

**Improve the quality of human resources in the banking sector  
in the context of digital transformation and climate change in Vietnam**

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**Abstract**

*Based on the assessment of opportunities and challenges for human resources in the banking sector today in Vietnam, the authors propose recommendations to improve the quality of human resources in the Vietnamese banking sector, in the context of digital transformation and climate change, for the State Bank, commercial banks and higher education institutions.*

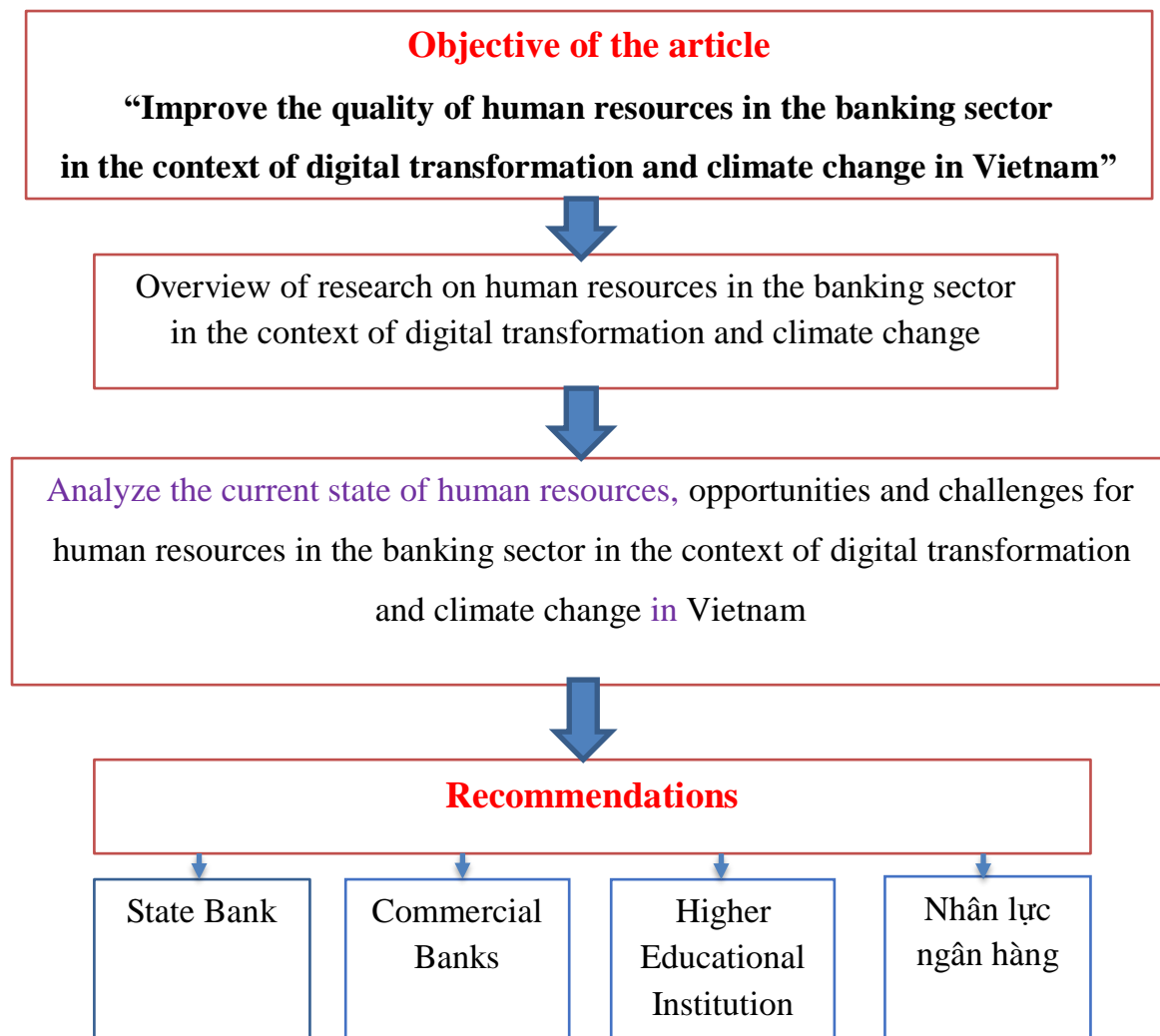
**Research purpose:**

*Proposal and recommendations to improve the quality of human resources in the banking sector, in the context of digital transformation and climate change in Vietnam*

