



Evaluation of the impact of the fourth industrial revolution on science research and training high quality human resources in higher education

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Abstract

Our Party and State have consistently regarded education and training as critical components in the enhancement of the country. "Continue to promote the development of human resources, mainly high-quality human resources, with a focus on modernizing and enhancing the quality of education and training to meet development requirements in the industrial revolution 4.0 and international integration", the 13th Party Congress decided. In this article, the authors analyse the significance of higher education and training in the development of quality human resources, the status of education and training in Vietnam in recent years, and then propose some solutions for innovating and improving education and training in order to contribute to prominent human resources in Vietnam.

Keywords: Human resources, high-quality human resources, the fourth industrial revolution, education and training

1. Introduction

Human resource (HR) is referred to as the combination of physical elements, intellectual abilities, labor skills, working styles, life experiences, morals, beliefs, cultural qualities, and capacity that people themselves as well as their society can mobilize into the creative working life for the advancement of society. The fourth industrial revolution emphasizes how important it is for high-quality human resources in general and the technical workforce in particular to be confronted with a rapidly changing challenge. In the context of proactive and active diplomacy in international integration, the labor market will be drastically challenged by the quality and quantity of labor supply and demand, as well as the structure of labor, creating fierce economic pressures on the labor market. Vietnam's forward-looking orientation focuses on human resource development as a driving force for economic growth through a variety of national strategies, with education and training policy being a key emphasis. Instead of focusing just on extending both the number and volume of educational institutions, the dominant orientation is to develop in the direction of quality training, completely providing employees with skills and knowledge to fulfill the demands of the workplace. It is extremely important to acknowledge that Vietnam's present low level of education and training, especially at the higher education level, is a key impediment to the country's scientific and technical progress. The main aim of higher education is to develop high-quality human resources for production in order to create material wealth and thrive economically in Vietnam. However, the typical issue nowadays is that universities may not completely anticipate the skills required by the job market. University training and research activities will undergo significant changes in terms of thinking, knowledge structure, skills, and methodologies for teaching rather than relying purely on traditional teaching methods. The rapid advances of the technological revolution required that educational institutions swiftly provide learners with new information, skills, creativity, adaptability to difficulties, and new requirements that traditional educational approaches cannot provide.

2. The role, characteristics and situation of education and training in human resource development in Vietnam

2.1. The role of education and training in human resource development in Vietnam

Education and training are always prioritized in the socio-economic development strategies of the majority of developing countries. Especially in the current conditions of knowledge-based economic development, human resources are increasingly occupying a central position and becoming a decisive factor for creativity, innovation, and development, so the role of education and training is becoming more and more important. In many nations, emphasizing the necessity of education and training as the genesis of national economic growth is becoming a top national policy issue. Education and training are one of the driving forces supporting the cause of industrialization and modernization, as well as a prerequisite for boosting human resources, which are a critical component in social development and quick, sustained economic progress. "Immediately develop human resources, particularly high-quality human resources, with an emphasis on radically rethinking national education. The mission of education and training is to raise people's intellectual standards, develop human resources, foster talents, make an important contribution to the development of the land economy country, and build Vietnam culture in general and Vietnam humans in particular." the 13th Party Congress redefined. According to Resolution No. 29-NQ/TW on the fundamental and comprehensive renovation of education and training to meet the needs of industrialization and modernization in socialist-oriented market economy conditions and international integration, the innovation process must be achieved through three goals in directing strategies on educational development and innovation. Human resource development is the most significant and priority goal, followed by raising people's intellectual standards and developing human resources. Today, in the context of the impact of the fourth scientific-industrial revolution, the proportion of low-skilled workers is decreasing, intellectual labor is increasing, and comparative advantage based on quantity of labor and low labor costs is also falling and is gradually moving towards countries with high-quality human resources. As a result, the quality of human resources is becoming a key component in developing competitive advantage as well as any country's swift and sustainable growth. This demonstrates the significance of education and training in our country's present socioeconomic development process.

