



Human Resource in Agricultural enterprises in Industry 4.0 A Case of Thai Nguyen Province, Vietnam

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Abstract

Human resource is one of the important resources in enterprises in general and agricultural enterprises in particular, especially in the background of Industry 4.0. However, Thai Nguyen's human resource in agribusiness has critical shortage in both quantity and quality. This article analysed human resource in agricultural enterprises, labor productivity in this area and the impacts of the Industrial revolution 4.0 on human resource in agribusiness. Secondary data was collected in Thai Nguyen statistics office in the period from 2013 to 2017 and this study used descriptive and inferential statistics approach. The research has shown that Industry 4.0 has brought both opportunities and challenges, as well as positive and negative effects on human resources in Thai Nguyen's agricultural enterprises. Young workforce has opportunity accessing to new technology and enhancing labor productivity, but the quality of labors and low-skilled human resources are the challenges of Thai Nguyen's human resources. From the empirical finding, the author recommended some core solutions to provincial leaders, agricultural enterprises and human resources to enhance the quality of human resources in Thai Nguyen's agribusiness in the Industrial revolution 4.0.

Keywords: human resources, agricultural enterprise, Industry 4.0, Thai Nguyen province, Vietnam

INTRODUCTION

"The Wave of Technology" of the Industrial revolution 4.0 is increasing dramatically around the world and impacting on all areas of social life, including agriculture enterprises. In the process of existence and development of enterprises; high-skilled human resources are the resources that influence to the development of enterprises, especially the background of Industry 4.0 will create major changes in labor's supply and demands'. With more than 50% of the working-age population, a period that occurs only once in the demographic history of each nation, Thai Nguyen is in a period known as "Golden Population Structure" with young human resources and have the ability to access the change of science and technology quickly. The core of Vietnam's economic strategy has been rapid integration into the world economy, with the breakthrough in technology in the fourth industrial revolution. Although the growth and development along with the development trend of the world, Vietnam in general and Thai Nguyen in particular is still a heavy place in agriculture and rural areas, so agriculture is an important economic field. However, the quality of human resources, especially the quality of

human resources in agricultural enterprises was very low, lacking in various skills that adapt to requirements of labor market. The adaptability of employees who work in agricultural enterprises is limited, the ability to apply and create in the workplace is low. Vietnam's human resources index ranks the 62nd in the world and the 14th in the Asia Pacific region; only 5% of the laborers are proficient in English and only 10.4% are skilled workers (ManpowerGroup Solutions, 2018).

Sara Gustafson (2016) indicated that information and communications technologies can increase farmers' resilience to various shocks. By increasing their access to weather and market information, digital technologies can help farmers make more informed decisions regarding when and which crops to plant, as well as when and where to sell those crops. In addition, this digital revolution has huge potential to reduce poverty throughout developing regions. Food security and sustainable food systems are closely intertwined and the Fourth Industrial Revolution holds great promise and opportunity (James C. Collins, 2016).

Industrial revolution 4.0 also poses many challenges, especially which will dramatically change the structure of labors and the labor market. Automation systems will gradually replace manual labors in the economy as a whole. This will affect the income of simple workers and increase unemployment. The demand for employment is totally new compared with the past but it is necessary to actively prepare and regulate appropriate policies (Phung Tran My Hanh, 2018).

According to the author Do Kim Chung (2017) supposed that the influence of this revolution, traditional agriculture has developed into "Smart Agriculture". Vietnam needs to know the impact of this revolution on human resources in agribusiness in order to recommend appropriate human resource development strategies and meet the demands of "The Wave of Technology" in the Industrial revolution 4.0.

The research was conducted to analyze the income, labor productivity and quality of human resource in agricultural enterprises in Industry 4.0 through secondary data from Thai Nguyen statistic. The results of the study indicate that the Industrial revolution 4.0 has both positive and negative impacts on human resources in agricultural enterprises. From the field findings, the researcher recommends some solutions for provincial leaders, agricultural enterprises and human resources in order to "catch up the Wave of Technology" in Industry 4.0

LITERATURE REVIEW

Human resource

"Human resources" are derived from the English term "human resource", which has been used extensively since the 1960s in many Western and Asian countries. This has become common place in the world.

