

TRAINING FOR ETHNIC MINORITY GROUPS TO MEET THE DEMANDS OF INDUSTRY 4.0

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The Industrial Revolution 4.0 has created a major change in the structure of human resources, including ethnic minority intellectuals. Human resources meet the Dramatical changes of Industry 4.0 to master new technologies including artificial intelligence, connected things, big databases, intelligent robots, etc... needing the remarkable change in resource training. Infact, limitation of ethnic minority human resources capacity has made this requirement for training of ethnic minority intellectual human resources. Solutions in the article will contribute to the orientation of the training process to meet the human resource requirements in the current period.

Keywords: Ethnic minority; Industrial Revolution 4.0; Ethnic minority training; Contingent of intellectuals; Ethnic minority intellectuals.

1. Introduction

The Fourth Industrial Revolution has created significant breakthroughs in technology and the seemingly impossible fields such as health and physics. IoT (Internet of Things), AI (Artificial Intelligence) and Robotics have gradually replaced human beings, especially in the production line, resulting in the risk of unemployment for those who could not be able to meet the demand of the Industry, including ethnic minority groups. This article identified the current demand and proposed possible solutions to the training of ethnic minority workforce. Specifically, the impacts of Industry 4.0 on this group and implications for the knowledge-based training of ethnic minorities have been examined.

2. Background of the study

The 4th Industrial Revolution is characterized by the integraton of digital platforms and smart technologies to optimize manufacturing procedures and methods, among which 3D printing, biotechnology, new material technology, automation and robotics are expected to exert most impacts on daily life. Within the Industry 4.0, automated processes and data exchange for manufacturing have become an inevitable trend thanks to cyber-physical network, Internet of things and cloud computing.

Industry 4.0 is not restricted to machine systems

or smart technologies, but to a much wider scope. It involves spectacular advances in such a variety of fields as gene coding, nano technology, renewable energies and quantum computing. It facilitates the operation of “*smart factories*” or “*digital factories*” where the cyber-physical system is programmed to monitor current physical processes and create a virtual copy of the real world. Thanks to IoT (Internet of Things), these cyber-physical systems could interact with each other and with human beings in real time.

The fourth industry is evolving at an exponential (World Economic Forum, 2016) rather than a linear pace. So it takes very little time to realize a fresh new idea of technology and innovation at global scale. The technological breakthroughs in all disciplinaries at unprecedented speed have created a mutual interaction, which forms a digitalized and automated world where manufacturing processes become smarter and more efficient.

The fourth Industry has exerted substantial **economic, social and environmental** impacts on all levels: worldwide, nationwide and sectorwide. Both positive influences as well as major challenges to human resource are evident. Main difficulties include how to master this industrial revolution and master the smart machine systems, how to create artificial intelligence, how to self-

improve our personal attributes to adapt to myriad changes. The product of the education process is a comprehensively developed person so it is crucial that the knowledge-based training should meet the demand of this industrial revolution.

Besides, those of ethnic minorities have a limited access to education but they can not stand outside the unprecedented tech boom. There have been a number of studies working out solutions to the training of ethnic minorities in our current status, such as: how Industry 4.0 affects the employment of ethnic minorities in Vietnam, which approaches to help the ethnic minorities with capital and skills enhancement so that they could get better access to new technologies, new manufacturing models and new machine systems (Cuong, 2018). Those working as school management leaders have played an important part in education, therefore quality training for them must be guaranteed (Son, 2018).

This article is expected to provide a comprehensive overview of education and how it would meet the demand of the 4th industry.

3. Research methodology

A combination of research instruments has been employed (secondary data analysis, survey questionnaires, inter-disciplinary research, field research, coding and analyzing data) in several provinces where ethnic minorities are currently inhabiting. The collected data are expected to reveal the significance of knowledge-based training for the workforce in ethnic minority groups to meet the demands of Industry 4.0.

