PREPARATION OF EDUCATION AND LABOR NEEDS OF THE BIOFUEL AND BIOCHEMICAL INDUSTRIES WITHIN EASTERN ECONOMIC CORRIDOR (EEC)

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Received 20 Febuary 2019
Accepted 13 May 2019

ABSTRACT

This research aims to study the development of an educational curriculum and the availability of labor market of biofuels and biochemicals industry within Eastern Economic Corridor (EEC). The sample groups consisted of 20 people, including 7 people from government and 13 people from educational institutions, using content analysis method. The tool used for data collection is government group interview and the group of educational institutions. The study found that in the government sector 1) has cooperated with educational institutions by integrated coordinating with technical colleges and open coordination center for production and development of vocational manpower (EEC) within the college in order to plan production and develop manpower to meet the need of enterprises. 2) preparing basic information is the demand for manpower, labor force and manpower development in the Institute for Skill Development. 3) preparing courses for skill development to support 10 target industries, cooperating with enterprises in the specific curriculum as required by enterprises. 4) designing questionnaires to survey the labor needs of enterprises and then use the data to analyze how much of labor the enterprises need and what kind of labor is needed. In the field of academy 1) There are only 3 educational institutions with branches that are related to biofuels and biochemicals industries, which are related to the vocational level only, consisting of industrial chemistry and petrochemical fields which currently still use the same curriculum and develop additional courses but still do not comply with the requirements of the enterprises relating to the biofuels and biochemicals industries. 2) with collaboration between educational institutions and enterprises. The enterprises will come to create additional courses, including funding to students, providing personnel to give knowledge and training in the areas of specialization with teachers and learners to increase skills and experiences. 3) There is a little for educational institutions with branches that are related to the biofuels and biochemicals industries and lack of human resource, are the professor and educational equipment. As well as each educational institution having 40 - 80 students graduating per year, but enterprises there are not enough students to meet the needs of enterprises.

Keywords: Curriculum Development, Availability of labor market, Vocational, Eastern Economic Corridor (EEC), Biofuel and Biochemical Industries

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Introduction

Thailand has developed economy and industry continuously. In the early stages, Thailand focused on driven with farmers because it is a country that is rich in natural resources and biodiversity. In the later stages, the light industry was developed to replace the import amount, follow by the development of heavy industries to focus on exports. But at present, Thailand has faced with 3 traps, such as, Middle Income Trap, Inequality Trap, and Imbalance Trap of Development combined with the accumulated structural problems resulting in low competitiveness, therefore causing obstacles in developing the country to grow in the future (Ministry of Industry, 2016).

Subsequently, the government under the leadership of General Prayut Chan-ocha has drafted the national strategic plan for 20 years under the concept of Thailand 4.0, driven by knowledge and innovation in order to comply with Sustainable Development Goals: SDGs. 20-years national strategic plan consisting of 6 strategies, namely (1) security strategy (2) strategies for creating competitiveness (3) developing strategy and empowering people (4) strategies for creating opportunities, equality and social equality (5) Strategies for creating growth on the quality of life that is environmental friendly (6) strategies to balance the development and public administration. The 6 strategies mentioned are long-term national development strategies which help raising the quality of the country, bring the country out of current problems and able to cope with threats and able to manage future risks by defining the vision "Thailand has stability, prosperity and sustainability as a development country with develops according to the philosophy of sufficiency economy " (Ministry of Industry, 2016, p.19)

From the 20-years national strategic plan (2017 - 2036) mentioned above, strategic plan for creating competitiveness considered to be the most important in industry, the cabinet therefore agreed to develop Eastern Economic Corridor (EEC) project to attract Thai investors and foreign investors. Which consists of 3 provinces: Chachoengsao, Chonburi and Rayong, these 3 provinces are the major industrial production bases of the country, including the petrochemical industry and automotive and parts. Together with the availability of important structure, namely Laem Chabang commercial port, Map Ta Phut port, special highway between cities (Motorway), double track railway, high speed train, U-Tapao International Airport. It's considered that the eastern region is located in the best strategic location of the ASEAN region which can be linked to China and India, where there are a lot of population and there is a high rate of economic expansion. Thus, the development of 10 industries is provided, namely the extension of 5 original industries + 5 new industries, namely 5 former industries (First S-Curve), consisting of (1) The Next-generation Automotive Industry (2) The Intelligent Electronics Industry (3) High Wealth and Medical Tourism Industry (4) The Advance Agriculture and Biotechnology (5) The Food Processing Industry. 5 new industries (New S-Curve) consisting of (1) The Robotics Industry (2) Aviation and logistics Industry (3) Biofuels and biochemical industries (4) Digital Industry (5) Comprehensive Healthcare Industry (Strategy and information group for provincial development, 2017) in order to attract investors and can increase potential of tourism as well. Biofuels and biochemicals industries are classified as one of the industries that are very important to Thailand because more than 50% of Thai people are engaged in agriculture thus making Thailand a large number of agricultural waste materials and is utilized to a minority. Biofuel and biochemicals industries are important in bringing various waste materials converted into energy and biological chemicals.

