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Opportunities and Challenges for Vietnam Education Background Toward Education 4.0

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Abstract: In society 4.0, the living, learning, and doing environment is no longer as separate as it is today but will integrate to cater to the individual and work needs 24/7/365. The geographical boundaries between people and work will gradually be erased when humans can control the system as well as robots by remote thinking. Talking in meetings between real people and holograms (3D images) deletes geographical and psychological boundaries in human interaction. In the industrial phase 4.0, competition in the labor market will be global and borderless.The 4th industrial revolution is directly affecting individuals, families,and businesses. Especially, the biggest influence is the educational environment - the place to directly train human resources for industrial 4.0. Industry 4.0, as well as people in society 4.0, are bringing many challenges to education to meet the development needs of every nation. Education in advanced countries is currently at 3.0 and is building infrastructure as well as a mechanism to move through 4.0. Countries in Southeast Asia are drastically improving national education to welcome industry 4.0. Meanwhile, in Vietnam, the majority of education has not passed 2.0. The article focused on highlighting opportunities and challenges for Vietnamese education in the trend of the fourth industrial revolution. Besides, the paper also proposes orientations for Vietnamese education to adapt to changes in world education on education 4.0.
Keywords: Opportunities and challenges, Vietnam education, education 4.0, industry 4.0

1. Introduction

The fourth Industrial Revolution spread throughout the world as it is today because of the speed of development and the impact of technological breakthroughs have had unprecedented strong influences. Innovations and scientific advances are present in all fields, such as artificial intelligence, robotics, Internet of Things (IoT), self-driving cars, biotechnology, Na-no technology, 3D printing technology. , material science, quantum computers. The impact on most industries at such a rapid rate that people say the Fourth Industrial Revolution is growing at the speed of exponential functions[1].Industrial Revolution 4.0[2] quietly penetrates social life to the extent that it seems natural. Experts said that shortly, products, people,and machines would communicate with each other like on social networks. These technologies have the potential to connect billions of people around the world, significantly increasing operational efficiency for organizations and businesses[3]. Activities to restore natural resources or even restore the losses that previous industrial revolutions cause. Vietnam is at risk of falling behind if it does not meet the resources to integrate itself into technology[3].In the current society, almost all activities from transportation, production, health, security are gradually using technology to replace human resources. However, for maximum effectiveness, people are the key to success[4]. Therefore, training and education playa significant role in developing human resources to meet the requirements of the 4th industrial revolution[5].

The fourth Industrial Revolution plays an essential role in creating products and services that allow us to have a better life. Conversely, this revolution may also lead to even higher inequality as new technologies will replace labor-intensive jobs[6]. This is considered the most prominent challenge brought about by this revolution. Also, there is another challenge to how to create jobs that require higher skills for people when automated technologies have replaced labor in many daily tasks.Thus, the phrase "industrial revolution" contains a significant change, not only transforming the economy but also transforming the whole culture and society. Vietnam is moving very fast from the "golden population" structure to the age of population aging. The fourth Industrial Revolution should be seen as an opportunity for us to increase labor productivity based on scientific and technical applications, effectively utilizing the current "golden population" structure. Indeed, education and training will play a pivotal role to solve this significant problem[7].The 4th industrial revolution is directly affecting each, family, business,andexceptionally,the most affected is the educational environment - where directly training human resources to serve the public Industry 4.0[8].

Facing the development of education in the context of the 4th Industrial Revolution, Vietnam will inevitably face many difficulties when our education is still too heavy on the transmission of knowledge but not yet directed[9]. To develop the quality and capacity of learners; the quality of teachers and managers is not uniform; The infrastructure system is still limited.Based on analyzing the impact of the industrial revolution 4.0,

the article is based on the SWOT analysis method to assess opportunities and challenges for Vietnamese education, and provide some orientations for education — Vietnamin the era of industrial revolution 4.0.

2. The impact of the Fourth Industrial Revolution on education

One of the requirements to prepare for the Fourth Industrial Revolution is to improve human capital to meet the continually changing requirements of knowledge and skills in the new working environment. This poses an excellent mission for education and training to prepare human resources to meet the country's development requirements[10]. The problem that many countries have found and posed is to shift from a heavy education to equipping learners with knowledge and skills to an education that helps develop capacity,promoting innovation and creativity for learners, meeting the requirements set for citizens during the Fourth Industrial Revolution.

With the flow of new learning models and the development of science and technology, traditional education methods will undoubtedly be subject to many challenges.One of the highlights is the differentiation of each of the learners. Each student has different needs and learning abilities. Technological advances allow educators to design separate learning pathways that are specific to each case. The educational software has been put into use with the ability to adapt to each student's ability and allow students to study at a pace that suits their own needs. In many countries, this adaptive learning software has quickly replaced each or every part of the classroom textbook role.Besides, access to information has become easier than ever, leading to a question that educators need to answer is identifying the core knowledge that learners need to be equipped in the future. While past education models focus on providing learners with the knowledge and skills needed to help them become highly skilled people, educators today are a lot — more about teaching students how to learn by themselves. Education teaches students how to think, how to assess situations, complex problems in life, thereby forming the ability to solve problems[11].