According to the World Bank (WB), human resource is the total human capital (physical, intellectual, occupational, etc.) that every individual can mobilize in the production process, business or any activity. Mai Quoc Chanh and Tran Xuan Cau (2000) showed that human resources are different from other resources (financial resources, material resources, technology resources ...) in that: in the process of mobilization, human resources are influenced mainly by natural factors (birth, death ...) and social factors (employment, unemployment ...)

General Statistics Office of Vietnam defined that "*human resources include people who are 15 years of age or older who are employed (working people) and those in working age who are capable of working but are in a state of being: being unemployed, going to school, doing homework in their home, having no need to work and other non-working people (not including people in the armed forces)*".

Agricultural enterprise

Bui Tuan Anh (2017) defines that agricultural enterprises are enterprises directly involved in production and business activities of agricultural products and foodstuffs or supply inputs to produce inputs for these enterprises. Therefore, the results of production and business activities of agricultural enterprises are closely related to the characteristics of agricultural production.

Industry 4.0

The term "Industrie 4.0" derives from a project in the High-Tech Strategy of the German Government, which encourages computerization of production. This term was first used in 2011 at the Hannover Fair - the world's leading trade fair for technology and industry, the industry's largest and most important event, held annually by Deutsche Messe AG.

This term has only really been of interest to the world since Klaus Schwab, President of the World Economic Forum (WEF), introduced the book "The Industrial Revolution 4.0" at the 46th World Economic Forum, WEF 46 was held in Davos - Klosters, Switzerland on January 20, 2016 with the theme of "The 4th Industrial Revolution", attracting the participation of 40 heads of state and over 2,500 Guests from more than 100 countries, including US Vice President Joe Biden, British Prime Minister David Cameron, Bill Gates, Microsoft CEO Satya Nadella, Chairman Alibaba Jack Ma, ... The Industrial Revolution Concept 4th or 4th Industry has been clarified at this forum (National agency for Science and Technology Information, 2017).

According to Klaus Schwab (2016): *"The fourth industrial revolution, however, is not only about smart and connected machines and systems. Its scope is much wider. Occurring simultaneously are waves of further breakthroughs in areas ranging from gene sequencing to nanotechnology, from renewables to quantum computing. It is the fusion of these technologies and their interaction across the physical, digital and biological domains that make the fourth industrial revolution fundamentally different from previous revolutions"*

RESEARCH METHODOLOGY

Research site

Thai Nguyen province is one of the political, economic and educational centre of the northern mountainous midland in Vietnam. Along with trending of economic development and the Industrial revolution 4.0 in Vietnam as well as the northern mountainous midland, Thai Nguyen province; with favorable conditions on geographic location, socio-economic characteristics; has created favorable conditions for the enterprise's development. In addition, with the policies about investment and enterprise development of Thai Nguyen's provincial leaders, many enterprises have established and attracted thousands labors from other provinces to work; but the amount of agricultural enterprises has increased slowly. (Thai Nguyen statistics office, 2018).

Data collection

The data used in this study is quantitative and qualitative data. Quantitative data obtained such as the number of acting enterprises, the number of agricultural enterprises, the number of employees and their income in agricultural enterprises in the background of the fourth industrial revolution, from 2013 to 2017 in Thai Nguyen province, Vietnam. The qualitative data is from Thai Nguyen profile and the agricultural enterprises informations; general description of the agricultural enterprises and the results research related to human resources in agricultural enterprises in Industry 4.0.

Secondary data of the Thai Nguyen statistics office was used. This data is retrieved and collected in connection with research in order to analyze for this research.

Descriptive and Inferential Statistics

Descriptive analysis and inferential statistical analysis were used in this article. Descriptive statistics utilize numerical, tables and graphical methods to describe the number of agricultural enterprises and human resources in the Industrial revolution 4.0 for each indicator and the average score obtained to summarize the information that they reveal and to present that information in a meaningful way.

Inferential statistics uses the data to make estimates, decisions, predictions, or other generalizations about human resources in agricultural enterprises in Thai Nguyen in the fourth industrial revolution from which the data was obtained.