2.2. Characteristics and major technology fields in the industrial revolution 4.0

The world is undergoing the fourth industrial revolution, which is an inevitable trend of development. The essence of the fourth industrial revolution is based on digital technology and incorporates all smart technologies, typified by the coupling of the Internet of Things (IoT) and Internet-connected systems (IoS), which cover all fields.

The fourth industrial revolution consists of 15 key areas: Big Data, Smart Cities, Blockchain/Bitcoin, Artificial Intelligence, Renewable Energy/Clean-tech, FinTech, E-Commerce, Robotics, 3D Printing, Virtual/Augmented Reality, Shared Economies, IoT, Nanotechnology/2D Materials, Biotechnology/Genetics and Agricultural Innovation, Desalination and Enhanced Waste Management.

2.3. Situation of Vietnam's capacity for training outstanding human resources

It must be acknowledged that Vietnamese higher education has made major contributions to the battle for national independence, unification, and defense of the homeland, particularly in the process of economic recovery and revitalization. Higher education is a form of educational institution that provides post-secondary education levels such as college, university, master's, and doctorate degrees. According to the Ministry of Education and Training's (2017) report and the General Statistics Office, data and analysis demonstrate that contemporary higher education activities have many flaws and deficiencies.

These deficiencies may be evident in terms of quantity, as the proportion of young people aged 20–24 enrolled in universities in Vietnam is just 10%, but it is 41% in Thailand and 89% in Korea. Our country now has around 120 students per ten thousand individuals, but Thailand has 400 students. In recent years, the number of high school students enrolling to take the university entrance test has been approximately 1.6–1.8 million, but the university system can only meet roughly one-fifth to one-sixth of the previously mentioned quantity. The Ministry of Education and Training presently regulates just around 30% of the country's universities and colleges. The present features of Vietnam's National Education system may be split into three major groupings, which are as follows:

Institutions of vocational education and training: According to statistics from the Ministry of Labor, Invalids, and Social Affairs, there are 1,917 vocational education institutes in Vietnam as of 2019. The placement system is spread across the country, including 400 colleges, 492 intermediate institutions, and 1025 vocational education facilities. There were 67,686 vocational instructors in the whole country as of December 31, 2016. In comparison to 2015, this figure increased by 11.35% (6,902 people). In 2019, the system of vocational education schools enrolled around 2,338,000 students. In 2017, the Vietnam system of vocational education schools provided 2,038,672 persons for the labor market, including approximately 488,672 with college or intermediate vocational degrees and around 1,550 thousand with short-term vocational certifications (achieving primary vocational status and training for less than 3 months).

Training human resources for academic practice: Vietnam had 237 universities and academies in 2019. There are 172 public universities, 60 private ones, and 5 institutions with 100% foreign capital among them. In addition, Vietnam's education system now includes 31 pedagogical colleges and 2 pedagogical intermediate schools. The university staff appears to have changed little over the last 17 years, while the number of students has more than doubled, from 150,000 to 300,000. On the other hand, the proportion of lecturers with a doctorate degree is also very low, which amounts to only about 10%, whereas the proportion of doctors in the teaching staff at Western universities is about 70% on average; the number of lecturers who are professors and associate professors is also very low (professors account for 0.1% of lecturers, but associate professors account for more than 5%). According to the Ministry of Education and Training (2018), in the 2016–2017 academic year, 16,514 out of a total of 72,792 university teachers in Vietnam gained doctoral degrees, and 43,065 received master's degrees. In the 2019–2020 academic year, Vietnam's higher education system is going to teach 1,518,986 students. Approximately 15% are

studying fundamental sciences and science and technology, whereas 43% are pursuing economics and law.

Training human resources for academic: In 2019, the majority of Vietnam's 237 higher education institutions were licensed to offer a master's degree program or associate degree training. The number of graduate-level enrollments grew until the 2018–2019 school year. During the 2017–2018 academic year, this system trained 105,801 master's students, 13,587 PhD students, and over 1,000 doctoral students. In the 2018–2019 academic year, Vietnam's higher education system trained 108,134 postgraduate students, including 11,000 PhD candidates. In the academic years 2016–2017 and 2017–2018, 35,918 master's and doctorates were conferred by Vietnamese higher education institutions.