Development technology has a significant influence on the role of teachers in the classroom. Technology management system with the support of technology can provide data system to help teachers monitor the progress of each class, thereby giving immediate feedback to the difficulties that students are encountering. However, technology, however modern and vital, cannot replace the teacher's role or turn the teacher into a robot. Therefore, how to leverage and master technology, let this tool support and create freedom and creativity in education is a challenge for every teacher and educational institution[12].The above changes are a reminder of how education models can operate in the near future: computers act as personal support tools in the classroom with a variety of learning routes; Teachers and parents are better equipped to understand students' learning process; The class is divided into small groups of students with appropriate skills and qualifications to work together.

3. Challenges and opportunities for Vietnamese education

3.1. Vietnam's challenges to address education and training

a. Backward thinking in planning strategies and educational policies

Characteristics of the Industry 4.0are the emergence of artificial intelligence, automation technology, new materials,and IT in data analysis (big data). With that characteristic, the industry structure will change very quickly. Most of the Industry 4.0 devices are multidisciplinary devices, such as smartphones that combine many functions, not just tools for listening and speaking. To make this product requires the integration of many sciences, many industries. Meanwhile, the Ministry of Education and Training currently applies the list of industries and requires universities to choose the right ones. In the coming time, this list of industries will be outdated quickly, because the industry is no longer a single industry.Besides, conservative thought, considering the development of Industry 4.0 is a long process has made the training innovation in university, in general, a slow and worrying process. Specific industry (IT), except for some large universities, has applied advanced new programs such as: National University (VNU) Ho Chi Minh City (UIT), Hanoi Polytechnic University, Dai Technology University - VNU-UET (VNU-UET), Academy of Posts and Telecommunications, Military Technical Academy, FPT University, other universities still train under the old programs of 3.0 generation even older, especially in basic subjects that create the foundation for IT development (egMaths). Fortunately, the Government recognized this problem, so there were drastic measures to support change. To do that, develop digital human resources, turning the advantages of "golden population" into an advantage of digital capacity in international integration and division of labor. To attach importance to training technological human resources, quickly increasing the quantity and quality of international standards to catch up with technological trends. Vietnam must become a center for providing high-quality human resources to the world digital economy. Besides, the Ministry of Education and Training has also issued a scheme to apply a unique mechanism for training IT human resources at the university level in the period of 2017-2020 to promote universities to innovate IT training programs.

b. The lag of Vietnamese education and training is farther away than the rest of the world

According to many experts, it seems that we have missed all the previous industrial revolutions and can now say less than 3.0. Historically, Vietnam was often unable to "prepare" for the emergence of industrial revolutions, thus "catching" the fruits of the industrial revolution as a "great consumer."Instead of becoming a "supplier," let alone "pioneer."Mr. Doan Mau Diep, Deputy Minister of Labor, Invalids and Social Affairs, said: "Vietnam lacks highly qualified workers, skilled workers, as well as high-level human resources in the sectors and fields that work strong impact on high and sustainable growth in the context of international economic integration. Therefore, we must train human resources to equip new knowledge and skills to adapt to changes in the digital age".With the development of technology revolution, traditional education will be completely changed in the next ten years. "Silicon Valley is developing smart robots that can recognize students' expressions and be able to communicate," said Anthony Seldon, Vice President of Buckingham University (UK), automation education will play a key role, robots will replace teachers of knowledge transfer, teachers will only serve as teaching assistants, assist in preparing tools for class or keeping class order only.

Previously, training in Vietnam often followed the process: setting up training programs, providing training programs,and graduating students, in which university training stopped at the graduation stage. However, in the new context, universities will have to change their training goals, study the process of students seeking jobs after graduation, as well as their contributions to increasing production efficiency for the company, from there consider redesigning the training program. For example, APEC's approach is to hire a company to find data on 350,000 listing information about jobs in the US, then calculate how much money a particular job earns, how much care is needed necessary skills, from which a set of data science skills for learners is best suited to the market. Vietnam can also statistics such ashuman resources [9]. How to change this? That is also a problem for education and training in general and science and technology training in particular.The emergence of technologies integrated intoIndustry 4.0, which has changed the base of production and services, it sets new requirements for human capacity; Since then requires universities to change training programs to meet the requirements of CMCN 4.0. Currently, the construction training program has not been flexible; the content is not consistent with the needs and trends of the labor market Industry 4.0. This results in a gap between training at universities and colleges with the fact that the demand for human resources at enterprises is too far. Most students after graduation are not good at knowledge, skills,and foreign languages. The number of students graduating from school is only about 30%, and the rest must be retrained (supplemented). For example, according to the Institute of Information and Communication Strategy Institute, currently, 72% of IT students have no practical experience, 42% lack teamwork skills [6].