4. Results and Discussion

4.1. Industry 4.0 and challenges to the ethnic minority workforce

Digital Technology and Industry 4.0 have brought massive changes in our life. Artificial Intelligence (AI), Internet of Things (IoT) and Big Data have become increasingly pervasive.

Biotechnology wise, the Industry has created major advancements for agriculture, aquaculture, medicine, food production, environmental protection, renewable energy, chemistry and materials.

New generation robots, 3D printers, self-driving cars, new materials (graphene, skyrmions) and nano-technology have brought substantial changes in physics. The combination between virtual and real systems is now becoming the key trend of this revolution.

In “smart factories”, machines are connected to the Internet thanks to IoT microprocessor system and they are able to self-monitor the whole manufacturing process and make essential decisions and the automated machines would ultimately

replace the traditional production lines.

Billions of people worldwide are now connected thanks to mobile devices and big data. Accordingly, advanced technologies like artificial intelligence, robotics, Internet of Things, self-driving cars, 3D printers, nanotechnology, biotechnology, material sciences, energy storage and quantum computing will greatly facilitate the information processing.

The unprecedented speed of change has indicated that there is a strict requirement for quality human resource to meet the demand of the industrial revolution. It is crucial that the workforce should be able to master the advancements such as digital technology, internet of things, big data, cyber-physical system. However, the current quality remains poor, especially for those in ethnic minority areas.

Surveys from the General Statistics Office and Committee for Ethnic Minorities on the socio-economic situation of 53 ethnic minority groups of Vietnam have shown that by August 2015, the number of literate people in ethnic minority groups (aged above 15) was 79.8%; approximately 79.2% of those could be able to read and write the standard language; Only 6.2% of the employed people (aged above 15) received formal training; The number of students who are enrolled in their right education level was 70.2% (primary level: 88.9%, junior secondary level: 72.6%, senior secondary level: 32.3%); The total number of schools in ethnic minority areas was 17,722 (with 5,420 kindergartens; 5,968 primary schools; 3,652 junior secondary schools; 597 senior secondary schools; the remaining 293 schools are shared by both primary and lower secondary levels).

According to statistics from Ministry of Education and Training, for the academic year 2014-2015, there were a total of 304 boarding schools nationwide with approximately 64,697 students from 45/53 ethnic minority groups. Among which there were 215 schools at district level, 89 ones at provincial level. The number of ethnic minority students going to primary schools was 1,316,048; to junior secondary schools was 816,995; to senior secondary schools was 296,868. Currently, there are more than 13,000 ethnic minority people who receive tertiary education degrees (or above) and more than 78,000 ones have professional intermediate degree.

The above situation has indicated that labour force in ethnic minority groups have not yet satisfied the society’s demand. In general, the quality of leaders and managers in ethnic minority areas remains low. The rate of ethnic minority leaders managers in the People’s Committee

(at province and district levels) only reached 11.32%. Among 48,200 ethnic minority officers at commune level, approximately 45.7% of them receive lower secondary qualification, 18.7% have primary qualification and 1.9% have college and university qualifications. For those at village level, the qualification is much lower. In addition, the proportion of working labours with formal training only stands at 10.5%; the number of ethnic minority people with tertiary education only reaches 2.8% which is 4 times as low as that of the national standard¹.

To sum up, there are multiple challenges in the training of human resource in ethnic minority groups to meet the demand of the 4th Industrial Revolution:

Firstly, Industry 4.0 has transformed labour structures in different economic sectors. It is evident that the traditional crafts which employ manual labours will gradually disappear and be replaced by new occupations. The emergence of automated machines and smart robots will lead to labour redundancy due to the current workforce's low quality.

Secondly, the differentiation in the labour market is inevitable. Low labour cost is no longer a competitive advantage for Vietnam. As a series of old professions disappear, there will be a clear distinction between labours with high skills and low skills. Additionally, the emergence of artificial intelligence and robots will definitely replace such low-skill groups as the ethnic minority, resulting in their unemployment.