From labor needs estimation of

biofuel and biochemical of Ministry of Labor in 2017 found that there is increasing of labor hiring only 1,074 in 2017 to 2,461 in 2018 and increase to 5,735 in 2027. A group that has more employment is Professional qualification and Bachelor Degree, while reducing the qualification to middle school or under. For example, Petrochemical Researcher, Chemist about renewable energy and Researcher. (The Secretariat of The House of Representatives, 2018)

But in modern times, production and labor force development at the vocational level still unable to meet the needs of the labor market as it should be. Because the researcher found that there are only 3 educational institution within Eastern Economic Corridor (EEC) which has branches there are related to biofuels and biochemicals, can produce a few students and not enough for enterprises. So, it is the cause which affect to the national competitive performance development. Therefore, the researcher is interested in studying the preparation of education and labor requirements of the biofuels and biochemical industries within Eastern Economic Corridor (EEC), to be able to create workforce with specific expertise and effective to the labor market.

The Objective of the Study

1. To study the development of the curriculum in the biofuel and biochemical industry within Eastern Economic Corridor (EEC).
2. To study the availability of a labor market of biofuels and biochemicals industry within Eastern Economic Corridor (EEC).

Conceptual framework

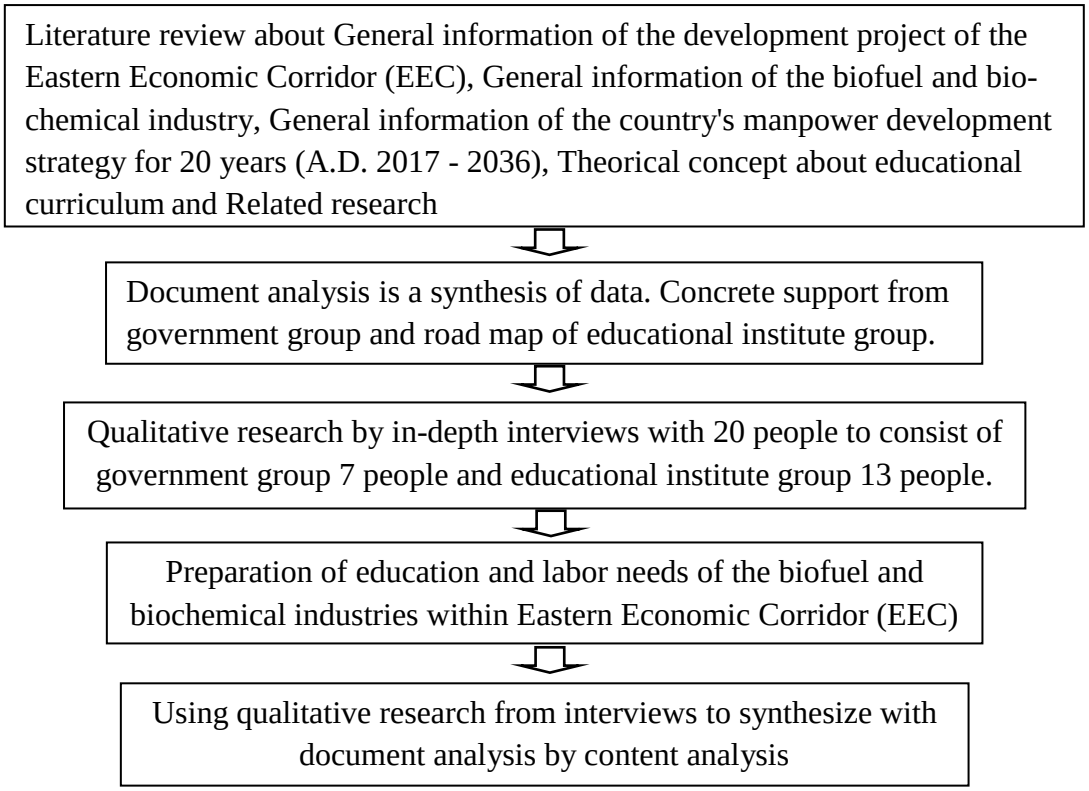

Figure 1 Conceptual framework

Expected benefits from research

1. Ministry of Education and Ministry of Labor can apply the results to the educational policy that can develop labor skills to meet the needs of the biofuel and bio-chemical industries within Eastern Economic Corridor (EEC).

2. Enterprises can apply the results to plan for labor rates in the biofuel and bio-chemical industries within the Eastern Economic Corridor (EEC).

3. The General public knows and can choose to study in a branch or course that is a requirement of the biofuel and bio-chemical industries within the Eastern Economic Corridor (EEC).

Literature review

General information of the development project of the Eastern Economic Corridor (EEC).