ANALYSIS AND DISCUSSION

The number of agricultural enterprises and human resources in this area in Thai Nguyen province in Industry 4.0

The amount of enterprises increased steadily in Thai Nguyen province in the period from 2013 to 2017. In 2013, the number of acting enterprises was 2,090 enterprises, with the growing rate reaching about 3.26%. As a result of the financial crisis and the global economic downturn from 2013, in the year 2014 the number of acting enterprises fell to 2,019 enterprises and the growing rate decreased 3.52% compared to the year 2013. In the year 2017, the number of acting enterprises rose up 2,894 enterprises; and the growing rate reached to the highest in this period, with 32.87%. From 2013 to 2017, the average growing rate of enterprises was about 8.08%.

Figure 1 has shown the number of enterprise and growing rate enterprise in Thai Nguyen province from 2013 to 2017 as follow:

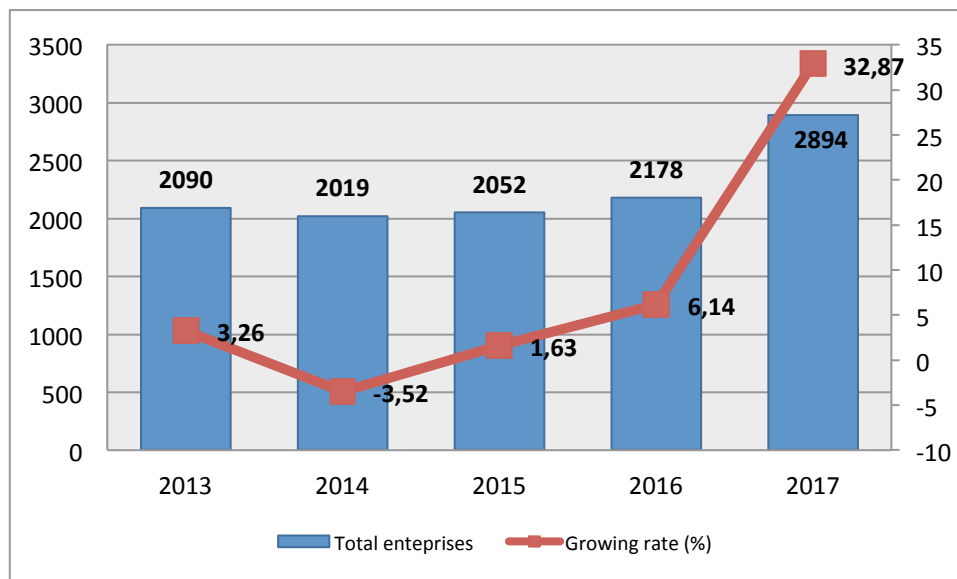


Figure 1. Total number of enterprises and growing rate of enterprises in Thai Nguyen province, Vietnam Source: Thai Nguyen statistics office

The enterprises by kind of economic sectors has included Agriculture, forestry and fishing enterprise, manufacturing and construction enterprise and service enterprises. In the period 5

years, from 2013 to 2017, the number of Agriculture, forestry and fishing enterprises remained stably and the proportion of these enterprises accounted under 1% in total number of acting enterprises in Thai Nguyen province. From 2013 to 2016, the volume of Agriculture, forestry and fishing enterprises were about from 13 to 14 enterprises, whereas there was a slight increase in the amount of Agriculture, forestry and fishing enterprises in the year 2017, at 21 enterprises.

Table 1. Number of enterprises by kind of economic activity in Thai Nguyen province, Vietnam

	<i>Unit: Enterprise</i>				
	2013	2014	2015	2016	2017
Agriculture, forestry and fishing enterprise					
Number of enterprises	13	14	13	14	21
Structure (%)	0.62	0.69	0.63	0.64	0.73
Manufacturing, construction enterprise					
Number of enterprises	814	785	830	890	1169
Structure (%)	38.95	38.88	40.45	40.86	40.39
Service enterprise					
Number of enterprises	1263	1220	1209	1274	1704
Structure (%)	60.43	60.43	58.92	58.50	58.88
Total enterprise	2090	2019	2052	2178	2894

