

Analysis of Thailand's Industrial Competitiveness in ASEAN Economic Community Era: The Case of Automotive Industry

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Abstract—ASEAN Economic Community (AEC) concept was espoused in the end of 2015 to create integrated economy in ASEAN countries, which will promote interregional trade and affect competitive advantage of countries. Since Thailand has a competitive advantages in manufacturing industry especially automotive production, the government needs to concern the changing in a business situation in Thailand to maintain the competitiveness of the economic sector. The purpose of this paper is to identify the potentials of social and economic change in Thailand's automotive industry with respect to AEC development through expert interviews to clarify the situation in Thailand's automotive industry. The results of this study is presented in the development plans for maintaining the leading position and increase the competitiveness of Thai's automotive industry. Furthermore, policies and strategies are prepared to create value in the automotive industry.

I. INTRODUCTION

The establishment of ASEAN Economic Community or AEC by 2015 (AEC2015) has a purpose to transform ASEAN into a single region with free movement of goods, services, investment, skilled labor, and freer flow of capital [2]. This economic development has effects on the business and economic environment in many industries both within ASEAN countries and partners of ASEAN. The main purpose of this paper is to identify the potentials of social and economic change in Thailand's automotive industry with respect to AEC development. To evaluate opportunities and challenges of AEC for Thai's automotive industry through experts interview to clarify the situation in Thailand's automotive industry. The result is expected to provide valuable information for suggesting strategies and policies to support and maintain the competitive advantage for Thai's automotive industry. Since AEC is focusing on improvement of social factors by economic and political development, it is considered as a social innovation [10].

The structure of this paper is divided into five sections. The first section is to overview on the implementation and plan of AEC. Section two is highlighting Thai's automotive performance. Section three contains numerous literature reviews related to AEC innovation and industry situation among ASEAN. After that, the methodology for data collection and consideration is discussed. Finally, the current situation of business development influence by AEC2015 will be concluded in order to provide better concrete effect on Thai's automotive industry.

A. Overview of ASEAN Economic Community

Association of Southeast Asian Nations (ASEAN) was first founded in 1967 for improvement economic cooperation among intra-regional. It is comprised of ten countries in Southeast Asian including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. ASEAN has been improving economic corporation and liberalization among Southeast Asia countries [14, 31]. Originally, ASEAN Free Trade Area (AFTA) officially started in 1993 by six ASEAN countries including Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand. CLMV countries (Cambodia, Lao PDR, Myanmar and Vietnam) had joined AFTA after that. AEC consider as a successor of AFTA. It was firstly mentioned at Bali Summit in 2003, which have the main objective to support the regional economic integration by 2020 [3]. It consider as one of three main pillars of ASEAN Community (AC) development which is including ASEAN Political-Security Community, ASEAN Economic Community, and ASEAN Socio-Cultural Community as shown in figure 1. After that, at the 12th ASEAN Summit at the beginning of 2007, the resolution was affirmed with a strong commitment from members to shorten the AEC implementation plan by five years. Thus, envision in the ASEAN Vision 2020 is conducted at the end of 2015 [3]. AEC establishment will transform ASEAN countries into a single region and become a third largest economy in Asia and the seventh largest in the world [25]. The ultimate goal of AEC2015 is not focus on the intra-ASEAN trade but to create competitive advantages and bargaining power with external ASEAN countries. Thus, the most important purpose is not emphasized on an increasing of trade among intra-ASEAN countries, but it is largely focused on an improvement of comparative advantages with respect to global partners and worldwide production networks.



Figure 1: Three pillars of ASEAN Community (AC)

AEC now becomes an important issue for the business sector to anxiety. The implementation of AEC2015 will create an integrated economy value of 2.5 trillion US dollars in gross domestic product with the population above 600 million people as shown in table 1. An integration of ASEAN countries lead to increasing market demand in ASEAN, This situation can see as a source of market opportunities for foreign firms to expand their production based to better serve the demand in ASEAN. Borderless can seamless transportation and logistics among ASEAN countries. However, the changing of business environment from AEC development is also seen as threats for the firms to develop an effective business model.

