



ISSN 2815 - 5610

JOURNAL OF

HUMAN RESOURCES AND SOCIAL PROTECTION

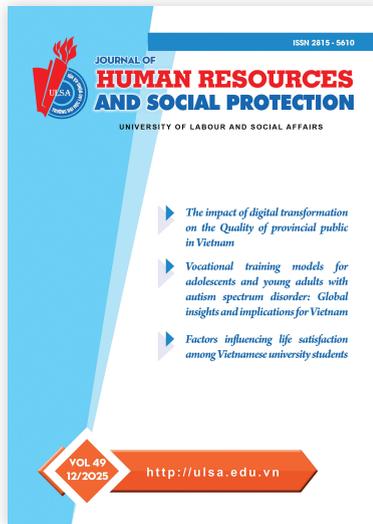
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- ▶ *The impact of digital transformation on the Quality of provincial public in Vietnam*
- ▶ *Vocational training models for adolescents and young adults with autism spectrum disorder: Global insights and implications for Vietnam*
- ▶ *Factors influencing life satisfaction among Vietnamese university students*

**VOL 49
12/2025**

<http://ulsa.edu.vn>

**JOURNAL OF HUMAN
RESOURCES AND SOCIAL
PROTECTION**



Monthly Publication

Vol 49 - 12/2025

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No. 438/GP-BTTTT dated 13th July 2021

Printed at Vietcolor Ltd. Company.

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THE IMPACT OF DIGITAL TRANSFORMATION ON THE QUALITY OF PROVINCIAL PUBLIC IN VIETNAM

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Abstract: This article examines the impact of digital transformation on public service quality across Vietnamese provinces using panel data from 63 provinces over the period 2012-2022. Digital transformation is measured by three components of the Vietnam ICT Index - technical infrastructure, human resource readiness, and information technology application - while public service quality is captured through administrative procedures and public service delivery indicators from the PAPI index. Employing a dynamic panel dataset and estimating by the Generalized Method of Moments (GMM), the results indicate that all three digital transformation components have a positive and statistically significant effect on provincial public service quality. In addition, GDP per capita, human capital, urbanization, and population density also play important roles. The findings provide empirical evidence to support policies aimed at strengthening digital infrastructure and improving digital governance to enhance public service quality in Vietnam.

Keywords: digital transformation, public service quality, provincial - level, Vietnam

Code: JHS-300

Received: 10th Oct 2025

Revised: 29th Oct 2025

Accepted: 15th Nov 2025

1. Introduction

In the context of globalization and increasingly deep economic integration, competitiveness has become one of the key factors determining the position of nations in the international arena. In Vietnam, policies on consolidation and reorganization of development spaces are fostering the emergence of economic subregions and megacities with greater scale and efficiency. For this process to achieve the desired outcomes, alongside counteracting hostile and disruptive narratives, strengthening public governance and the administration of the new institutional apparatus - toward a public service system that is inclusive both in breadth and depth - has been identified as one of the most urgent priorities. Within this context, examining the quality of public services across 63 provinces and cities is not only an essential requirement but also plays a crucial role in informing development policies tailored to the intrinsic characteristics of each locality, thereby building a foundation for effective and sustainable regional development.

Vasavakul et al. (2009) argued that effective policies - reflected through a public service mechanism designed to serve diverse societal groups - constitute the Government's approach to addressing the economic, social, political, and environmental challenges currently confronting Vietnam. The quality of public services significantly influences human capital, which is an endogenous driver of economic growth. Based on the Push - Pull Theory, human capital tends to concentrate in areas with a high-quality public service system, while less developed areas often struggle to attract skilled labor. Moreover, regional infrastructure and public services - including healthcare, education, and transportation - are powerful determinants of migration decisions and long-term settlement patterns (Hu et al., 2020).

Among the factors influencing the quality of public services today, digital transformation is viewed not merely as a supporting tool but as a dynamic capability that enables flexible adaptation and development in rapidly changing environments (Bui, 2024). According to Sarker et al. (2018), digital transformation can enhance the quality of public services by improving accessibility for citizens while simultaneously reducing costs and processing time. Through the adoption of blockchain, artificial intelligence, big data analytics, cloud computing, and other advanced technologies, digital transformation contributes to restructuring social protection systems and continuously improving service delivery efficiency and quality (Li, 2023). Today, big data is reshaping how governments manage welfare and poverty reduction by improving beneficiary identification, program coordination, and social support provision (Aiken et al., 2023). Notably, digital transformation also enables more accurate identification of individuals in need and more equitable allocation of welfare programs, as illustrated by

risk assessment systems used to enhance the efficiency of child protection services in the United States (Eubanks, 2018).

From a broader macro perspective, digital transformation further contributes to reshaping governance models, development paradigms, and the quality of public services. This transformative capacity stems from the exceptional ability of digital technologies to store, access, and share knowledge rapidly and efficiently. According to the UNCTAD Digital Economy Report (2019), humanity can accumulate more knowledge every 2.5 to 3 years than the entirety of human history prior, thanks to highly efficient digital storage, retrieval, and information-sharing systems. The growth of accumulated knowledge expands opportunities for information access and technical cooperation, thereby generating new employment opportunities, facilitating skill transfer, enhancing productivity, and strengthening accountability in both the public and private sectors (Finger, 2007). It is evident that digital transformation is not merely a technological driver but also a strategic foundation for advancing the quality of public services in the digital era.

As Vietnam actively implements the "National Strategy on the Fourth Industrial Revolution to 2030," the profound and far-reaching impact of digital transformation has increasingly drawn attention to its role in improving the quality of public services at the local level. However, most existing studies on competitiveness in general and public services in particular tend to focus on analyzing individual provinces (Bui, 2024), resulting in a lack of in-depth, comparative studies on provincial competitiveness across economic regions and inter-provincial clusters. Furthermore, although digital transformation has become a topic of growing scholarly interest, empirical research in Vietnam remains concentrated primarily at the national, sectoral, or enterprise level, while the effects of digital transformation on the quality of public services have yet to be adequately examined. To address part of this gap, this study investigates the impact of digital transformation on the quality of public services across 63 provinces and cities in Vietnam during the period 2012-2022, using data compiled from the Vietnam ICT Index (issued by the Ministry of Information and Communications) and the Provincial Governance and Public Administration Performance Index (PAPI), published by the Centre for Community Support and Development Studies (CECODES).

The article consists of five sections: Section 1 presents the Introduction; Section 2 outlines the Literature Review; Section 3 describes the Research Method; Section 4 presents the Study Results; and Section 5 provides Conclusions.

2. Literature review

According to Kadyrova (2021), the quality of public services is understood as a set of attributes associated with

both the process and outcomes of service delivery aimed at meeting the needs of service recipients. In this regard, citizen satisfaction is a widely used indicator reflecting the extent to which public expectations are fulfilled after their actual interactions with government agencies. The study indicates that the quality of public services is closely linked to procedural factors (transparency, clarity, convenience, and processing time) and service delivery conditions (staff competence, technical infrastructure, and responsiveness) - all of which directly influence citizens' perceptions. This approach is particularly relevant to the Vietnamese context, where the quality of public services depends substantially on the performance of the administrative apparatus and its capacity to provide essential services to the population. Numerous studies have shown that poor-quality public services, complex procedures, or a lack of transparency can impede citizens' access and create inequalities in service benefits (Seery, 2014; Moynihan et al., 2016). Therefore, improving the quality of public services is considered a critical condition for promoting sustainable and inclusive development in Vietnam.

Meanwhile, digital transformation is defined as the processes and strategic applications of digital technologies that bring about significant changes in how organizations operate and deliver services (Suedi & Zulfikar, 2023). In other words, digital transformation goes beyond the adoption of new technologies; it entails a comprehensive restructuring of service-providing institutions to enhance efficiency, transparency, and public value. This is not merely a trend but an essential requirement of modern administrative reform. According to Sarker et al. (2018), the core objective of digital transformation in public services is to improve accessibility, reduce costs, and shorten administrative processing time. Hence, digital transformation is recognized as a key factor in modernizing governance and enhancing the quality of public services; however, it also faces challenges such as limited ICT infrastructure, cybersecurity risks, and digital divides between regions and demographic groups (Ragnedda et al., 2022).

In Vietnam, the effectiveness of digital transformation in general and information technology in particular is reflected through three dimensions: technical infrastructure, human infrastructure, and the level of practical IT application. Accordingly, the impact of digital transformation on the quality of public services is typically transmitted through these dimensions (Hoang & Le, 2024).

Regarding technical infrastructure, it is regarded as the material foundation for digitalization and the provision of online public services. Components such as network systems, databases, and digital platforms enable local governments to deliver public services with broader coverage and higher operational efficiency. Singh

et al. (2014) show that the adoption of data platforms and digital technologies can improve service quality in essential public sectors by enhancing information-processing capacity and resource allocation. In the Vietnamese context, disparities in the level of technical infrastructure development across localities-particularly between urban and rural areas-may constrain accessibility and service stability (Hoang & Le, 2024), thereby negatively affecting public service quality.

Second, human infrastructure reflects the capacity of civil servants and public officials to utilize and operate information technology systems. From the Digital Era Governance (DEG) perspective, digital transformation is not merely a technological issue but also requires changes in capabilities and working practices within the public administration (Margetts & Dunleavy, 2013). When officials possess appropriate digital skills, new systems can be effectively integrated into administrative processes, contributing to greater accuracy, transparency, and responsiveness of public services. Conversely, according to the World Bank (2016), limitations in digital human capital in developing countries may undermine the effectiveness of public service digitalization efforts.

Third, the level of practical IT application serves as an indicator of how technical and human infrastructure potentials are realized. The implementation of online public services and the integration of administrative processes on digital platforms help reduce transaction costs, shorten processing time, and enhance inter-agency coordination. Margetts and Dunleavy's (2013) DEG framework emphasizes the role of service reintegration and digital innovation in improving public sector performance. However, increasing levels of IT application also heighten dependence on digital systems, introducing risks related to cybersecurity and service disruption, such as ransomware attacks analyzed by Gawazah et al. (2024). If not effectively governed, these risks may undermine public service quality, particularly for essential services.

Overall, digital transformation is a crucial driver contributing to the enhancement of public service quality in many countries, including Vietnam, by increasing transparency, reducing transaction costs, and improving the operational efficiency of the administrative apparatus. However, its impacts depend largely on local readiness, citizens' access to digital technologies, and the extent to which digital infrastructure is secure and coherent. In the context of Vietnam, examining the influence of digital transformation on the quality of public services is necessary to better understand the mechanisms of impact and the conditions required to maximize the benefits of digitalization at the provincial level.

In summary, most previous studies have indicated a positive correlation between digital transformation and the quality of public services. Therefore, the authors propose the following hypothesis:

(H): Digital transformation has a positive impact on the quality of public services in Vietnam.

3. Research method

3.1. Variables in the model

Public service quality

This study employs the Provincial Governance and Public Administration Performance Index (PAPI) in Viet Nam, jointly implemented by the United Nations Development Programme (UNDP) and the Centre for Community Support Development Studies (CECODES), following the approach proposed by Giang et al. (2020). The PAPI index is currently applied to all 63 provinces nationwide and consists of eight dimensions: Participation at the local level; Transparency; Vertical accountability toward citizens; Control of corruption in the public sector; Public administrative procedures; Public service delivery; Environmental governance; E-governance. These dimensions are standardized on a scale from 1 (indicating the poorest governance performance) to 10 (indicating the best governance performance) to assess provincial-level governance effectiveness.

Following Giang et al. (2020), the authors use two dimensions - Public Administrative Procedures and Public Service Delivery - to measure provincial-level public service quality. These two dimensions are normalized on a scale from 1 to 10, under the assumption that they carry equal weights.

Digital transformation

The study measures digital transformation using the ICT Readiness Index for Development and Application in Viet Nam, developed under the leadership of the Authority of Information Technology Industry (AITI), Ministry of Information and Communications, in collaboration with the Vietnam Informatics Association. This index provides a standardized framework for data collection, assessment, and evaluation of ICT development across ministries, sectors, and localities.

According to Hoang & Le (2024), this index provides information on the current status of ICT development and application in Vietnam, while also offering assessments and rankings based on the level of readiness for ICT development. The ICT Index ranges from 0 to 1, with values closer to 1 indicating a higher level of technological advancement. The index consists of three main components: technical infrastructure, human resources, and information technology application. This structure is consistent with the United Nations' EGDI framework, in which digital transformation is determined by connectivity infrastructure, human capital, and the level of digital service provision and application. According to Le et al. (2025), the use of the three indicators: technical infrastructure, human infrastructure, and IT application as independent variables has a clear theoretical foundation, as they represent the core pillars

reflecting digital readiness, absorptive capacity, and the degree of digital technology realization of an organization or locality.

Control variables

Control variables are constructed using data published in the Statistical Yearbooks of Vietnam by the General Statistics Office (GSO) at the provincial level. These variables include: GDP per capita; human capital (measured by the proportion of trained workers aged 15 and above); urbanization (measured by the proportion of the permanent urban population); and population density.

After compiling data from the above sources, the study conducts descriptive statistics and index calculations using Stata 14, employing a panel data structure. The dataset covers 63 provinces and cities in Vietnam over six survey years (2012, 2014, 2016, 2018, 2020, and 2022), resulting in a total of 311 observations.

3.2. Methodology

The impact of digital transformation on public service quality is assessed using the following regression equation:

$$PublicService_{jt} = \beta_0 + \beta_1 * TI_{jt} + \beta_2 * HR_{jt} + \beta_3 * ITA_{jt} + \beta_4 X_{jt} + u_{jt} \quad (1)$$

Trong đó:

$PublicService_{jt}$ denotes the public service quality index of province j in year t ;

TI_{jt} represents the technical infrastructure index;

HR_{jt} denotes the human resource infrastructure index;

ITA_{jt} refers to the information technology application index;

X_{jt} is a vector of control variables, including GDP per capita, human capital, urbanization, population density, and economic regions;

u_{jt} captures unobserved factors in the model.

The study employs panel data combining cross-sectional data from 63 provinces and a time series covering the period 2012–2022, yielding 378 observations. To estimate the model, the GMM approach is adopted because Pooled OLS, FEM, and REM cannot simultaneously address endogeneity, heteroskedasticity, and autocorrelation. The IV-2SLS method is not suitable due to the difficulty in identifying valid external instrumental variables, while ARDL requires a longer time dimension than that available in the dataset. Therefore, GMM is employed as it effectively mitigates endogeneity and autocorrelation through lagged variables and eliminates unobserved fixed effects. System GMM improves estimation efficiency by combining equations in first differences and levels, allowing the use of additional internal instruments. This method effectively addresses endogeneity, unobserved fixed effects, and autocorrelation, especially in dynamic panel models with small T and large N .

First, the Durbin-Wu-Hausman test is conducted to assess the appropriateness of the GMM approach. As reported in Table 1, all models yield p-values below 0.05, indicating the presence of endogeneity. Endogeneity leads to biased and inconsistent estimates under conventional estimation methods; therefore, the use of GMM helps mitigate this problem.

The study incorporates the lagged dependent variable in the GMM framework to address endogeneity, model dynamic relationships, and provide valid instrumental variables, thereby improving the accuracy and validity of the estimated coefficients. Accordingly, Equation (1) is reformulated into the following dynamic specification:

$$PublicService_{jt} = \beta_0 + \beta_1 * PublicService_{jt} + \beta_2 * TI_{jt} + \beta_3 * HR_{jt} + \beta_4 * IPA_{jt} + \beta_5 * X_{jt} + u_{jt} \quad (2)$$

In addition, the study employs the Hansen (or Sargan) test to examine the validity of the instrumental variables, and the Arellano-Bond (AR) test to assess serial correlation in the differenced error terms, particularly second-order autocorrelation (AR(2)). As shown in Table 1, the Hansen test yields p-values greater than 0.10, indicating that the instruments used are valid. The Arellano-Bond test produces p-values above 0.05, suggesting the absence of second-order autocorrelation in the residuals of the estimated model.

4. Study results

4.1. The state of digital transformation and public services quality in Vietnam

Digital transformation

Figure 1 illustrates considerable fluctuations in Viet Nam's digital transformation during the period 2012-2022. Specifically, the Technical Infrastructure Index exhibits noticeable volatility; however, its overall score increased by 0.16 points over the entire study period, with a particularly strong rise of 0.22 points during 2018-2022, equivalent to an increase of 68.75%.

In contrast, the Human Resource Infrastructure Index experienced a pronounced and persistent decline. Initially the highest-performing sub-index in the early years (peaking at 0.63 in 2014), it continuously decreased and reached a low of 0.42 in 2022, falling below both technical infrastructure and ICT application indices.

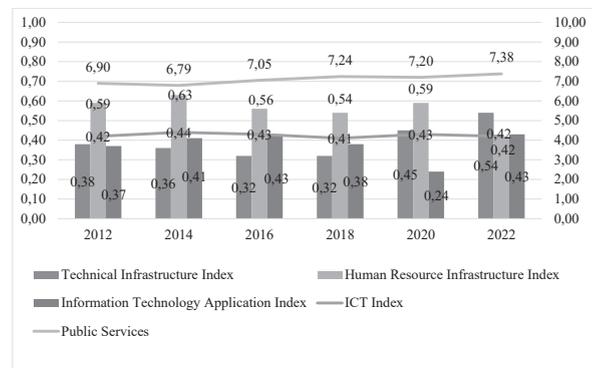
The Information and Communication Technology (ICT) Application Index demonstrates irregular fluctuations, recording a sharp decline to a historic low of 0.24 in 2020, followed by a remarkable recovery to 0.43 in 2022, approaching the highest level observed in the preceding period.

Overall, the composite ICT index remained relatively stable in the early years, fluctuating slightly around 0.42-0.44 from 2012 to 2016, and showed signs of stagnation in 2018, when it declined to 0.41. Nevertheless, the period 2020-2022 witnessed a clear breakthrough, with the index reaching a peak of 0.46 in 2022. This trend

suggests that recent digital transformation efforts have begun to yield positive quantitative outcomes.

The simultaneous growth of the composite ICT index and the Technical Infrastructure Index in the later period (2020-2022) reflects the strong impact of the National Digital Transformation Program as well as the digitalization pressure induced by the COVID-19 pandemic, which stimulated substantial public investment in hardware and network infrastructure. However, the decline in the Human Resource Infrastructure Index indicates that the pace of training and digital capacity building among civil servants has not kept up with equipment investment, creating a "time lag" and structural imbalance in ICT development.

Figure 1. Average scores of the digital transformation index and public service quality across 63 provinces and cities in Vietnam, 2012-2022



Source: Authors' calculations

Public service quality

Figure 1 also depicts an upward trend in the quality of public service delivery over the period 2012-2022, with an overall increase of 0.48 points. Although the index experienced a slight decline during 2012-2014 (a decrease of 0.11 points), it subsequently recovered and maintained steady growth, reaching its highest level of 7.38 in 2022.

The public service quality curve consistently remains at a relatively high level (above the upper-middle range of the 10-point scale) and exhibits a steadily increasing slope, indicating gradual improvements in citizen satisfaction and public governance effectiveness over time.

Improvements in the Public Service Quality Index can be attributed to decisive public administrative reform (PAR) policies and the implementation of the "one-stop shop" and "interconnected one-stop shop" mechanisms. In particular, during the 2020-2022 period, the synergy created by the enhancement of technical infrastructure (as discussed in the ICT analysis) provided a solid foundation for the deployment of online public services at Levels 3 and 4, thereby increasing transparency and convenience for citizens and ultimately improving evaluation scores.

4.2. The impact of digital transformation on provincial-level public service quality in Vietnam

Table 1. Estimation results of the impact of digital transformation on public service quality across 63 provinces and cities in Vietnam, 2012-2022

Independent variable		Regression coefficient	Standard deviation
Public Services			
Lagged Public Services		0.2553***	0.0299
Technical Infrastructure Index		0.1349**	0.0806
Human Resource Infrastructure Index		0.3328***	0.0493
Information Technology Application Index		0.1003**	0.0390
Control variables			
GDP per capita		0.0017**	0.0007
Human capital		0.0150***	0.0038
Urbanization		-0.0020***	0.0002
Population density		-0.00004**	0.00002
Economic region (Reference category: Northern Midlands and Mountainous Areas)	Red River Delta	0.0221**	0.0911
	North Central and Central Coastal Region	0.1591***	0.0747
	Central Highlands	-0.0036*	0.1095
	Southeast	-0.0409**	0.1087
	Mekong River Delta	0.1384**	0.0899
Constant		5.1153***	0.2206
Wald chi2 (13)		16132.78	
Prob>chi2		0.000	
Wu-Hausman F		0.0001	
AR(2) (P-value)		0.073	
Hansen J. (P-value)		0.115	
Number of observations		311	
Number of instrumental variables		60	
Statistical significance levels: * p<0.1; ** p<0.05; *** p<0.01			

Source: Compiled by the authors

Table 1 reports the effects of digital transformation on provincial-level public service quality across 63 provinces and cities in Vietnam during the period 2012-2022. Overall, all three components of digital transformation exert positive and statistically significant effects on public service quality.

Regarding technical infrastructure, at the 5% significance level, a 0.1-point increase in the Technical Infrastructure Index is associated with an increase of 0.1349 points in the Public Service Quality score. This finding is consistent with prior domestic and international studies, including West (2004), Osborne et al. (2022), Chien and Thanh (2022), and Pham et al. (2023). The underlying explanation is that technical infrastructure, such as internet connectivity and subscriber density, constitutes a fundamental prerequisite for system quality, enabling public services to operate in a stable, rapid, and convenient manner, thereby directly enhancing user experience. Extensive connectivity networks facilitate citizens' access to information and strengthen their ability to monitor government performance. Moreover, advanced digital infrastructure enables two-way interaction channels (e.g., digital citizen applications),

allowing governments to receive and respond to public feedback in a timely manner, which in turn reinforces trust and increases overall citizen satisfaction.