**Research motivation:**

*Announcing the research results of the author group on the basis of addressing the current situation, opportunities, and challenges for human resources in the Vietnamese banking sector.*

**Research design, approach, and method:**



**Figure 1.1. Research framework of the article**

**Main findings:**

- Digital transformation and climate change in Vietnam have brought about fundamental changes in the structure and quality of the Bank's human resources with higher and more diverse requirements;
- It presents both great opportunities and challenges for human resources in terms of quality necessitating a reduction in quantity, structural changes, and quality improvement.
- The current state of human resource quality in Vietnamese Banks has not yet met the needs of digital transformation on both the macro and micro levels.
- This situation calls for a comprehensive, synchronized, and systematic solution to change the perception of strategic thinking regarding the banking sector development plan, improving training quality with specific implementation actions.

- Human resource training and fostering activities are the sole methods to tackle these changes successfully, with training frameworks and various methods, and activities. Only the drastic and synchronous joint action of the entire system from the State Bank, commercial banks, higher education institutions, and bank staff will be able to fulfill the stipulated tasks and established objectives.

***Practical/managerial implications:***

*Proposal and recommendations to improve the quality of human resources of the Vietnamese banking sector, in the context of digital transformation and climate change, for the State Bank, commercial banks, and higher education institutions ...*

**Keywords:** *human resources in the banking sector, digital transformation, climate change, Vietnam.*

**1. INTRODUCTION:**

According to United Nations forecasts, by 2050, climate change could cause losses of up to 4% of total global economic output. Vietnam is one of the countries that will be severely affected by climate change. At COP26 and COP27, the Government of Vietnam launched a roadmap to reduce greenhouse gases and committed to bringing national net emissions to "zero" by 2050. Banks are identified as an important financial supply channel of the economy, Vietnam will continue to promote the central role of the banking system in "greening" investment capital flows for sustainable development goals aimed at responding to climate change.

Banks not only have to deal with risks from climate change but also have to promote sustainable financial projects and products. The bank plays an important role in providing financing for green and environmentally friendly projects, such as solar power projects, green construction, and clean energy research and development.

Besides, the digital transformation process is having a strong impact on every organization and business in the world; including the banking sector. To become a digital bank, banks' human resource needs are increasingly changing. The way of working in banking also requires new skills and competencies. Bankers must adapt to using new technology, perform complex data analysis, and have a deep understanding of technical issues. The way of interacting with customers must also change, with the increase of online transactions and access through mobile applications.

It can be seen that banks simultaneously face the dual challenges of digital transformation and climate change. They must consider how to use technology to improve performance and how to take advantage of opportunities to support sustainable development, ensuring that banks not only meet current market requirements but are also prepared for The future is full of challenges and opportunities.

## **2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT:**

The research group has found a great number of studies on digital transformation and climate change in the banking sector. In this paper, we review some representative studies regarding human resources in the banking sector during the era of digital transformation and climate change.

The study by M. Rathi Meena, and Dr. G. Parimalarani (2020) pointed out that banking human resources can help accelerate digital transformation. To achieve that, bank employers must encourage the workforce to participate in the creation and adoption of innovative working methods. Additionally, employers must also make sure that they recruit suitable talent and provide the workers with the necessary training. Due to digital transformation, the banking sector will create great employment opportunities for many technology-related jobs. Digital transformation in the banking sector will promote human resources to improve and develop a diversified set of skills.

Conversely, in a study on Indian banking human resources, scholars Ms.Priyanka Kadur, and Dr.Supriya R (2022) concluded that digital transformation could threaten the organization's goals and reduce overall work performance. The main causes of this problem identified by the scholars are workload, customer support, lack of support, lack of cooperation, and work pressure among employees.