TABLE 1: DEMOGRAPHIC INFORMATION OF MEMBERS IN ASEAN YEAR 2015

Country	Total land area	Total population	Population density	Annual population growth	GDP at current prices
	km ²	thousand	persons per km ²	percent	US\$ million
Brunei Darussalam	5,769	413.0	72	1.7	17,108
Cambodia	181,035	15,184.1	84	1.5	16,771
Indonesia	1,860,360	252,164.8	136	1.3	983,571
Lao PDR	236,800	6,809.0	29	1.9	11,777
Malaysia	330,290	30,261.7	92	1.0	326,346
Myanmar	676,577	51,486.0	76	0.9	65,785
Philippines	300,000	101,174.9	337	1.8	284,910
Singapore	716	5,469.7	7,638	1.3	307,872
Thailand	513,120	68,657.0	134	0.6	373,225
Viet Nam	330,951	90,630.0	134	1.0	186,224
ASEAN	4,435,618	622,250.2	140	1.2	2,573,589

Source: <http://www.asean.org/news/item/macroeconomic-indicators>

B. Automotive Industry in Thailand

The automotive industry is one of the important industries that contribute and create value to driving global and national economy [28] and also, consider as knowledge- [26] resource- and labor-intensive based industry [9]. In Thailand, the automotive industry has been started in the early 1960s with government support to establish export-oriented production base and assembly plants [12, 22]. Thailand has implemented policies to provide automobile firms both from Europe and Japan for assembling in Thailand. Then the demand is increasing from importing parts and components to other production bases around the world as Complete Knock Down (CKD) product. It is resulting in the continuous growth of Thai’s automotive industry in both local producers of parts and components in the 1970s [22]. Besides, the government also encourages and supports the domestic firms in term of policies and trade facilitation. During the trade liberalization in the 1990s, Thailand is known as an important automotive production base in ASEAN with many automotive parts and components factories. In additional, the automotive industry in Thailand can cogitate as an export base industry since more than half of finished products are exported to other countries [22]. Furthermore, Thailand is an attractive location within ASEAN for foreign investment especially in the automotive industry because Thailand is the most advanced in this industry among ASEAN countries [26].

Now Thailand has become a major production base of Asia, known as Asian Detroit. Thus, it attracts foreign direct invest to the automotive industry in Thailand. Besides the automobile companies, component parts or Tier 1 &2 part suppliers are interested in international and domestic companies. In addition, parts and components industry is one of an important value creation industries that contribute to growing in Thai economics [19]. However, trade liberalization among the global economy leads to the increment of competition in the automobile industry. Automotive producers may recognize the benefit from the establishment of production bases in Asia such as Malaysia, Indonesia, and Thailand. The establishment of a production base in Asia can create total trade value of 78,241.1 million dollars which is the top five trade value among ASEAN (as shown in table 2) and it can provide numerous jobs opportunities and generate a large amount of revenue for ASEAN countries [26]. According to Organisation Internationale des Constructeurs d’Automobiles (OICA) in 2015 automotive industry can create 182,300 employments in Thailand. The vehicles are a top five of total trade value in ASEAN. Nevertheless, automobile production also creates the demand in many industries such as electronic, steel, plastic, etc. This industry can consider as an important industry in ASEAN. However, the situation can be changed due to the development of business environment and economic development from influences of AEC, the investor may reconsider on other countries within the region.

Key automotive products in ASEAN can obviously consist of two main products. First is the Mid-size pickup (body on frame), this product has been very popular in Thailand and many ASEAN countries. Since the trend of the automotive industry is shifting to more fuel efficiency and environmentally friendliness, another key product is a small car. This product is considered as a new segment of this market. Especially after 2010, the small cars was promoted by the government in many countries in order to encourage the market demand, reduce the value of fuel imported and reduce overall emissions from vehicle.