With respect to human resource infrastructure, at the 1% significance level, a 0.1-point increase in the Human Resource Infrastructure Index leads to an increase of 0.3328 points in public service quality, representing the largest marginal effect among the digital transformation components. This result can be explained by the critical role of high educational attainment and professional competence among public officials (government human resource infrastructure) in ensuring accurate, lawful decision-making and reducing administrative processing time (Korbaffo and Efu, 2025). At the same time, a higher level of social human capital enhances citizens' capacity to access and effectively use public services, thereby reducing technical barriers and frustration stemming from procedural misunderstandings. The compatibility between strong service provision capacity on the government side and high absorptive capacity on the citizen side generates a superior service experience, which substantially increases satisfaction with provincial public service quality (Tuan et al., 2023).

Similar to technical infrastructure, information technology application also exhibits a positive effect: public service quality increases by 0.1003 points when the IT Application Index rises by 0.1 points. According to West (2004) and GC et al. (2024), the extensive application of information technology in internal administrative processes helps standardize and automate procedures, eliminate redundant manual tasks, and significantly shorten processing time for service delivery. Online public service systems and electronic document management enhance procedural transparency, allowing citizens to track processing progress and reducing the risks of rent-seeking behavior or informal payments. In the Vietnamese context, Nguyen et al. (2020) emphasize that system quality, information quality, reliability, and transparency are key determinants of citizen satisfaction with provincial public service quality.

In addition, Table 1 reveals the effects of demographic and socioeconomic characteristics on provincial public service quality during the study period. While GDP per capita and human capital exert positive effects, urbanization and population density display negative associations with public service quality. Specifically, a one-unit increase in GDP per capita and human capital raises public service quality by 0.0017 and 0.0150 points, respectively. Conversely, a 1 percentage point increase in the urbanization rate and an increase of one person in population density reduce public service quality by 0.0020 and 0.00004 points, respectively. Furthermore, public service quality varies across economic regions in Vietnam, with scores tending to increase in the Red River Delta, North Central and Central Coastal Region, and Mekong River Delta, while declining in the remaining regions.

5. Conclusion

Building upon the findings presented in Chapter 4, the authors propose several recommendations for the Government and local authorities in designing programs and policies aimed at enhancing the quality of public services amid the ongoing process of digital transformation.

The empirical results indicate that indicators of digital transformation are positively associated with the quality of public services in Vietnam.

First, the institutional reform agenda should focus on improving the legal framework and governance mechanisms in line with the requirements of digital transformation in the public sector. The State should continue to review, revise, and harmonize regulations related to public service delivery toward simplifying administrative procedures, enhancing transparency, and adopting a citizen-centric approach. The expansion of fully online public services should be implemented within a unified institutional framework that ensures

interoperability and data sharing among ministries, sectors, and local governments. At the same time, the digital institutionalization of mandatory disclosure regarding processing progress, time limits, responsible authorities, and outcomes of administrative procedures is necessary to strengthen administrative accountability and enhance public trust in government. In addition, developing a comprehensive set of public service quality indicators - capturing transparency, procedural simplicity, and the actual effectiveness of essential public services - should be regarded as a key instrument for policy adjustment and resource allocation.

Second, human resource development plays a pivotal role in realizing digital transformation goals and improving public service quality. The research findings indicate that digital transformation yields positive effects only when operated by civil servants with adequate professional competence, digital skills, and a strong service orientation. Accordingly, public agencies should implement regular and systematic training programs on digital skills, citizen-service skills, and sector-specific knowledge tailored to public service domains such as healthcare, education, land administration, and business registration. Training modalities should be innovated toward blended learning to enhance flexibility and practical applicability. In parallel, performance evaluation mechanisms for civil servants should be outcome-based, with citizen and business satisfaction identified as a core criterion. Public disclosure of periodic evaluation results would further strengthen accountability while motivating civil servants to proactively innovate and improve service quality.

Third, solutions related to infrastructure and public service delivery models should aim to ensure coherence, inclusiveness, and adaptability to rapidly changing socio-economic conditions. The State should continue investing in digital infrastructure, ensuring information security and personal data protection, while enhancing interoperability among national and local databases. Public service delivery models should be developed in a multi-channel manner, harmoniously combining digital platforms with traditional methods to meet the needs of diverse population groups, particularly the elderly, residents in remote or disadvantaged areas, and groups with limited digital skills. Moreover, expanding public-private partnership models in public service provision can help mobilize social resources, improve service quality, and alleviate fiscal pressure. Notably, the application of big data and artificial intelligence in demand forecasting, performance monitoring, and anomaly detection would enable policy design and implementation to become more proactive, flexible, and better aligned with the national digital transformation process.

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VOCATIONAL TRAINING MODELS FOR ADOLESCENTS AND YOUNG ADULTS WITH AUTISM SPECTRUM DISORDER: GLOBAL INSIGHTS AND IMPLICATIONS FOR VIETNAM

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Abstract: Evidence indicates that numerous adolescents with autism encounter challenges when transitioning from education to the workforce, often leading to unemployment or precarious job situations. This article consolidates global experiences in vocational training associated with employment for adolescents with autism, extracts valuable insights, and suggests an appropriate model framework for Vietnam. Through a review of literature and a comparative analysis of models from the United States, the United Kingdom, Australia, Canada, and Hong Kong, the article introduces an effective model that should be structured with a clear pathway encompassing assessment, planning, foundational and vocational skill training, workplace internships, job placement, and post-employment support. The article underscores the necessity for training that is customized to the learner's requirements; learners should engage in real work experiences, receive guidance from on-site mentors, collaborate across various disciplines, and have their progress monitored over a period of 6 to 12 months.

Keywords: Vocational training; international experience; model; autism spectrum disorder; adolescents; supported employment.

Code: JHS-301

Received: 18th Oct 2025

Revised: 7th Nov 2025

Accepted: 15th Nov 2025

1. Introduction

Autism spectrum disorder (ASD) is classified as a developmental brain disorder, typically characterized by challenges in communication, social integration, and interpersonal interactions, along with inflexible repetitive behaviors or interests; the degree of support required can vary greatly among individuals (World Health Organization - WHO, 2025). According to WHO, it was estimated that in 2021, approximately 1 in 127 individuals were identified as being on the autism spectrum (WHO, 2025).

Moreover, besides early intervention, the transition from adolescence to early adulthood represents a crucial period for individuals with autism as they shift from the educational environment to vocational training and engagement in the labor market, which necessitates high levels of communication, adaptability, and practical skills. Utilizing data from the United States, studies consistently indicate that young individuals with ASD often face unfavorable employment outcomes. Even when they manage to obtain jobs, these roles are frequently part-time

and lack stability (Drexel University, 2015; Whittenburg et al., 2019). Consequently, the creation of vocational training models that are closely aligned with employment support for adolescents and youth with ASD is widely considered a practical and essential intervention.

In Vietnam, the Law on Persons with Disabilities recognizes the right to access education, vocational training, and employment (National Assembly, 2010). However, in practice, vocational training services and specialized employment support for adolescents and youth with ASD remain disjointed. There is still limited coordination among mainstream schools, vocational education institutions, employers, and social services; additionally, trained employment support personnel and standardized pathways to employment for young individuals on the autism spectrum are not yet broadly accessible. In light of this situation, the current article synthesizes international evidence and experiences in developing vocational training models for adolescents and youth with ASD, extracts lessons pertinent to the Vietnamese context, and proposes a viable model framework adapted to Vietnam's existing conditions.

2. Literature review and legal foundations for developing vocational training models for adolescents and youth with autism spectrum disorder

2.1. International research on vocational training models for adolescents and youth with autism spectrum disorder

In the last ten years, global studies on vocational training models for adolescents and youth with ASD have primarily concentrated on the transition from educational settings to the workforce. Taylor et al. (2012) discovered that while the quantity of research investigating career guidance, vocational training, and employment support initiatives for individuals with ASD aged 13-30 is still relatively scarce, programs that yield favorable results typically exhibit several common characteristics. These features include opportunities for practical work experience, direct on-the-job training, and personalized assistance. Elements such as pre-employment preparation, connections to job opportunities, workplace-based support, and initiatives aimed at enhancing employers' awareness of autism have been demonstrated to significantly contribute to improved employment participation outcomes. In a similar vein, Fong et al. (2021) highlight that the primary objective of vocational interventions should go beyond merely "securing a job" to fostering stable and sustainable employment. Consequently, successful programs frequently prioritize job-related skills training and continuous workplace support to improve long-term employment outcomes.

In addition to vocational skills, social and communication abilities in the workplace are deemed crucial for individuals with ASD to maintain long-term

employment. Whittenburg and associates contend that social skills training proves to be more effective when it incorporates modeling, practice through situational exercises or role-playing, and timely feedback, as well as when it is paired with the use of pictures, videos, or assistive technologies (Whittenburg et al., 2019). On the other hand, challenges in communication, adherence to social norms, and processing feedback heighten the risk of employment disruption if sufficient support is not provided. Schall et al. (2020) demonstrate that supported employment models possess significant evidence of effectiveness, especially when they offer opportunities for work experience before graduation, facilitate community integration, and provide direct, on-site workplace assistance to improve access to competitive employment. The significance of long-term support is also highlighted. Brooke and associates (2018) illustrate that job retention correlates with continuous intervention and support over time, along with the involvement of employment support personnel in overseeing and modifying workplace assistance.

At the organizational level, when employees with autism receive appropriate adjustments and support, their capacity to integrate and perform effectively tends to improve (Lindsay et al., 2021). However, revealing a disability may entail the risk of stigma or prejudice (Romualdez et al., 2021; Lindsay et al., 2021). Consequently, it is essential to establish clear management policies and foster a welcoming organizational culture that respects diversity, enabling employees to seek support without fear (Romualdez et al., 2021; Morris et al., 2025). From a business perspective, numerous studies indicate that to enhance recruitment opportunities and promote sustainable employment, it is crucial to 'influence employers.' This can be achieved through training for managers and colleagues, modifying recruitment and integration processes, and providing suitable support (Derbyshire, D. W., et al., 2024; Phillips, B. N., & colleagues, 2016).

The synthesis of current evidence suggests that vocational training models for adolescents and young adults with autism should be structured as an integrated continuum of services, where vocational skills training is merely one aspect. Key components such as the enhancement of social and communication skills, task-oriented on-site coaching, behavioral support, collaboration with employers, and workplace accommodations are crucial for achieving positive employment outcomes and ensuring job retention (Taylor et al., 2012; Fong et al., 2021; Schall et al., 2020). Among the models that exhibit relatively strong results, Project SEARCH is notable as a business-linked vocational training model; Wehman and colleagues (2017) demonstrate that it significantly increases the rates of competitive employment for autistic youth in

comparison to standard services (Wehman et al., 2017).

Furthermore, the supported employment approach advocates for a “place first, then train and support” strategy, which involves introducing participants to appropriate work environments early on and providing continuous support to maintain employment (The Scottish Government, 2022). The five-stage framework is designed to organize the continuum of transition services and minimize disruptions in support following graduation (SUSE, n.d.). Nevertheless, reviews also point out ongoing deficiencies in the evidence base, such as the scarcity of randomized controlled trials, inconsistent outcome measures, and insufficient long-term follow-up (Taylor et al., 2012; Fong et al., 2021). These deficiencies underscore the need for further examination of national experiences and the development of a model framework that is suitable for the Vietnamese context.

2.2. Legal basis and the Vietnamese context in developing vocational training models for children and adolescents with autism spectrum disorders

The Law on Persons with Disabilities (Law No. 51/2010/QH12) serves as a crucial legal framework that promotes a “rights and inclusion” perspective for individuals with disabilities. This legislation not only outlines the rights and responsibilities of persons with disabilities but also delineates the duties of the State, families, and society in facilitating equal access and participation for people with disabilities in various aspects of life. In terms of support policies, the Law encompasses a wide array of assistance measures, which include healthcare, education, vocational training, and employment, among other social sectors, while underscoring the importance of integrating disability policies into socio-economic development (Government, 2008). Furthermore, the Law elucidates the vital role of families in safeguarding, caring for, and enabling individuals with disabilities to exercise their rights (Government, 2008).

Conversely, Decree No. 43/2008/ND-CP outlines comprehensive regulations regarding policies for vocational educators and groups of vocational educators catering to individuals with disabilities. It also establishes criteria for distinguishing between “specialized” and “inclusive” classes or institutions based on the percentage of learners with disabilities (for instance: specialized classes with 70% or more; inclusive classes ranging from 5% to less than 70%) (Government, 2008). Furthermore, the Decree highlights the importance of State funding in the training and development of teachers, the creation of curricula, and the provision of necessary conditions to effectively carry out vocational training for individuals with disabilities (Government, 2008).

In the realm of developing models for individuals with autism, a significant challenge often arises from the fact that support requirements extend beyond vocational skills to include workplace social communication, environmental

and sensory adaptation, behavior management, and long-term job retention.

International evidence reviews suggest that successful employment interventions generally necessitate a blend of support at both the individual level (which includes behavioral support, social skills enhancement, and on-the-job assistance) and at the organizational or workplace level (such as fostering co-worker relationships, improving environmental conditions, and ensuring person-organization alignment) (Fong et al., 2021). Therefore, when implementing the legal framework in Vietnam, a significant consideration is the necessity to create a continuous service pathway (comprising recruitment, training, internships, hiring, and ongoing job-retention support) backed by interdisciplinary teams, to guarantee that autistic learners experience a smooth transition into employment.

3. Research methods

This article utilizes an evidence synthesis approach in conjunction with comparative case analysis to outline and differentiate vocational training models associated with employment support for individuals with Autism Spectrum Disorder, thereby extracting design insights pertinent to the Vietnamese context.

The primary data sources consist of: (1) studies and reviews pertaining to career guidance, vocational training, and employment interventions aimed at individuals with ASD; and (2) documents that outline specific models or programs, along with implementation reports from selected countries or territories. Furthermore, pertinent guidelines or quality frameworks that are directly linked to each model (when available) are utilized as reference materials to elucidate implementation requirements and measurement methodologies. The scope of the literature is concentrated on the timeframe from 2012 to 2025 to encompass publications and models documented over the last decade while ensuring the relevance of the discussion.

The literature synthesis process was carried out through a series of steps designed to improve transparency and replicability: conducting keyword-based searches of authoritative sources; eliminating duplicates; screening titles and abstracts; and performing a full-text review for inclusion in the synthesis. Subsequently, data were extracted using a standardized matrix that addressed the following dimensions: target population, intended outcomes, service components, roles and involvement of employers, forms of workplace support, duration of support, outcome indicators, and quality assurance mechanisms.

The criteria for selecting the literature encompassed: (i) direct relevance to Autism Spectrum Disorder or to populations that require substantial support during the transition to employment; (ii) adequately detailed descriptions of models or processes that facilitate meaningful comparison; (iii) the presence of information

regarding outcome indicators (e.g., paid employment, job retention) or quality standardization mechanisms (such as standards, evaluation frameworks, or accreditation); and (iv) a preference for credible sources, which include peer-reviewed journal articles, official guidelines or frameworks, and technical reports produced by professional organizations.

The selection of national or territorial cases was intentional and based on three criteria: representation of various approaches (enterprise-based internships; pathway-oriented supported employment services; community-based services; and State-coordinated commissioning mechanisms); the availability of sufficiently clear documentation regarding service components and processes; and the existence of comparable evidence on outcomes or quality standards.

The comparative analysis is based on a set of criteria derived from the second group of materials, with a focus on: (i) service pathways and support components (outreach-assessment-training-jobplacement-retention); (ii) the level of employer engagement; and (iii) mechanisms for outcome measurement and quality assurance (output indicators, self-assessment, and independent evaluation). On the basis of these comparisons, the article derives design implications for vocational training models that are appropriate to the Vietnamese context.

The chosen cases have been deliberately selected to exemplify the various approaches: the United States (enterprise-based internship models), the United Kingdom (five-stage supported employment and quality frameworks), Australia (disability employment services with an evidence-informed practice orientation), Canada (community-based supported employment), and Hong Kong (state coordination and the involvement of non-governmental organizations-NGOs).

4. Results and discussion

4.1. International experience in vocational training and employment support for adolescents and youth with autism spectrum disorder

4.1.1. The U.S. enterprise-based internship model (Project SEARCH + ASD Supports)

Project SEARCH represents a school-to-work transition framework that is executed directly within businesses or employing organizations. Participants engage in an intervention program that spans approximately nine months, aiming for the ultimate goal of securing competitive employment (paid work in the open labor market).

The essence of this model lies in rotational internships across various job roles within the business setting, coupled with daily, scheduled preparation for “going to work.” Research studies suggest that the program’s schedule generally encompasses about 1.5 hours per session dedicated to work-readiness skills training, alongside roughly four hours each day of internships in

different roles within the host organization.

A variation of the “Project SEARCH with support for individuals with autism” framework enhances focused assistance to tackle prevalent workplace difficulties. The initiative incorporates Applied Behavior Analysis (ABA) techniques and supportive strategies to promote positive behaviors, including: step-by-step task analysis, structured repetitive practice, role-playing, modeling (both direct and video), positive reinforcement, visual aids, self-regulation of behavior, functional communication interventions, and training in social-communication skills within the work environment.

At the same time, the model prioritizes on-the-job training and “business development” initiatives (collaborating with departments and personnel, increasing disability awareness, establishing internship roles, and creating appropriate job opportunities), perceiving businesses as collaborative partners in implementation rather than merely locations that “host interns”.

A significant piece of evidence is the randomized controlled trial conducted by Wehman and colleagues (2017), which compared a group involved in Project SEARCH, receiving support for individuals with autism, to a group that received standard special education services. The results indicated that 90% of the intervention group secured part-time competitive employment within three months post-graduation (in contrast to 6% of the control group), and 87% maintained their employment after 12 months (compared to 12% in the control group). This strengthens the argument that business-linked internships, provided they are of adequate duration and accompanied by specialized support, can greatly enhance both access to and retention of competitive employment for young individuals with autism.

From this model, design directions can be suggested for its application in the Vietnamese context: (1) Initiate close collaboration with businesses from the beginning to co-create internship positions, tasks, competency standards, and recruitment pathways; (2) A sufficiently extended internship duration and rotation of roles to facilitate “learning on the job”, as well as adapting to workplace culture and procedures; (3) Ensure the availability of on-site personnel support and long-term assistance mechanisms when necessary; (4) Incorporate behavioral and social skills support as an essential element, as it significantly influences the inclusion and job retention of individuals with autism.

4.1.2. The UK model of supported employment based on the 5-stage model and quality assurance

In the UK, supported employment is executed through a 5-stage service process designed to assist individuals with disabilities and those requiring high levels of support in securing paid employment within the open labor market and sustaining that employment over time. The Scottish

Union of Supported Employment (SUSE) underscores that this model has been formally embraced by Scotland as a framework for implementation, reinforcing the principle that “anyone can work if they desire to and receive appropriate support”.

Firstly, the 5-stage model of supported employment, as outlined by the Scottish Union of Supported Employment (SUSE), encompasses the following components:

- Accessing and engaging job seekers: assisting job seekers in comprehending the model, making an informed choice to participate, and establishing a trusting relationship.

- Creating a vocational profile: “explore - plan” based on individual goals, interests, strengths, and support requirements; developing a profile that serves as a foundation for job searching and matching.

- Job search: employment support personnel collaborate with job seekers to identify appropriate opportunities; they may engage directly with employers to mitigate excessively formal hiring obstacles.

- Engaging employers: conducting job analysis, reaching agreements on support plans during the recruitment process and within the workplace; fostering sustainable partnerships with employers.

- Assistance in the workplace and beyond: support for on-the-job learning, training, and workplace mentoring; may extend assistance beyond working hours (such as commuting and financial management...) if it impacts job retention. SUSE highlights that one-on-one support can be gradually diminished as employees achieve proficiency in their roles and transition to receiving “natural support” from their colleagues and managers.

Secondly, ensure quality through the Supported Employment Quality Framework (SEQF) advocated by the British Association for Supported Employment (BASE). To prevent fragmented implementation, BASE formulates the quality framework in a manner that is “standardized by criteria and measurement”, establishing a fundamental set of quality and value standards that service providers are required to uphold; it also underscores the objective of “supporting job seekers to find - retain - develop suitable employment” and considers businesses as a significant “customer”.

The effectiveness of SEQF is evaluated through output indicators and independent assessments. For instance, this includes the percentage of individuals who initiate a professional profile and subsequently attain paid employment, the average duration from the commencement of the service to the initiation of work, and the retention rate of paid employment for a minimum of 6 months (26 weeks). Additionally, SEQF incorporates an external evaluation system to assess adherence to quality standards (certification levels determined by scores), which is supplemented by regular self-assessments and ongoing improvement strategies. During the workplace

support phase, BASE prioritizes the approach of “placing the individual in a job - providing on-the-job training - and then gradually decreasing support”. This approach considers the quality to be high when the level of assistance is diminished or when the supporter is deemed ‘no longer necessary’ as the employee has successfully integrated.

Insights gained from the implementation in the UK indicate that there are two crucial aspects to consider when developing this model in Vietnam: first, the need to standardize service processes following a well-defined “journey” (engagement-registration-job search/matching-employer linkage-support in/out of work) to guarantee uniform execution; second, the importance of establishing quality standards and measuring effectiveness through key output indicators (employment with pay rate; time to job transition; job retention), along with self-assessment and independent evaluation to prevent fragmented implementation and challenges in demonstrating impact.

4.1.3. The Australian model of employment services for individuals with disabilities and evidence-based reform orientations.