In summary, Vietnam's national education system has created a comprehensive education system throughout the years, with all levels of education and training genres dispersed throughout the country to meet the demands of a high-quality labor market. However, there are still some quality restrictions, as indicated by professors' uneven teaching competency; even prominent universities have many lecturers who do not meet the stipulated standards. This shows that Vietnam's job market is getting increasingly fragmented at the lower education levels. Meanwhile, Vietnam's higher education institutions have fallen short of meeting the need for an increasingly skilled workforce, both in terms of labor market quantity and quality.

3. Opportunities and challenges for education and training quality human resources

3.1. Opportunities

Firstly, our Party and State have prioritized education and training in their growth initiatives. The development and enhancement of human resources, particularly high-quality human resources, is a crucial component of the country's rapid and sustainable prosperity. "Education is the most important national policy," according to the Political Report of the 12th Party Congress. "Developing education and training to improve people's intellectual standards, train human resources, and foster talents" necessitates "a significant shift in the educational process, primarily from knowledge provision to comprehensive capacity and learner quality; learning goes hand in hand with practice, theory with practice."

Secondly, the world is undergoing the Fourth Industrial Revolution, which is having an immediate influence on Vietnam. This is a tremendous chance as the country continues to industrialize and modernize. However, the lack of high-quality human resources presents an opportunity to strengthen human resource training in general and high-level human resource training in particular in order to meet labor market demand in the coming years.

Finally, throughout the current integration process, Vietnam has actively engaged in the signing of FTAs, CPTPP agreements, and other agreements, especially the recently effective EVFTA Agreement. Experts believe that the opportunities from the agreements that Vietnam has joined will give Vietnamese businesses great development opportunities, provided that employers have the right workforce to work. Furthermore, European organizations depend heavily on technology; the needs of European corporations include not only inexpensive labor but also expertise. This will support excellent human resource training activities at a high professional level.

3.2. Challenges

Firstly, our country's education is still generally of poor quality. On the one hand, it has not yet reached the advanced level in the area and throughout the world, and on the other hand, it has not yet met the professions in society. We can see that the training quality of our country's universities is still too limited in terms of four quality criteria for graduates: general knowledge (including social knowledge, proficiency in computer technology, English, etc.), professional knowledge, problem-solving skills, and personality criteria. Secondly, in terms of facilities and lecturers, it demonstrates that the university training sector's teaching personnel are in short supply and typically of poor quality. Education administration is still inefficient, and education programs, courses, and methodologies are sluggish to change and update. In terms of techniques and forms of higher education organization, universities in our nation do not typically approach the world's popular methods and forms of higher education organization. The infrastructure of the institution is not synchronized and continues to be deficient.

4. Solutions for innovation and improvement of education and training for the development of human resources in Vietnam

To carry out the mission of education and training for the purpose of human resource development in our country, the authors propose focusing on adopting the following basic solutions:

First, the Party and the State must increase their leadership in education and training reform in keeping with the global market economy's growing trend. For the country's socioeconomic growth, industrialization, modernization, and international integration goals, the state develops human resource strategies based on fields and training levels. It is vital to focus on overhauling the key components of the education and training development plan with an emphasis on improving learner quality and ability. Simultaneously, investigate and remodel the general education system to meet the country's distinctive requirements as well as the country's and the world's educational development trends.

State management agencies' engagement is crucial in two ways:

1. Increasing the importance of labor force forecasting for training orientations at educational institutions;
2. Acting as a link between international cooperation in economics and technology such as FinTech and e-commerce-cooperation in training and retraining human resources is crucial.