Major automotive companies are considering ASEAN as a major investing destination, due to the increasing of the potential market and beneficial in the manufacturing and assembling. It is expected that in 2020, Thailand, Indonesia, and Malaysia may contribute about 96 percent of automobile production in ASEAN [4]. Due to the AEC development, it is not focusing only on the improvement of intra-ASEAN trade, but it largely involved in ASEAN external trade partners and enhancement of global production networks. The fully implement of AEC2015 can predispose the automotive producers to invest in ASEAN countries due to the trade liberalization within the region. Many companies are evaluating the business opportunities and benefits for establishing production base within ASEAN. In order to improve the business environment in Thailand to attract automotive investment, this study is aimed to identify the effects of AEC to economic and business situation in Thai’s

automotive industry. Literature research and interview with key players in AEC development can provide more understanding and clarify the business situation that affected by trade liberalization agreement among ASEAN. The purpose of this research is to identify the current situation and the effects of AEC implementation on Thai's automotive industry using both primary data and secondary data.

TABLE 2: VALUE OF IMPORT AND EXPORT DIVIDED BY HARMONIZED SYSTEM (HS CODE) YEAR 2015

Commodity group		Value		
2-digit HS code	Description	Exports	Imports	Total trade
85	Electrical machinery and equipment	290,529.2	248,021.9	538,551.1
27	Mineral fuels, mineral oils and products of their	207,505.6	268,423.2	475,928.7
84	Nuclear reactors, boilers, machinery and mechanical appliances	139,847.6	154,010.2	293,857.8
39	Plastics and articles thereof	43,376.6	43,924.4	87,301.0
87	Vehicles other than railway or tramway	41,008.7	37,232.5	78,241.1
90	Optical, photographic, cinematographic,	34,121.1	27,911.6	62,032.6
29	Organic chemicals	33,411.0	27,139.1	60,550.1
71	Natural or cultured pearls jewelry, coin	28,027.9	25,654.2	53,682.1
72	Iron and steel	8,903.5	42,538.5	51,442.0
40	Rubber and articles thereof	32,975.7	11,559.1	44,534.7
	Top Ten Commodities	859,706.8	886,414.6	1,746,121.4
	Others	432,926.8	349,869.3	782,796.1
	Total	1,292,633.6	1,236,283.8	2,528,917.4

Source: ASEAN Trade Database (compiled from data submission and/or websites of ASEAN Member Countries' national statistical offices and other relevant government agencies)

II. LITERATURE REVIEW

Improving the efficiency of customs processes by Single Window and online custom are one of the purposes of AEC [9]. Even though the main purpose of AEC is the improvement of exports rate to third markets outside ASEAN, it also influencing the increase of intra-regional trade. The purpose of free trade agreement was focused on investment more than trade [13]. However, the effects of an economic agreement are significantly different in each country because of the business situations and environments are different. It is difficult to isolate the effects of an economic agreement on the business environment [16]. The key macroeconomic variables that were important to consider in trade liberalization agreements are trade and employment [16]. This economic agreement can generate the benefit for

manufacturing sectors by two components including the removal of Non-tariff barriers (NTBs) and improvements in the investment climate. Beside intra-regional economic development and integration of AFTA and AEC, An integration of intra-regional economic cooperation among ASEAN will be significant for not only members of ASEAN, but also influencing the investment and trade between ASEAN and partners. Although AEC can integrate ten countries and create a single economic region, many ASEAN countries have major trade partners outside ASEAN which will gain comparative advantages from AEC development. The study of Ramstetter [9] is mention that an elimination of tariff and trade barriers among the region can lead to increasing of extra-regional trading but it may incur low levels of intra-regional trade because ASEAN region is an important supplier and partner of well-developed countries such as Europe, Japan, and North America. In short, AEC can lead to low intra-regional shares because the major trade partners of ASEAN are not located within the region. Nevertheless, trade is influenced by many factors. Thus, it unable to assume that the increased of trade value among the region is a primary result of an economic agreement [13]. Employment or labor is one of the key topics that should be considered in economic agreement implementation. Free flow of labor is one of the agreements of AEC2015, Labor usually displace due to the difference wages. However, trade liberalization general increase in long-run productivity but it also influence in labor displacement in short run [13]. The elimination of tariff among ASEAN is dramatically affect to labor-intensive industries [24]. Fortunately, cooperation and integration among ASEAN members must be tightened [14].