In Australia, the employment service system for individuals with disabilities is undergoing reforms aimed at enhancing effectiveness for groups with significant support needs, particularly those with autism. An analysis of the system by Hayward and Flower reveals that evidence regarding effective employment support initiatives for individuals with autism in Australia remains relatively scarce. However, consistent findings highlight that the quality of services is largely contingent upon service providers’ comprehensive understanding of autism and the specific needs of autistic adults. Additionally, there is a pressing need to elevate the level of individualization and appropriateness of support (Hayward & Flower, 2025). In light of this, the authors propose essential enhancements to the system, which include improving professional training on autism for service staff and bolstering the ability to deliver support that is customized to the sensory, communication, and behavioral characteristics of individuals with autism within the employment setting (Hayward & Flower, 2025). From the perspective of employer engagement, compilations of evidence provided by Australian government agencies highlight the “organizational advantages” of hiring individuals with disabilities, including enhanced human resources, increased engagement, and improved diversity and inclusion within corporate culture. This also addresses several prevalent misconceptions regarding adjustment costs or work performance (Australian Government, JobAccess, 2025a, 2025b). The design implication suggests that, in addition to selecting the suitable intervention model for learners/workers, Vietnam must implement a service quality monitoring system (competency standards, procedures,

output indicators) and develop a strategy to persuade businesses through a “benefit–value” argument backed by evidence, to improve employers’ ability to engage and to maintain support in a significant and impactful way (Australian Government, JobAccess, 2025a, 2025b; Hayward & Flower, 2025).

4.1.4. *Canada’s model of community-based supported employment*

In Canada, community-based supported employment is frequently executed by local service organizations, such as social organizations, disability support centers, and employment service providers. These entities serve as a “bridge” connecting job seekers with businesses, while also offering ongoing support post-employment. Martin and Lanovaz (2021) conducted an evaluation of a supported employment initiative managed by a community organization in Canada, specifically for individuals with autism who do not have intellectual disabilities. The research team monitored participant characteristics, the total number of service hours delivered, and various employment-related outcome indicators. They also compared levels of job-related anxiety and confidence in job-seeking and retention before and after the participants engaged in the program (Martin & Lanovaz, 2021).

The results show that even though participants had a high prevalence of comorbid mental health issues, 62.1% still obtained paid employment within 12 months; those with post-secondary education also tended to find jobs related to their field of study or requiring specialized skills (Martin & Lanovaz, 2021). At the same time, after the intervention, participants experienced reduced anxiety and increased confidence in approaching employment, indicating that community services can provide significant support during the job search and entry phase (Martin & Lanovaz, 2021). However, the study also emphasizes that job retention remains a major challenge; mental health issues and difficult life circumstances can hinder both the job search and employment stability, so prolonged and cross-sector support (particularly involving mental health services) is needed rather than just short-term pre-employment assistance (Martin & Lanovaz, 2021).

Taking a broader perspective, the “ecosystem” model for employment of individuals with autism in Canada indicates that employment results are intertwined with community resources, family assistance, workplace capabilities (including managers and colleagues), and policy frameworks. Consequently, successful programs must be structured through networks and coordinated efforts among multiple stakeholders (Nicholas et al., 2018). This underscores the importance of community organizations as an ongoing “service layer”, which not only offers professional assistance (such as career assessments, job matching, and workplace coaching) but also ensures follow-up support to mitigate the risk of disruption during the critical transition period following employment.

Therefore, Vietnam ought to establish a network of community service units (including social organizations, disability support centers, and local employment service centers) to function as an “extension” post-graduation, thereby guaranteeing a comprehensive support system that encompasses: (i) assessment and career profiling; (ii) job search and matching; (iii) providing mentorship in the workplace; (iv) overseeing and assisting with long-term maintenance, particularly in instances of mental health challenges or adjustment crises (Martin & Lanovaz, 2021; Nicholas et al., 2018). This approach aids in minimizing service interruptions among schools, vocational training institutions, and businesses, thereby enhancing the chances of sustainable employment for individuals with autism.

4.1.5. *The model of Government-coordinated supported employment services in Hong Kong and the involvement of non-profit organizations*

In Hong Kong, the Social Welfare Department has established a system through which the Government coordinates and allocates funding to social organizations for the provision of supported employment training services aimed at individuals with disabilities. These services encompass skills training, trial internships, vocational training, and counseling for groups that are not yet prepared to engage in the general labor market, while also facilitating job placement and offering post-employment support (The Government of the Hong Kong Special Administrative Region, 2025). Furthermore, Hong Kong incentivizes businesses by offering wage subsidies during the ‘trial work’ phase and mandates a minimum of 12 months of support following placement (The Government of the Hong Kong Special Administrative Region, 2025).

In addition to the general services provided, social organizations also create specialized programs tailored for individuals with autism. Heep Hong Society has indicated that it has been offering vocational training for adolescents with autism since 2008. Currently, it operates a comprehensive support chain that includes assessment and vocational training, development of practical skills, internships, individual follow-up, emotional support, parent support, business training, and a mentoring program aimed at enhancing inclusion (Heep Hong Society, n.d.). This model illustrates that support must extend beyond training to encompass internships, job placement, and post-placement follow-up.

The experience in Hong Kong indicates an effective operational model when the Government coordinates and commissions services, while social organizations provide flexible, individualized services and collaborate directly with businesses. Additionally, incentive mechanisms are necessary to motivate businesses to accept and sustain support (The Government of the Hong Kong Special Administrative Region, 2025; Heep Hong Society, n.d.).

4.2. Proposed framework for a vocational training model for children and adolescents with autism spectrum disorder in Vietnam

The proposed model framework is designed to improve the transition from education to employment for adolescents and young adults with autism spectrum disorder in Vietnam. The targeted age range is 14-24, which can be adjusted flexibly based on local context and the characteristics of the learners. The primary objective of the model is to enhance the percentage of learners who achieve occupational competencies and secure appropriate, sustainable employment within an inclusive work environment. This, in turn, aims to elevate quality of life, foster independence, and encourage social participation. Specific objectives encompass: ensuring that learners fulfill competency standards for occupational tasks; completing structured internships at various enterprises; securing paid employment; and sustaining employment at critical milestones (6 months and 12 months). Additionally, there is a focus on enhancing foundational skills that are directly linked to employability and job retention, including workplace safety, effective workplace communication, adherence to procedures, and self-management.

The model operates according to several fundamental principles. First, personalization serves as a guiding principle: every decision related to career, learning pathways, assessment methods, and the level of support must be informed by the functional evaluation and career profile of each learner. Second, learning through practice is regarded as the primary method, where professional skills are cultivated through practical tasks and task-based assessments. Third, the model necessitates interdisciplinary coordination and case management to amalgamate support from social work, psychology, special education, vocational training, and businesses into a cohesive plan. Fourth, businesses are recognized as co-design partners, engaging from the inception of internship/job positions, guidance methods, and workplace feedback to post-placement monitoring mechanisms. Fifth, data-driven quality assurance is an essential requirement aimed at standardizing processes, tracking progress, and evaluating outcomes. Ultimately, the model emphasizes the importance of upholding the rights and dignity of learners, ensuring that participation is voluntary, maintaining the confidentiality of information, and preventing any form of discrimination, violence, or harassment within training and work settings.

In terms of organizational structure, the proposed model distinctly differentiates between the coordination level and the implementation level. At the provincial or city level, it is essential to create an inter-sectoral coordination committee, which will be led by the Department of Home Affairs, in partnership with education and training agencies, health organizations, business representatives

or associations, social organizations that provide community services, and family representatives. The coordination committee is tasked with standardizing minimum procedures, establishing a mechanism for service commissioning, developing a network of partner businesses, and overseeing quality assurance. At the implementation level, the model suggests the formation of an 'implementation cluster' that includes vocational education institutions (which offer modular vocational training and practical workshops), centers that support individuals with disabilities or rehabilitation, community service units (which assist with foundational skills and post-placement follow-up), general education schools or continuing education centers (which cater to the 14-18 age group), and partner businesses (which provide structured internships and job placements). Based on this framework, each learner receives support from a shift management team that includes a social work coordinator, vocational educators, specialists in psychology and special education, staff providing workplace employment assistance, and representatives from both business and family sectors. This team collaborates to formulate plans, allocate responsibilities, and convenes regular shift meetings to implement timely modifications.

The implementation process is structured into six continuous phases. The initial phase involves intake, screening, and functional assessment to evaluate eligibility for participation and to categorize support requirements. The essential components of the assessment encompass independence levels, functional communication abilities, foundational social skills, behavioral and self-regulation capabilities, vocational interests, task-related strengths, co-existing mental health issues, as well as factors related to family, transportation, and participation time. The second phase entails the creation of a vocational profile and the formulation of an individual transition plan, which delineates priority career objectives, module-based competency standards, necessary adjustments in learning and internships, the responsibilities of all involved parties, and a timeline for regular reviews. The third phase focuses on pre-vocational foundational skills training, emphasizing life skills and self-management, occupational safety, workplace communication, basic social skills, and essential digital skills; assessments are designed to prioritize simulated scenarios over traditional paper-based evaluations. Step four involves competency-based vocational training that consists of small modules, clearly defined tasks, progressively increasing levels of independence, and assessments grounded in observable criteria (correct procedures, quality, time, safety). This training allows for the utilization of support tools such as checklists and visual aids. Step five encompasses structured internships within businesses, with flexible durations ranging from approximately 8 to 24 weeks, contingent upon the level of support required. During

this phase, workplace support personnel perform job analyses in a step-by-step manner, provide task-based training, assist in modifying the work environment (including lighting, noise levels, and workstation layout), coordinate brief training sessions for company mentors on task assignment and effective feedback provision, and monitor weekly progress through regular shift meetings to make necessary adjustments to the plan. Step six focuses on job placement and ongoing support for maintaining employment for a period of 6 to 12 months. This includes on-the-job support (task management, situation handling, communication support - feedback) as well as off-the-job support when external life factors impact job retention (such as transportation issues, daily routine management, stress management, and connecting to support services as needed). The support framework is designed to gradually diminish as the employee becomes more stable, transitioning towards natural support from the company and enhancing the individual's self-management capabilities.

To maintain a high-quality operational model, it is essential to explicitly outline the input conditions and evaluation metrics. In terms of human resources, the minimum requirement for a deployment unit consists of one social work coordinator overseeing the shift, one vocational teacher, one psychologist or special education specialist, and one staff member assisting with workplace employment for approximately 15 to 20 learners during the internship phase; the enterprise must designate a direct supervisor for the internship or work position. On the financial side, resources should integrate local service order budgets, contributions from enterprises fulfilling social responsibility, and legitimate project funds; concurrently, expenses related to shift management and workplace employment support should be "identified", reasonably adjusted, and quality monitored to prevent mere formal implementation. Regarding data management, each learner must have a digital record for each shift and be monitored for a minimum of 12 months following job placement, incorporating an early risk warning system and stringent confidentiality regulations.

The minimum output indicators of the model encompass: the completion rate of vocational modules and adherence to task standards; the rate of internship

completion; the percentage of paid employment; the job retention rates at 6 and 12 months; income and working hours; the satisfaction levels of learners, families, and businesses; the gradual reduction in support over time; and the count of safety-related or serious conflict incidents along with the measures taken to address them. Utilizing these indicators, local authorities are able to assess effectiveness, modify policies, and appropriately expand the model in a manner that is validated for the specific conditions of each region.

5. Conclusion

The article highlights that a significant obstacle in assisting adolescents with autism spectrum disorder during their transition to employment is the disjointed nature of services: vocational training frequently lacks a close connection with workplace practice, job placement, and ongoing support. Simultaneously, the support requirements of this demographic extend beyond professional skills to include workplace social skills, environmental adaptation, and self-regulation, indicating that solely vocational training is unlikely to yield sustainable outcomes.

Drawing on international experiences, the article establishes a general principle: an effective model must be crafted as a transition chain, tailored to the vocational profile, with businesses engaged as co-design partners, supported by multidisciplinary teams and on-site personnel, alongside mechanisms for quality assurance and outcome measurement. In light of this, the article suggests a model framework for Vietnam comprising six sequential steps: intake-assessment; career profiling and transition planning; foundational skills training; modular vocational training; structured internships at enterprises; and job placement with support for 6-12 months.

In order for the model to function efficiently and be scalable, it is essential to enhance intersectoral coordination at the local level, cultivate specialized personnel (such as shift managers, vocational educators, special education and psychology staff, and workplace support personnel), and establish a financial mechanism that links service commissioning to outcomes, alongside a data system to monitor results post-placement. The subsequent phase involves piloting in various localities and conducting evaluations at 6-12 months intervals to improve the model prior to broader implementation.

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FACTORS INFLUENCING LIFE SATISFACTION AMONG VIETNAMESE UNIVERSITY STUDENTS

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Abstract: This study examines how self-esteem, the impostor phenomenon, and perfectionism shape life satisfaction among Vietnamese university students. Using survey data from 406 students and Structural Equation Modeling (SEM), the study identifies both direct and indirect psychological mechanisms influencing life satisfaction. The results show that the impostor phenomenon and maladaptive perfectionism significantly reduce life satisfaction, whereas adaptive perfectionism enhances it. Most importantly, the impostor phenomenon is found to mediate the relationship between self-esteem and life satisfaction, indicating that self-esteem may undermine well-being when it triggers impostor feelings in competitive academic contexts. This study offers novel empirical evidence from Vietnam by clarifying the mediating role of the impostor phenomenon and distinguishing the contrasting effects of adaptive versus maladaptive perfectionism. The findings provide a robust empirical basis for developing targeted psychological support and student mental health policies in higher education.

Keywords: students; life satisfaction; Vietnam

Code: JHS -302

Received: 16th Oct 2025

Revised: 6th Nov 2025

Accepted: 20th Nov 2025

1. Introduction

In contemporary society, where individuals are required to continuously adapt to academic demands, competitive pressures, and social expectations, life satisfaction has emerged as one of the most important indicators reflecting quality of life and mental health. According to Diener (1984), life satisfaction constitutes a core component of subjective well-being, encompassing individuals' cognitive evaluations of their lives as well as their experiences of positive and negative affect. Beyond merely capturing "happiness," life satisfaction reflects individuals' capacity to cope with stress, adapt to challenges, and maintain a sense of meaning in life.

A substantial body of international research has demonstrated that life satisfaction is shaped by a wide range of psychosocial factors, including self-esteem, social relationships, economic conditions, and cultural context (Campbell, 1981; Veenhoven, 1991). In individualistic societies, self-esteem often plays a central role in fostering happiness and positive life evaluations. In contrast, in collectivist cultures, satisfaction with life is more strongly nurtured through connectedness with family, friends, and the broader community (Triandis, 1989).

In the Vietnamese context, university students represent a distinctive population group undergoing a critical transition from adolescence to adulthood,

during which they face multiple pressures related to academic performance, employment prospects, financial constraints, and future orientation. Coupled with the pervasive influence of mass media and social networking platforms, societal ideals of “success” and “perfection” exert substantial psychological pressure on students, increasing vulnerability to anxiety, self-doubt, and diminished self-worth. This phenomenon is particularly evident in the growing prevalence of the impostor phenomenon, a psychological state in which individuals persistently perceive themselves as incompetent or undeserving of their achievements despite objective evidence to the contrary (Clance & Imes, 1978).

Previous studies have consistently documented close associations among the impostor phenomenon, self-esteem, and life satisfaction. Kamarzarrin et al. (2013) reported a significant negative relationship between self-esteem and impostor feelings, suggesting that individuals with lower self-esteem tend to undervalue themselves and experience greater difficulty attaining happiness. Moreover, Islam et al. (2024) found that the impostor phenomenon negatively affects life satisfaction, while adaptive perfectionism may serve as a positive regulatory factor by helping individuals sustain motivation and a sense of personal control.

Collectively, these findings suggest that life satisfaction is a multidimensional construct, simultaneously influenced by cognitive, emotional, and social factors. For Vietnamese university students - who face intense academic competition, social comparison, and identity formation - psychological variables such as self-esteem, impostor phenomenon, perfectionism, and social support may play a particularly salient role in shaping life satisfaction. However, empirical research on this topic in Vietnam remains limited. Existing studies have primarily focused on academic stress or depression, with relatively little attention given to the interplay between positive psychological factors and life satisfaction.

Against this backdrop, the present study aims to identify the key factors influencing life satisfaction among Vietnamese university students. Specifically, it examines the relationships among core psychological constructs - self-esteem, perfectionism, and the impostor phenomenon - while also considering the role of social factors such as peer relationships, family support, and financial conditions. By integrating theoretical frameworks of subjective well-being (Diener, 1984) with recent empirical evidence, this study seeks to provide a robust scientific foundation for the development of psychological

support programs, academic counseling services, and policies aimed at fostering a more supportive and positive learning environment for Vietnamese students.

2. Theoretical background

2.1. Theoretical background

To address the research gap identified in the literature, this study is grounded explicitly in Self-Discrepancy Theory (Higgins, 1987) as its central theoretical framework. This theory provides a coherent psychological explanation for how discrepancies among different self-representations shape individuals’ emotional experiences, self-evaluations, and overall life satisfaction. By adopting this framework, the present study establishes a systematic basis for selecting research variables and interpreting their relationships.

Within the self-discrepancy framework, self-esteem is conceptualized as an outcome of the perceived alignment between the actual self and the ideal self. When this alignment is weak, individuals are more likely to experience negative self-evaluations and diminished life satisfaction. At the same time, discrepancies between the actual self and the ought self -standards imposed by society or significant others-are theorized to give rise to the impostor phenomenon, characterized by persistent self-doubt and fear of being exposed as incompetent. These impostor feelings, in turn, undermine individuals’ capacity to experience satisfaction with their achievements and life circumstances.

Furthermore, perfectionism is incorporated into the framework as a self-regulatory response to self-discrepancies. Drawing on prior theoretical and empirical work, the study distinguishes between adaptive perfectionism, which reflects flexible goal striving aimed at self-improvement, and maladaptive perfectionism, which represents rigid, self-critical striving driven by fear of failure. While adaptive perfectionism may reduce self-discrepancy and enhance life satisfaction, maladaptive perfectionism is expected to intensify psychological strain and reduce well-being.

Based on this theoretical integration, the proposed research model conceptualizes life satisfaction as a distal outcome shaped by self-evaluative processes (self-esteem), discrepancy-driven psychological responses (impostor phenomenon), and differential forms of perfectionism. The impostor phenomenon is further hypothesized to function as a mediating mechanism linking self-esteem and life satisfaction. This framework not only clarifies the theoretical logic underlying variable selection but also provides a unified lens for interpreting the empirical findings, thereby strengthening the explanatory power and theoretical contribution of the study.

2.2. Self-esteem

Self-esteem refers to individuals' overall evaluation of their own worth and competence, reflecting the extent to which they feel confident, proud, and respectful toward themselves (Rosenberg, 1965). It is considered a central construct in personality psychology, playing a pivotal role in shaping individuals' emotions, behaviors, and overall quality of life. Individuals with high self-esteem tend to have greater confidence in their abilities, display perseverance in the face of adversity, and experience life more positively (Baumeister et al., 2003; Orth & Robins, 2014).

A substantial body of research has demonstrated a close association between self-esteem and life satisfaction. Individuals with higher self-esteem generally hold more positive self-evaluations, experience fewer negative emotions, and are more likely to achieve psychological equilibrium (Diener, 1984; Baumeister et al., 2003). Within the student population, self-esteem reflects the capacity to affirm personal value, sustain academic motivation, and adapt to various pressures inherent in the learning environment. Students with stable self-esteem tend to be more open, proactive in social interactions, and effective in building positive interpersonal relationships, which in turn reinforces their sense of happiness and overall life satisfaction (Orth et al., 2012).

2.3. Life satisfaction

Life satisfaction is conceptualized as a state encompassing both cognitive and affective components (Proctor et al., 2009), reflecting the extent to which individuals positively evaluate the overall quality of their lives (Veenhoven, 1996; Kurnaz et al., 2020). Such evaluations are typically based on self-defined standards (Diener et al., 1985) as well as individuals' perceived achievements in both material and psychological domains (Ha & Tam, 2013).

Life satisfaction is widely regarded as the central cognitive component of subjective well-being (Proctor et al., 2009). According to the 'integrated life' perspective, an individual's global appraisal of their life is not an isolated judgment but a reflection of satisfaction across multiple domains, including social contacts, family, health, and finances (Rode et al., 2005). Among these, social contacts and family generally exert the most significant impact on global life satisfaction, whereas income often has the lowest relative weight. This suggests that a student's overall happiness is more heavily dependent on the quality of their interpersonal relationships than on their material resources (Kapteyn et al., 2010).

Theoretical models propose that self-esteem acts as a critical mediator that translates personality traits and social experiences into global life evaluations (Rey et al., 2011).

Empirical evidence has consistently demonstrated a positive relationship between self-esteem and life satisfaction. Studies by Rey et al. (2011) and Ye et al. (2012) indicate that individuals with higher levels of self-esteem tend to report greater life satisfaction, whereas those with lower self-esteem are more likely to experience dissatisfaction. Moreover, individuals with high self-esteem generally exhibit more adaptive coping responses and greater psychological resilience when confronting life challenges or adversity (Moksnes & Espnes, 2013). These adaptive processes enable individuals to maintain positive life evaluations even under stressful conditions.

Based on these theoretical arguments and empirical findings, the present study proposes the following hypothesis:

H1: Self-esteem has a positive effect on life satisfaction among university students.

2.4. Impostor phenomenon

The impostor phenomenon is a psychological condition in which high-achieving individuals persistently doubt their intelligence, skills, and accomplishments despite objective evidence of competence (Mullangi & Jagsi, 2019). Individuals experiencing this phenomenon tend to attribute their success to external factors such as luck or favorable timing rather than to their actual abilities, while simultaneously harboring a persistent fear of being exposed as a "fraud" (Mullangi & Jagsi, 2019). Consequently, they often feel undeserving of praise and recognition, which can be regarded as a form of self-devaluation (Parkman, 2016).

Empirical studies by El-Setouhy et al. (2024) and Egwurugwu et al. (2018) have demonstrated a significant negative correlation between self-esteem and the impostor phenomenon. Any increase in self-esteem is associated with a corresponding decrease in impostor feelings, and vice versa. Low self-esteem reflects individuals' tendency to undervalue their personal worth or underestimate their own abilities, accompanied by feelings of unworthiness and inferiority-core characteristics of the impostor phenomenon (Szczęśniak, Mazur, Rodzeń, & Szpunar, 2021). Based on these arguments, the following hypothesis is proposed:

H2: Self-esteem has a negative effect on the impostor phenomenon among university students.