Source: Thai Nguyen statistics office

Although the number of Agriculture, forestry and fishing enterprises increased slightly, but these enterprises have played a critical role in job creation for employees in Thai Nguyen's economy as well as Vietnam's economy. In 2013, the number of employees who worked in agriculture enterprises was 463 people; while in the year 2014, the volume of employees in this area increased up to 497 people with the growing rate reached to 7.34%. There was a sharp increase in the number of employees who worked in agriculture, forestry and fishing enterprises from just 579 people to 879 people from 2016 to 2017, with growing rate in 2017 about 51.81%. The reason for the increasing of labors who worked in this area was that Thai Nguyen's government invested to build new industrial zones such as Diem Thuy, Nam Pho Yen, Quyet Thang...Therefore, it has attracted many laborers to work in enterprises, especially Agriculture, forestry and fishing enterprises in Thai Nguyen province. In addition, this is also in the period of "Golden population structure" in Thai Nguyen, along with the background of industrial revolution 4.0 also that created the changing labors market in the province.

The tendency of the number of employees and growing rate of employees in Agriculture, forestry and fishing enterprises has illustrated as figure 2:

Unit: Employee

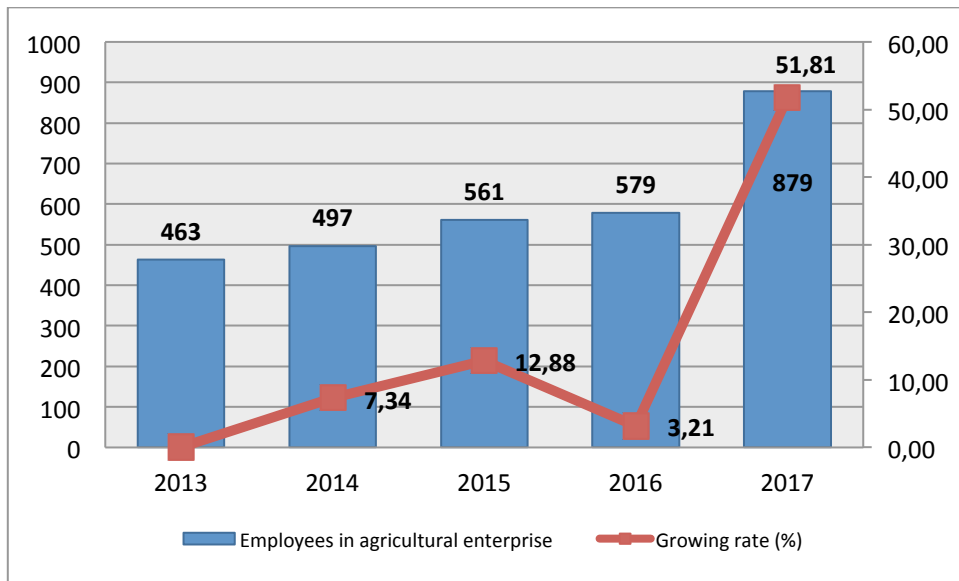


Figure 2. Total number of employees and growing rate of employees in Agriculture, forestry and fishing enterprise in Thai Nguyen province, Vietnam

Source: Thai Nguyen statistics office

Thai Nguyen labor productivity in agricultural enterprises in the Industrial revolution 4.0

Thai Nguyen's enterprises took positive impacts of the fourth industrial revolution to enhance labor productivity in the period from 2013 to 2017. There was a dramatic increase in Thai Nguyen's labor productivity from just 52.68 million dong to 112.74 million dong, a rise of about 60.06%. From 2013 to 2017, average growing rate of Thai Nguyen labor productivity was about 18.28%.

From 2013 to 2017, labor productivity in Manufacturing, construction enterprises and in Service enterprises increased sharply; especially in Manufacturing, construction enterprises. In 2013, labor productivity in Manufacturing, construction enterprises was about 84.79 million dong, with growing rate fell to 17.81%; whereas in 2014 labor productivity was 131.66 million dong, with growing rate reached to the highest, about 55.28%. Labor productivity in Manufacturing, construction enterprises continued to rise significantly and in the year 2017, labor productivity in this area was about 205.65 million dong. From 2013 to 2017, labor productivity in service enterprises increased steadily from 104.04 million dong to 142.81 million dong; average growing rate of labor productivity in service enterprises was about 6.82%.