Thailand has grown up by the Eastern Seaboard since 1981, but now Eastern Seaboard is very small. If later on, Vietnam's Ho Chi Minh Industrial Estate, Myanmar's industrial estate, Tiwa become larger, Thailand will be pressured more in terms of investment. Thai government must urgently push for more investment. (Strategy and information group for provincial development, 2017)

On June 29, 2016, the Cabinet approved the principle of the Eastern Economic Corridor Development Project since seen that the eastern region is located in the best strategic location of the ASEAN region. Can be linked to China and India with a large population and a high rate of economic expansion. The proportion of gross domestic product (GDP) of the Asia and Pacific countries accounted for 1 in 3 of the global GDP value. (Strategy and information group for provincial development, 2017)

Eastern Economic Corridor Development Project is a project that will develop infrastructure such as roads, railways, ports and airports to attract investors and promote investment in this area. Increasing the potential of tourism, industry and urban development with provinces in the eastern region that are in development, namely Chachoengsao, Chonburi and Rayong province. And it is the development of ASEAN's leading economic zone to promote the 10 target industries to be engine driving the economy to the future (New Engine of Growth), which is to review the investment plans in the new round of Eastern Seaboard of Thailand, to invest more and have higher economic returns, consisting of 5 former industries + 5 future industries, are as follows: (Strategy and information group for provincial development, 2017)

1. The extension of 5 former industries (First S-Curve) consists of

1.1 The Next-generation Automotive Industry

1.2 The Intelligent Electronics Industry

1.3 High Wealth and Medical Tourism Industry

1.4 The Advance Agriculture and Biotechnology

1.5 The Food Processing Industry has a strong base, but must continue investing in new products, with research and development, to raise the industry to the international level

2. The addition of 5 future industries (New S-Curve) which are new industries that Thailand has the potential in competition and there are interested investors, consist of:

2.1 The Robotics Industry

2.2 Aviation and logistics Industry

2.3 Biofuels and biochemical industries

2.4 Digital Industry

2.5 Comprehensive Healthcare Industry

The government expects the development of the Eastern Economic Corridor Development Project which operates in three eastern provinces, including Chonburi, Rayong and Chachoengsao province, will be a major catalyst in encouraging Thailand to move

forward to the 4th industrial revolution or Industry 4.0 that combines technology in the industry with IT technology and will spark a long-term sustainable economic growth from 2017 onwards. (Strategy and information group for provincial development, 2017)

From the labor needs estimation report analyzing of Ministry of Labor in Eastern Economic Corridor (EEC) within A.D. 2018 – 2027 using the estimation of the study level analyzed in annually found that there are increasing of labor hiring around 191,119 people in 10 years and a group that has more employment is professional qualification: 83,184 people increasing, Bachelor Degree is 62,980 people increasing and middle school or under is 29,366 people increasing. (The Secretariat of The House of Representatives, 2018)

In the context of this digital age communication, communication must be integrated to create efficiency and effectiveness that causes change in attitude and behavior of all those involved to move forward to Thailand 4.0 together, consisting of mainstream and digital media or social media Including public relations, organization and visiting the site, to create public participation as well. (Office of the Eastern Economic Corridor Development Policy Board, n.d.)

General information of the biofuel and bio-chemical industry

General information

Biofuel industry and biochemical development have received a lot of attention because of the current world, the energy consumption nowadays is likely to increase. No matter due to economic expansion, investment in the industrial sector, increasing population, cause much more energy consumption in the household sector, while the source of energy fuels such as fossil fuels caused by humus and carcasses for millions of years with elements of hydrocarbon compounds that can be used as fuels such as oil, natural gas and coal reduced and Is an exhausted type of energy, unable to rotate as recycled, renewable energy has been implemented in turnover and enhance the proportion of more in the future. (Office of the Board of Investment, 2016)

Renewable energy is energy used that never runs out, because can find new substitutes, such as solar energy, wind energy and energy from biofuels, etc. (Office of the Board of Investment, 2016)

Cycle of energy and biochemical industry, starting from the bringing of biomass, such as grass waste, wood chips, residues from agricultural or industrial waste such as sawdust, straw, rice husk, bagasse, etc., through various procedures using a variety of fields (Biorefinery) to modify natural materials into biofuels or biochemicals and to be reconstructed into bioplastics. (Office of the Board of Investment, 2016)

Biofuel

Biofuels are fuels or energy obtained from biomass or substances derived from plants and animals, based on the photosynthesis process, which is the process of collecting energy from the sun in the form of chemical energy, for example plants are bio-energy caused by the photosynthesis process. Change the energy from the sun for energy, accumulate in the form of organic matter which is useful for growth when people or animals eat plants that are beneficial to the body which can be brought to be used as a useful energy. Biofuels can be divided into 3 types, (Office of the Board of Investment, 2016) namely

1. Vegetable oil is oil produced from various types of plants such as oil palm, soybean, coconut and sunflower seeds, etc., brought through a distillation process to adjust the property: viscosity reduction, eliminate grease, odor and color before mixing with diesel oil to be biodiesel.

2. Biodiesel is a fuel for diesel engines by using vegetable oils, animal

fats or cooking oils that have already been used, through the chemical process.