In academic settings, Islam et al. (2024) reported that the impostor phenomenon exerts a negative effect on life satisfaction, particularly among university faculty members. Individuals experiencing impostor feelings are more likely to suffer from anxiety, self-doubt, fear of failure, and chronic stress-psychological states that are fundamentally incompatible with the positive emotions

underlying life satisfaction (Egwurugwu et al., 2018). As a result, such individuals often feel dissatisfied with their lives and struggle to enjoy or feel deserving of their achievements compared to others (Islam et al., 2024). Accordingly, this study proposes the following hypothesis:

H3: The impostor phenomenon has a negative effect on life satisfaction among university students.

Furthermore, Diener et al. (1999) identified self-esteem as one of the strongest antecedents of life satisfaction. The impostor phenomenon frequently emerges among individuals with low self-esteem, leading to diminished positive self-evaluation and reduced experiences of happiness (Neureiter & Traut-Mattausch, 2016). Characterized by persistent self-doubt and fear of being “exposed” despite actual success (Clance & Imes, 1978), the impostor phenomenon may function as a psychological mechanism through which self-esteem influences life satisfaction. Therefore, this study examines the mediating role of the impostor phenomenon in the relationship between self-esteem and life satisfaction, leading to the following hypothesis:

H4: The impostor phenomenon mediates the relationship between self-esteem and life satisfaction among university students.

2.5. Perfectionism

Perfectionism is regarded as a widespread phenomenon that has been increasing, particularly as younger generations face growing demands from society and parental expectations (Curran & Hill, 2019). In this context, perfectionism can be understood as a complex personality trait characterized by individuals setting excessively high standards for themselves and engaging in overly critical self-evaluation (Frost et al., 1990).

Empirical studies have reinforced the view that perfectionism is a multidimensional construct (Slaney et al., 1995; Slaney et al., 2001). Building on the seminal work of Hamachek (1978), perfectionism has been commonly classified into two main types: adaptive and maladaptive (Lo & Abbott, 2013).

Furthermore, Saha and Vijayan (2024) demonstrate that the relationship between impostor phenomenon and perfectionism is bidirectional, whereby the impostor phenomenon can intensify individuals’ perfectionistic tendencies. Specifically, students with a strong impostor

tendency often strive to maintain a flawless image in order to avoid being perceived as incompetent. They frequently adopt perfectionistic self-presentation strategies, such as attempting to display superior competence or concealing personal shortcomings. These behaviors function as psychological defense mechanisms that help alleviate anxiety about being exposed as a “fraud”. This suggests that perfectionism often originates from defensive psychological processes aimed at preventing the risk of being identified as an impostor. Based on these arguments, the following hypotheses are proposed:

H₅: The impostor phenomenon has a positive effect on adaptive perfectionism among students

H6: The impostor phenomenon has a positive effect on maladaptive perfectionism among students

Evidence from a survey conducted among Chinese university students indicates that maladaptive perfectionism may undermine life satisfaction (Wang & Wu, 2022). Specifically, students characterized by maladaptive perfectionistic tendencies tend to fear making mistakes, hesitate in taking action, and experience pressure stemming from high parental expectations. These characteristics make them more vulnerable to academic burnout, leading to diminished self-confidence and self-esteem, which in turn negatively affect their level of life satisfaction.

In contrast, other empirical evidence suggests that adaptive perfectionism is positively associated with life satisfaction (Rice & Lapsley, 2001; Ashby et al., 2012). For example, individuals with adaptive perfectionistic tendencies typically set high personal standards without engaging in harsh self-criticism when goals are not achieved, and they tend to view failure as an opportunity for learning. As a result, they are more likely to maintain motivation and pride in their achievements (Burnam et al., 2013).

Based on the foregoing discussion, the following research hypotheses are proposed:

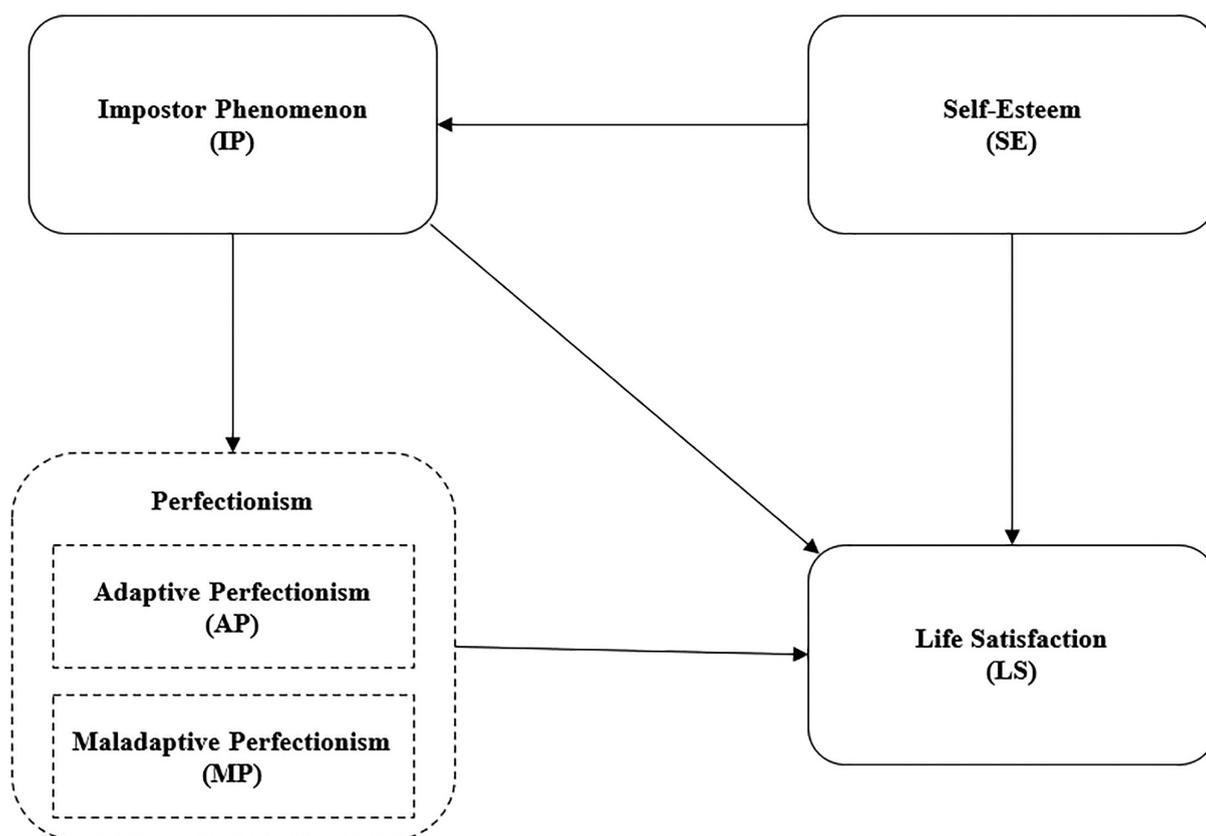
H7: Maladaptive perfectionism has a negative effect on students’ life satisfaction

H8: Adaptive perfectionism has a positive effect on students’ life satisfaction

2.6. Research Model

Based on the foregoing arguments, the authors propose the following research model.

Figure 1. Proposed research model



Source: Authors' analysis

3. Research methodology

3.1. Measurement

The questionnaire was developed using a five-point Likert scale (ranging from 1 to 5), where (1) indicates “Strongly disagree,” (2) “Disagree,” (3) “Neutral,” (4) “Agree,” and (5) “Strongly agree.”

The Life Satisfaction scale was adapted from the study by Margolis et al. (2019). This scale was designed to measure the latent construct through two groups of items: nine direct items and fourteen reverse-scored indirect items. The content of the items reflects individuals' levels of envy toward others' lives, regret over past decisions, as well as their desire to change their current life circumstances, thereby providing a comprehensive assessment of overall life satisfaction.

The Self-Esteem scale was adapted from Rosenberg (1965), who conceptualized self-esteem as encompassing two dimensions: (1) individuals who perceive themselves as “very good,” reflecting high

self-esteem, and (2) those who evaluate themselves as merely “good enough”. This scale consists of ten items, including five positively worded and five negatively worded items, capturing individuals' positive or negative attitudes toward themselves.

The Impostor phenomenon was measured using the scale developed by Freeman et al. (2022), which comprises twenty indicators describing individuals' internal psychological characteristics. This scale provides a robust foundation for identifying individuals with impostor tendencies and for developing effective support and intervention strategies.

Finally, Perfectionism was assessed using the scale proposed by Rice et al. (2013), which includes eight indicators divided into two dimensions: adaptive perfectionism and maladaptive perfectionism. This scale aims to evaluate perfectionistic tendencies as personality traits, reflecting relatively stable and enduring individual characteristics.

Table 1. Measurement scales

Variables	Items	Sources
Life satisfaction	<ol style="list-style-type: none"> 1. I am satisfied with the way my life has turned out. 2. When I look back on my life, I feel satisfied. 3. Overall, I am satisfied with my life. 4. My life is going very well at present. 5. like the way my life is going. 6. I feel content with my life. 7. I am satisfied with my current position in life. 8. I would be satisfied if my life continued on its present path. 9. When I think about what I want from life, I feel that nothing is lacking. 10. If I could change my past, I would change many things. 11. I wish I had made different decisions in my life. 12. I wish that certain aspects of others' lives were also part of my own life. 13. I feel envious of other people's lives. 14. I want to change my life. 15. I am not truly satisfied with my life until I achieve certain important goals. 16. Sometimes I wish my life were very different. 17. There are aspects of my life that I strongly wish to improve. 18. I wish I could exchange my life for someone else's life. 19. People around me seem to be living better lives than I am. 20. I want to change the direction my life is currently taking. 21. I am considering starting a new life. 22. There are things I would do differently if I had the chance to choose again. 23. When thinking about important decisions, I wish I had not made so many mistakes. 	Margolis et al. (2019)
Self-Esteem	<ol style="list-style-type: none"> 1. I feel that I am a person of worth, at least on an equal basis with others. 2. I feel that I have a number of good qualities. 3. All in all, I am inclined to feel that I am a failure. 4. I am able to do things as well as most other people. 5. I feel that I do not have much to be proud of. 6. I take a positive attitude toward myself. 7. On the whole, I am satisfied with myself. 8. I wish I could have more respect for myself. 9. At times, I feel that I am useless. 10. Sometimes I think that I am no good at all. 	Rosenberg (1965)

Variables	Items	Sources
<p>Impostor phenomenon</p>	<ol style="list-style-type: none"> 1. I often perform better on tests or tasks than I expect, even though beforehand I worry that I will not do well. 2. I am sometimes able to make others believe that I am more competent than I actually am. 3. I tend to avoid evaluation and dislike it when others assess or judge me. 4. When I am praised for an achievement, I worry that I will not be able to maintain others' expectations in the future. 5. I often believe that my current achievements or position are mainly due to luck or being in the right place at the right time. 6. I fear that people who are important to me will discover that I am not as capable as they think. 7. I frequently think about things I have not done well or could have done better. 8. I rarely feel satisfied with completing a task exactly as I intended. 9. At times, I feel that success in my life or work is merely a matter of luck or coincidence. 10. I find it difficult to believe compliments or positive feedback about my intelligence or achievements. 11. Sometimes I feel that my success is largely attributable to good fortune. 12. I am often disappointed with what I have achieved and think that I should have performed better. 13. At times, I worry that others will realize that I truly lack knowledge or ability. 14. I often fear failure when taking on a new task or responsibility, even though I usually perform well. 15. Even after achieving success and receiving recognition, I still doubt whether I can replicate that success. 16. When I receive a great deal of praise or recognition for an achievement, I tend to downplay the value of what I have accomplished. 17. I frequently compare myself with others and believe that they are more intelligent than I am. 18. I often worry that I will not succeed in a major task or will not pass an important exam, even when others are confident in my abilities. 19. When about to receive a scholarship, award, or special opportunity, I often hesitate to speak up because I am unsure whether I truly deserve it. 20. I feel disappointed or discouraged when I am not the best or do not stand out in achievement-related activities. 	<p>Freeman et al. (2022)</p>
<p>Perfectionism</p>	<p>Adaptive perfectionism</p> <ol style="list-style-type: none"> 1. I always set high expectations for myself. 2. I often impose very strict standards on myself. 3. I always expect myself to perform at my best. 4. I feel that I must put in maximum effort to achieve excellent results. <p>Maladaptive perfectionism</p> <ol style="list-style-type: none"> 1. Even when I try my hardest, I still feel that it is never enough. 2. My academic/work performance rarely meets the standards I set for myself. 3. I rarely feel satisfied with the results of my work. 4. After completing a task, I often feel disappointed because I believe I could have done better. 	<p>Rice et al. (2013)</p>

3.2. Data collection and processing

According to Hair et al. (2006), the minimum sample size for structural equation modeling should be at least five times the number of observed variables. With 22 observed variables in the proposed model, the minimum required sample size was 110. This study collected 413 responses, of which 406 valid questionnaires were retained after data screening, indicating that the sample size was adequate for model estimation and hypothesis testing.

The target population consisted of undergraduate students enrolled in Vietnamese universities across different fields of study and academic years. Data were collected using a non-probability convenience sampling approach via an online questionnaire administered through Google Forms. The survey was distributed through social media platforms, including Facebook, Messenger, and Zalo. The final dataset was analyzed using SPSS version 20.

4. Results and discussion

4.1. Results analysis

4.1.1. Descriptive statistics

The descriptive statistics indicate that, among the 406 students who participated in the survey, female students constituted a larger proportion (66.9%) compared to male students (33.1%). In terms of academic year, the majority of respondents were third-year students (48.76%), followed by second-year students (20.94%) and those in their fourth year or above (23.9%), while first-year students accounted for the smallest proportion (6.4%). In addition, most respondents reported that their parents were still living together (92.12%), with only a very small percentage indicating divorced, widowed, or separated family statuses. These demographic characteristics provide an overall profile of the research sample and establish a necessary foundation for subsequent analyses examining factors influencing students' life satisfaction.

4.1.2. Scale validation

4.1.2.1. Reliability analysis

The research team assessed the reliability of the measurement scales using Cronbach's alpha for each construct in the research model in order to evaluate the internal consistency among observed variables and their ability to adequately represent the underlying latent constructs. According to Nunnally and Bernstein (1994), observed variables are considered acceptable when the Corrected Item-Total Correlation is greater than or equal to 0.3. In addition, Nunnally (1978) suggested that a scale is regarded as good when Cronbach's alpha exceeds 0.8, usable when it ranges from 0.7 to 0.8, and acceptable when it is above 0.6, particularly in cases where the research construct is relatively new or applied in a novel research context.

The results indicate that the Life Satisfaction, Self-Esteem, and Perfectionism scales yielded Cronbach's alpha coefficients of 0.840, 0.891, and 0.926, respectively.

Based on Nunnally's (1978) criteria, no observed variables were eliminated. The observed variables exhibited high corrected item-total correlations, indicating that the Life Satisfaction, Self-Esteem, and Perfectionism scales demonstrated high reliability and were suitable for subsequent analyses.

Following the first reliability assessment of the Impostor Phenomenon construct, the results showed a Cronbach's alpha coefficient of 0.721, with two observed variables (IP9 and IP10) exhibiting corrected item-total correlations below 0.3. Specifically, the corrected item-total correlation values for IP9 and IP10 were 0.089 and 0.126, respectively. As these values did not meet the required threshold, IP9 and IP10 were removed from the scale. A second reliability assessment was then conducted, yielding a Cronbach's alpha coefficient of 0.770, with all remaining observed variables demonstrating satisfactory corrected item-total correlations. Therefore, the results of the second reliability test were deemed acceptable for use in subsequent analyses.

4.1.2.2. Exploratory factor analysis

Following the reliability assessment using Cronbach's alpha, the research team conducted Exploratory Factor Analysis (EFA) to examine the convergent and discriminant validity of the measurement scales across four constructs: Life Satisfaction, Self-Esteem, Perfectionism, and the Impostor Phenomenon.

The results of the rotated factor matrix indicated that most observed variables exhibited factor loadings greater than 0.3. However, item LS12 loaded on two factors, with a loading difference of 0.153 (0.515 - 0.362), which is below the recommended threshold of 0.2. In addition, items LS16, IP3, and IP6 showed factor loadings below 0.5. Therefore, based on the criteria proposed by Hair et al. (2009), the research team removed items LS12, LS16, IP3, and IP6 from further analysis.

A second EFA was subsequently performed, and the results demonstrated satisfactory model adequacy. Specifically, the Kaiser-Meyer-Olkin (KMO) measure was 0.879, which falls within the acceptable range of [0.5, 1], indicating sampling adequacy. Bartlett's Test of Sphericity was statistically significant (Sig. = 0.000), confirming the suitability of the data for factor analysis. All extracted factors had eigenvalues greater than 1, and the Total Variance Explained reached 55.980%, exceeding the recommended threshold of 50%. These results indicate that the EFA model was appropriate for the study.

Furthermore, the rotated factor matrix revealed that the initial set of observed variables was grouped into six factors. Based on the EFA results, item content, and prior research by Rice et al. (2013), the Perfectionism scale was divided into two distinct dimensions. Specifically, items PF1, PF2, PF3, and PF4 loaded onto Factor 1 - Adaptive Perfectionism (AF), while items MF1, MF2, MF3, and

MF4 loaded onto Factor 2 - Maladaptive Perfectionism (MF)..

4.1.3. Structural Equation Modeling (SEM) Analysis

Structural Equation Modeling (SEM) using AMOS version 20.0 was employed to test the proposed research model. The structural model was designed to examine the effects of four factors: (1) Life satisfaction, (2) Self-Esteem, (3) the Impostor phenomenon, and (4) Perfectionism. Notably, Perfectionism comprises two

subdimensions: Adaptive perfectionism (AF) and Maladaptive perfectionism (MF).

The results below present the effects of the independent variables on the dependent variable, Life Satisfaction. The estimation of the relationships among the research constructs indicates that six out of seven hypotheses were supported at the 5% significance level (p-value < 0.05). The detailed results of hypothesis testing are reported in Table 2.

Table 2. SEM structural model results

Hypothesis	Expected Sign	Standardized Estimate	P - value	Hypothesis Testing
H1	Negative	-0.196	0.004	Supported
H2	Positive	0.237	***	Supported
H3	Negative	-0.322	***	Supported
H5	Positive	0.356	0.080	Not supported
H6	Positive	0.109	***	Supported
H7	Negative	-0.139	0.003	Supported
H8	Positive	0.245	0.005	Supported

Source: Authors' calculations.

An examination of the standardized path coefficients reveals three positive and three negative associations among self-esteem, the impostor phenomenon, perfectionism, and life satisfaction. Overall, six of the seven hypothesized relationships were supported, as their standardized estimates were consistent with the proposed directions and reached statistical significance, whereas one hypothesis was rejected due to insufficient statistical evidence.

Specifically, self-esteem showed a statistically significant negative effect on life satisfaction ($\beta = -0.196$, $p = 0.004$). Although this finding appears counterintuitive, it may reflect the competitive academic context in which students' self-esteem is closely tied to performance and external evaluation. In such settings, higher self-esteem may be accompanied by heightened pressure to maintain competence, thereby reducing overall life satisfaction. In addition, self-esteem was positively associated with the impostor phenomenon ($\beta = 0.237$, $p < 0.001$), indicating that students with stronger self-evaluative concerns may be more prone to doubting their own abilities despite objective success.

Consistent with this interpretation, the impostor phenomenon exerted a strong negative effect on life satisfaction ($\beta = -0.322$, $p < 0.001$). Persistent feelings of being intellectually inadequate or undeserving of achievement may prevent students from fully experiencing satisfaction with their academic and personal lives. This finding highlights the impostor phenomenon as a critical psychological risk factor for student well-being.

Regarding perfectionism, the effect of the impostor phenomenon on adaptive perfectionism was not

statistically significant ($\beta = 0.356$, $p = 0.080$), suggesting that impostor feelings do not necessarily promote constructive goal striving. By contrast, the impostor phenomenon significantly increased maladaptive perfectionism ($\beta = 0.109$, $p < 0.001$), reflecting a tendency toward excessive self-criticism and fear of failure. Maladaptive perfectionism, in turn, negatively affected life satisfaction ($\beta = -0.139$, $p = 0.003$), whereas adaptive perfectionism was positively associated with life satisfaction ($\beta = 0.245$, $p = 0.005$). This distinction underscores that high personal standards enhance well-being only when they are accompanied by flexibility and self-acceptance.

To assess the indirect effect of self-esteem on life satisfaction via the impostor phenomenon, a bootstrap mediation analysis was conducted following the procedure recommended by Hayes (2022), with 5,000 resamples and a 95% bias-corrected confidence interval. The results indicated that the indirect effect was statistically significant (BootLLCI = 0.0006; BootULCI = 0.0754), as the confidence interval did not include zero. The estimated indirect effect was 0.372, providing robust evidence that the impostor phenomenon functions as a mediating mechanism in the relationship between self-esteem and life satisfaction.

4.2. Discussion

The findings of this study reveal three positive and three negative relationships among self-esteem, the impostor phenomenon, perfectionism, and life satisfaction. Overall, six hypotheses were supported, as their standardized estimates were consistent with the proposed directions and reached statistical significance,

whereas one hypothesis (H5) was rejected due to a p-value exceeding the 0.05 threshold.

With regard to H1, the negative effect of self-esteem on life satisfaction diverges from the dominant view in the literature that self-esteem is a universal predictor of greater well-being (Rosenberg, 1965; Diener, 1984). However, this finding is consistent with more recent theoretical perspectives emphasizing contingent or defensive self-esteem (Orth & Robins, 2014). From the lens of Self-Discrepancy Theory, presented in the theoretical background, high but unstable self-esteem may reflect a large gap between the actual self and ideal or ought selves, thereby generating psychological strain rather than satisfaction. This result suggests that in highly competitive academic environments, self-esteem may operate differently from what has been observed in less performance-oriented contexts.