On the other hand, under the pressure of climate change, the consequences for the banking sector are widespread and of significant magnitude. According to Gai and Kapadia (2010), environmental and financial risks due to climate change mutually interact and influence each other. In a recent study by Xinwu (2023), it was revealed that substantial fluctuations in climate patterns could have the effect of reducing the Conditional Value at Risk (CoVar) of commercial banks, resulting in the devaluation of assets within the banking system. Additionally, the authors displayed the deleterious impact of climate change on related industries and investor behavior. This, in turn, leads to the direct depreciation of physical assets and collateral values held by banks' customers. Consequently, the banking system witnessed a high level of asset

volatility and non-performing loan ratio. YongPing Liu (2023) declared that climate warming pushed up non-performing loan ratios (NPL), which then increased systemic risks in the banking sector. In the research, they confirm the statistically significant impact of climate change on banking systemic risks through a mediator variable NPL in the short run. Liquidity is considered to be significantly sensitive to climate change risks (Qiaoqi Lang, 2023). Its negative relationship showed that physical and transitional risks due to climate change can lead to the unexpected mass amount of withdrawal from customers and the maturity of some unsubsidized funds (e.g. guarantees), posing threats to the stability of the banking system.

Brandon Sutcliffe (2021) has pointed out three pivotal challenges confronting the banking sector under the pressures of climate change. Firstly, financial institutions encounter notable complexities when attempting to accurately assess the multifaceted risks associated with their physical infrastructure, workforce, and supply chain in the face of extreme climate events. Secondly, the absence of a standardized industry framework for the integration of climate risk into their risk management practices presents a formidable challenge. Thirdly, all industries nowadays, including banking, lack experts who are capable of both climate science and risk management. The author believes that the above three challenges are all related to the bank's senior human resources. This conclusion aligns with the findings of Austrindanney Sina Azhar (2023), which states that human capital is an indirect factor that affects a company's performance under the changing and immobile state of the surrounding environment.

Furthermore, the development of green finance emerges as a critical imperative within the banking sector, contributing significantly to carbon emissions reduction. Xin Chen and Zhigang Chen (2021) have articulated that the evolution of green finance indirectly fosters a reduction in carbon emissions by alleviating financing constraints and catalyzing innovation in green technologies.

### **3. METHODOLOGY**

The authors have collected data and information [from research in domestic and foreign banks on opportunities and challenges](#) for human resources in the banking sector today in Vietnam, then have used the statistical analysis methods combined with data analysis and processing to propose solutions and recommendations to [improve](#) the quality of human resources in the banking sector in the context of digital transformation and climate change in Vietnam for the [State Bank, commercial banks, and higher education institutions](#).

### **4. RESULT AND DISCUSSION**

#### **4.1. Current situation of human resources in the banking sector in the context of digital transformation and climate change in Vietnam**

The quality of human resources is one of the basic and important factors for every business in general and banks in particular in the process of survival and development.

According to data from the Department of Personnel and Organization, State Bank of Vietnam, as of June 1, 2019, the entire banking sector is estimated to have 346,614 people, with the following qualification structure: PhD: 569 people (accounting for 0.16%), Master's degree: 20,286 people (accounting for 5.85%), University: 263,927 people (accounting for 76.16%), College: 23,453 people (accounting for 6.77%), Intermediate level: 20,054 people (accounting for 5.79%), the rest (elementary or untrained): 18,325 people (accounting for 5.29%), Duong Hai Chi (2020).

**Ranking of human infrastructure in some Vietnamese banks 2018-2020**

Banks	Proportion of specialized IT staff (%)	Percentage of specialized information security officers (%)	Percentage of IT staff achieving international certification (%)	Human infrastructure index	Ranking		
					2020	2019	2018
Tien Phong Com	2,8	0,3	46,7	<b>1,0000</b>	<b>1</b>	2	-
Vietnam Technological and CJSB	3,9	0,3	15,6	<b>0,7106</b>	<b>2</b>	3	3
Nam A CJSB	3,7	0,4	9,1	<b>0,6966</b>	<b>3</b>	1	2
Viet A CJSB	4,9	0,3	1,4	<b>0,6417</b>	<b>4</b>	-	10
Military CJSB	4,0	0,3	7,8	<b>0,6254</b>	<b>5</b>	6	8
Southeast Asia CJSB	5,3	0,1	8,1	<b>0,6210</b>	<b>6</b>	4	9
Vietnam Public CJSB	2,7	0,1	27,3	<b>0,5316</b>	<b>7</b>	7	21
Vietnam Thuong Tin CJSB	2,6	0,4	8,3	<b>0,5252</b>	<b>8</b>	-	-
Global Petroleum Commercial Bank Limited	2,4	0,2	23,3	<b>0,4929</b>	<b>9</b>	21	31
Vietnam Maritime CJSB	3,8	0,3	2,1	<b>0,4823</b>	<b>10</b>	11	15
Bac A CJSB	1,4	0,5	3,6	<b>0,4676</b>	<b>11</b>	5	4