3. The form of gas, biofuel that is in the form of gas, such as biogas containing methane (CH4) compounds, can be combustible, often used as heat energy or electric power. Most of them are caused by the waste fermentation process or wastewater containing organic compounds by microorganisms.

In addition to the 3 patterns above, it also can be divided into solid and liquid form as follows:

1. Solid form of biofuels that are in solid form, such as wood chips, sawdust, corn cobs, bagasse, rice husk, as well as waste from sorting. There is a heating value that can be burned and transformed into energy called Refuse Derived Fuel: RDF

2. Liquid form biofuel in liquid form can be classified as follows

- Ethanol is a chemical compound of alcohol group, obtained from raw materials containing flour and sugar as components such as corn, cassava, molasses and sugarcane etc.

Biochemicals and bioplastics

Biochemicals are chemicals derived from biomass by using biological processes such as starch digestion procedure to be sugar and fermentation process. (Office of the Board of Investment, 2016)

In addition, the bio-succinic acid (BSA), which has received a lot of attention today, can be used for many purposes such as adjusting the acid-base condition of food products, is a component in a drug or cosmetic formulation and used as a substrate for the synthesis of other substances such as Polybutylene Succinate (PBS) which is a biodegradable polymer at normal temperature and can also be used in the bioplastics industry as well. (Office of the Board of Investment, 2016)

General information of the country's manpower development strategy for 20 years (A.D. 2017 - 2036)

ML. Puntarik Samiti, Permanent Secretary of the Ministry of Labor, revealed that from the Prime Minister's orders at the cabinet meeting on 7 December 2016, the Ministry of Labor has to prepare a master plan for labor development for 5 years (A.D. 2017-2021). By studying and analyzing the economic situation, investment, the current labor situation, as well as the needs of the laborers of various sectors, both domestic and foreign, which focuses on the development of Thai labor skills to be able to support the needs of the labor market in the future Including supporting the development of Eastern Economic Corridor (EEC) as well as supporting the Industry 4.0 to bring the country to Thailand 4.0. (Petchthab, 2016)

For the 20-year manpower development strategy framework (A.D. 2017-2036), there is content that focuses on the development of labor potential to support Thailand 4.0, which defines vision that "Highly valuable human resources to sustainable development" is divided into 4 periods of 5 years each: (Petchthab, 2016)

The first period, Productive Manpower (A.D. 2017-2021) is the period of creating the foundation of labor to be an international standard by eliminating labor barriers in developing country such as social protection, manpower preparation in both quantity and quality, adding skills etc.

The second period, Innovative Workforce (A.D. 2022-2026) is the period of building the country's manpower to be the people of the world in order to enable workers to use technology and innovation to increase productivity more effectively, supporting Thailand 4.0 by improving labor regulations, creating an employment system that contribute to the aging workforce comprehensively.

The third period, Creative Workforce (A.D. 2027-2031), is a period of creating manpower to be creative in creating added value for work to create labor sustainability to sustainability in life

by full employment, productivity and valuable work.

The fourth period, Brain Power (A.D. 2032-2036), is a period of creating a working society of wisdom by increasing the number of manpower to be able to use knowledge and ability, and use intelligence in high value work in order to have higher income that will lead the country to escape from the middle-income trap. (Petchthab, 2016)

Theorical concept about educational curriculum

International goal and important role of vocational education

Since in the late 18th century into the 19th century, the era in which the United States with the highest growth by entering the era of the industrial revolution. There is demand for more workers than in the early era. United States needed to have more multiple trained workers, and problems with the United States faced at that time was problems with frequent American settlement movements and there are lots of. (Thipnak, 2014)

Causing demand for highly skilled workers, therefore it is the origin of many vocational laws later on. So, it can be concluded that vocational education is to prepare people or learners to continue to learn more to work in the profession he has chosen. (Finch & Crunkilton, 1993 cited in Thipnak, 2014)

The goal of vocational education is bringing knowledge about teaching career development for everyone, every age group and in every community and reduce the problem of entry into the profession of many people with existing occupational groups by determining occupational groups to allow students to understand the different careers that are in that group, rather than as a profession or students to understand the world of careers. This ensures a correct perspective on the profession and preparation into the professional world that they are skilled and interested in. (Thipnak, 2014)

Vocational education can be considered as a goal for the development of basic skills of manpower or labor force development to meet the needs of the labor market, production of workforce must consider many factors such as manpower demand of industry, Policy on manpower development, ability to produce and develop manpower of schools or institutes of vocational education. (Thipnak, 2014)

The purpose of vocational education

Thipnak (2014) stated that vocational education is a science that develops labor force to be ready for a career. The main objective of vocational education is

1. Reinforcing the basic requirements of individuals to be ready for occupation.
2. To develop the unique capabilities of the individual.
3. Support and motivate the labor force by developing manpower cause lifelong learning in all forms to live a good life and lead to economic development of the country.