Consistent with H2, the positive association between self-esteem and the impostor phenomenon aligns with the findings of Neureiter and Traut-Mattausch (2016), who argued that individuals with unstable self-esteem in high-achievement settings are more susceptible to impostor feelings. This result also reinforces the discussion in the literature review that excessive self-evaluative focus can intensify perceived discrepancies between self-representations, thereby fostering impostor experiences. In line with previous studies (Clance & Imes, 1978; Vergauwe et al., 2015), the impostor phenomenon was found to negatively affect life satisfaction (H3), confirming its role as a critical psychological risk factor that undermines subjective well-being through anxiety, fear of failure, and chronic self-doubt.

Regarding perfectionism, the rejection of H5 indicates that impostor feelings do not significantly promote adaptive perfectionism. This finding contrasts with some studies suggesting a positive link between impostor tendencies and high personal standards, but supports the distinction emphasized in the literature between constructive striving and defensive perfectionism (Lo & Abbott, 2013). In contrast, the support for H6 is consistent with Thompson and Bigatti (2020), indicating that impostor feelings are more closely associated with maladaptive perfectionism rooted in fear of failure and self-criticism. This pattern aligns with the theoretical argument that impostor phenomenon emerges primarily from discrepancy-driven self-regulation rather than growth-oriented motivation.

Furthermore, the opposing effects of maladaptive and adaptive perfectionism on life satisfaction (H7 and H8) are consistent with prior empirical evidence (Stoeber & Otto, 2006; Slade & Owens, 1998) and reinforce the multidimensional conceptualization of perfectionism discussed in the literature review. While maladaptive perfectionism amplifies stress and dissatisfaction, adaptive perfectionism appears to enhance life satisfaction by reducing self-discrepancy and fostering a sense of

competence and achievement.

Finally, the mediation analysis extends previous research by empirically confirming the impostor phenomenon as a key mechanism linking self-esteem and life satisfaction. While earlier studies have examined these constructs separately, the present findings integrate them within a unified framework grounded in Self-Discrepancy Theory. This contribution is particularly meaningful in the Vietnamese context, where empirical evidence on these psychological pathways remains limited. The results thus strengthen the theoretical coherence of the proposed model and provide new insights into how self-evaluative processes shape students' life satisfaction.

5. Conclusion and policy implications

Based on the analytical results and discussion, this study identifies several key contributions in both academic and practical terms. Academically, the study extends the theoretical foundation and adds empirical evidence regarding life satisfaction among Vietnamese university students. Notably, a novel contribution lies in the development and empirical testing of the relationships among self-esteem, impostor phenomenon, and perfectionism within a single research model, thereby clarifying the mediating role of the impostor phenomenon. This integrative approach addresses a gap in prior studies, which have largely examined these psychological factors in isolation. Practically, the findings provide a scientific basis for the refinement of policies and governance practices in higher education with a stronger emphasis on students' mental well-being. Furthermore, the results support higher education institutions, lecturers, and educational administrators in designing psychological support programs, innovating teaching methods, and fostering personal development, thereby contributing to improved educational quality and sustainable human resource development.

For the State and educational authorities: The national policy framework for student mental health care within the higher education system needs to be further strengthened and refined. Specifically, indicators of students' mental well-being, self-esteem, and life satisfaction should be incorporated into higher education quality assessment systems alongside traditional academic criteria. At the same time, the Ministry of Education and Training may provide strategic direction for the implementation of programs aimed at developing personal skills, managing academic expectations, and enhancing students' psychological adaptation, thereby facilitating sustainable human resource development.

For lecturers: The research findings indicate that teaching approaches and lecturer-student interactions exert a significant influence on students' self-esteem. Accordingly, lecturers should prioritize supportive and encouraging feedback that emphasizes individual progress rather than comparative achievement. In addition,

lecturers may integrate activities such as prompting students to self-assess their level of understanding, facilitating discussions on learning difficulties, and guiding students to set learning goals aligned with their abilities, thereby contributing to enhanced student satisfaction and mental well-being.

For educational institutions: Higher education institutions should prioritize the systematic provision of counseling and psychological support services to facilitate early identification of impostor phenomenon symptoms and maladaptive perfectionism among students. Moreover, assessment policies should be reoriented toward a more holistic approach that extends beyond grade-based evaluation to recognize individual effort and

growth-oriented attitudes. Such reforms may help reduce perfectionistic pressure and enhance students' satisfaction with both academic life and overall life experience.

Despite its contributions, the study has several limitations. First, the use of a cross-sectional online survey may limit the generalizability of the findings. Second, the sample was drawn from only a limited number of universities, which may not fully capture the diversity of students nationwide. Future research is therefore encouraged to expand the scope and sample size to provide a more comprehensive understanding of the relationships among self-esteem, the impostor phenomenon, perfectionism, and life satisfaction among Vietnamese university students.

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UNLOCKING ENVIRONMENTAL PERFORMANCE: THE CONDITIONAL IMPACT OF GREEN TRANSFORMATIONAL LEADERSHIP ON GREEN HUMAN RESOURCE MANAGEMENT OUTCOMES

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Abstract: This study examines the relationship between Green human resource management (GHRM) and Environmental performance (EP), focusing on the individual effects of three components: Green ability (GA), Green motivation (GM), and Green opportunity (GO). It also investigates the moderating role of Green transformational leadership (GTL) in the relationship between GHRM and EP. Using survey data from 339 managers and employees in Vietnamese enterprises and analyzing it with SmartPLS, the findings indicate that GA and GO positively influence EP, whereas GM shows no significant effect. Moreover, the absence of a significant moderating effect of GTL contributes to resolving prior empirical inconsistencies regarding green transformational leadership and underscores its context-dependent effectiveness in emerging economies. The study incorporates three theoretical foundations: the Natural Resource Based View to explain sustainable competitive advantage at the organizational level; the Ability, Motivation, and Opportunity (AMO) framework to describe mechanisms at the individual level; and Social Cognitive theory (SCT) to capture psychological and behavioral dynamics. This multi-level integration provides a comprehensive understanding of the internal mechanisms through

which GHRM enhances EP and clarifies the conditions under which GTL may effectively support organizational greening. Based on the empirical evidence, the study recommends that leaders and managers strengthen the implementation of GHRM practices while reinforcing leadership that inspires employees and cultivates a culture of sustainability. Such a coordinated approach can enhance competitive capabilities and ensure long-term growth amid rising environmental and societal pressures.

Keywords: Green human resource management, environmental performance, green transformational leadership, natural-resource-based view, ability-motivation-opportunity theory, social cognitive theory

Code: JHS -303

Received: 20th Oct 2025

Revised: 8th Nov 2025

Accepted: 20th Nov 2025

1. Introduction

Environmental issues have become a significant challenge for organizations seeking to protect their reputation and maintain long-term performance (Afsar et al., 2018). However, achieving strong environmental outcomes requires more than compliance with regulatory standards; it also relies on employees' willingness to respond proactively to environmental concerns by engaging in pro-environmental behaviors (Unsworth & McNeill, 2017). Given the close interdependence between human behavior and environmental outcomes, firms are increasingly expected to encourage employee involvement in environmental initiatives as part of their broader sustainability responsibilities (Baykal & Divrik, 2023).

In response to these expectations, Green human resource management (GHRM) has emerged as a key organizational approach that embeds environmental sustainability within HR policies and practices (Jackson et al., 2014). According to the HR dimension of environmental management (Renwick et al., 2013), GHRM emphasizes pollution prevention through operational processes and has become a strategic tool for firms seeking to internalize sustainability and enhance environmental performance (Aftab et al., 2023). However, the effectiveness of GHRM in promoting widespread environmental performance may be influenced by the extent to which it is complemented by leadership practices. Green Transformational Leadership (GTL) serves as a catalyst for change by motivating, inspiring, and guiding employees toward environmental goals (Chen & Chang, 2013; Singh et al., 2020). While GHRM provides structured, policy-oriented mechanisms to shape green behaviors, GTL complements these efforts by offering psychological support and cultivating subjective environmental norms that help employees internalize sustainability values (Robertson & Barling, 2013). Together, GHRM and GTL represent as effectively influential managerial approaches for advancing environmental responsibility

within organizations (Leroy et al., 2018).

This is further strengthened by global policy developments. According to the Organisation for Economic Cooperation and Development - OECD (2020), the 2030 Agenda has established a universal sustainability framework for both developed and developing nations, outlining shared priorities for sustainable development. In alignment with this agenda, countries around the world are actively pursuing the Sustainable Development Goals (SDGs) (UN, 2015), including SDG 8 on sustainable economic growth and decent work (Liu et al., 2024), and SDG 12 on responsible consumption and production (Walsh et al., 2020). Both goals underscore the necessity for organizations to adopt green practices and develop environmentally responsible workforces (Chang et al., 2025).

In developing countries, these issues are even more pronounced, as weaker institutional frameworks, resource constraints, and sociocultural barriers make the adoption of comprehensive green practices significantly more challenging (Kodua et al., 2022). These barriers highlight the importance of human resource-based interventions, such as GHRM and GTL, which can cultivate internal capabilities even when external conditions are less supportive. Vietnam provides a particularly relevant context for this investigation. As one of ASEAN's fastest-growing industrial economies, Vietnam's rapid economic expansion has led to significant increases in energy consumption and carbon emissions (Hung, 2023). Thu et al. (2022) report that a 1% increase in GDP corresponds to a 1.26% rise in CO₂ emissions, surpassing the global average. These trends highlight the pressing need for Vietnamese firms to balance economic growth with environmental stewardship, particularly in light of the National Climate Change Strategy to 2050 (Decision No. 896/QĐ-TTg) and Vietnam's commitment at COP26, where the Prime Minister pledged to achieve net-zero greenhouse gas emissions by 2050.

Nevertheless, despite the rising scholarly focus on GHRM and environmental outcomes, empirical insights into GTL's moderating role remain limited and inconsistent. As highlighted by Dong et al. (2024), although research on green leadership has expanded, its specific influence on organizational sustainability is still far from fully understood in Vietnamese context. This gap becomes even more critical as contemporary enterprises are expected to integrate economic priorities with social responsibilities and environmental stewardship (Yang et al., 2024). Furthermore, while Niazi et al. (2023) report supportive evidence for the moderating role of GTL in the banking industry, Younis & Hussain (2023) show that GTL does not significantly moderate the pathway through which GHRM enhances EP via a stronger green psychological climate. It highlights notable inconsistency in prior findings, requiring further empirical examination of when and how GTL strengthens or fails to stimulate the translation of GHRM into EP, particularly within emerging economies such as Vietnam, where contextual factors may shape or constrain leadership effects. Moreover, existing research tends to focus on single industries such as manufacturing (Aftab et al., 2023; Singh et al., 2020) or services (Vu et al., 2025), leaving a gap in understanding how GHRM and GTL operate across diverse and mixed industry settings.

Against this backdrop, the present study investigates the impact of GHRM practices on EP and examines the moderating role of GTL, thereby clarifying how and under what conditions GTL enhances the translation of GHRM into improved environmental outcomes within Vietnamese businesses. By providing empirical evidence from an emerging economy, the study makes several important contributions to the literature. Specifically, it develops an integrated framework grounded in the Natural Resource-Based View (NRBV), the Ability-Motivation-Opportunity (AMO) model, and Social Cognitive Theory (SCT), offering a theoretically robust explanation of how green capabilities are cultivated and enacted within organizations. Collectively, these contributions strengthen theoretical understanding and offer practical insights, providing a solid foundation for examining how Vietnamese enterprises can strategically leverage internal resources, particularly human and leadership capabilities, to advance environmental sustainability and reinforce competitive advantage.

2. Literature Review

2.1. Theoretical framework

2.1.1. Natural-Resource-Based View

Resource-Based View (RBV) argues that firms attain sustained competitive advantage through resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991), and has been extensively applied in HRM

studies and strategic management (Barney, 1991; Chen & Yan, 2022; Singh et al., 2020). However, a key limitation of the RBV is its neglect of the natural and biophysical environment, rendering it insufficient for addressing sustainability-oriented challenges (Hart, 1995; AlNuaimi et al., 2021). To overcome this shortcoming, Hart (1995) first introduced Natural Resource-Based View (NRBV), expanding the traditional RBV by incorporating environmental considerations into strategic management. NRBV positions a firm's competitive advantage as contingent not only on its internal capabilities but also on how it engages with the natural environment (Suleman et al., 2024). As an evolution of RBV, this perspective embeds environmental considerations directly into strategic thinking, arguing that future sources of competitive advantage will stem from capabilities that foster environmentally responsible and sustainable practices (Aslam et al., 2024).

Under the NRBV, firms can cultivate enduring competitive advantage through three mutually reinforcing strategic pathways: pollution prevention, product stewardship, and sustainable development (Hart, 1995). These pathways highlight that advantage can be created by reducing waste and inefficiencies (pollution prevention), addressing environmental impacts throughout the product life cycle (product stewardship), and pursuing long-term growth through green technologies and sustainable markets (sustainable development).

Grounded in this theoretical perspective, the current study adopts the NRBV as its principal framework. The theory clarifies how essential intangible resources - particularly leadership and human capital - contribute to the development of internal green capabilities for these strategies, such as GHRM and GTL, which subsequently drive improvements in environmental performance (Hart, 1995; AlNuaimi et al., 2021; Aslam et al., 2024; Niazi et al., 2023; Suleman et al., 2024).

In addition, firms in developing and emerging economies such as Vietnam frequently encounter institutional constraints and possess weaker environmental capabilities than those in more developed countries, making employing the NRBV especially pertinent (Zafarullah & Mehnaz, 2025; Chan, 2005). These contextual challenges underscore the critical importance of building robust internal green capabilities to achieve both sustainability and competitive performance. As Hart (1995) emphasizes, developing such capabilities and fostering a shared vision dedicated to sustainable development are particularly crucial for firms in emerging markets, as they provide the strategic guidance and long-term commitment necessary to promote environmentally sound growth and achieve

sustainable competitive advantage even in resource-constrained contexts.

2.1.2. Ability-Motivation-Opportunity theory

While the NRBV explains why GHRM and GTL, as internal green capabilities, constitute valuable and hard-to-imitate strategic resources that support EP and sustainable competitive advantage (Hart, 1995; AlNuaimi et al., 2021; Niazi et al., 2023), the Ability-Motivation-Opportunity (AMO) theory offers a complementary micro-level perspective by detailing the mechanisms through which these capabilities lead to improved environmental outcomes (Appelbaum, 2000; Renwick et al., 2013). According to AMO theory, employees' performance outcomes arise from the interplay of their abilities, motivation, and the opportunities provided for them to contribute (Appelbaum, 2000; Renwick et al., 2013). Within the environmental domain, these components clarify the mechanisms through which GHRM practices improve EP. Specifically, green abilities are developed through recruitment and training initiatives that equip employees with ecological knowledge and competencies; green motivation is fostered through evaluation and reward systems that reinforce pro-environmental behaviors; and green opportunities emerge when employees are empowered to engage in environmental initiatives (Anwar et al., 2020; Marin-Garcia & Tomas, 2016; Pham et al., 2019). This theoretical perspective connects individual employee behaviors with organizational environmental outcomes (Jiang et al., 2013), which in turn provides a coherent mechanism for achieving superior EP (Song et al., 2021).

A growing stream of empirical studies has employed the AMO framework to explain how GHRM drives organizational outcomes across various sectors. Prior research has examined GHRM in contexts such as healthcare (Pinzone et al., 2016), hospitality (Pham et al., 2019), the automobile industry (Yu et al., 2020), SMEs (Singh et al., 2020), universities (Anwar et al., 2020), and manufacturing in a developing country (Aftab et al., 2023), with findings highlighting roles of green innovation, pro-environmental behavior, and environmental strategy. Together, this evidence underscores that embedding GHRM within the AMO model offers a coherent and empirically supported explanation for how GHRM activates employees to improve EP.

Furthermore, recent research has broadened the AMO perspective by integrating leadership as a contextual force capable of either amplifying or weakening the HRM-performance linkage. Hameed et al. (2021) identified GTL as a significant moderating factor that intensifies the effect of GHRM on green creativity, while Awan et al. (2023) showed that GTL facilitates the transformation of employees' green abilities into

GI, thereby enhancing EP. Extending beyond the AMO lens, Niazi et al. (2023) found that GTL strengthens the GHRM-EP relationship by cultivating a green vision and a supportive, inspirational learning climate. This conclusion is consistent with Younis & Hussain (2023), who highlighted GTL's crucial role in developing a psychological green climate that reinforces employees' environmental identification and motivates sustainable outcomes. Therefore, combining AMO with the NRBV reinforces the study's theoretical foundation: the NRBV highlights the strategic importance of human and leadership resources, whereas the AMO framework clarifies the behavioral mechanisms through which these resources enhance environmental performance (Singh et al., 2020; Renwick et al., 2013).

2.1.3. Social cognitive theory

Social Cognitive Theory (SCT) further enriches this multi-level framework by explaining the social and psychological mechanisms through which leadership influences environmental management systems (Bandura, 1991, 1999; Aslam et al., 2024; Chen & Yan, 2022). Central to SCT is the principle of triadic reciprocal causation, which rejects one-way determinism and instead suggests that personal factors, behavioral patterns, and environmental conditions operate as mutually interacting determinants (Bandura, 1999). Within this theoretical view, individuals are seen as active agents whose learning and performance emerge through processes such as observational learning, social modeling (Bandura, 1999), and the development of self-efficacy and self-regulatory capabilities (Bandura, 1991), rather than being shaped solely by external circumstances.

Building on this logic, a growing body of sustainability research has drawn on SCT to explain how social and contextual signals influence employees' pro-environmental behavior (Aslam et al., 2024). In line with this understanding, GTL operates as a key mechanism, fostering learning, empowerment, and environmentally oriented innovation among employees (Awan et al., 2023). By serving as a social-cognitive model that stimulates employees' self-efficacy and motivations to engage in ecological actions (Chen & Yan, 2022), GTL exemplifies how leaders shape environmental behavior. Leaders who communicate a compelling environmental vision and consistently demonstrate green behaviors create conditions that facilitate observational learning and collective identification, ultimately encouraging continuous improvements in EP (Chen & Chang, 2013; Niazi et al., 2023).

Consistent with SCT's assertion that purposeful behaviors derive from the interaction between external social cues and individuals' internal beliefs through self-regulatory mechanisms, prior studies increasingly emphasize the pivotal role of perceived efficacy in shaping adaptive and innovative behaviors (Bandura, 1991,

1999). In this light, the present study positions GTL as an essential moderating element within the GHRM-EP pathway. SCT hence offers a micro-level lens suggesting that employees' green behaviors are shaped not only by the formal structures of HRM practices but also by leaders' capacity to cultivate self-efficacy, self-regulation, and shared environmental values.

2.1.4. Theoretical integration and multi-level framework

Drawing upon the aforementioned theories, this section provides a synthesis that avoids a fragmented use of theories and addresses limited and inconsistent empirical evidence on the moderating role of GTL (Niazi et al., 2023; Younis & Hussain, 2023) - particularly within emerging economies such as Vietnam and across diverse industry contexts. We synthesize the NRBV, AMO, and SCT into an integrated multi-level framework that elucidates how firms' internal green capabilities are converted into EP. Specifically, NRBV provides strategic foundation that explains why firms must develop internal green capabilities to achieve sustainable competitive advantage, while AMO clarifies how GHRM translates this strategic intent into employees' green abilities, motivation, and opportunities. SCT, then, offers the psychological lens to explain how GTL operates as a higher-order contextual force that shapes employees' self-efficacy, self-regulatory processes, and observational learning (Aslam et al., 2024; Chen & Yan, 2022; Bandura, 1991, 1999). These psychological mechanisms, in turn, reinforce employees' green abilities, motivation, and opportunities, enabling environmental strategies to yield tangible performance improvements. Together, these perspectives form a coherent theoretical flow that elucidates how firms' internal green capabilities are converted into EP through the contextual role of GTL. Building on this theoretical integration, our study advances the sustainable HRM literature in several important ways. First, anchoring the analysis in the NRBV, AMO, and SCT, we propose a comprehensive multi-level model that captures how individual-level psychological processes aggregate into organizational-level environmental outcomes. While AMO and SCT primarily explain behaviors at the micro level, we extend their application by drawing on Multilevel Theory (Ployhart & Moliterno, 2011) to bridge the micro-macro interface. According to this lens, emergent organizational phenomena materialize when individual cognitions, emotions, and behaviors reinforce one another through interaction, ultimately forming higher-level collective capabilities. Following this logic, we argue that effective GHRM and GTL create a shared organizational climate in which employees' green abilities and motivation consolidate into firm-level environmental capabilities that shape EP.

Additionally, integrating the NRBV, AMO, and SCT provides a strong theoretical foundation for explaining

the conditional mechanisms through which GHRM enhances EP, particularly the way GTL strengthens this relationship. This tripartite framework offers a nuanced account of how green capabilities emerge and interact within organizations, thereby generating clearer conceptual insights and actionable guidance for sustainable management, especially in emerging economies such as Vietnam, where institutional pressures and resource limitations make the development of organizational green capabilities increasingly critical.

2.2. Green human resource management

Green human resource management refers to HR practices designed to influence firms' environmental outcomes by aligning people-related activities with organizational environmental strategies and encouraging employees' green behaviors (Renwick et al., 2013; Singh et al., 2020). As a subdomain within Sustainable HRM, which balances financial, social, and ecological goals (Elkington, 2004), GHRM shifts the traditional HRM focus from performance enhancement toward mobilizing employees to advance environmental outcomes (Paulet et al., 2021). Ren et al. (2018) further clarify the construct by defining GHRM as an organizational phenomenon that examines how HRM systems are designed, implemented, and developed in relation to activities affecting the natural environment. In line with Jackson et al.'s (2014) broader view of HRM systems, this perspective positions GHRM as an organizational commitment to developing HR practices that proactively and positively address ecological challenges.

In addition, from a strategic standpoint, GHRM also reflects the core logic of the NRBV (Hart, 1995). By cultivating employees' green knowledge, skills, and values, GHRM enables firms to convert environmental pressures into strategic opportunities, in turn supporting ecological sustainability while strengthening long-term competitiveness (Rehman et al., 2021). In this sense, GHRM functions as a pivotal mechanism through which organizations develop human capital that aligns with and advances environmentally responsible corporate strategies.