Table 2. Thai Nguyen labor productivity in enterprises by kinds of economic activity

	<i>Unit: million dong/person</i>				
	2013	2014	2015	2016	2017
Labor productivity in Agriculture, forestry and fishing	20.97	22.21	25.42	27.83	29.78
Labor productivity in Manufacturing, construction	84.79	131.66	165.33	187.78	205.65
Labor productivity in Service	104.04	113.45	121.82	136.87	142.81
Thai Nguyen's labor productivity	52.68	67.20	85.10	100.37	112.74

Source: Author's calculation based on Thai Nguyen statistics office

Compared with other kinds of economic activity, labor productivity in agricultural enterprises was the lowest, but the growing rate of labor productivity of this area rose steadily in the period from 2013 to 2017. In the year 2013, labor productivity in Agriculture, forestry and fishing was 20.97 million dong, with the growing rate approximately 21.96% and reached its highest proportion of labor productivity; while the figure in 2014 was higher, at 22.21 million dong with the growing rate about 5.92%. In 2017, labor productivity in Agriculture, forestry and fishing increased to 29.78 million dong and the growing rate about 7%. In this period, average growing rate of labor productivity in agricultural enterprises was about 11.76%.

The information about Thai Nguyen labor productivity and the growing rate in enterprises by kinds of economic sectors have illustrated as figure 4:

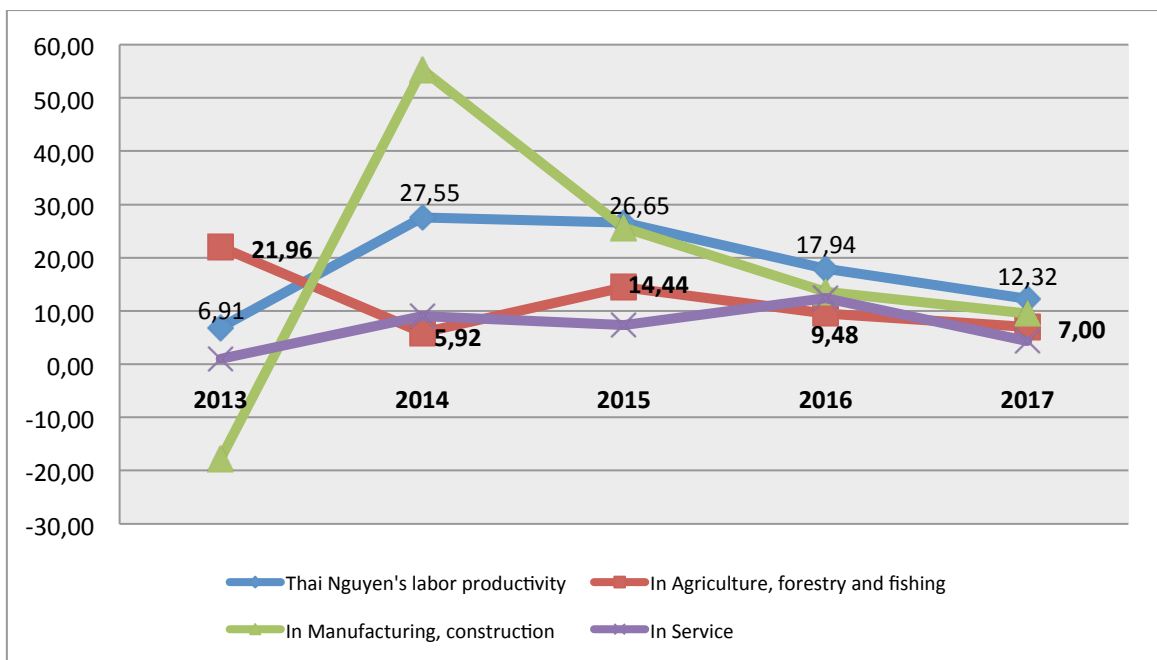


Figure 4. The growing rate of Thai Nguyen labor productivity in enterprises by kinds of economic activity

Source: Author's calculation based on Thai Nguyen statistics office

Average compensation per month of labors in agricultural enterprises compared with other kinds of economic activity in Thai Nguyen province in Industry 4.0

Figure 3 has illustrated that average compensation per month of employees in enterprises rose significantly, while average compensation per month of employees in agricultural enterprises decreased sharply in the period from 2013 to 2016.