So vocational education is the preparing for people to join the employment industries for improving individual advance skills to work. advance skills mean understanding in working roles with the basic of reading writing speaking on calculation. Order skills are the important basic especially language skills, calculation skill and scientific thinking process skill. Reading to the development of professional skills for an advance job which can analyze and solve the problem immediately while working, understand the working role. The International vocational student believe that the vocational learner develops from learning in the basic education system which is one of the important elements in developing the knowledge of vocational learning to be more successful. Therefor, the structure and important roles of vocational education must be studied in order to

develop readiness and lifelong learning ability in working and increasing lifelong learning of vocational student (Thipnak, 2014)

By biofuel and bio-chemical industries, there are relevant vocational courses as follows.

1. High Vocational Certificate Program (Diploma), 2014, Industrial type in petrochemical industry.
2. High Vocational Certificate Course (Diploma), 2014, industrial type in Industrial Chemistry. (Office of Vocational Education Commission, 2014)

Related research

Imsamai (2014) studied on needs for vocational education personnel. After the integration of the ASEAN Economic Community in 2015, the results found that the demand for labor in 2013 was 38.87 million people, when compared with the number of workers from collected survey data in 2012 was 39.40 million people. Although the number of workers has decreased in 2013 by about 50,000 people, still need to use various agencies to control and develop skilled workers further to be able to respond to the needs of vocational personnel in order to be ready to respond to the needs of the labor market after the ASEAN community integration. The agencies that has primary responsibility for development of the quality of vocational workers, including Office of the Higher Education Commission (OHEC), Office of the Vocational Education Commission (VEC), and the Department of Skill Development, to establish a course of study and training to increase the number of workers as well as more cooperation with the government and the private sector to cooperate with each other to jointly develop vocational workers in the future as well as developing of quality factors of vocational workers. With the liberalization of the ASEAN community, it was found that Personnel lack knowledge and vocational skills, communication and social skills, such as English, occupational skills, communication and later law and support policies that support the development and help those groups who want to study in vocational groups such as the policy to support education assistance. Changing Education model and the development of vocational students to comply with the current situation.

Tantikornphan and Sukbot (2016) conducted a study on Qualifications of workers graduated from private vocational schools to meet the needs of the industrial sector in the southern region of Thailand. The study found that enterprises require a large number of vocational graduates, graduates of vocational certificate level (vocational certificate). Followed by the graduates of higher vocational diploma level (Higher Vocational Certificate) and want graduates that are highly responsible, adapt to the colleagues well, love, progress, work hard, dedicate, diligent, patient, consistency in finding knowledge, understanding of work. The establishment cooperates with educational institutions in the manner of accepting students for internships, and almost every enterprise establishes a policy to develop an annual plan in a systematic way. There is defined process and how to recruit manpower clearly, especially the interview to consider the concept, attitude and mental state.

Research methodology

This research study focuses on the study guidelines for preparation for education and labor requirements of the biofuels and biochemical industries within Eastern Economic Corridor (EEC) by determining the educational model as qualitative research, which is the introduction of a summary from in-depth interviews of 20 people: 7 people from the government group which are the professor of the Eastern Economic Corridor (EEC) and related departments and 13 people from educational institute group who working with EEC TVET Career Center: Eastern Economic Corridor Technical and

Vocational Education and Training Career Center used in the content analysis to interpret the data. They are two groups of interviews:

Government group

1. Mr. Montri Chanachaiwiboonwat (Advisor to the Chief Executive of the PAO the professor of the Eastern Economic Corridor (EEC))
2. Rayong Provincial Labor Office
3. Rayong Skill Development Institute
4. Chonburi Provincial Labor Office
5. Chonburi Skill Development Institute
6. Chachoengsao Provincial Labor Office
7. Chachoengsao Skill Development Institute

Educational institute group (EEC TVET Career Center: Eastern Economic Corridor Technical and Vocational Education and Training Career Center)

8. Rayong Technical College
9. Map Ta Phut Technical College
10. Ban Khai Technical College
11. IRPC Technological College
12. Bangsaen Technical College
13. Thai-Australian Technical College
14. Chonburi College of Agriculture and Technology
15. Eastern College of Technology (E. Tech)
16. Leam Chabang Engineering Technological College
17. Chachoengsao Technical College
18. Bangpakong Vocational College
19. Phanomsarakham Industrial and Community Education College
20. Chachoengsao College of Agriculture and Technology

Area boundary

In this research Is a research in the area within Eastern Economic Corridor (EEC), including Rayong, Chonburi and Chachoengsao province.

Scope of duration

Study was conducted during the period from April 2017 - April 2019.

Research tools

Tools used in this research is an interview to study the guidelines for preparation for education and labor requirements of the biofuels and biochemical industries within Eastern Economic Corridor (EEC) which the researcher created an open-ended question which is divided into 4 parts as follows.

