic development. The rate of trained workers reached 77%, with 29.3% holding degrees or certificates. Over 80% of commune-level cadres and civil servants have been trained in basic digital skills, while thousands of young workers have participated in courses on e-commerce, online work skills, and digital marketing. This serves as an essential foundation for Ninh Binh to establish a workforce capable of adapting quickly to technological shifts.

A system of colleges and universities offering diverse majors has been established in the province, with several institutions actively participating in research, technology transfer, and S&T human resource training. The province prioritizes land allocation, allocates public investment capital, and efficiently mobilizes resources to support or construct higher education and vocational institutions under central ministries and agencies. Furthermore, it actively promotes shifts in labor and occupational structures while attracting and effectively utilizing high-quality human resources. The Center for Application of Science, Technology, and Innovation Support under the Department of Science and Technology has been established, initially supporting startups and technology transfer. The province has placed strong focus on training to enhance digital capabilities for officials and civil servants through large-scale communications, dissemination, and tailored training programs. During the 2021–2025 period, nearly 70 conferences on digital transformation were organized for various agencies and units, attracting over 200,000 participants directly across connected locations. Immediately following the implementation of the two-tier government model, 04 training courses were organized to build digital knowledge and skills-specifically focusing on the Document Management and Executive System and the Administrative Procedure Settlement System-for cadres, civil servants, and public employees across departments, boards, sectors, and commune-level People's Committees. Furthermore, the Center for Digital Transformation and Communications was directed to conduct direct training at commune People's Committees for 100% of staff working at Public Administrative Service Centers.

*2.2.2. Shortcomings, Limitations, and Causes***Key Shortcomings and Limitations:**

Although digital transformation-including digital human resource development-is a top priority for Ninh Binh, the province continues to face several limitations and challenges:

- **Low proportion and uneven quality:** Digital technology human resources account for a low proportion (approximately 2%), with inconsistent overall quality.
- **Shortage of specialized personnel:** The workforce in specialized areas (such as data and information security) is thin in quantity and weak in quality, failing to meet the governance and operational requirements of unified infrastructure. There is a lack of deep experts in data, information security, and artificial intelligence (AI) to lead complex digital transformation projects.
- **Infrequent advanced training:** In-depth workshops and specialized training programs in fields like information security and artificial intelligence remain irregular.
- **Incomplete awareness and underutilized platforms:** Awareness of the role, importance, and benefits of digital transformation among many cadres, civil servants, public employees, and citizens remains

incomplete, leading to hesitation in adopting technology in management tasks. Furthermore, the exploitation and utilization of digital platforms, as well as the creation, development, and management of digital data in certain agencies, units, and localities, have not received adequate attention, with quality and efficiency falling short of digital government and digital transformation requirements.

Primary Causes:

- Inadequate leadership focus: Certain Party committees and local authorities have not paid sufficient attention to human resource quality, resulting in a lack of determination and synchronization in directing implementation.
- Inflexible recruitment mechanisms: There is no dedicated mechanism for recruiting digital personnel, particularly for the job position “in charge of digital transformation.” Because these roles lack formal job titles despite handling IT and digital transformation duties, personnel are often assigned to general office or administration departments with low compensation. Consequently, despite requiring high-quality talent, attracting candidates with appropriate professional qualifications remains difficult.
- Constrained investment and facilities: Investment resources for digital human resource development remain limited, while working environments and equipment fail to meet operational demands.
- Weak attraction incentives: Mechanisms to attract, incentivize, and retain high-quality human resources are not strong enough.

2.3. *Requirements for Digital Human Resource Development in Ninh Binh Province*

Focus must be placed on comprehensive digital human resource training and development to meet the demands of the Fourth Industrial Revolution and the province's new development model, aiming for two primary goals: (1) Building a professional workforce of digital technology experts; and (2) Enhancing digital skills for cadres, civil servants, public employees, workers, and the entire population.

Based on the current state of the province's digital human resources post-restructuring, digital capacity development must be approached in a comprehensive, sustainable manner closely tied to the imperative of innovating state governance methods in the context of digital transformation. Current requirements demand concurrently addressing competency standardization, training organization, evaluation mechanisms, and implementation guarantees, specifically:

Raising awareness of digital transformation and digital skills: Cadres, civil servants, public employees, workers, and citizens must be equipped with a full understanding of the role of digital technology and digital transformation in socio-economic development. Simultaneously, they must possess the skills to utilize digital platforms and services to ensure adaptability to new working environments.

Developing a digitally competent leadership and staff: The province needs to build a cadre of leaders, managers, and specialists with a digital mindset, data governance capabilities, the ability to operate in a digital environment, and proficiency in using information systems for work. This is a crucial requirement for elevating state administration efficiency and administrative reform.

Training high-quality IT human resources: Growing demand exists for personnel in fields such as artificial intelligence, big data, cybersecurity, e-commerce, and automation. Therefore, the province must partner with educational institutions and enterprises to train a digital tech workforce that satisfies the development needs of the new phase.

Aligning training with local practical needs: Digital human resources must directly serve the province's key strengths, including tourism, cultural industries, high-tech agriculture, services, and smart urban management. Training should be practice- and application-oriented, meeting the demands of government agencies, businesses, and the labor market.

Promoting continuous training and professional development: Rapid technological changes demand continuous, updated training. The province must establish lifelong learning mechanisms, online training, and periodic digital skills upgrading for cadres, civil servants, public employees, and workers.

Attracting and retaining high-quality human resources: While challenging, this is a vital requirement for the locality. The province needs appropriate mechanisms and policies regarding working environments, income, and support for research and innovation to attract tech experts, engineers, and high-level digital talent to work in the province.