Ho Chi Minh City Development Joint Stock Commercial Bank	2,1	0,1	23,1	<b>0,4197</b>	<b>12</b>	19	11
An Binh CJSB	2,3	0,2	16,3	<b>0,4122</b>	<b>13</b>	15	17
Joint Stock Commercial Bank for Investment and Development of Vietnam	2,9	0,2	13,1	<b>0,4121</b>	<b>14</b>	10	14
Dong A CJSB	2,6	0,2	10,2	<b>0,3908</b>	<b>15</b>	-	1
Saigon CJSB - Industry and Trade	2,8	0,3	3,2	<b>0,3884</b>	<b>16</b>	-	6
Bao Viet CJSB	3,2	0,1	9,1	<b>0,3871</b>	<b>17</b>	9	5
Saigon - Hanoi CJSB	2,9	0,2	10,9	<b>0,3830</b>	<b>18</b>	16	18
Vietnam Export-Import CJSB	3,2	0,2	5,5	<b>0,3631</b>	<b>19</b>	14	19

*Source: Department of Information Technology, Ministry of Information and Communications*



Through the survey results of the Ministry of Information and Communications, it can be seen that technological skills combined with management skills are one of the challenges facing human resources in Vietnam.

The banking system has grown in breadth quite rapidly, as shown by the increase in the number of banks and the opening of a series of branches and transaction offices across the country, leading to the number of banking staff at 28 banks. Listed on the stock exchange grew dramatically from 2019 to 2022. By the end of the first quarter of 2023, the total number of employees of 28 banks was more than 275,084 people, a decrease of 1,053 people compared to the beginning of the year. This is the first time the banking sector's personnel scale has shrunk after 9 consecutive quarters of growth since the end of 2020, Ha Linh (2023). In general, the trend of downsizing human resources also occurs in many top banks such as VietinBank, Sacombank, HDBank, Techcombank, VIB, SHB, and TPBank. Among them, VPBank had the sharpest decline in personnel with the number of employees of the parent bank and member companies decreasing by 956 people compared to the beginning of the year, Van Tue (2023).

The major and existing challenges of the banking sector in the face of digital transformation and climate change are the scarcity of high-quality human resources (Jan Smit, Stephan Kreutzer, Carolin Moeller & Malin Carlberg, 2016). The traditional banking system will gradually be replaced by modern banks, banks all want to digitally transform, and the shrinking of transaction offices will reduce some job positions at banks such as teller, and retail. Human resource needs in the banking sector, especially non-financial needs in customer care, transactions, etc., have been significantly reduced. Vietnamese banks have a tendency and desire to become digital banks, and technical technologies will replace and help handle human work in products, services, and operations.

In addition to a series of banks aggressively cutting staff, some banks continue to recruit staff, but the recruitment scale is not large. The explanation for this increase and search for human resources is that with the impact of digital transformation on the banking sector, banks are in dire need of information technology labor to meet digital technology trends. They also need experts in risk management, especially environmental risks, and green credit fund management is of more concern than ever. In the context of digital transformation and climate change, banks desperately need high-quality human resources, so they inevitably increase recruitment. Among the vacancies, most banks need human resources related to the

fields of information technology, along with risk management and credit management to meet digital banking trends and climate change.

## **4.2. Opportunities and challenges for human resources in the banking sector in the context of digital transformation and climate change in Vietnam**

### ***4.2.1. Opportunities***

The convergence of digital transformation and climate change presents a unique opportunity to cultivate a high-quality workforce, thereby inspiring employees to enhance their value and competitiveness within the labor market. This dual challenge encourages the human resources in banks to acquire new skills, including big data management, artificial intelligence (AI), blockchain, sustainable development, and risk management. Consequently, it creates an opportunity for human resources in the banking sector to expand in both quantity and quality, fostering a more diverse and innovative work environment.