The study of other trade liberalization agreements is require for measuring the effect of trade agreement that may occur in the development of AEC. Thus, the study of North American Free Trade Agreement (NAFTA) and European Union (EU) are considered because these agreements are highly represents trade integration among many countries within the region. Burfisher [16] has studied the effect of NAFTA since implementing in 1994 for the automotive industry in U.S. and Mexico. Researchers mention that trade liberalization can increase trade with respect to comparative advantage and grow of GDP in the region can significantly general the demand within the region. The study is expected that investment, production, and employment are shifting from the United States to Mexico due to the lower operation cost. According to the assumption, the development of NAFTA effect on the automotive industry in many aspects. High skill workers with lower wages are attracting automotive producer from U.S. to expand their production based in Mexico. It is expected to increase automobiles and parts exports from U.S. to Mexico. However, it tends to create smaller increases in U.S. imports rate because Mexico had higher tariffs barriers. The export rates from Mexican to U.S. are expected to increase because Mexican automotive factories are the suppliers of U.S. producers with higher demand. In consequence, after the implementation of NAFTA, an

integration of North American auto industry has improved, which allow the producer of automobile and parts reach to the higher level of efficient. NAFTA has significantly influencing on intra-industry trade in autos and parts. According to the data from 1994 to 1996, the employment rate in the American automotive industry including both auto parts sector and vehicles assembly sector have grown by 14.1 percent. In 1993 to 1996, U.S. automobile companies including General Motor (GM), Ford Motor, and Fiat Chrysler Automobiles (FCA US) have invested \$39.1 billion in establishing and improving factories in the United States, while investing in Mexico only \$3 billion [16]. However, Mexico required improvement in capital and technology that generally occur by an increasing of foreign investment [13]. It has an evident that after NAFTA, FDI in Mexico has increased, but when comparing to other Latin American countries it is not significantly different. Researchers find only a few relationship between an increasing of exports and productivity rate in Mexico [7]. Trade and labor force also be interested factors in the study of European Union integration. The study of OECD [21] in 2000, presenting that trade can influence the growth of capital and investment in the region. Additionally, low wages always effect of labor displacement and raised the competition. According to the case of Hungary, Many economic indicators such as FDI, productivities, trade value, disinflation, and labor force increase due to EU agreement. However, the study from Anna Shaleva [1] concluded that only the development EU accession has not brought an economic miracle all of sudden. Government action including policies and strategies are important to handle the challenge of economic development and increase the capability of economic and social development among free trade network situation.

The development of ASEAN countries from the past two decades are incurred the shifted of imports and exports value from natural resource or agriculture intensive to manufacturers including electronics and other relatively manufactures [24]. It is influenced to the growing of automotive industry in ASEAN countries by demand increasing and establishing export bases in South East Asia [23]. An implementation of AEC is resulting in an increasing of marginal trade and flexibility among ASEAN members [6] and create benefit in many aspects for the automotive industry. The fully integrated AEC can be potential development for improving in the manufacturing sector. Automotive products are received benefits from economies of scale which is the key motivation for establishing a single market and production base of ASEAN [24]. The establishment of the AEC will be able to provide the seamless business operation and harmonized among the region. Likewise, it can provide opportunities and support the automotive industries in term of market integration [8]. ASEAN can categorize as one of the important partners for Japanese companies especially in automotive industry, this region is considered as a major market and invest for Japan automobile manufacturers in term of both markets and