The problem is how to train human resources in the field of science and technology in an effective and quality way to meet the new requirements of society. It is also the problem that is being posed for our universities today.

3.2. Opportunities for Vietnamese education

In the context of the development of education in the context of the Fourth Industrial Revolution, Vietnamese education has significant advantages to receive the development opportunities that this industrial revolution brings.Our Party and State always anticipate challenges in educational activities for future generations. On November 4, 2013, the 8th Conference of the 11th Party Central Committee approved Resolution No. 29 on fundamental and comprehensive innovation of education and training, meeting public requirements industrialization and modernization in the context of the socialist-oriented market economy and international integration. The Resolution of education reform direction of the Resolution is: "Strongly transforming the educational process from mainly equipped with the knowledge to the comprehensive development of learners' capabilities and qualities. Learning with practice; reasoning with practice; school education combined with family education and social education ". On May 4, 2017, the Prime Minister issued Directive No. 16 on strengthening the capacity to access the Fourth Industrial Revolution with many essential solutions. In particular, the Prime Minister requested a drastic change in educational policies, contents,and methods to create human resources capable of receiving new production technology trends. On May 5, 2017, the Ministry of Education and Training sent Official Letter No. 1891 to all higher education institutions to guide the direction of training human resources capable of adapting to the Fourth Industrial Revolution. From 2018, this will be one of the primary contents for evaluation and development orientation for the whole industry.Besides, one of the fundamental advantages for education to take advantage of development opportunities is that Vietnamese society always attaches great importance to learning. We are always appreciated in creating a positive learning environment, ensuring discipline, good school,and helping students have theright learning attitude. Participation, encouraging young people from parents and students is also a positive factor in forming a learning society.

The third advantage is that the education management staff, the teachers - the force plays a crucial role in the educational innovation process - are always concerned, invested,and supported in capacity building. Career standards and regulations of managers at all levels and teachers are being prepared for issuance. Those standards and regulations will be tools to support managers and teachers in capacity building training to meet the requirements in the new period.

Although there are still many concerns about Vietnam's study program, it is not associated with reality, high results in the PISA examination, Intel ISEF international science and technology exam, international and regional Olympic competitions. The area that contributes to asserting our education has begun to move, focusing on students using knowledge to solve practical problems, rather than just memorizing content from textbooks. This result also demonstrates the potential of our human resources in the areas of math and science if adequately invested.Besides, Vietnam's education program always emphasizes helping students gain a deep understanding of core concepts and mastery of knowledge. The new general education program will be put into operation from 2019, changing from a content approach to capacity development and quality will be a prerequisite for fundamental and comprehensive innovation of general education.

Recently, the Ministry of Education and Training has pushed up the policy to make schools more autonomous in the implementation of curriculum and assessment. These innovations bring positive effects on the quality of our education. In the recent report of the World Bank Smarter Growth: Learning and Developing Equality in East Asia - Pacific (4), Vietnam, along with China, is considered as the two pioneering countries in educational innovation, an awe-inspiring development education system can become valuable lessons for other countries.

4. Some orientations for Vietnamese education in the context of the 4th Industrial Revolution

4.1. Attach teaching and learning to practice

Education needs to simulate and prepare learners to enter into practical life as much as technology has made it easy to access knowledge, making knowledge no longer "insurance." for the future of learners as before (5). One of the appropriate approaches is to strengthen science, technology, engineering,and math education (STEM education) in schools[13]. Accordingly, students will be equipped with knowledge associated with their applications in practice; be experienced in exploring and exploring technology associated with the knowledge learned in the educational program; are encouraged to create science and technology to improve new technology development. This is an interdisciplinary approach to equip learners with the knowledge and skills that learners can apply to solve problems in life.The Ministry of Education and Training has piloted STEM education at 15 middle and high schools in the provinces, cities of Hanoi, Hai Duong, HaiPhong, Nam Dinh, and QuangNinh. The pilot results show that STEM education directs students to close local ideas, passionate extracurricular clubs,and some change in the way of teaching and learning science[14].

4.2. Diversify educational routes

Each student will have different needs and learning abilities,and the task of education is to discover, nurture,and motivate learners to identify and pursue their interests and passions. This requires the education system to provide diverse educational pathways to cater to the individual learning styles and learning styles of each[15]. The new general education program has made fundamental changes with the integration of content at primary and lower secondary levels, sharply differentiated at the high school level, promoting career orientation, and streamlined in general education.