Besides, a shift in investment behavior from carbon-intensive industries to green finance has attracted capital and preferential loans from international organizations (WB, IDA, ADB). These abundant resources will be utilized to address climate change issues, safeguarding the environment and facilitating loans for sustainable projects, which then enhances the bank's reputation and fosters trust in its societal responsibility. Along with income from the bank's activities, with the provision of green finance, each employee has a clear sense of their contribution to society by working on these projects, increasing their satisfaction and motivation.

To summarize, climate change will push banks to focus on social responsibility and sustainability, thereby cultivating a favorable public image and increasing their employees' responsibility to society, while digital transformation encourages them to acquire more skills. Thereby, this dual challenge fosters changes in banks' human resources, improving the effectiveness of implementing government policies (such as Net zero).

### ***4.2.2. Challenges***

The biggest challenge in human resource development: Digital transformation requires banking human resources to master new technical skills such as Big Data management, Artificial Intelligence (AI), and Blockchain, as well as adaptability and in-depth knowledge of information technology. However, Vietnam's workforce has yet to meet these demands.

According to the Global Talent Competitiveness Index, in 2022, Vietnam's digital skills ranking stood at 82nd out of 133 countries.

Banks in Vietnam face difficulties in accurately assessing risks associated with the level of physical infrastructure, employees, customers, and their suppliers exposed to harsh climatic phenomena, and the lack of standardized industry models for integrating climate risks into bank risk management.

Digital transformation and climate change will increase the demand for roles related to IT, technology, and data, as well as higher skills in risk management and quality of human resources. However, these roles focus especially on high-quality human resources, are hard to find, and require significant investment due to market competition; in particular, positions regarding CEOs with expertise in digital transformation, climate science, and risk management are in high demand across all industries.

According to TopDev's report on IT human resources, it is predicted that from 2023 to 2025, Vietnam will still face a shortage of 150,000 to 200,000 programmers/engineers annually. Many external career choices make it challenging to find and retain tech talent.

Digital transformation and climate change will necessitate new policies, tools, and work processes. Meanwhile, banks must adhere to new regulations on sustainable development and social responsibility set by governments and regulatory agencies.

There is a high risk in the case of poor implementation and *information security*: Banking is one of the few business sectors with significant financial and reputation risks. Digital initiatives in this sector must be carefully planned, modeled, and tested before market release. The primary goal is to prevent operational disruptions and minimize potential vulnerabilities that could lead to leaks, loss of information, or unauthorized access to bank accounts. Along with the diverse development of channels, forms of customer interaction, and the banking technology ecosystem, security regarding IT infrastructure and data is *one of the biggest challenges* in digital transformation, leading to high risks for the bank's survival, consumers, and society.

#### **Some issues posed for training human resources in the banking sector:**

*Firstly*, training efforts have not kept up with rapidly changing life demands in both quantity and quality. Working in banking requires a deep understanding of this field and proficiency in IT, business management, and banking operations. This means recognizing the difference

between manufacturing enterprises and commercial banks—both are businesses, but *the latter deals with money*. It is not about mobilizing inputs, producing products, and selling them in the market. Instead, it is about capital mobilization, designing credit packages, evaluating loan projects, and managing the risks of borrowing customers. Business management varies at different levels: between the State Bank and commercial banks, between headquarters compared to branches and transaction points interacting with deposit and loan customers.

*Secondly*, in training Banking students, although under the same curriculum framework, there are differences in training perspectives, methods, and styles, and practices vary at the same educational level.

*Thirdly*, due to the different positions of banking training institutions and varying financial strengths, training programs and practices accessing international standards and foreign experts vary significantly. Moreover, the output quality differs across training institutions due to the advantages of learners' inputs.

#### **4.3. Recommendations to enhance the quality of human resources in the banking sector amidst digital transformation and climate change in Vietnam:**

##### **4.3.1. For the State Bank**

The State Bank needs to focus on performing its "*sector leadership function*", researching and devising *strategies for banking sector development and human resource growth; training high-quality human resources*, forecast workforce needs for each period to plan training accordingly; designing training programs based on international standards to avoid redundancies or shortages; develop standardized curriculums according to developed countries' standards tailored to Vietnamese conditions; standardize the team of lecturers, officers, and officials in the banking sector.