production bases [14]. To be more specific, Japan has the highest value of invest in Thailand among ASEAN [15]. It will be able to improve the capability of production and performance for Japan Automobile Manufacturers Association (JAMA). Automotive producers from Japan are expected to further strengthen production network in ASEAN and driven an economic development of the automotive industries within the region in the future [11]. In general, an increasing of manufacturing productivity is resulting in an enhancement of ASEAN's comparative advantage [24]. The manufacturing sector in Thailand is contributed about one-quarter of the total sale value of ASEAN-6. It means the effects of AEC implementation will be largest in manufacturing sector especially in automotive goods and logistics [9]. Thus, Thailand can receive benefits from AEC in the manufacturing section rather than agriculture goods [27]. Manufacturing sectors are relatively capital-intensive and technology-intensive and directly related with Foreign Direct Investment (FDI) in the nation [24] which lead to an incremental of inward investment and the technological development.

Thus, the competitive environment from AEC establishment, it has some factors that needed to be considering the development of AEC 2015. In order to increase flexibility and collaboration among ASEAN, communication among members through the information center is require for sharing information among members. Besides, labor knowledge and skill also significant for increasing productivity and knowledge of the firms. The study of Sabhasri [6] suggested that infrastructure, information sharing center and labor training program should be implemented as soon as possible. Furthermore, financial support is also important for CLVM countries in order to create well development and beneficial among AEC. Additionally, capital, technological capabilities, and managerial skills are important for domestic firms in order to survive in the competitive environment [20]. The study of Meadhapithakwong [27] has considered the investment, production, and labor effect on Thailand from AEC2015. Labors are required in this industry even robotic technology has influence in production line because, in the developing countries like ASEAN, the labor force is still cheaper than the developed countries. Thus, the firm should concern on the opportunities from regional integration because import and export facilitation are directly related to tariffs, the reduction of tariff collection can incur competitive pressures within the region [20]. The study of Oizumi and Soejima [15] is considered on the important of supply chain management for manufacturing in AEC era. This paper concludes that Thailand will be the center of the supply chain in ASEAN, due to the supportive infrastructure and border development. The growing of the economic in neighboring countries including of Cambodia, Laos and Myanmar led to an increase in customer demand and expansion of customer markets. Thus, an enhancement of supply chains competitiveness in ASEAN is required for increasing the value of production

bases in Thailand. In the automotive industry, there are four ASEAN countries that can consider as competitors including Indonesia, Malaysia, Philippines, and Vietnam. These five countries (including Thailand) are key players in the automobile market in Asia [23].

According to literature reviews, the implementation of AEC can be a source of a significant effect to the economic situation within the region. Trade and employment are frequently discussed in the literature. However, the effects of the economic agreement are far beyond the trade but it is including market demand, trends, and competitiveness of each country because it is difficult to distinguish the effects of trade among economic development. Then, labor is the sensitive factors that elastic with respect to wages. AEC can allow free flow of labor which is directly related to the industrial input that directly effect to Thai's automotive industry. In summary, those effects can be classified into three categories as shown in table 3. First, many studies are focused on the industrial input such as financial support, foreign investment, immigration of labor force, and infrastructure development in members of ASEAN. Second, AEC clearly related to the current economic situation in both supply and demand side, supply chain management is another area that affected by AEC, communication among supplier, information sharing across countries, and flexibility are including in the area of supply chain. AEC also expected seamless the supply chain among firms in the different country. Thirdly, the economic growth in developing countries within ASEAN resulted in the expansion of market within the region and increasing customer demand. However, it is also leading to the increasing in competitiveness among ASEAN.