Unit: thousand dongs per month

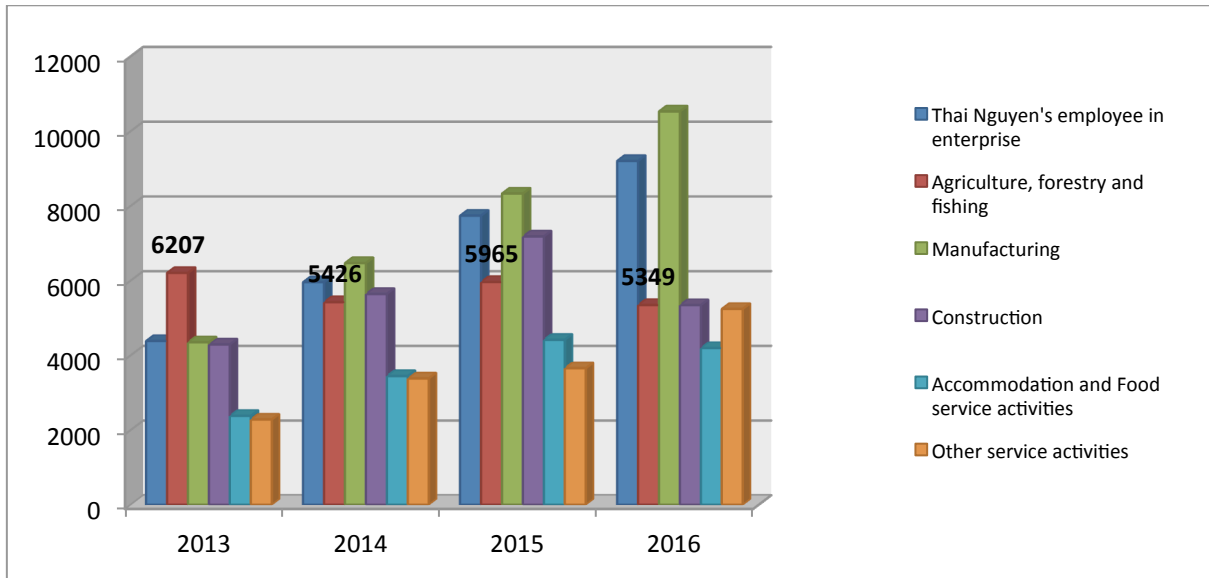


Figure 3. Average compensation per month of employees in enterprises by kinds of economic activity in Thai Nguyen province
Source: Thai Nguyen statistics office

In the year 2013, average employee’s income per month of Agriculture, forestry and fishing enterprises was at its highest; at 6,207 thousand dongs per month; while average employee’s income per month of other service activities was its lowest, at 2,283 thousand dongs per month. In 2016, compared with other kinds of economic sector enterprises in Thai Nguyen province, the average compensation per month of Agriculture, forestry and fishing enterprises decreased at 5,349 thousand dongs; whereas the average employee’s income per month of manufacturing enterprises was 10,531 thousand dongs and average wage per month of employees who worked in Thai Nguyen enterprises was 9,205 thousand dongs. The increase of industrial zones in Thai Nguyen and the human resource attracting policies of manufacturing enterprises about the salary led to a significant increase in income in the manufacturing sector. In addition, “the wave of technology” in the Industrial revolution 4.0 has applied in many manufacturing enterprises and this will improve labor productivity; thereby the employee’s income in this area increased rapidly in the period from 2013 to 2016.

The impact of Industry 4.0 on Thai Nguyen human resources in agricultural enterprises

Thai Nguyen is one of the fastest developing province getting started from agriculture, with advantages of great natural resources and human resources is in a period of “Golden Population Structure”. Agriculture is a foundation, a development axis, and a strong pillar of the economy and Agricultural enterprise is one of important Thai Nguyen economic sectors. Over the year, economic development of Thai Nguyen province has depend much on agriculture and these enterprises have recorded continuous growth with important achievements, contributing

to nationwide economic stability, reducing poverty and improving the standard of living for rural areas.