Second, establish excellent collaboration among enterprises, employers, training institutions, and the government in order to generate human resources that meet social needs. Focusing on mobilizing social resources to engage in and respond to labor market human resource needs in a timely and effective manner. In order to develop human resources, it is necessary to aggressively socialize the vocational training sector, form public-private partnerships, and encourage local and foreign firms to participate in the education and training system. Proper structures and policies are essential to establishing a partnership between training institutions and businesses in terms of human resources, the design of training content and programs, and the effective use of educational and training commodities. Simultaneously, the State should create conditions, as well as robust processes and policies, to

encourage firms from all economic sectors to spend funds on building and developing an enterprise training system. Organize continuous training for employees in the fields of FinTech, E- Commerce, modern ERP (a modern Enterprise Resource Planning system that uses the latest technologies such as artificial intelligence (AI) and machine learning to provide full visibility into every aspect of the business), etc. Actively collaborate with overseas partners in personnel retraining or collaborate with foreign partners through scientific and professional societies.

Third, human resource training should focus on meeting the diverse and multi-layered technical demands as well as the growth of sectors and professions, particularly in the context of modern Industry 4.0. Fintech human resources must be knowledgeable about information technology and have professional financial abilities. Meanwhile, human resources in Vietnam frequently fail to achieve these two requirements due to a lack of training institutions offering training specialties that fully match the aforementioned requirements for having a sufficient number of high-quality human resources in the Fintech industry.

Training programs at financial and banking institutions are essential to developing technical expertise. The core contents include basic programming, information technology application in fields such as financial data analysis (Big Data Analytics, Artificial Intelligence), and financial market infrastructure (payment technology, risk control, digital currency, chain technology, and so on). To guarantee that background knowledge matches international standards, training institutions must rely on banks, financial institutions, and FinTech businesses to seek partnerships with overseas institutions to build program material. Training institutions must evaluate prompts to determine whether they contain the most suitable quantity of knowledge based on training level and output criteria.

Fundamentals of finance and banking must be included in the curriculum of information technology training institutions. Basic finance and banking knowledge, finance and banking legislation, financial management of financial institutions, personal financial management, mathematical tools, financial statistics, and cybersecurity in FinTech operations must all be incorporated. Furthermore, output standards must reflect the nature of financial and banking operations so that they may design and create applications in FinTech competitively. These are all problems to be mindful.

In terms of teaching staff, training institutions must develop a force of trained and qualified lecturers to fulfill professional qualification standards. In the short term, it is feasible to engage local and foreign specialists to help with program creation and to participate in the teaching and training of lecturers. Training institutions are required to work with financial institutions and FinTech firms to provide practical surveys and internships for students and trainees to approach reality as well as understand the skills, strengths, and job needs of recruitment units.

Vietnam is transforming into a digital economy, which encourages innovation. Vietnam is taking any shortcuts, which necessitates the use of multiple levels of technology, the development of a diverse range of industries, both labor-intensive and spearhead industries, with comparative advantage and strategic significance for rapid growth, and the ability to participate deeply in global supply chains. As a result, in order to meet the demands for human resources throughout the industrialization and modernization

processes, education and training must be more diverse in terms of levels and vocations. Specifically, concentrating on the implementation of programs and initiatives aimed at teaching high-quality human resources for important sectors and disciplines, leading technology, etc.

5. Conclusion

With the widespread use of information technology, the fourth industrial revolution necessitates new training approaches and ways of changing. Based on the current state of human resource training as well as an analysis of the quality of human resource training capacity, opportunities, and challenges in our country in recent years, it is demonstrated that to fulfill all requirements for human resources for the economy to serve the cause of innovation and creativity, a fundamental change from the macro policy of the State through labor market management policy to the microscopic policy of the economy is required in the education institutions. Virtual training, simulation, and lecture digitalization will be future trends in professional training. The growth of a knowledge-based economy, with education and training as the most fundamental foundations, is a must for Vietnam. In the coming time, it will be necessary to create motivation and mobilize all social resources to improve the effectiveness of education and training. The simultaneous execution of the aforementioned objectives and solutions, as well as the participation of all forces, will result in a more completely and long-term socioeconomic picture in our country.

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