The existing literature categorizes GHRM practices in multiple ways, reflecting different perspectives on how HRM activities contribute to environmental management (Pham et al., 2019; Tang et al., 2018; Ren et al., 2018; Anwar et al., 2020; Awan et al., 2023; Ngo et al., 2022). Among these, Tang et al. (2018) offer one of the most systematic classifications by outlining five core practices - green recruitment and selection, green training, green performance management, green pay and reward, and green involvement - which serve as the operational framework for this study. Besides, building on Renwick et al. (2013) further consolidate these practices into three higher-order components under the lens of AMO theory (Appelbaum, 2000): green

abilities (via green recruitment and green training), green motivation (via green performance management and green rewards), and green opportunities (via green employee involvement). Such an integration reflects the core logic of the AMO framework, which provides a foundational explanation for how HR practices shape employee behaviors and, ultimately, organizational performance (Appelbaum, 2000; Renwick et al., 2013; Marin-Garcia & Tomas, 2016). Thus, by integrating the individual-level lens of AMO with the firm-level perspective of the NRBV (Jiang et al., 2013), GHRM emerges as a cohesive mechanism that cultivates employees' green abilities, motivation, and opportunities while simultaneously building environmentally oriented human capital as a strategic resource, thereby enhancing firms' environmental outcomes and long-term competitive advantage.

2.3. Hypothesis development

2.3.1. Green human resource management and Environmental performance

Environmental performance is defined as the extent to which an organization's activities fulfill or surpass societal expectations regarding environmental stewardship (Chan, 2005). Rather than merely complying with environmental regulations, it reflects a proactive orientation toward broader ecological goals (Chen et al., 2015). The concept also captures the environmental consequences of a firm's processes, products, and resource utilization, emphasizing actions that meet legal standards while advancing long-term sustainability (Singh et al., 2020). In practice, such stewardship is manifested through measurable environmental outcomes, including compliance with environmental standards, reductions in emissions and resource consumption, and minimized use of hazardous materials, which capture the actual environmental impacts of firms' green initiatives (Laosirihongthong et al., 2013).

To achieve these superior environmental outcomes, the NRBV indicates that firms must develop unique organizational capabilities derived from bundles of intangible resources (Hart, 1995). Building on Grant's (1991) distinction, resources serve as the antecedents of organizational capabilities, which in turn constitute the primary source of competitive advantage. In the context of environmental strategy, it is argued that the effective application of eco-friendly technologies requires more than just physical assets; it demands the full involvement, commitment, and coordination of human resources (Hart, 1995; Chan, 2005). Accordingly, GHRM can be viewed as a strategic HR system that mobilizes human resources to support NRBV-based environmental capabilities such as pollution prevention and sustainable development (Mustafa et al., 2023), consistent with earlier arguments emphasizing the importance of

human and organizational resources for environmental improvement (Russo & Fouts, 1997).

In particular, GHRM operationalizes these NRBV-based capabilities through the AMO framework, creating a behavioral mechanism that translates intangible human resources into tangible environmental performance (Mustafa et al., 2023; Anwar et al., 2020). First, regarding green abilities, by integrating environmental criteria into job descriptions and candidate evaluations, firms attract and select individuals whose personal values align with the organization's sustainability goals (Tang et al., 2018). This value alignment is critical because employees who share the organization's environmental values are more likely to commit to sustainability, actively participate in eco-initiatives, and continuously develop their environmental knowledge that ultimately improve the firm's EP (Renwick et al., 2013; Hameed et al., 2021; del Brio et al., 2007; Tang et al., 2018). Furthermore, a strong green employer branding allows firms to attract and compete for high-quality talent who prioritize sustainability (Gupta & Gupta, 2013). In the specific context of Vietnam, recent evidence confirms that green recruitment practices significantly enhance organizational prestige and attract a workforce ready to commit to environmental agendas (Ngo et al., 2022).

While green recruitment and selection secures the potential, green training transforms this potential into actionable competence. Training equips employees with specific technical knowledge and skills, such as waste management, energy conservation, and recycling protocols, necessary to operationalize environmental strategies to gain superior EP (Daily & Huang, 2001; Teixeira et al., 2012). Beyond technical skills, effective green training raises awareness, enabling employees to identify environmental problems (e.g., leakages, inefficiencies) and empowering them to take proactive corrective actions (Teixeira et al., 2012). Consistent with the NRBV, firms with a higher proportion of environmentally trained employees exhibit a stronger capacity to respond to environmental challenges and evolving regulatory demands (Hart, 1995).

Synthesizing these arguments, green abilities function as a critical driver of EP (Awan et al., 2023; Anwar et al., 2020), by ensuring that employees are not only willing (via recruitment and selection) but also capable (via training) of performing environmentally responsible behaviors. When employees possess the requisite abilities, they can effectively optimize resource usage and minimize negative ecological impacts, thereby directly enhancing the firm's EP. Based on this discussion, we propose the following hypothesis:

H1: Green abilities positively impact EP.

Green motivation refers to the evaluative and incentive-based HR mechanisms: performance appraisal, systematic feedback, and reward systems that

foster employee behaviors aligned with organizational environmental objectives (Harvey et al., 2013). Green performance management serves as a structured directional system that translates broad environmental strategies into actionable individual targets (Pham et al., 2019). By explicitly incorporating environmental criteria into performance appraisals, firms clarify employees' roles and expectations in environmental management (Anwar et al., 2020) and strengthen accountability and alignment with ecological priorities, thus stimulating overall EP (Guerci et al., 2016). The mechanism of green performance management also relies on the feedback loop; regular reviews allow employees to evaluate their effectiveness against green standards and identify areas for improvement (Darvishmotevali & Altinay, 2022). As Jackson et al. (2011) argue, this feedback process not only strengthens accountability but also enhances employees' green competencies, motivating them to create innovative solutions for overlooked environmental problems.

Complementing the directional role of green performance management, green pay and rewards serve as fundamental HRM mechanisms that reinforce desired behaviors, positioning them as highly effective in encouraging employees to engage in environmental initiatives (Saeed et al., 2019). It creates a tangible link between EP and personal benefit through both financial incentives and non-financial recognition (Jabbour et al., 2013). Tying compensation and recognition to environmental outcomes also strengthens employees' sense of responsibility and promotes organizational citizenship behaviors toward the environment (Daily & Huang, 2001). Although non-financial incentives, such as praise or eco-related benefits, can effectively motivate employees (Jabbour et al., 2008), research suggests that combining monetary and non-monetary rewards is generally most effective for sustaining long-term engagement (Jackson et al., 2011; Renwick et al., 2013). In addition, when employees fall short of green targets, organizations may employ disincentives as a form of negative reinforcement to strengthen employees' environmental responsibility (Tang et al., 2018).

When combined, green performance management and green rewards create a robust motivational environment where employees are not only aware of what they need to do but are also deeply committed to doing it. Empirical evidence indicates that this combination significantly strengthens employee commitment and willingness to participate in eco-initiatives, which directly translates into superior organizational environmental performance (Rawashdeh, 2018). In the specific context of Vietnam, Ngo et al. (2022) confirmed that reward systems linked to environmental outcomes. Thus, grounded in NRBV and AMO, we give the hypothesis that:

H2: Green motivation positively impacts EP.

Within the AMO framework, green opportunities are realized primarily through green employee involvement practices (Singh et al., 2020; Renwick et al., 2013). From the perspective of the NRBV, Hart (1995) emphasizes that successful pollution prevention strategies cannot rely solely on top-down mandates; rather, they require the decentralized, active participation of employees to detect and eliminate waste and process inefficiencies at the source. Therefore, offering employees opportunities to participate is a critical strategic capability, with green employee involvement functioning as the primary mechanism that facilitates their engagement in environmental management (Renwick et al., 2013; DuBois & Dubois, 2012; Awan et al., 2021, 2023).

DuBois & Dubois (2012) further highlight that green employee involvement creates a platform for employees to voice environmental concerns, share knowledge, and propose innovative solutions to complex ecological challenges, like reducing waste and pollution while promoting the efficient use of resources (Tang et al., 2018). This mechanism operates on two levels to enhance environmental performance:

First, at the individual level, empowering employees to participate in environmental decision-making enhances their self-control and problem-solving capabilities, contributing to higher EP (Alt & Spitzbeck, 2016). When employees perceive that their input is relevant and valued - a concept Zaichkowsky (1985) refers to as involvement, they develop a sense of ownership over environmental outcomes. This psychological ownership fosters proactive behaviors, such as identifying non-obvious sources of pollution or suggesting process improvements that managers might overlook (Renwick et al., 2013). Crucially, Boiral (2002) notes that this involvement generates tacit environmental knowledge which is experiential insights - a unique, inimitable resource according to the NRBV logic, to strengthen EP.

Second, at the organizational level, green employee involvement facilitates collective action through mechanisms such as green teams, open communication channels, and supportive learning climates (Tang et al., 2018). Given that environmental problems are often multifaceted and cross-functional, these opportunities allow for the exchange of diverse ideas and the coordination required for an effective environmental management system (Del Brío et al., 2007). By leveraging the collective intelligence of the workforce, firms can implement sustainable practices more efficiently, reduce waste, and improve resource utilization (Tang et al., 2018; Pinzone et al., 2016).

In the specific context of Vietnam, where businesses are increasingly integrating sustainability into their core operations, the ability to mobilize the entire workforce through involvement initiatives is vital. Evidence suggests that when Vietnamese firms provide these green

opportunities, it stimulates organizational citizenship behaviors for the environment (Pham et al., 2019) and directly contributes to superior ecological outcomes (Ngo et al., 2022). Consistent with Hart (1995), active participation of employees through empowered work teams enables firms, especially in resource-constrained contexts, to prevent pollution effectively, reducing waste and associated costs while enhancing environmental performance. Therefore, we posit that:

H3: Green opportunities positively impact EP.

2.3.2. The moderating role of Green transformational leadership

Green transformational leadership (GTL) describes leadership behaviors that inspire employees to pursue environmental goals and to go beyond required levels of environmental performance (Chen & Chang, 2013). Rooted in Transformational Leadership theory (Bass, 1985), GTL reorients the four main aspects - intellectual stimulation, individualized consideration, idealized influence (charisma), and inspirational motivation - toward environmental and sustainability outcomes (Robertson & Barling, 2013). Idealized influence manifests when leaders act as moral role models by prioritizing environmental responsibility and the collective good, thereby encouraging employees to emulate pro-environmental behaviors. Inspirational motivation involves articulating an appealing environmental vision that inspires employees to transcend self-interest and persist in environmentally beneficial actions despite challenges. Intellectual stimulation encourages employees to question existing environmental assumptions and to approach ecological problems in innovative ways, while individualized consideration is reflected in leaders' personalized support and mentoring that help employees develop environmental competencies and internalize green values. Hence, through stimulating new ways of thinking, providing personalized support, and articulating an engaging environmental vision, GTLs foster employees' environmental learning, creative problem-solving, and commitment to ecological objectives (Bass, 1985; Gong et al., 2009). In turn, GTL cultivates a psychologically supportive climate that strengthens employees' green creativity, innovative thinking, and environmental engagement (Chen & Chang, 2013; Younis & Hussain, 2023).

Strategically, the NRBV positions GTL as an intangible organizational resource that leverages human skills and learning capabilities to strengthen green innovation and EP, at the same time contributing to firms' long-term competitiveness (Hart, 1995; Singh et al., 2020). Within the AMO theory, GTL complements GHRM by translating employees' green abilities, motivation, and opportunities into effective pro-environmental actions through inspiration,

empowerment, and shared vision (Awan et al., 2022; Singh et al., 2020; Chen & Chang, 2013). From the perspective of SCT, GTL shapes behavior through social learning with leaders' pro-environmental conduct as a model that employees observe and internalize, then improving their moral commitment and self-efficacy (Bandura, 1991, 1999; Robertson & Barling, 2013; Chen & Yan, 2022). Taken together, GTL operates as a cross-level mechanism that links firm-level sustainability strategy (NRBV) with individual-level cognition and behavior shaped by abilities, motivation, opportunities, social learning and modeling (AMO & SCT).

In addition, some studies have examined the positive effects of GTL and transformational leadership on employees' pro-environmental behaviors and organizational environmental performance. Chen & Chang (2013) indicate that GTLs guide employees toward environmental objectives by articulating a clear green vision and inspiring them to internalize these goals. Through charisma and inspirational motivation, they encourage innovative thinking and the pursuit of performance beyond routine expectations, thereby fostering green creativity and contributing to environmental outcomes. These align with NRBV (Hart, 1995), that providing a clear environmental vision and actively involving employees in empowered teams enables firms to translate strategic green goals into effective pollution prevention, achieving faster reductions in emissions and waste while strengthening EP. Additionally, GTLs stimulate employees to acquire new knowledge by creating a learning-oriented environment in which leaders model adaptive behavior, encourage exploration, and motivate followers to seek novel solutions to emerging challenges, while simultaneously enhancing their psychological empowerment and organizational commitment (Para-González et al., 2018). Grounded in SCT, it also strengthens employees' self-efficacy by providing role modeling, encouragement, and mastery opportunities (Gong et al., 2009).

GTL further cultivates employees' green passion by eliciting strong emotional identification through charisma, stimulating enthusiasm for environmental goals through inspirational motivation, offering supportive individualized consideration, and fostering confidence and optimism via intellectual stimulation (Jia et al., 2018). Empirical evidence from banks in Pakistan supports that higher levels of GTL enhance employees' effective internalization of GHRM practices, consequently, strengthening their impact on EP (Niazi et al., 2023). Moreover, Mansoor et al., (2021) suggest that GTL and GHRM often operate in a mutually reinforcing manner to establish the organizational conditions necessary for implementing environmental agendas. Rather than functioning in isolation, GTL complements structural HR practices by adding the

behavioral influence required to foster green creativity and performance. In this regard, the commitment and support of top management or supervisors remain critical to ensuring that environmental programs achieve their intended outcomes (Afum et al., 2021).

Hence, drawing on NRBV, AMO, and SCT, we posit that GTL acts as a catalyst leadership resource that intensifies the impact of GHRM components on EP. Specifically, GTLs leverage intellectual stimulation to create a psychologically safe environment, encouraging employees to effectively apply their green abilities. Besides, by providing intrinsic meaning through inspirational motivation and idealized influence, GTL reinforces the link between green motivation and performance. Finally, through individualized consideration, leaders actively empower employees to seize green opportunities for tangible environmental outcomes. Accordingly, the following hypotheses are proposed:

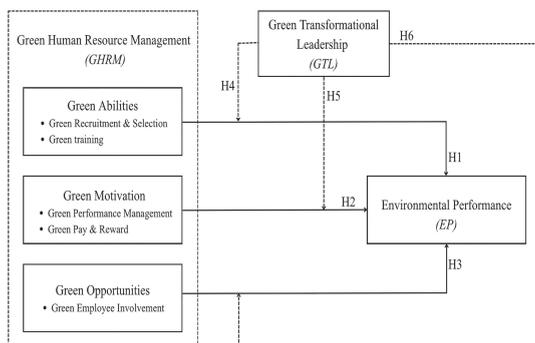
H4: GTL moderates the link between green abilities and EP.

H5: GTL moderates the link between green motivation and EP.

H6: GTL moderates the link between green opportunities and EP.

Based on the proposed hypotheses, the conceptual model is illustrated in Figure 1.

Figure 1. Conceptual Model



Source: Compiled by the authors

3. Research methodology

3.1. Sampling and data collection

A quantitative research approach was adopted to study the impact of GHRM on EP and moderating with GTL. The study was conducted using questionnaire and non-probability convenience sampling, done in such a way that it could take into account the flexibility of accessibility for respondents and obtain samples from firms across all provinces and cities throughout Vietnam. After development of the formal survey instrument, an electronic questionnaire was sent to managers and workers, allowing for efficient data collection with a large geographic spread at low cost. In line with the common “5-10 times rule” referring to minimum sample size in PLS-SEM (Hair et

al., 2011). As the structural model consists of 30 items, the recommended minimum sample size ranges from 150 to 300 respondents. The collection of 339 valid responses in this study exceeds this threshold, ensuring that the model estimation is both sufficiently powered and reliable for further analysis.

3.2. The measurement of the constructs

In this study, the questionnaire was constructed using measurement scales adapted from prior research on GHRM, GTL, and EP. The original English-language scales were translated into Vietnamese by the research team and subsequently refined to ensure linguistic accuracy and contextual relevance for domestic enterprises. The questionnaire consisted of observed variables corresponding to each construct in the research model and employed a 5-point Likert scale, where a score of 1 indicated “completely disagreed” and a score of 5 indicated “completely agreed.” This design allowed respondents to express their assessments clearly while ensuring that the data collected were both distinctive and reliable for subsequent quantitative analysis.

More specifically, the scale for the “Green Human Resource Management” construct, comprising 19 observed variables and adapted from Tang et al. (2017), was organized into three subdimensions consistent with the framework of this study: “Green Abilities” with 6 items, “Green Motivation” with 7 items, and “Green Opportunities” with 6 items. The “Green Transformational Leadership” scale consists of 6 observed variables adapted from Chen and Chang (2013). Meanwhile, the “Environmental Performance” scale includes 5 observed variables based on the measurement framework proposed by Laosirihongthong et al. (2013).

3.3. Data analysis

Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized in this study to assess the proposed model and empirically examine the formulated hypotheses using the collected dataset. This method is well suited for analyzing complex associations among latent and observed variables, particularly when the data may not follow a normal distribution or when the available sample size is relatively modest. After the survey data were gathered, the responses were processed and analyzed through SmartPLS 4 using a linear modeling framework. The reliability of the constructs was examined through composite reliability and Cronbach’s alpha, while convergent validity and discriminant validity were employed to evaluate the validity of the measurement model. Once the measurement model satisfied all required quality criteria, a Bootstrapping procedure with 339 samples was implemented to assess the statistical significance of the path coefficients and to substantiate the study’s hypotheses.

4. Results

4.1. Demographic profile of the respondents

The demographic profile indicates that the respondents possessed adequate professional experience, educational backgrounds, and organizational positions to provide valid and reliable responses for this study. Demographic information was collected on several key characteristics, including gender, age, educational level, job position, years of work experience, industry sector, type of enterprise, and company size. Approximately 51.3% of the firms in the sample are classified as small and medium-size enterprises (SMEs), with the remainder

belonging to micro and large enterprises. In terms of industry sector, the majority of respondents (72.9%) worked in the service sector, followed by 24.4% in the industrial construction sector, and a small proportion in agriculture and related fields. Regarding job position, 67.1% of respondents identified as employees, while 32.9% held managerial or leadership roles. Concerning educational attainment, most respondents possessed a university degree (64.4%), followed by 28.8% with postgraduate qualifications, with only a small fraction holding lower educational levels.

4.2. Measurement model

Table 1. Results of factor loading, reliability analysis and convergent validity

Construct	Item	Factor loading	Cronbach's alpha	Composite reliability	AVE (Construct level)
GHRM	GA1	0.871	0.936	0.949	0.757
	GA2	0.874			
	GA3	0.839			
	GA4	0.895			
	GA5	0.855			
	GA6	0.886			
	GM1	0.912	0.956	0.964	0.792
	GM2	0.847			
	GM3	0.925			
	GM4	0.866			
	GM5	0.874			
	GM6	0.901			
	GM7	0.903			
	GO1	0.926	0.957	0.966	0.824
	GO2	0.908			
	GO3	0.912			
	GO4	0.923			
	GO5	0.920			
GO6	0.854				
GTL	GTL1	0.923	0.974	0.978	0.883
	GTL2	0.951			
	GTL3	0.956			
	GTL4	0.953			
	GTL5	0.945			
	GTL6	0.910			
EP	EP1	0.924	0.948	0.960	0.828
	EP2	0.939			
	EP3	0.881			
	EP4	0.893			
	EP5	0.911			

Source: Calculated by the authors

Before assessing the structural relationships, this study first evaluates the measurement model by examining scale reliability, internal consistency, and construct validity including both convergent and discriminant validity as presented in table 1. The initial focus is placed on internal reliability, assessed through Cronbach's alpha and composite reliability, to ensure the adequacy of the measurement scales. Following the recommendations of Nunnally and Bernstein (1994), the Cronbach's alpha coefficients obtained in this study (ranging from 0.936 to 0.974) exceed the minimum threshold of 0.70, indicating a very high level of internal consistency across the constructs. Composite reliability values show a similar pattern of robustness, ranging from 0.949 to 0.978, which further confirms strong internal consistency. While some constructs slightly exceed the recommended CR threshold of 0.95, this can be explained by the theoretical consistency of items drawn from validated measurement instruments, and thus the indicators were retained to maintain content validity. However, several constructs (GM, GO, EP, and GTL) display composite reliability values above the recommended upper boundary of 0.95 (Hair et al., 2017), suggesting potential redundancy among items and possible conceptual overlap. This finding underscores the importance of further examining discriminant validity and reviewing the item composition of these constructs.

Convergent validity was assessed using the Average Variance Extracted (AVE), and all AVE values (ranging from 0.757 to 0.883) surpass the minimum threshold of 0.50, demonstrating satisfactory convergent validity in accordance with Fornell and Larcker (1981).

4.3. Structural model

Table 2. Structural model results

	R Square	R Square Adjusted
EP	0.743	0.738

Source: Calculated by the authors

The study employed Partial Least Squares (PLS) analysis to assess the effectiveness of the proposed model. The direct effect results, presented in table 2, include the explanatory variance (R^2), path coefficients, and their statistical significance. Bootstrapping was further applied to confirm the significance of these relationships. The R^2 values of the endogenous variables were also examined to evaluate the model's predictive capability. The structural model explains a substantial proportion of the variance in Environmental Performance (EP), with an R Square of 0.743 and an adjusted R Square of 0.738. According to Hair et al. (2017), such values indicate strong explanatory power, suggesting that the predictors provide a robust explanation for EP.