TABLE 3: SUMMARY OF INFLUENCE FACTORS BASED ON LITERATURE

Factors	Description
Industrial Input (Supporting sectors)	Factors that consider as an input for business development such as labor cost, labor skill, foreign investment, etc. Those factors directly effect to Thai's automotive industry
Supply Chain	The relationship between suppliers among supply chain is reflecting the performance of an industry. An improvement communication and integration can occur by AEC development.
Economic Situation (Customer)	External factors that related to a business situation such as market demand, trends, and competitiveness among ASEAN countries. The change of this business environment is influencing in the automotive industry.

Many studies have discussed the AEC implementation topic; the effects of trade agreement were measured in a different perspective. Trade liberalization can create opportunities and challenges for any industry. Thus, the firms and relative government agencies should heavily consider that effect. Especially in Thai's automotive industry, this sector is an important industry that creates benefits to Thai's economy. However, the current situations that occur in Thai's automotive sector are unable to identify and detail of impact

for the firms are unmeasurable. Since, effects of AEC2015 on the automotive industry in Thailand still not being identified, the policies recommendation and strategic plan are unknown. In order to determine the solutions to maintain and increase the competitiveness of Thai's automotive industry, it is essential to concern the current situation and detailing of AEC affects.

III. METHODOLOGY

AEC is an influence on the business situation due to the trade facilitation and liberalization. Key players in this economic development are including government agency who directly related with the strategic plans development, a business organization who facing the revolution of the business environment, and educational sector who study and understand the overall system of business and economic revolution. Therefore, in-depth interviews of the government sector and private sector are necessary to measure the effect of AEC situation Thai's automotive industry in terms of opportunities and challenges. An in-depth interview is known as an important qualitative technique to collect detailed information on a small number of respondents [5] to confirm and create an understanding of economic and social situation [17]. The purpose of in-depth interview methods is to measure the unidentifiable business situation for the automotive industry in Thailand due to the development of AEC. The questions for in-depth interviewing are developed for conducting the undefinable data from the experts who associated with the implementation of AEC2015.

Since this research has the limitation of cost and time for gathering data, a telephone interview was implemented for data collection in this research. Besides, the interviewees are key persons in an organization; the availability time and schedule are limited. The telephone interview is the best method to gather the data in this research with the major advantages of cost-effectiveness [18] and quality of the data [29]. A telephone interview can reduce some form of bias [18]. The interviewees are seemed to have a higher level of willingness to discuss via telephone. Interviewees in telephone interview have a lower level of embarrassment when comparing to face-to-face interview [30]. The duration of an in-depth interview conducted in this research is up to one hour. The questions for interviewing are based on the information that unavailable in the literature by the main purpose of clarification the real situation occurs in AEC environment. Thus, several kinds of literature were conducted to define the significant question based on the effect of AEC on the automotive industry in Thailand. Semi-structured interview question was implemented to discuss the situation that occurs in Thai's automotive industry due to the development of AEC2015. The questions in table 4 were developed based on the gaps that exist in literature reviews. The most important questions for AEC implementation are related to the effect of this trade integration in both positive and negative terms. Then, what should the firms and

government prepare for the fluctuating of business and economic development. The questions are discussed base on three consideration factors namely industrial input, supply chain, and economic situation. The in-depth interview has the main purpose to gain undefinable information about the current situation among AEC development.

TABLE 4: IN-DEPTH INTERVIEWING QUESTIONS

No.	Interview Question
1	What are positive and negative effects of AEC on Thai's automotive industry?
2	What should the government, firms, and related sector prepare for environmental change?

TABLE 5: DESCRIPTION OF INTERVIEWEES

Section	Affiliation	Description
Government	Office of the National Economic and Social Development Board	Development plans for AEC implementation are conducted by the government. Office of the National Economic and Social Development Board act as an intermedia player for plan development.
Private firm	Japanese automobile company in Thailand	In order to identify the real situation that the firms have to face, a key person of an automobile company in Thailand needed to be an interview.
Academic	Logistics and supply chain experts	The big picture of supply chain system with the influence of AEC implementation. An interview with logistics expert can provide more understanding of supply chain development due to the implementation AEC.