The analysis results illustrated that total number of enterprises by kind of economic activity increased significantly, but the number of agricultural enterprises increased slightly. In the fourth industrial revolution, Thai Nguyen's labor productivity in agricultural enterprises was the lowest compared to other kinds of economic sector, so the average compensation per month of labors in this area was very low. While other kinds of economic sectors, especially manufacturing enterprises with the fourth industrial revolution results in strong development of new technologies and robots, resulting in a bigger gap between the employee's income in agricultural enterprises and manufacturing enterprises, and ultimately in potential social conflicts.

In addition, quality of human resources in Agricultural enterprises has not met the changing of Industry 4.0. The labors in Thai Nguyen with the advantages of low cost labors will significantly affect in Industry 4.0. The development of science and technology can lead to mass unemployment, as a large number of laborers in agriculture will not be able to adapt to new technologies. Human resources in agriculture enterprises are in short supply both in quantity and quality. Therefore, the needs of enterprises about high quality human resources have so much and it is difficult to find human resources because of lacking of young human resources in agriculture, shortage of skilled labor, shortage of soft skill,...

The industrial revolution 4.0 and high technology applied to agriculture, enterprises need labor to fully meet the skills and think to exploit, use technology, apply advanced technology to manufacturing. However, the high rate of low-skilled labor force has a huge impact on access to science and technology. In addition, agricultural laborers are mostly old people, production mainly based on experience, the ability to apply technology to production is very limited; less updated scientific and technological information. Young professionals are very few in the agricultural sector and most do not like to participate in this field. This is an issue of concern for agriculture in general and for agribusiness in particular.

After the effects of industrial revolution 4.0, Vietnam has faced with many challenges, especially the ability to compete to maintain and seek job of low-qualified labors. In the "Readiness for the Future of Production Report 2018" report was released by the World Economic Forum (2018), in a total of 100 countries, Vietnam fell in the group of countries where are not ready for the 4th industrial revolution; the quality of human resources ranked No. 70 and the indicators related to innovation and the quality of human resources at a very low level.

The Industry 4.0 requires the Vietnamese labor market to improve its quality in a changing world of work. Beyond negative effect in Industry 4.0, employee in agricultural enterprise has many opportunities to approach and participate in the new technology as it has a youthful labors market with "*Golden Population Structure*". The industrial revolution 4.0 has the potential to develop human resources through improving the knowledge and professional experience of the local workforce to adapt to the requirements of automation and digitization, providing the labor market information, analysing and orientation, while sharing experience of international labor markets, connecting and enhancing labors all around the world.

CONCLUSION AND RECOMMENDATIONS

The research conducted above indicates that the number of agricultural enterprises has not changed significantly and the labor in this sector increased slightly compared to other kinds of economic sector in the period from 2013 to 2017. The labor productivity and average compensation per month of employees were the lowest because the agribusiness lack high-

skilled human resources to meet the change of “The Wave of Technology” in Industry 4.0. Thai Nguyen’s human resource are in the situation of lacking of young human resources in agriculture, shortage of skilled labor, shortage of soft skill,...

The results of this study indicate that the Industrial Revolution 4.0 is an indispensable trend, that is happening and nothing can be resisted. Beyond the challenges, Industry 4.0 has brought many opportunities for Thai Nguyen human resource adapt to the need of labor market. From the field findings, the author recommends some important requirements for employee to enhance labor productivity and quality of human resource in Thai Nguyen in the fourth Industrial revolution.

Provincial leaders and organizations should have ways of forecasting the labor market needs in “The Wave of Technology”. There should be policies to help human resources be consulted, be fully informed about labor market needs, especially in agricultural enterprises, avoid unemployment after training. In addition, the training of human resources in agribusiness should be integrated with other national target programs, particularly in connection with the new rural development program of the national target.

When Agriculture 4.0 occurs, the labor market will have surplus labors, especially low-skilled workers. From there, it is necessary to have a mechanism to improve the quality of agricultural labor for agriculture 4.0. In addition, businesses need to combine with training institutions to develop specific training programs in order to integrate training with production.

Workers need to improve actively their skills, self-consciousness, practise the industrial style actively adapt to the requirements of agriculture 4.0.

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