4.4. Results of direct effect and moderating effect

Table 3. Results of direct effects analysis

Hypothesis	Effects	β	p-value	f Square
H1	GA -> EP	0.164	0.052	0.015
H2	GM -> EP	0.093	0.315	0.005
H3	GO -> EP	0.267	0.017	0.031

Source: Calculated by the authors

Among the subdimensions of GHRM, Green Abilities (GA) demonstrate a marginally significant positive effect, while Green Opportunities (GO) exert a statistically significant positive influence on Environmental Performance (EP) (H1: GA -> EP: $\beta = 0.164$, $p = 0.052$; H3: GO -> EP: $\beta = 0.267$, $p = 0.017$). The corresponding effect sizes for H1 ($f^2 = 0.015$) and H3 ($f^2 = 0.031$) are small, indicating

that both GA and GO have modest impacts on EP. In contrast, Green Motivation (GM) does not affect EP (H2: GM -> EP: $\beta = 0.093$, $p = 0.315$). Overall, these results suggest that while specific aspects of GHRM, namely abilities and opportunities, contribute to improvements in EP, the motivational component does not exhibit a direct significant effect within this model.

Table 4. Results of moderating effects analysis

Hypothesis	Effects	β	p-value	f Square
H4	GTL x GA -> EP	-0.085	0.352	0.005
H5	GTL x GM -> EP	-0.005	0.969	0.000
H6	GTL X GO -> EP	0.060	0.664	0.002

Source: Calculated by the authors

The analysis of moderating effects reveals that Green Transformational Leadership (GTL) does not significantly moderate the relationships between the GHRM subdimensions and Environmental

Performance (EP). Specifically, the interaction between GTL and Green Abilities (GA) do not impact EP (H4: $\beta = -0.085$, $p = 0.352$). Similarly, the interaction of GTL with Green Motivation (GM) is not statistically

significant (H5: $\beta = -0.005$, $p = 0.969$), and no moderating effect is found for the interaction between GTL and Green Opportunities (GO) (H6: $\beta = 0.060$, $p = 0.664$). Moreover, the corresponding effect sizes (f^2) for H4, H5, and H6 are very small (0.005, 0.000, and 0.002, respectively), indicating negligible moderation. Collectively, these results suggest that GTL neither amplifies nor diminishes the influence of GA, GM, or GO on EP, demonstrating the absence of moderating effects in the proposed model.

5. Discussion

This study re-examines the relationship between GHRM and EP while clarifying the role of each individual component within the underlying mechanism. The findings reaffirm the positively significant impact of GO on EP and reveal a marginally positive influence of GA, suggesting that employees' green abilities and opportunities play meaningful roles in driving EP. GA indicates that employees who possess environmental values and knowledge aligned with the organization's sustainability orientation tend to demonstrate stronger commitment, actively participate in green initiatives, and continuously enhance their environmental understanding thereby contributing significantly to EP (Renwick et al., 2013; Awan et al., 2023; Anwar et al., 2020). In our findings, although GA attains only marginal significance, it still exhibits potential and opportunities to exert a positive influence on EP. With respect to GO, it exerts a positive impact on EP by creating the space and opportunities for employees to propose, share, and implement green solutions in their daily work (DuBois & Dubois, 2012). Notably, in the context of developing countries, GO often emerges as the most influential component affecting EP. In Vietnamese enterprises where power distance remains relatively high, employees frequently encounter barriers when attempting to voice their ideas (Rafiei & Pourreza, 2013), and consequently, when organizations actively provide avenues and opportunities for employee involvement, the positive effects on EP become particularly pronounced.

In contrast, a noteworthy finding is that GM does not exhibit a significant effect on EP, which contradicts the conclusions of Awan et al. (2023) regarding the motivational role of GM. Drawing on the crowding effect theory proposed by Frey and Jegen (2001), external motivational practices that are superficial or poorly designed may undermine employees' intrinsic motivation. This phenomenon is particularly prevalent in enterprises in developing countries, where GM initiatives tend to be formalistic and financially driven, relying heavily on compliance-oriented external incentives. As a result, employees' intrinsic motivation

toward green behaviors is constrained, preventing GM from translating into improvements in EP.

Furthermore, the study finds that GTL does not fulfill its expected moderating role. GTL does not influence any of the relationships between GA, GO, GM, and EP, which contradicts the findings of Niazi et al. (2023), who argue that GTL can strengthen the impact of GHRM on EP. However, this result aligns with Younis & Hussain (2023), who assert that GTL does not significantly moderate the pathway through which GHRM enhances EP via a stronger green psychological climate. One plausible explanation is that GTL typically functions to support and reinforce the implementation of GHRM practices, rather than directly strengthening the impact of GHRM on EP (Dahinine et al., 2024). While GTL primarily operates at the organizational level and emphasizes intrinsic motivation (Sun et al., 2022), GHRM exerts stronger and broader influence by simultaneously fostering green capabilities and providing opportunities for employees (Mustafa et al., 2023). Consequently, when the effects of GHRM are sufficiently strong, the moderating role of GTL may become less pronounced. Additionally, GTL is characterized by idealization, inspiration, and individualized consideration (Huang et al., 2021), yet in developing countries, leadership styles that rely heavily on subjective vision or do not align well with organizational culture may struggle to generate meaningful influence on EP.

This research also offers theoretical contributions by integrating the AMO, NRBV, and SCT frameworks, thereby extending the analysis from the individual level to the organizational level. From the NRBV perspective, the findings reinforce the argument that GHRM and GTL represent strategic green capabilities that are difficult to imitate and particularly valuable for developing countries such as Vietnam, where firms face substantial environmental capability constraints and institutional pressures (AlNuaimi et al., 2021). AMO further elucidates the micro-level mechanism through which GHRM translates into EP, as GA and GO emerge as the two primary components that enhance environmental performance by strengthening employee capabilities and expanding opportunities to engage in green activities (Appelbaum, 2000; Renwick et al., 2013). Meanwhile, the absence of GTL's moderating effect may be interpreted through SCT: leadership signals may not be sufficiently strong to build employees' self-efficacy or activate learning-modeling mechanisms as suggested in prior studies (Bandura, 1991, 1999; Gong et al., 2009; Chen & Yan, 2022). Taken together, these three theoretical lenses complement one another, thereby forming a

comprehensive analytical framework for interpreting the study's findings.

5.1. Theoretical contribution

This study contributes to the theoretical literature in three main ways.

First, it reconfirms the role of GHRM components in enhancing EP, thereby reinforcing previous empirical evidence and clarifying the mechanisms through which GA, GO, and GM operate. Specifically, the findings highlight the differentiated effects of individual GHRM components, showing that GA and GO play more substantive roles in improving EP, whereas GM may be less effective in contexts where motivation practices are compliance-driven and externally oriented.

Second, it sheds light on the moderating role of GTL in the relationship between GHRM and EP, demonstrating that GTL's moderating effect may not materialize in certain organizational contexts, particularly within developing countries. This suggests that GTL may serve more as a supportive organizational capability rather than a universal moderator capable of amplifying the effects of GHRM on EP.

Third, by simultaneously integrating the AMO, NRBV, and SCT frameworks, the study offers a more comprehensive theoretical foundation that encompasses multiple levels of analysis within organizations.

5.2. Practical implications

Based on the empirical findings, this study proposes several practical implications for Vietnamese firms and managers seeking to enhance environmental performance.

First, organizations should increase investment in training programs aimed at strengthening employees' practical green capabilities, such as standardized waste-handling skills, material efficiency practices, or energy-saving equipment operation. These contents should be designed to be closely integrated with

employees' daily tasks to ensure practical applicability.

Moreover, firms should broaden opportunities for employees to participate in green activities by empowering them to propose innovations, encouraging experimentation with new solutions, and establishing reward systems aligned with green contributions. For example, firms can establish internal channels to collect employees' green ideas, allow small-scale pilot implementations to test feasibility, and formally recognize initiatives that contribute to cost and resource saving.

For leaders, it is essential to avoid allowing personal inspiration or subjective visions to impose pressure on employees as this may trigger negative reactions or latent resistance within the organization. Instead, selecting and applying leadership styles compatible with organizational culture and the broader context of developing countries will help ensure effective management and foster green behaviors. Managers should prioritize a supportive and guidance-oriented leadership style by providing clear directions, offering regular feedback, and facilitating employees' gradual adaptation to new green requirements.

5.3. Limitations and future research

This study still has several limitations. First, the sample size remains relatively small and is concentrated primarily in Northern Vietnam. Future studies should expand the sample size and geographical coverage to improve generalizability and provide a more comprehensive picture.

Second, the theoretical perspectives adopted in this study mainly focus on internal organizational mechanisms. To gain deeper insights into external influences on GHRM and EP, future research could incorporate additional frameworks such as institutional theory to examine the roles of regulatory environments, institutional pressures, and external stakeholders.

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ENHANCING HUMAN RESOURCE QUALITY IN VIETNAM'S LOGISTICS INDUSTRY: A FOUNDATION FOR SUSTAINABLE DEVELOPMENT

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Abstract: Vietnam's logistics sector has experienced rapid growth and plays a key service role in promoting economic development. However, this growth is constrained by shortages in human resources, particularly high-quality personnel with strong international integration capabilities. This article focuses on analyzing the current state of logistics human resources in relation to the sustainable development of Vietnam's logistics industry. Based on a synthesis of secondary data from industry reports, government agencies, and academic studies, the paper clarifies key concepts, theoretical foundations, and the current situation of logistics human resources. The findings indicate that despite strong growth momentum and significant potential, a substantial gap remains between labor demand and the existing workforce's capabilities. Shortages of skilled workers with professional expertise, technological competencies, and foreign language proficiency constitute major challenges. Accordingly, the paper proposes several strategic solutions, including reforming training programs, strengthening cooperation among universities, enterprises, and the state, and promoting practice-oriented training, with the aim of improving human resource quality and enhancing Vietnam's logistics position within global supply chains.

Keywords: logistics industry, Vietnam, human resource quality enhancement.

Code: JHS-304

Received: 25th Oct 2025

Revised: 12th Nov 2025

Accepted: 15th Nov 2025

1. Introduction

The logistics sector in Vietnam is encountering significant opportunities for growth, establishing itself as a vital economic domain that positively influences national economic growth. Logistics serves not only as a supportive service sector but also as the "backbone" of the economy, facilitating connections, optimizing transportation expenses, expediting the movement of goods, and enhancing business competitiveness. The evolution of logistics contributes to reducing production and operational costs, broadening market access, attracting investments, and robustly supporting international trade activities. In the era of globalization

and the Fourth Industrial Revolution, logistics assumes an increasingly pivotal role in fostering socio-economic progress at both national and local scales. Nevertheless, the swift advancement of the industry presents a substantial challenge regarding human resources. At present, Vietnam is grappling with a significant deficit of high-caliber logistics professionals, particularly in roles that demand specialized knowledge, technological proficiency, and international communication skills. This shortage undermines the industry's competitiveness, especially as Vietnam aspires to establish itself as a regional and global logistics center.

To enhance the quality of human resources within

the logistics sector, it is essential to establish close collaboration among The State, businesses, training institutions, and industry associations. The Government has shown its dedication through specific policies, such as Decision No. 2229/QĐ-TTg dated October 9, 2025, which approves the Vietnam Logistics Service Development Strategy for the period of 2025-2035, with a vision extending to 2050. This strategy highlights the importance of human resource training in transitioning the workforce from a focus on quantity to one on quality and international professionalism. Concurrently, creating a mechanism that connects businesses, universities, and localities to develop practical training programs that are regularly updated to align with global trends is regarded as a crucial and urgent solution. Enhancing the quality of human resources is not merely an immediate necessity but also a long-term strategy aimed at ensuring sustainable development and national competitiveness in the logistics sector. The analysis above indicates that while logistics is recognized as a significant driver of economic growth and international integration, deficiencies in the quality of human resources are emerging as a bottleneck that impedes the sustainable development of the industry in Vietnam. Consequently, this article aims to elucidate the theoretical and practical aspects related to the enhancement of human resource quality in Vietnam's logistics industry, viewing this as the fundamental basis for long-term growth and the improvement of national competitiveness.

2. Theoretical basis and research overview

2.1. Concept of human resources

Human resources (HR) refer to the complete potential of individuals - encompassing physical strength, intellectual ability, skills, knowledge, experience, and creativity - that can be harnessed to promote economic and social development. Throughout history, this concept has been examined from various perspectives. The United Nations (2000) defines HR as human capital, highlighting the significance of knowledge and creativity in both personal and national progress. On a macro scale, human resources are viewed as the total working-age population, which acts as a labor source for the economy; in a more specific context, they represent the portion of the working-age population that is capable of engaging in labor, playing a crucial role in the production and business operations of society (Tiep, 2005).

From an economic standpoint, human resources are evaluated not only in terms of quantity but also with a focus on quality and creative potential. Cau and Chanh (2008) contend that human resources represent human assets that can generate both material and spiritual wealth for society, which is reflected through quantity, quality, and structure

at a specific moment in time. At the organizational and enterprise level, human resources encompass the entire workforce engaged within the organization. As noted by Nhon (2006), the human resources of a business consist of the employees listed on the payroll and compensated by the business; concurrently, human resources are perceived as the aggregate physical and intellectual capabilities of individuals, which directly influence the survival and growth of the organization (Diem & Quan, 2004; Quan, 2014).

In conclusion, human resources represent the entirety of individuals and their labor potential, assessed at various levels ranging from the national to the organizational level. Within the scope of this study, human resources are primarily examined at the enterprise level, highlighting the current workforce along with the qualifications, skills, and competencies of the employees.

2.2. Concept of human resource quality

Human resource quality encompasses a broad concept that indicates the level of workforce development regarding physical, intellectual, and mental capabilities. This aspect is crucial as it not only influences labor productivity and production efficiency but also mirrors the economic, social, and cultural advancement of a nation. As noted by authors Cau and Chanh (2008), human resource quality represents "a certain state of human resources, reflecting the relationship between the internal factors that constitute human resources". Furthermore, author Phung (2006) suggests that HR quality can be evaluated through education, expertise, skills, and health - criteria that are quantifiable and represent the actual abilities of workers. In contrast, Ran (2008) examines HR quality through two dimensions: operational capacity (evidenced by training, academic credentials, job skills, etc.) and moral character - a component that is challenging to quantify yet is essential for both personal and organizational growth. Furthermore, Tiep (2008) highlights that the quality of human resources comprises various factors: health, cultural level, expertise, practical skills, social dynamism, ethics, work style, income, and the extent to which personal needs are satisfied. These factors do not exist in isolation; rather, they interact with one another, shaping the essence and practical value of human resources. In light of the digital economy, globalization, and Industry 4.0, the quality of human resources is in a state of continuous evolution and development, necessitating assessments that are flexible, comprehensive, and contextually relevant. Consequently, enhancing the quality of human resources is not merely an immediate concern but also a long-term strategy essential for ensuring the competitiveness and sustainable growth of the economy.

Enhancing the quality of human resources is defined as the process of augmenting the overall value of individuals, which includes physical capabilities, intellectual abilities, professional skills, and social attributes, to satisfy the increasingly elevated demands of economic and social progress. On an individual level, this represents a holistic development process for workers, enabling them to consistently enhance their skills and attributes to adapt to the fluctuations within the labor market. At the organizational level, improving the quality of human resources entails the organization and execution of management, training, and development initiatives aimed at elevating the quality of the workforce relative to the current state. This process aims to enhance the physical strength, mental capacity, creativity, and professional behavior of employees, thus increasing the effectiveness of achieving the development goals and strategies of the enterprise.

2.3. Overview of research on enhancing human resource quality

In recent years, the quality of human resources has emerged as a significant research focus for numerous scholars both nationally and internationally, highlighting the crucial role of human factors in boosting labor productivity, organizational efficiency, and national competitiveness within the framework of integration and sustainable development. Theoretically, Benjamin Bloom (1956) was among the first scholars to establish the groundwork for analyzing the competency structure of workers, identifying three components of human resource quality: cognition (knowledge and thinking), emotion (qualities and attitudes), and skills (action-oriented capabilities). Bloom posited that a high-quality individual is one who can actively receive, process, synthesize, and evaluate information, while also exhibiting positive qualities and the capability to convert knowledge into effective work behavior.

In Vietnam, Nhon (2006) organized the concept of human resource quality into three fundamental categories: physical strength (health, endurance), intellectual strength (educational attainment, professional skills), and spirit (sense of organizational discipline, responsibility, conduct). This framework underscores the intrinsic elements within the structure of human resource quality and emphasizes the interconnectedness of material and non-material factors in evaluating human capabilities.

Building on this viewpoint, Kha (2007), in his research on the training and utilization of human resources within a market economy, highlighted the essential role of training in enhancing the quality of human resources. However, this study did not establish a specific set of criteria for measuring human resource quality. Likewise, Nhat (2008)

examined the current state of human resource quality in Vietnam amid innovation and international integration, while suggesting several strategies for developing high-quality human resources to fulfill the demands of industrialization and modernization. Nonetheless, the research primarily concentrated on a macro perspective and did not adequately quantify the influencing factors or delineate specific operational methods applicable to each industry.

From a policy implementation standpoint, Son (2015) identified seven categories of solutions aimed at enhancing the quality of human resources in Vietnam, which include: improving educational levels and skills, fostering a learning society, aligning human resource strategies with socio-economic development plans, enhancing labor market information, and bolstering international collaboration. These proposed solutions reflect a thorough comprehension of the significance of human resources in national development. Nevertheless, the study falls short in its examination of the various elements that contribute to human resource quality, such as mental resilience, physical capability, soft skills, and adaptability to technology.

Since 2017, there has been a gradual shift in international research towards exploring the connection between digital transformation and the quality of human resources. Schwertner (2017) contends that digital transformation transcends mere technological application in business processes; it necessitates a holistic reorganization of the entity, which demands a workforce equipped with innovative thought, technological proficiency, and the capacity to adjust to the digital landscape. Rathi Meena and Parimalarani (2020) further observe that in India, the digitization of banking services has not only influenced products and services but has also transformed the mindset and operational models of employees. Consequently, this evolution necessitates that human resources possess digital competencies, adaptable thinking, and a commitment to lifelong learning. However, the majority of these studies have primarily focused on the effects of the phenomenon without thoroughly investigating the interplay between internal factors (knowledge, skills, attitudes) and external factors (technology, market, policy) on the quality of human resources.

In recent years, research conducted by Van (2021), Lugovsky (2021), and Tu (2023) has started to explore the quality of human resources within the framework of digital transformation in the finance and banking sector, particularly concerning the younger workforce, known as Generation Z. These studies indicate that digital transformation encompasses not merely technological

advancements but also a holistic transformation of business models, organizational culture, and human resource capabilities. Nevertheless, these investigations primarily concentrate on the internal functions of banks and do not thoroughly examine the reciprocal relationship between technological demands and human resource capabilities. Concurrently, there remains a deficiency of integrated theoretical frameworks that can effectively assess human resource quality in a highly digitalized context.

Adopting a high-quality human resources perspective, Diep (2010) underscores the significance of human resource development in fostering the knowledge economy, where human resource quality is evaluated based on three fundamental components: physical strength, intellectual strength, and mental strength. In light of this, the author suggests strategies for cultivating high-quality human resources that align with the long-term developmental needs of the economy. From the standpoint of addressing the demands of innovation and integration, Nhat (2008) identifies the deficiencies in the quality of Vietnam's human resources, which arise from low wages and inadequacies in human resource planning, management, and development, while also proposing measures to enhance the quality of human resources to support the nation's industrialization and modernization.

A review of various studies indicates that the quality of human resources is a complex concept, shaped by both internal factors (such as physical strength, intellectual ability, and character) and external factors (including the work environment, technology, policies, and market conditions). Nevertheless, the majority of research has primarily focused on establishing broad criteria for evaluating human resource quality, while the creation of specific criteria that cater to the unique characteristics and circumstances of each industry and organization remains an area that necessitates further investigation. In the context of Vietnam's logistics sector, which is under considerable pressure from digital transformation, automation, and international integration, enhancing the quality of human resources is not only a pressing necessity but also a fundamental requirement for sustainable development. Consequently, there is a need for more comprehensive research that integrates both quantitative and qualitative methods to elucidate the elements of HR quality, assess the influence of internal and external factors, and subsequently propose strategies to enhance HR quality in accordance with the distinct characteristics of Vietnam's logistics industry.

3. Research methodology

Data collection method

The article employs secondary data collection

techniques derived from published sources to guarantee reliability and systematicity. Data was gathered from: Vietnam logistics industry Reports released by the Ministry of Industry and Trade, the Vietnam Logistics Association (VLA), the General Statistics Office, and specialized management agencies; Proceedings of seminars, dissertations, theses, and scientific articles published in esteemed domestic and international journals pertaining to human resource development and logistics; National strategic documents and policies concerning human resource development, digital transformation, digital economic development, and logistics within the framework of international integration. The data was chosen to comprehensively represent the current situation, trends, and factors influencing the quality of human resources in Vietnam's logistics sector.

Data processing methods

The gathered data underwent processing through qualitative research techniques, which included:

Document analysis: This method was utilized to organize the theoretical and practical foundations associated with the quality of human resources in the logistics sector, elucidating concepts and content pertinent to the study.

Synthesis and generalization: This approach was employed to extract prominent features, existing challenges, and the current state of development in the training, utilization, and advancement of logistics human resources.

Comparative method: This method aimed to assess Vietnam's current situation over time, thereby elucidating gaps, development, and opportunities for enhancing the quality of human resources.

System analysis: Utilized to suggest a range of solutions aimed at enhancing the quality of human resources sustainably, considering the viewpoints of businesses, educational institutions, and governmental management agencies.

4. Current status of the research issue

4.1. Current status of the logistics industry in Vietnam

The logistics sector in Vietnam is witnessing one of the most rapid and stable growth trajectories in the region, boasting an average annual growth rate ranging from 14% to 16% and an estimated market size of around USD 40-42 billion (VLA, 2023). This growth is attributed to the significant modernization of transportation, warehousing, delivery, and supply chain operations, aligning with the evolving trends of the digital economy. Furthermore, Vietnam has emerged as one of the 29 nations involved in the World Logistics Passport Program, highlighting its increasingly significant role on the global supply chain landscape.