Part 1 General information of interviewees

Part 2 Interview Questions for Government Groups

Part 3 Interview Questions for Educational Institutions

Part 4 Other suggestions

Data collection

Using in-depth interview method with 20 participants, to consist of 7 people in government group which are the professor of the Eastern Economic Corridor (EEC) and related departments and 13 people in educational institute group who working with EEC TVET Career Center: Eastern Economic Corridor Technical and Vocational Education and Training Career Center, in order to inquire about the preparation of education and labor needs of the biofuel and biochemical industry within Eastern Economic Corridor (EEC), by means of taking note, collecting all information and using open-end questions. By IOC checking from 5 professors.

Data analysis

In this study, using the method of qualitative data analysis that was analyzed by creating code and coded data by interpreting according to the content analysis, according to the research questions and to analyze the meaning of feelings or analyze the hidden hints which will include the interpretation and implications of the language context and language users. For information gained from the interviews, the researcher used to listen and summarizing the content according to the issues, questions, opinions

and suggestions that affect the preparation of education and labor requirements of the biofuels and biochemical industries within Eastern Economic Corridor (EEC).

Results

1. Results of general data analysis of interviewees, found that interviewees from government groups and institution groups are mostly male with age between 29 - 60 years and have work experience from 2 - 41 years. Most of them are experts in the special economic balcony project on the east side and work in the agency regarding such project so they are able to provide good information.

2. From interviews with government groups and educational institutions, it can be concluded that educational preparation and labor requirements of the biofuel and biochemical industries within Eastern Economic Corridor (EEC).

Starting from a government group who are preparing for becoming Eastern Economic Corridor (EEC), it is found that there is a clear division of duties, in Chonburi, Rayong, Chachoengsao province. The administrative coordination center for the development of the Eastern Economic Corridor (EEC), will be established. Agents of the EEC, including the department of industrial works were brought to provide information to those interested in investing. Department of Labor will prepare with basic information such as labor requirements, labor force and manpower development in the institute for skill development. So, vocational education must produce manpower to enter into the job and can work at all. And the institute for skill development will prepare a skill development program to support 10 target industries and advanced technology industry, including collaborating with enterprises to create specific courses as required by enterprises in order to increase labor efficiency in the establishment. And a questionnaire was designed to survey the workforce needs of enterprises and then use the data to analyze how much of the labor demand of the establishment is and what kind of labor is needed, in addition, department of labor has also made about manpower development plans every year to see whether in the future there may be an increase or decrease in the demand for labor. In addition, the government has also cooperated with educational institutions by coordinating on integration with technical colleges and open coordination centers for production and development of vocational personnel (EEC) within the college in order to plan production and develop manpower to meet the needs of the establishment.

In terms of economic impact, resulting in a better economy, since private investment has been made, there are more people coming, resulting in more employment. Less unemployment, more trading and more agile. Including sending news to communicate with the public, such as organizing the arena, organizing labor market, monthly meetings are held in the province, providing mobile province project, including providing information and labor relations through media such as, online media, radio and public relations documents to the public and private in another way.

In terms of educational institutions, MOUs are made with industrial plants which is a bilateral education system, is schooled in the factory, to practice by sending students into internships in enterprises and receive remuneration as an allowance. In addition, there is a process of co-education between vocational teachers and enterprises by developing curriculum, developing teachers to meet the needs of enterprises. There are only 3 educational institutions with branches that are related to biofuel and biochemical industries. The branches that are related to the biofuels and biochemical industries will be at the higher vocational level only, consisting of industrial chemistry and petrochemical fields. Which currently still uses the same curriculum and develop additional courses, but still do not comply

with the requirements of enterprises related to the biofuels and biochemical industries, so there is a collaboration between educational institutions and enterprises, by enterprises as the people who come to prepare courses, including granting funds to learners. Provide personnel to provide knowledge and training in the areas of specialization with teachers and learners, to increase skills and experience since educational institutions with less relevant branches and lacking of human resources are teachers and educational equipment. As well as each educational institution having 40 - 80 students graduating per year, but labor demand of enterprises increases, the students are not sufficient to labor demand of enterprises.

Educational institutions are the ones that lead people to know the basic needs in their own careers. When graduating, they will go into the process of developing skills to have more skill by receiving support from the government in the development of skilled labor, which has the Institute of Skill Development which prepares courses to support and increase skills for workers after the workers have worked in the enterprise, the enterprise will provide training to develop manpower for learning for having a better life and this will result in enterprise qualities in the future.