In order to clarify the situation of the automotive industry in Thailand due to the development of AEC in term of processes and key achievements that effect to the economic situation, the in-depth information from government, the private sector, and educational sector are important for measure the business and economic situation in Thai's auto industry. Thus, three experts in each field are interviewed to identify the current situation of automotive industry due to AEC development. In government perspective, Office of the National Economic and Social Development Board is one of the key actors for AEC development in Thailand. This agency has a role in developing development plans, a study on an important issue, trace and evaluation the outcomes. This agency is an intermedia actor from AEC implementation plan in Thailand. Besides the government agency consideration, interview the representative of automobile maker is significant to conduct for receiving the real situation that automotive companies are facing. The educational sector also considered gaining more understanding. Logistics expert and lecturer at the university in Thailand is being an interviewee for contributing the knowledge in term of influence effect of AEC on the future situation and supply chain of the automotive industry. In consequence, the information from interviewees can provide all perspectives of AEC development in Thailand.

The interviewees section and affiliation are shown in table 5. Member check method was implemented to recheck the script from the interviewees. After the interview, interviewer summarizes the information in each discussion and submitted to the interviewees to make a confirmation on their opinions.

IV. RESULTS

According to the opinions of interviewees, the collaboration under the AEC agreement will lead to the reduction of trade and tariff barriers among ASEAN members. It can result in an increasing of cumulative import and export value of the automotive product in ASEAN. AEC is expected to enable the supply chain to reduce the complexity of transportation and logistics by the set up the same standard for transportation among ASEAN countries. Thus, it can result in cost and time reduction and increase capability of the supply chain. However, the major competitors of Thai's automotive producers are Indonesia and Malaysia. Indonesia has a high rate of economic growing due to the government's policy that encourages the small car and fuel efficiency car (eco-car) to support the global automotive development. Besides, Malaysia also launched policies that support the production of the environmentally friendly vehicles such as hybrid and electric car.

The gather of AEC can drive automotive parts and producers in Thailand because it is required to develop the competitiveness by improving production capability. In particular, Thai automotive industry should look for a new production technology that clean and environmentally friendly as well as the use of renewable energy. The development of electric vehicles and reduction of overall weight of vehicles and auto parts are also significant in the global automotive market. Skill labor is one of the competitive advances of Thai automotive industry. However, I also consider a source of problems as well. Problems indicated by human factor can be classifying into two main parts; first is labor force, it is considered as an input of automotive industry. Even Thailand has skill labor when comparing to neighbor countries but Thai workers lack willingness to work hard, workers normally change a job frequently especially for the tough work. Social value in Thailand for students in vocational school is not quite positive. The vocational school in Thailand viewed as a school for the students who cannot apply for ordinary school. In addition, it is not received an acceptable and supportive of the society. It is resulting in the lower number of skill labor and the firm need to hire the labor from neighbor countries. The second part is advanced knowledge and skills worker can be discussed in term of the knowledge-intensive problem. As we know automotive industry is knowledge and innovation base industry. The global trend of the automotive industry is shifting to more fuel efficiency and environmentally friendly vehicles. Hybrid, plug-in hybrid, Extended-Range Electric

Vehicles (E-REV), and Electric Vehicle (EV) are the new trend in the automotive industry. However, research and development for automobile development are mostly no conduct in Thailand due to the lack of knowledge and skill worker. However, advanced knowledge and skills worker may not recognize as a significant part that should be concerned because the globalization of supply chain management. Research and development processes can be conducted at any place. Nevertheless, the human factor is seen as a primary or prerequisite factor that important for the development of AEC. Any investments are requiring labor for, the factory cannot run without labors, and technology cannot be well implemented due to the lack of knowledge from workers.