Thirdly, there is a strong demand for highly skilled workforce, especially those in such industries as information technology, computer technology, automation which are considered weaknesses of ethnic minority labours.

Fourthly, there will be an intense competition in job recruitment which calls for high-quality labours to fulfill the requirements of the 4th Industrial Revolution. The ethnic minority people who lack formal training or fail to meet the market demand will take higher risk of unemployment.

4.2. Solutions to human resource training for the 4th Industrial Revolution

The challenges in human resource indicate difficulties in education. The question is how the educational institutions can adjust to the 4th Industry's requirements.

The Resolution by the 5th Meeting of the

¹. Data from the General Statistics Office and Committee for Ethnic Minorities

12th Central Committee has highlighted the role of “developing human resource, especially the high quality to optimize the opportunities and advancements of the 4th Industrial Revolution”. This is a sound policy which demonstrates the sharpness, creativity and finest mindset of the Party.

Firstly, the development of a consistent and comprehensive network of education and training institutions is needed. Detailed planning on the number, quality, scale and structure of sectors, sub-sectors for the training of ethnic minority groups and a favorable administrative mechanism must be formulated in a way that corresponds the 4th Industrial Revolution's requirements.

Secondly, there should be a close link between the academic training program and the development strategies for skilled labours in specific sectors which have potential for future demands.

Thirdly, enhancing capability and qualification for managers and teachers of educational institutions is a prerequisite for the creation of skilled workforce that could meet the demands of the industrial revolution. This is in line with the Party's orientation to “build development strategies for human resource in specific fields and sectors through consistent and comprehensive planning, among which training and retraining of the teaching staff should be prioritized”.

Fourthly, it is essential to take advantages of Industry 4.0 in education and training to realize the goal of creating skilled workforce that meets the requirements of national development. Quality should be valued over quantity; there should be a close link between labour training and labour use in which such skills as autonomy, creativity and adaptability must be focused.

It is crucial that the Party and Government improve the legal corridor and create a favorable environment for the development of ethnic minority workforce so that local human resource can be efficiently tapped.

5. Conclusion

The fourth Industrial Revolution, with its unprecedented speed of change, has created exponential breakthroughs in socio-economics and culture of all the nations. Vietnam can not stand outside the trend. Training high quality labour for the Industry is among enormous challenges faced by many countries. The education and training sector of Vietnam has taken advantage of the fourth industrial revolution to reach national development goals. Among the strategies for human resource, enhancing the quality of ethnic minority workforce to meet the demand of Industry 4.0 is given priority.

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ĐÀO TẠO NHÂN LỰC DÂN TỘC THIỂU SỐ ĐÁP ỨNG YÊU CẦU CỦA CUỘC CÁCH MẠNG CÔNG NGHIỆP 4.0

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Tóm tắt

Cuộc cách mạng công nghiệp 4.0 đã tạo ra sự thay đổi lớn về cơ cấu nguồn nhân lực trong đó bao gồm cả đội ngũ trí thức dân tộc thiểu số. Nhân lực đáp ứng sự thay đổi đột phá của cách mạng công nghiệp 4.0 để có thể làm chủ công nghệ mới bao gồm trí tuệ nhân tạo, vạn vật kết nối, cơ sở dữ liệu lớn, robot thông minh... đòi hỏi sự thay đổi mang tính bước ngoặt trong đào tạo nguồn lực. Thực tế cho thấy sự hạn chế trong năng lực nguồn nhân lực dân tộc thiểu số đã đặt ra yêu cầu về đào tạo nguồn nhân lực trí thức dân tộc thiểu số này. Các giải pháp được đề xuất trong bài báo sẽ góp phần định hướng cho quá trình đào tạo đáp ứng được yêu cầu nguồn nhân lực trong giai đoạn hiện nay.

Từ khóa

Dân tộc thiểu số; Cách mạng công nghiệp 4.0; Đào tạo nhân lực dân tộc thiểu số; Đội ngũ trí thức; Trí thức dân tộc thiểu số.