Discussions

From research results, preparation of education and labor requirements of the biofuel and biochemical industries can be discussed the results as follows:

1.Preparation of the Eastern Economic Corridor (EEC) found that there are clear divided responsibilities, namely the establishment of coordination center of the Eastern Economic Corridor Development, bringing representative of EEC, including the Department of Industrial Works to provide information to those interested in investing. Department of Labor has prepared with basic information such as labor requirements, labor force and manpower development, which is consistent with the general information of the country's manpower development strategy, 20 years, 2017 - 2036, which discusses the development of labor potential to support Thailand 4.0, which has defined the vision that "Highly valuable human resources to sustainable development " by dividing the operation into 4 periods, each 5 years each. (Petchthab, 2016)

2. Cooperation of the public and private sectors in Eastern Economic Corridor (EEC) found that the government and the private sector have collaborated with the Institute of Skill Development to train skills for employees in the workplace. And together with enterprises to develop a specific curriculum to fill up to help increase the efficiency for workers which is consistent with general information of the country's manpower development strategy, 20 years, 2017 - 2036, that mentioned discussions with the Ministry of Education and the Ministry of Industry, including the private sector to use the information as a guideline to determine the needs of both domestic and foreign workers. (Petchthab, 2016)

3. Economic impact of the entry of the Eastern Economic Corridor (EEC) found that the entry of the Eastern Economic Corridor (EEC), has an impact on the economy that will lead to a better economy. Since, private investment has been made, there are more people coming in, resulting in more employment. Unemployment is less Increased trade and more agile. Transport infrastructure has occurred, for example: Construction of double rail trains that corresponds to the theory of the Eastern Economic Corridor Development Project that describes the development of the eastern region of Thailand to be ASEAN's leading economic zone. (Rayong Province Office, 2017)

4.Information preparation and labor relations in the Eastern Economic Corridor (EEC) region, found that the government

is preparing the data and publicity on labor in the Eastern Economic Corridor (EEC) in many ways as follows: The government has organized the arena, labor market, monthly meeting of the province, Providing mobile province project, including providing information and public relations through media such as online media, radio media and public relations documents Including establishment of an EEC integrated information center that can provide labor information and news to the public and private in another way. Which corresponds to the theory of development of the Eastern Economic Corridor Project or EEC that mentioned public relations, organization and visiting the site to create public participation. (Office of the Eastern Economic Corridor Development Policy Board, n.d.)

5. Promotion of enterprises or educational institutions, found that the government sector has cooperated with educational institutions by coordinating on the integration with technical colleges. And open coordination center for production and development of vocational personnel (EEC) within the college in order to plan production and develop manpower to meet the needs of establishment. There is institute of skill development that is training and skill training center for workers to meet the needs of the labor market. Encouraging people to increase productivity in the workplace. And professional trainers to help train and develop them to meet the needs of enterprises. This is consistent with the research of Imsamai (2014) who conducted a study about demand of vocational personnel after integration of the ASEAN Economic Community in 2015, the study found that labor demand in 2013 was 38.87 million workers when compared to the total labor force survey data from the year 2012 was 39.40 million workers. Although the number of workers has decreased in 2013 by about 50,000 workers, still requires agencies to control and develop skills further in order to meet the needs of vocational personnel to be ready to respond to the needs of the labor market after the ASEAN community integration. The agency that has the primary responsibility for development of quality vocational workers, including the Office of Commission on Higher Education (CHE), Office of Vocational Education Commission (VEC), and the Department of Skill Development, to establish a course of study and train to increase the number of workers as well as cooperate with the government and the private sector to cooperate with each other in the joint development of vocational workers in the future.

6. The preparation of labor management within the province to increase, found that the province workers will issue a questionnaire to explore the labor needs of enterprises. And then use the data to analyze how much the labor demand of the enterprises is and what kind of labor is needed. After that, the institute for skill Development will come to train skills and skill for workers to raise the level of skill for workers to meet the needs of the workplace, in addition, the labor department has also made planning matter of manpower development every year. And also there is a plan for action or strategy in the Ministry of Labor, with a 5-year strategy since 2017 - 2021, to see whether in the future there may be an increase or decrease in demand for labor, which is consistent with the general information of the country's manpower development strategy, 20 years from 2017 - 2036, which mentions the focus on the development of Thai labor skills to have the potential to support the needs of the labor market in the future. Including supporting the development of special economic zones as well as supporting the Industry 4.0 to lead the country to Thailand 4.0. (Petchthab, 2016)

7. Related fields and expectation to open a new branch that is consistent with biofuels and biochemical industries, found

that there are only 3 educational institutions with branches that are related to the biofuel and bio-chemical industries, will be in the higher vocational level only. Consisting of industrial chemistry and petrochemical fields which currently still uses the same curriculum and develop additional courses but still do not comply with the requirements of enterprises related to the biofuels and biochemical industries. And there was a partnership between government and the private sector, i.e. enterprises doing curriculum itself, including providing scholarships to the students or providing personnel or experts to provide knowledge and training in the areas of specialization with teachers and learners, to enhance the skills and experience that is consistent with theorical concepts about curriculum that mentioned: Diploma Curriculum 2014, Industry Trades, petrochemical program and Diploma Curriculum, 2014, Industrial Trades, Industrial Chemistry program. (Office of Vocational Education Commission, 2014)

8. Sufficiency of students on labor requirements in the biofuel and biochemical industries, workplace and the unemployment rate, found that each educational institution has only 40 – 80 graduate students per year, but labor demand of enterprises increase, the students are not sufficient to labor demand of enterprises.