Ensuring cybersecurity, information safety, and digital ethics: Digital human resources must not only be technically proficient but also possess a high awareness of data protection, information security, legal compliance, and ethical standards in cyberspace.

2.4. *Solutions for Digital Human Resource Development in Ninh Binh Province*

First, continue refining mechanisms and policies to attract, train, and develop digital human resources to meet the province's development demands. Formulate sound policies for training, attracting, and utilizing talent based on practical needs to prevent “brain drain.”

Focus on comprehensive solutions, including:

- Competitive financial compensation (salaries, bonuses, and housing support).
- Creative working environments and transparent career advancement opportunities.
- Deserving recognition and rewards to build a team of highly qualified, specialized scientific and technical personnel and top experts in the province's priority development sectors.

Encourage state agencies to hire experts, scientists, and entrepreneurs on a contractual basis to advise, conduct research, and support the implementation of specialized tasks in key areas such as policy-making, digital transformation, investment, and planning.

Second, innovating the content and methods of digital capacity building toward practical outcomes and target-group differentiation is a key solution. Instead of implementing generic, universal training programs, the province needs to design role-based training curricula tailored to:

- Leadership cadres
- Specialized IT/digital transformation personnel
- Frontline operational staff directly handling work tasks

Furthermore, the province should establish and execute specialized human resource development programs in key fields, including Data, Information Security, and Artificial Intelligence (AI). Regular conferences, workshops, and seminars should be maintained to exchange experiences, disseminate effective models, and spread awareness of digital transformation.

Third, strengthen and enhance the quality of the cadre, civil servant, and public employee workforce to meet the requirements of modern governance. It is essential to establish mechanisms for assessing, measuring, and recognizing the digital competencies of cadres, civil servants, and public employees in association with their performance in public service delivery. The assessment of digital competencies should be integrated into the annual performance evaluation system for public personnel, based on clear and measurable criteria rather than being limited to formal assessments or the number of training courses completed. Based on evaluation outcomes, the province may consider incorporating digital competency indicators into performance assessment frameworks, administrative reform metrics, and the quality of public service provision. Such measures would create incentives for public personnel to proactively enhance their capabilities and adapt to the demands of digital transformation.

Fourth, reform and improve the quality of education and training while concentrating resources on the development of a digital workforce. The development of digital human resources should be closely linked to the modernization and reform of the province's vocational and higher education systems. A comprehensive plan for the development of higher education institutions within the province should be formulated, with particular emphasis on investing in and developing Hoa Lu University as a key higher education institution and a leading center for teacher education and the training of high-quality human resources to support the province's socio-economic development. Furthermore, cooperation and training partnerships with universities and research institutes should be expanded to develop undergraduate and postgraduate human resources in information technology, focusing on core technologies such as Artificial Intelligence (AI), Big Data, the Internet of Things (IoT), and Information Security, thereby supporting the development of the province's strategic and high-priority industries.

Fifth, strengthen enabling conditions and on-site support mechanisms to sustain and further develop digital capacities at the grassroots level, particularly within commune-level administrative units following administrative restructuring. Special emphasis should be placed on allocating a minimum of 5% to 8% of the total digital transformation budget specifically for training and digital workforce capacity development. Such expenditure should be regarded as a strategic investment to ensure the successful implementation of a comprehensive digital transformation agenda.

3. CONCLUSION

The development of digital human resources remains a strategic priority that plays a decisive role in promoting the rapid and sustainable development of both the nation and individual provinces. In the context of deepening globalization, the Fourth Industrial Revolution, accelerating digital transformation, and the growing demand for innovation in growth models, the development of human resources, particularly digital human resources, is not only an objective necessity but also a prerequisite for the successful realization of national industrialization and modernization goals.

The experience of Ninh Binh Province demonstrates that investment in people is fundamentally an investment in the future. It enables every worker to become a “digital citizen” capable of mastering advanced technologies and actively contributing to the development of a sustainable digital economy and digital society. Through continuous investment in education, training, and digital skills development, localities can enhance their competitiveness, improve governance effectiveness, and foster inclusive and sustainable socio-economic development in the digital era.

REFERENCES

1. Communist Party of Vietnam. (2021). *Documents of the 13th National Congress of Delegates*. National Political Publishing House Truth, Hanoi.
2. Communist Party of Vietnam. (2026). *Documents of the 14th National Congress of Delegates*. National Political Publishing House Truth, Hanoi.
3. Ninh Binh Provincial Party Committee. (2023). *Resolution on Digital Transformation in Ninh Binh Province through 2025, with Orientation to 2030*. Ninh Binh.
4. Ninh Binh Provincial People's Committee. (2024). *Report on the Current Status of Public Sector Digital Human Resources and Training Demands in Ninh Binh Province*. Ninh Binh.
5. Politburo of the Communist Party of Vietnam. (2019). *Resolution No. 52-NQ/TW dated September 27, 2019, on several guidelines and policies to actively participate in the Fourth Industrial Revolution*. Hanoi.
6. Politburo of the Communist Party of Vietnam. (2024). *Resolution No. 57-NQ/TW dated December 22, 2024, on breakthroughs in national science, technology, innovation, and digital transformation development*. Hanoi.
7. Prime Minister of Vietnam. (2022). *Decision No. 146/QĐ-TTg dated January 28, 2022, approving the Scheme on “Awareness raising, skill popularization, and national digital transformation human resource development through 2025, with orientation to 2030”*. Hanoi.
8. Prime Minister of Vietnam. (2025). *Decision dated May 24, 2025, approving the Scheme on Human Resource Training for High-Tech Development for the 2025–2035 period*. Hanoi.
9. World Bank. (2021). *Digital Vietnam: The Path to Tomorrow - Public Sector Digitalization and Governance Reform*. World Bank Group, Washington, D.C.