4.3. Encourage lifelong learning

One of the most important goals of education is to discover and nurture talents, encourage the pursuit, passion,and lifelong learning needs of learners. Achieving this goal, a major change is to restructure the system of continuing education centers and community learning centers, change traditional patterns to build lifelong learning centers[16].This is also the basic solution to implement fundamental and comprehensive innovation of education "Perfecting the national education system towards open education system, lifelong learning and building a learning society" spirit of Resolution No. 29-NQ / TW of the 8th Conference of the 11th Party Central Committee.

4.4. Promote teaching and learning foreign languages, especially English

The Ministry of Education and Training has submitted to the Prime Minister to issue a Decision approving the adjustment and supplement of the Foreign Language Teaching and Learning Project for the period of 2017 - 2025 (6) with some orientations. Such as "creating a breakthrough in the quality of teaching and learning foreign languages for all levels of education and training levels, encouraging the introduction of foreign languages into schools from preschool levels and social activities[17]. Promote foreign language teaching

integrated into other subjects and teach other subjects (such as math and science subjects, specialized subjects ...) in foreign languages. Promote the application of advanced technology in foreign language teaching and learning with an electronic learning system suitable for all subjects so that learners can learn foreign languages and approach native languages anytime, anywhere, by any means, especially in developing listening and speaking skills. Create a foreign language learning environment in schools, families,and societies for teachers, lecturers, family members, and learners (students, students) to study foreign languages".

Also, our education program should ensure learners are equipped with digital and technological insights at all levels of study to access scientific and public advances easilytechnology. In the new general education program, foreign language and informatics have become compulsory subjects at the beginning of primary school.The emphasis on the application of information technology in education management should also be paid special attention. The education sector is continuing to promote computerization in management, determined to build a seamless communication system between the Ministry of Education and Training and the departments of education and training and building a shared database of the whole industry.

4.5. Improve the capacity and expand the role of universities

To enhance the competitiveness of human resources, in addition to continually improving the capacity of scientific research and teaching, universities need to show their pioneering role in the implementation of a bright innovation mission. Create and start creative businesses. The impact of a university will no longer be limited to educating and changing students' lives. The university must be a platform to promote innovation, providing a launchpad for future entrepreneurs and start-up companies, keeping pace for industries. The Ministry of Education and Training has submitted to the Prime Minister for the approval of the Decision to support students to start their business until 2025 (7)[18]. Direct schools to innovate the construction of training programs, including the participation of managers and employers. Formulating and announcing the output standards of training programs; support the coordination between higher education institutions with enterprises and employers in training. Direct higher education institutions to strengthen cooperation with enterprises to integrate training with the needs of the domestic and foreign labor market[19].

Universities also need to embrace the trend that high-skilled workers' training time will not only be limited to 4 or 5 years but throughout their working life, as learners continue to turn aroundto get more knowledge and skills after graduation. Therefore, the old thinking of a proactive education will change, as universities determine the lifelong learning process as part of their mission. In order to help higher education institutions, develop their ability to be proactive, creative, improve operational efficiency, enhance competition and diversify types of education and training to meet human resource requirements of the country, the Ministry of Education and Training has urgently drafted the Law on amendments and supplements to several articles of the Higher Education Law to submit to the National Assembly for approval and continue to improve the system of legal documents guiding the implementation of the Higher Education Law after it is amended[20]. The Ministry has also submitted to the Government a decree on university autonomy to replace Resolution 77, formalizing university autonomy as an inevitable path of Vietnamese higher education.

5. Conclusion

To succeed in the following decades, the education sector must have a vision in the context of continuous transformation of organizational forms and skills requirements. Accordingly, future employees will need to have lifelong learning ability to be ready for changes. Current educational institutions are mainly products of technological infrastructure and social circumstances in the past. In the context of changing rapidly, educational institutions need to reconsider to improve their responsiveness. Agencies and businesses must also adapt to changing environments and need to determine the importance of developing human resource development strategies for sustainable development through cooperation with schools. To prepare for future generations and increase the competitiveness of Vietnamese people, we need to build an education system that promotes innovation and creativity, which emphasizes the importance of lifelong learning. And long-term development of learners. Above all, efficient budget allocation, coupled with a strong political commitment to education and training, will make a difference for the future of the Vietnamese youth.In the 4.0 revolution, many careers will disappear,but new jobs are born. Before the trend of automation machines to replace people, human resources must be equipped with appropriate knowledge and skills, especially knowledge of science and technology and soft skills, to meet public requirements. Work in the new situation. Therefore, the demand for training science and technology human resources to meet the requirements of the current economy becomes exceptionally urgent. Therefore, the research, construction and renovation of training programs, scientific research, management, strengthening cooperation between training institutions, scientists and enterprises to train quality human resources High, anticipated by the requirements of the industrial revolution 4.0 in the lagging

situation of Vietnam is a job that requires high determination of each training institution in science and technology.

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