To implement digital transformation in Vietnam, the State Bank must prioritize training high-quality human resources, especially the "most elite experts", at a national level to *enhance the quality of institutions and policy-making capacity on a legal basis* for new technologies, business models, digital government, and cybersecurity; develop and improve institutions for industries with new business models to ensure transparency, encourage innovation, and align with the risk level of industries and business activities; adopt experimental mechanisms and *create a legal corridor for the activities of banks and enterprises in the new era*.

In the immediate future, it is necessary to *promulgate policy frameworks for high-quality human resource training and international cooperation* to contribute to implementing a digital transformation strategy adapted to climate change for 2026 - 2030 concerning digital banking, electronic money, and electronic payment mechanisms in the context that other countries have applied these techniques will affect Vietnam's banking and finance.

National teaching and research activities should continue to research, facilitate, and encourage credit institutions to connect and share data with state management agencies and adopt Open Application Programming Interfaces (Open APIs) to create new products and services and improve banking service quality. Early research for enacting a legal testing framework for applying Big Data, AI, Robotic Process Automation, and Blockchain technology in banking operations is essential, especially for *securing the banking system and consumers* during digital transformation.

#### ***4.3.2. For Commercial Banks***

Apart from relying on formal state training institutions, commercial banks must proactively recruit and nurture their banking human resources. This can be done by first supplementing IT knowledge, followed by financial knowledge and banking operations, rather than the other way around. They should hire IT experts specialized in AI, microchip design, microchip technology, programming, and cybersecurity to develop electronic payment methods, move towards digital banking, and other applications that ensure the introduction of consumer-friendly new products and bank safety.

For the staff at branches, commercial banks should regularly upgrade their employees' qualifications. Aside from basic knowledge and banking industry directives, employees should be further trained in IT to understand electronic payments, digital banking, e-money, legal knowledge, sales skills, management knowledge, communication skills, and foreign languages. They should also consider computer literacy and management skills for their staff.

Commercial banks *should actively collaborate* with training institutions to set training requirements; send banking experts to teach specific topics; accept intern students, offer scholarships to high-performing students, and employ qualified graduates immediately after graduation.

#### ***4.3.3. For University Education Institutions***

Many countries have widely adopted electronic payment methods, digital currencies, and digital banking. *IT training institutions* must not only meet the general demands of various economic sectors but also offer specialized training for the banking sector's unique requirements in the new context. *Banking training institutions* must approach international training standards to change program structures and course content; boldly invest in renovating programs, and provide facilities and equipment to apply simulated banking, stock simulation, and company simulation models to enhance banking human resource training quality. Furthermore, they should have a suitable remuneration policy for lecturers and researchers.

They should expand collaboration with international financial and monetary organizations and foreign training institutions for banking human resource training. Based on diversifying collaboration entities and forms, they should maximize support in finance, programs, training content, lecturers, and teaching methods. They should encourage training institutions to collaborate with foreign educational establishments to improve management, scientific research, technology transfer, training, and lecturer development.

#### ***4.3.4. For Banking Human Resources***

For banking human resources, even as students, it is crucial to understand the banking sector's future development trends and requirements, preparing well for their career paths. Therefore, besides specialized banking knowledge, students must also prepare essential knowledge in modern banking technology, understand blockchain, AI, and e-commerce, and be proactive in improving their language proficiency, soft skills, teamwork skills, and creativity to meet future job requirements.

## **5. CONCLUSION**

The growth rate of digital transformation and climate change *has fundamentally changed the human resource structure* of the banking sector towards increasing the proportion of human resources with skills and knowledge of information technology in finance. This requirement causes banks to face the problem of lacking qualified staff to operate and master electronic payment and digital banking technology. Facing the new situation, training, and fostering solutions are necessary and important, but there needs to be a systematic way of looking at solving the problem, starting to change the thinking of leaders, and planning training strategies. The creation of the entire system and the

joint organization and implementation of the State Bank and commercial banks in a systematic way can meet practical requirements.

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