Table 1. Top 10 emerging logistics markets in 2024

Rank	Rank Change	Country	Overall Score	Last Year's Score	Domestic Opportunities	International Opportunities	Business Fundamentals	Digital Readiness
1	0	China	8.61	8.31	8.54	9.08	6.71	8.07
2	0	India	7.21	7.43	7.86	7.60	6.35	6.28
3	0	UAE	6.49	6.59	5.52	6.10	8.71	6.88
4	0	Malaysia	6.17	6.16	5.25	6.03	7.84	6.55
5	0	Indonesia	6.16	6.08	6.33	6.34	6.07	5.70
6	0	Saudi Arabia	6.05	6.07	5.41	6.11	7.28	6.02
7	0	Qatar	5.85	6.02	5.72	4.93	7.21	6.36
8	+2	Vietnam	5.73	5.52	5.26	6.44	6.03	5.20
9	0	Mexico	5.60	5.55	5.37	6.25	5.41	5.16
10	-2	Thailand	5.59	5.67	5.13	5.96	5.51	5.87

Source: Agility, 2024

According to the Agility Emerging Markets Logistics Index 2024, Vietnam is positioned 8th out of 50 in the global ranking of emerging logistics markets, and it holds the 3rd position in Southeast Asia, following Malaysia and Indonesia, while outperforming nations like the Philippines, Myanmar, and Cambodia.

In comparison to 2023, Vietnam has advanced significantly, moving ahead of Thailand and Mexico to achieve 8th place globally in the emerging logistics sector. Within the domestic logistics arena, Vietnam is ranked 9th, having improved by 73 places since 2022, with a score of 5.26.

In terms of international logistics prospects, Vietnam is at the forefront of Southeast Asia and ranks 3rd worldwide with a score of 6.44. Furthermore, the metrics for business conditions and technological readiness are ranked 15th and 21st, respectively, indicating notable enhancements in the logistics landscape due to adaptive management strategies and technological advancements (Agility, 2024; Ministry of Planning and Investment, 2024).

The swift growth of the industry has resulted in a heightened demand for infrastructure, including seaports,

warehouses, distribution centers, and freight forwarding services. This surge has also created considerable pressure on the labor market, particularly for skilled professionals.

The Vietnamese government has established a strategic objective to position logistics as a vital service sector within the economy. As outlined in Decision No. 2229/QĐ-TTg dated October 9, 2025, which endorses the Vietnam Logistics Service Development Strategy for the period spanning 2025 to 2035, with a vision extending to 2050, Vietnam aims to achieve an average annual growth rate of logistics service revenue between 12% and 15% during the 2025-2035 timeframe. This growth is expected to contribute directly to the gross domestic product (GDP), accounting for 5% to 7%. By the year 2050, the logistics sector in Vietnam aspires to attain sustainable development and enhanced integration, with its GDP contribution projected to rise to 7%-9%, while simultaneously reducing logistics costs to a range of 10%-12%. These objectives are crucial for bolstering national competitiveness, particularly in light of the significant transformations occurring within the global supply chain post-pandemic and the ongoing effects of digital transformation.

Table 2. Newly registered transport and warehousing enterprises, total capital, and labor force in the first 9 months of 2024

Category	First 9 months of 2024			Compared with the same period in 2023 (%)		
	Number of enterprises	Registered capital (billion VND)	Number of Employees (persons)	Number of enterprises	Capital	Employees
Total enterprises nationwide	121,898	1,158,536	735,097	103.4	103.4	96.6
Transport and warehousing enterprises	6,503	36,551	28,898	113.5	88.7	118.3
Share of transport & warehousing enterprises / total nationwide (%)	5.33	3.15	3.93	—	—	—

Source: Vietnam Logistics Report 2024

In the first nine months of 2024, the nation saw the establishment of 121,898 new enterprises, which collectively registered a capital of VND 1,158,536 billion and provided employment for 735,097 individuals. When compared to the same timeframe in 2023, these metrics showed an increase of 3.4% in both the number of enterprises and registered capital, while the workforce saw a decline of 3.4%. Specifically, within the transport and warehousing sector, 6,503 new enterprises were founded, representing 5.33% of the total enterprises across the country. This sector's total registered capital amounted to VND 36,551 billion, which is 3.15% of the overall figure, and it employed 28,898 workers, accounting for 3.93%. In comparison to the previous year, the number of new enterprises in transportation and warehousing experienced a notable rise of 13.5%, and the workforce increased by 18.3%, indicating a substantial expansion in employment scale. Nevertheless, the registered capital saw a decrease of 11.3%, suggesting a more cautious investment approach or the emergence of small and medium-sized enterprises.

In 2023, as per the World Bank's evaluation, Vietnam achieved the 43rd position out of 139 economies assessed on the Logistics Performance Index (LPI), representing a notable advancement from its 53rd place in 2010. Within the ASEAN region, Vietnam ranks among the top five nations, sharing this position with the Philippines and trailing only Singapore, Malaysia, and Thailand. On a global scale, as reported by Agility, an international transportation and logistics service provider, Vietnam is recognized as one of the top 10 most appealing emerging logistics markets out of 50 markets surveyed. Significantly, in the criterion for "international logistics opportunities", Vietnam holds the 4th position worldwide, reinforcing its status as a promising hub for logistics development in Southeast Asia. Despite these substantial advancements, the logistics sector across the nation continues to encounter various challenges, including insufficient infrastructure, elevated transportation costs, limited connectivity in international supply chains, and a lack of skilled labor.

The Agility report indicates that Vietnam has achieved notable advancements in infrastructure efficiency, trade policy, logistics service quality, and technological readiness. The integration of emerging

technologies such as the Internet of Things (IoT), artificial intelligence (AI), blockchain, and big data is progressively enhancing operational efficiency and transparency within the supply chain. Additionally, Vietnam's advantageous geographical position - situated in the heart of Southeast Asia and featuring an extensive coastline - provides numerous opportunities for the development of a network of seaports, airports, and multimodal logistics centers.

In summary, the recent growth of Vietnam's logistics sector highlights its vast potential and strategic importance in fostering national economic development. Nevertheless, despite these accomplishments, challenges persist, including a lack of high-quality human resources, insufficient infrastructure, and elevated logistics costs, which pose significant obstacles. Consequently, it is essential to continue pursuing comprehensive policies focused on human resource development, infrastructure investment, and the promotion of innovation to establish a robust foundation for the sustainable growth of Vietnam's logistics industry and its deeper integration into the global supply chain.

4.2. Current state of Vietnam's logistics workforce

Vietnam is becoming a promising and appealing market for the logistics sector due to its robust economic growth rate, advantageous geographical position, and significant international integration. According to information published by the General Statistics Office, during the first nine months of 2024, the nation saw the establishment of nearly 6,500 new enterprises in the logistics field, which represents about 5.33% of the total number of newly formed businesses across the country. In comparison to the same timeframe in 2023, the number of companies rose by 13.5%, and the workforce increased by 18.3%, indicating a trend towards operational expansion within the industry. Nevertheless, the total registered capital experienced a decline of 11.3%, suggesting a more cautious approach to investment or market entry by businesses with limited capital. The total registered capital for this category of enterprises amounted to VND 36,550 billion, with close to 28,900 registered employees. These statistics highlight the vibrancy of the logistics sector while also emphasizing the necessity to enhance resource utilization efficiency and the quality of human resources.

Table 3. Situation of new logistics enterprises and number of employees in the first 9 months of 2024

Indicators	First 9 months of 2024	Compared with the same period in 2023 (%)
Number of newly established enterprises	6,500	+13.5%
Total registered capital (billion VND)	36,550	-11.3%
Total registered workforce (persons)	28,900	+18.3%

Source: Vietnam Logistics Report 2024

Currently, the logistics sector is grappling with a significant shortage of human resources, both in terms of quantity and quality. The Ministry of Industry and Trade (2024) reports that the existing logistics workforce fulfills only about 40% of the actual demand. As of 2023, merely 5-7% of the workforce in this sector has received formal training in logistics, while the demand for recruitment continues to rise sharply, with 50% of businesses indicating a need to hire an additional 15-20% of employees in the near term (VLA, 2023). Despite the industry expanding at an average annual rate of 15-20%, workforce growth is only at 7.5%, leading to an increasingly severe imbalance (Vietnam Logistics Research and Development Institute, 2024).

In the long run, forecasts from the Ministry of Industry and Trade and the Vietnam Logistics Research and

Development Institute suggest that by 2030, the entire industry will require approximately 2.2 million additional workers, including around 200,000 high-quality personnel-defined as workers possessing professional qualifications, vocational certificates, and proficient foreign language skills. If the workforce growth rate remains at 7.5% annually, Vietnam will only be able to add about 117,532 workers during the 2016-2030 timeframe, which falls significantly short of the actual demand. Moreover, assuming that each logistics company currently employs an average of 400 individuals and needs to retrain 50% of its workforce at a growth rate of 5% per year, transport and freight forwarding companies alone (approximately 200 large firms) will require the training of at least 100,000 additional workers over the next 15 years.

Table 4. Demand for workforce and skill levels in the logistics sector of Vietnam for the year 2023

Criteria	Percentage (%)
Enterprises seeking to hire an extra 15–20% of their workforce	50%
Employees who have received formal training in logistics	5-7%
Workforce skilled in English	4%
Enterprises that provide retraining for their staff	30%
Enterprises satisfied with employees' qualifications	6.7%

Source: Ho Chi Minh City Institute for Development Studies, 2023.

Furthermore, a study conducted by the Ho Chi Minh City Development Research Institute (2023) indicated that 53.3% of logistics firms are deficient in employees possessing suitable professional qualifications, 30% of these firms are required to retrain their staff, and merely 6.7% express satisfaction with the professional qualifications of their existing workforce. In a similar vein, a survey from the National Economics University found that as much as 80.26% of individuals in the logistics sector receive training through their everyday tasks, 23.6% engage in domestic training programs, 6.9% benefit from instruction by foreign specialists, and only 3.9% have undergone training overseas. The logistics sector is presently facing challenges due to the Fourth Industrial Revolution. Cutting-edge technologies such as artificial intelligence (AI), the Internet of Things (IoT), blockchain, as well as transportation management software (TMS) and warehouse management software (WMS) are becoming critical necessities for personnel in the industry. Nevertheless, a majority of companies are encountering difficulties in sourcing employees who are proficient in technology. Consequently, businesses are compelled to invest in internal training initiatives or recruit foreign experts, which escalates operational

expenses.

A burgeoning trend in the industry is the emphasis on green and sustainable logistics, which companies are prioritizing to reduce carbon emissions. However, the current workforce in this domain is not sufficiently trained in environmentally sustainable logistics practices, resulting in a deficit of highly specialized personnel.

In response to the increasing demand for human resources within the logistics sector, by July 2023, 59 higher education institutions had established training programs related to this field, accommodating approximately 5,600 students annually. The range of majors available is quite extensive, including: Logistics and Supply Chain Management, Customs and Logistics, Logistics Service Management, Transportation Management, International Business and Logistics, Multimodal Transportation, Maritime Management, and Port Management - Import-Export - International Freight Forwarding (Vietnam Logistics Report, 2023).

Concerning the quality of training, currently around 20% of universities comply with domestic accreditation standards, 7.5% are undergoing the accreditation process, and another 7.5% have received recognition from international bodies such as AUN, FIBAA, and

Triple Crown. Training programs are being implemented uniformly across various educational systems, including mass education, high-quality, advanced, and international integration. Significantly, the percentage of training programs that incorporate international vocational certificates such as FIATA, AGKN, or degrees from foreign universities has risen from 20% in 2021 to 22.5% in 2023. These programs not only deliver comprehensive knowledge but also focus on enhancing practical skills and providing internships to bolster students' professional competencies.

Furthermore, short-term, specialized training initiatives such as FIATA FD and FIATA FHD (collaboratively organized by VLA/VLI) have successfully trained over 1,000 participants in the last three years. Nevertheless, these programs still do not adequately address the annual training requirements for tens of thousands of workers. Projections indicate that by 2035, Vietnam will need to recruit over 350,000 logistics personnel, yet the current capacity to fulfill this demand is merely around 10% (Vietnam Logistics Report, 2024). Indeed, 85.7% of Vietnamese companies are compelled to train their staff through hands-on work experience. Some large corporations, including Gemadept and Tan Cang Saigon, have set up their own training facilities to proactively cultivate human resources. However, the absence of a formal training ecosystem that connects educational institutions, businesses, and regulatory agencies continues to be a significant obstacle. In the era of globalization and profound economic integration, a skilled workforce is essential for boosting the competitiveness of Vietnamese logistics firms. Strategic investment in human resource development not only enables businesses to adapt to emerging technological trends but is also vital for Vietnam's aspiration to become a regional and global logistics hub.

5. Strategies to enhance the quality of human resources in Vietnam's logistics sector - a cornerstone for sustainable development

First, it is essential to create an effective coordination mechanism among three key parties: businesses, educational institutions, and government regulatory bodies to ensure alignment between training goals and real-world requirements. This collaboration should encompass activities such as vocational certification training, organizing internship and apprenticeship opportunities, recruitment processes, academic assessments, career counseling, skills enhancement, and applied scientific research. The creation of scholarship funds and a series of specialized seminars featuring leading companies and both domestic and international experts will foster a practical learning environment, aid in enhancing the professional capabilities of learners, and encourage innovation in training.

Secondly, educational institutions must prioritize

the adjustment of their training programs to align with career orientation, emphasizing roles that are currently in high demand and are expected to remain so, including: logistics administrative personnel, transportation coordinators, warehouse operators, truck drivers, e-commerce and logistics IT professionals, among others. To accomplish this, it is essential to secure investment from the government and encourage social initiatives to enhance scholarships, financial assistance, and create opportunities for students to intern at reputable companies, thereby gaining exposure to real-world work environments. Concurrently, it is crucial to innovate teaching methodologies and the content of training programs in a manner that is concise, practical, and adaptable, particularly for short-term or medium-term courses offered by institutes, centers, and professional associations. Additionally, referencing and adapting successful training programs from developed nations such as Japan, Singapore, and Germany will aid in standardizing content, enhancing integration, and particularly fortifying students' specialized foreign language competencies.

Third, logistics companies must take an active role in the training and development of their workforce. In particular, they should establish policies that encourage employees to seek further education, such as offering support for training costs, providing flexible scheduling options, and organizing in-house training sessions. At present, many companies are still required to conduct their own training because the workforce does not yet fulfill practical requirements. Common methods of self-training include on-the-job training, mentoring programs that pair experienced employees with newcomers, or inviting experts to conduct internal training sessions. This approach serves as a practical solution in a context where formal training programs lack flexibility and timely updates.

Fourth, it is essential to foster connections between functional agencies such as port authorities, customs, tax, and inspection agencies, and training institutions to enhance the development of practical skills. Specifically, these agencies can provide professional support by establishing simulation rooms, supplying real data, and sending officials to serve as guest lecturers. In turn, training institutions can offer specialized training courses for civil servants while also transferring new technologies to facilitate administrative reform and the digitization of logistics management processes. Adopting the principle that "every staff member is a lecturer" will help close the gap between theory and practice, thereby contributing to the cultivation of human resources capable of functioning in a high-tech and legally intricate environment.

Fifth, it is essential for businesses and training institutions to actively support the creation and ongoing operation of logistics alumni associations within educational establishments. These associations serve

not only as networks for exchanging knowledge and professional experiences but also as vital connections between educational institutions and businesses for recruitment efforts, updating labor market insights, and guiding industry advancements. This relationship will foster both vertical and horizontal connections within the training-labor utilization framework, thereby facilitating the development of a sustainable logistics ecosystem and the spread of knowledge throughout the community.

6. Conclusion

The caliber of human resources is a crucial element influencing the operational efficiency and competitiveness of Vietnam's logistics sector amid integration and digital transformation. Despite the

robust growth of the industry, the deficiency in human resources, both in quantity and quality, poses a significant challenge, particularly given the rising demand for technological expertise and green logistics. In practice, the absence of strong connections among educational institutions, businesses, and the government represents a significant barrier to the training and development of skilled professionals. Consequently, the establishment of a comprehensive training ecosystem, the enhancement of practical training, and the implementation of internationally recognized vocational training programs are urgent priorities necessary to lay a solid foundation for sustainable growth and to elevate Vietnam's logistics industry on the global supply chain landscape.

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THÔNG TIN CẢI CHÍNH

Ban Biên tập Tạp chí Nguồn nhân lực và An sinh xã hội trân trọng thông báo cải chính một số thông tin trong Số 48 của Tạp chí, cụ thể như sau:

1. Tại trang Mục lục tiếng Việt:

- Đối với bài viết *“Đánh giá các yếu tố thể chế ảnh hưởng đến nhân lực xanh tại các doanh nghiệp Việt Nam trong bối cảnh chuyển đổi năng lượng công bằng”*: Bổ sung tác giả: Nguyễn Thị Hồng (đồng tác giả cùng Đỗ Thị Tươi).
- Đối với bài viết *“Cơ cấu vốn của doanh nghiệp công nghiệp phụ trợ niêm yết tại Việt Nam”*: Điều chỉnh tên bài viết thành: *“Cơ cấu nguồn vốn của doanh nghiệp công nghiệp phụ trợ niêm yết tại Việt Nam”*.

2. Tại trang Mục lục tiếng Anh:

- Đối với bài viết *“Research on the influence of KOLs on TikTok platform on fashion purchase intentions of students at Hanoi Industrial Textile Garment University”*: Bổ sung tác giả: Ha Thao Vy, Nguyen Thi Thom, Nguyen Ngoc Vy, Dang Phuong Mai (đồng tác giả cùng Nguyen Thi Giang).

Tổng Biên tập

PGS. TS. Lê Thanh Hà

QUY ĐỊNH BÀI VIẾT GỬI ĐĂNG TRÊN TẠP CHÍ NGUỒN NHÂN LỰC VÀ AN SINH XÃ HỘI CỦA TRƯỜNG ĐẠI HỌC LAO ĐỘNG – XÃ HỘI

I. HÌNH THỨC CỦA BÀI BÁO

- Bài viết bằng tiếng Việt, soạn thảo trên Word, font Times New Roman (Unicode); cỡ chữ 12; trên khổ giấy A4; lề trên, dưới, trái, phải: 2,54 cm; giãn dòng: 1,5 lines. Mật độ chữ bình thường, không được nén hoặc kéo giãn khoảng cách giữa các chữ.
- Nội dung bài viết cô đọng, súc tích, theo cấu trúc của bài báo khoa học; không quá 15 trang đánh máy giấy A4 (bao gồm cả bảng biểu, hình vẽ, chú thích, tài liệu tham khảo).

II. KẾT CẤU VÀ CÁC THÀNH PHẦN NỘI DUNG CỦA BÀI BÁO

- 1. Tên bài báo:** tên bài báo cần phải ngắn gọn (không nên quá 20 chữ/words), rõ ràng và phải phản ánh nội dung chính của bài báo. Tên bài báo phải viết chữ in hoa, cỡ chữ 12, in đậm, căn giữa trang.
- 2. Tên tác giả, cơ quan công tác, địa chỉ email** (Trường hợp có nhiều tác giả cũng nêu đầy đủ).
- 3. Tóm tắt bài viết:** phần tóm tắt bài báo gồm 2 phần tiếng Việt và tiếng Anh. Tóm tắt bằng tiếng Việt có độ dài từ 150 đến 250 từ, phản ánh khái quát những nội dung chính trong bài báo và thể hiện rõ những kết quả, đóng góp, điểm mới của bài báo.
- 4. Từ khóa:** từ khóa là những từ được cho là quan trọng đối với nội dung nghiên cứu đặc trưng cho chủ đề của bài viết đó. Tác giả đưa ra một số từ khóa (khoảng 3 - 6 từ khóa) của bài viết. Từ khóa có cỡ chữ 12, chữ thường, cách mỗi từ là dấu phẩy.
- 5. Nội dung bài báo:** có thể có hình thức khác nhau nhưng đảm bảo các nội dung sau: Giới thiệu; Tổng quan nghiên cứu và hoặc cơ sở lý thuyết; Phương pháp nghiên cứu; Kết quả nghiên cứu (Thực trạng vấn đề nghiên cứu); Kết luận hoặc /và giải pháp/khuyến nghị/hàm ý và Tài liệu tham khảo.

III. CÁC QUY ĐỊNH VỀ KỸ THUẬT TRÌNH BÀY

1. Quy định về đánh số đề mục

Trong phần nội dung chính của bài viết, các đề mục lớn phải là chữ in đậm, căn trái và được đánh số liên tục theo chữ số Ả-rập. Các tiểu mục cấp 1 (ví dụ: 1.1) là chữ in đậm và nghiêng. Các tiểu mục cấp 2 (ví dụ: 1.1.1) là chữ in nghiêng nhưng không in đậm.

2. Quy định về trình bày bảng biểu, hình vẽ, ký hiệu, công thức

Quy định trình bày bảng, hình vẽ

- Các bảng dữ liệu trình bày trong bài báo được ghi thống nhất là Bảng. Các bảng dữ liệu phải là định dạng bảng (table) trong phần mềm Microsoft Word.
- Các đồ thị, biểu đồ, sơ đồ trong bài báo được ghi thống nhất là Hình.
- Các bảng/hình trong bài báo phải được dẫn nguồn.

3. Quy định về trình bày trích dẫn, tài liệu tham khảo

Việc trích dẫn tài liệu tham khảo được thể hiện ở trích dẫn trong bài và tài liệu tham khảo. Tạp chí áp dụng cách trích dẫn kiểu APA.

IV. HÌNH THỨC GỬI BÀI, NHẬN BÀI

Bài viết gửi về Ban Biên tập theo địa chỉ email: tapchinguonnhanluc@ulsa.edu.vn

- Quy định thể lệ viết bài Tạp chí, tác giả vui lòng xem chi tiết tại website của Trường:

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