Because the enterprises have a lot of labor needs Therefore, there are not enough students for the enterprises, since lack of human resources: teachers and educational equipment while graduating students have work with very little unemployment rate. Most students go to work in the company which is consistent with theoretical concepts about the course of the study mentioned. Global goals and the critical role of vocational education in the late 18th century to the 19th century, is the era in which the United States has the highest growth by entering the industrial revolution era, making labor demand is more than in the beginning. The United States needs more multiple trained workers and problems with the United States faced at that time was Problems with frequent American settlement movements and there are lots, resulting in the need for highly skilled workers (Finch & Crunkilton, 1993, cited in Thipnak, 2014)

9. Making an MOU with an industrial factory found that education institute has made MOU with enterprises such as Thai Oil, SCG Chemicals, UBE Chemicals, Dow Chemical company, affiliated industrial factories of IRPC (Public) company limited and PTT (Public) company limited etc. And having a bilateral education system, is to study in a factory in school, practice by sending students into internships in the workplace and receive remuneration as an allowance, in addition there is a process of co-education between vocational teachers and enterprises by curriculum and teacher development to add value to students. This is consistent with the research of Imsamai (2014) who conducted a study about demand of vocational personnel after integration of the ASEAN Economic Community in 2015, the study found that in order to meet the needs of vocational personnel to be ready to respond to the needs of the labor market after the ASEAN community integration. The agency that has the primary responsibility for development of quality vocational workers, including the Office of Commission on Higher Education (CHE), Office of Vocational Education Commission (VEC), and the Department of Skill Development, to establish a course of study and train to increase the number of workers as well as cooperate with the government and the private sector to cooperate with each other in the joint development of vocational workers in the future as well as developing of quality factors of vocational workers.

Suggestions for doing this research

Research of preparation of education and labor demand of biofuels and biochemical industries within the Eastern Economic Corridor (EEC), can be summarized as follows:

1. The government sector should distribute news, public relations or general public to be aware of the importance of entering of Eastern Economic Corridor (EEC), starting from a small part, to publicize at the community level for people to know at every level, including with the introduction of preparing to cope with the consequences of the upcoming impact of the entry of the Eastern Economic Corridor (EEC), to be acknowledged by the public, such as announcements via voice of the municipality, publicity through community leaders, notice signs for people in the community to acknowledge etc.

2. Vocational colleges without a field related to Industrial chemistry and petrochemicals, should be opened more branches because the current vocational college with industrial chemistry and petrochemicals with only three colleges, and vocational colleges that are already related to Industrial chemistry and petrochemicals should admit more students. Since at present, the vocational colleges have admitted so few students, so, is not sufficient to meet the needs of enterprises. Therefore, the government should allocate budget for personnel development, teachers, starting from the colleges should have a survey within the college about the college teachers if there is anyone who has aptitude in the areas of industrial chemistry, and petrochemicals. Then, send teachers to train in the workplace to practice in the actual place to add new knowledge to meet the needs of the establishment. Or hire outside trainers to teach more by teaching part-time after school or Saturday-Sunday holidays to add new knowledge and skills to students, in addition, the government should allocate budget for promoting vocational colleges such as new teaching equipment, education related to biofuel and biochemical industries to be able to produce efficient and sufficient manpower to be able to meet the needs of the establishment.

3. There should be collaboration between government agencies, vocational college and the enterprises to build a positive image for vocational education, campaigning for people or the general public to open their hearts and can see the importance of vocational education Including cooperation in both vocational colleges and enterprises in bringing specialized speakers to guide and conducting specific tests related to biofuel and biochemical industries for high school students to be a guideline for students to study further. Including important guidance and benefits in vocational education as well as creating confidence for parents in working in the workplace after students graduate since vocational education is an important force in driving the country's economy.

4. Schools at the secondary level should inserted about the Eastern Economic Corridor Project and further study at the vocational level for students to know, such as intervening in the morning when standing in front of the flagpole, homeroom, guidance and voice announcements in schools, for students to see the importance and as a guide to further study, then the vocational college should issue specific examinations related to biofuel and biochemical industries in order to select students for further study in vocational colleges.

Suggestions for the next research

1. This study is single data, aimed to study the government, educational institutions and enterprises, so, the preparation of education that results into labor, should be aware of the opinions of the public sector as well, to study more factors in entering vocational education.

2. This research was conducted a study on vocational education in the

biofuel and biochemical industries only within the Eastern Economic Corridor (EEC). Therefore, further studies on higher education should be made to provide information covering both professional and general.

3. Since this research focuses only on the biofuel and biochemical industries in the Eastern Economic Corridor (EEC) only, so, the next research should study the preparation of education and labor needs in other industries as well to cover 10 new industries (New S-Curve) of the Eastern Economic Corridor Project quantitative.

4. The researcher has studied only the preparation of education and labor requirements there for, the next research may have additional studies, such as the labor requirements that the enterprises need.

Limitation

1. Limitation of accessing in some confidential information.

2. Education curriculum still in developing process about biofuel and biochemical industries within eastern economic corridor (EEC)

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