Thailand has been seen as a hub of ASEAN for assembly the vehicles due to the location of Thailand that located in the center of ASEAN, but the true advantages are far beyond the location. In order to gain the competitive advantage among ASEAN, value and market creation are more important. Thailand has seen as a hub for assembly the vehicles with fine quality and reasonable price among ASEAN. Even it is not difficult for the firm to move the factory to other ASEAN countries, but it is difficult to reestablish supply chain network as complete as in Thailand. Therefore, the most competitive advantage of Thai's automotive industry is the supply chain network that intensely allocated within Thailand. Furthermore, skill and experience workers are also important, the automobile is required at least 20,000 parts for assembly. Hence, the expertise and quality of production processes are important in this industry. In the other hand, the vehicle is directly related to the safety of customers. The minor error can lead to major problem for the organization. The rises of minimum wages have a minor effect on the automotive industry as long as Thai's worker has better assembly skill. In additional, the government sector is playing an important role to support the auto parts producers in order to expand the market. TAPA or Thailand auto parts and accessories is a market event held every two years. The main purpose is to promote the automotive companies and improve the market in Thailand and ASEAN. This event occurs with the collaboration between Department of International Trade Associations and many public and private agencies involved in Thai's automotive industry with the objectives to drive Thai's automotive industry towards the goal of 3 million cars producing and a global green automotive hub. The summaries of expert's opinion are in table 6.

In order to consider on an accuracy of expert's opinions, the topic that each expert is considered is confirmed by the secondary data from literature reviews in AEC topic. The results of primary and secondary data are summarizing in table 7. This analysis shows that the expert's opinions are similar to the factors that concerned by researchers in literature reviews by classifying into three related factors.

TABLE 6: SUMMARIES OF EXPERT'S OPINION

Sector of respondents	Summary opinion
Government	The development of AEC in Thailand can create beneficially to Thai's industry in term of investment and market growth. The related government agencies and private sectors are collaborating and prepared plans for bearing with the AEC situation. The most undeniable important factor is labor.
Private firm	The gathered of AEC can be the motivator for automotive parts and producers in Thailand because it is required to develop their competitiveness by improving production capability. The firm should focus on the technological development due to the changing in market trend. However, the support from government and other related party are important to expanding the productivity and competitiveness of Thai; automotive industry.
Academic	Based on the logistics and supply chain perspective, AEC is expected to enabling the supply chain to reduce the complexity of transportation and logistics among ASEAN. Thus, it can result in cost and time reduction and increase capability of the supply chain. Thailand has competitiveness in term of supply chain network and labor skill. Thus, it is quite difficult for the firm to move out the production base from Thailand. However, Thailand should not leave to room for competitor overcome.

TABLE 7: CONFIRMATION FACTOR BETWEEN PRIMARY AND SECONDARY DATA

Factors	Primary data	Secondary data
Industrial Input (Supporting sectors)	The development of AEC can increase labor intensive and improve production capability.	Labor cost, labor skill, foreign investments are directly affected Thai's automotive industry.
Supply Chain	AEC can increase supply chain capability by reducing the complexity of transportation and logistics among the region.	An improvement of communication and integration can improve the supply chain management.
Economic Situation (Customer)	AEC Increase competition within region and improve production capability	The change of this business environment including market demand, trends, and competitiveness are influencing in the automotive industry.

V. CONCLUSION

In this paper, the effects of AEC2015 on the automotive industry in Thailand are presented with respect to the perception of experts in three related fields namely government, automobile firm, and educational sector. AEC2015 is expected to create benefits to Thailand by an increasing of market opportunities and investment attraction. In order to be an automobile production base of Asia, Thai's automotive industry has a major strength in supply chain network and skill labor. However, it has some obstacles to be overcome, the discrimination of skill labor and changing market trend are needed to be considered. Since the vocational school is the second choice for students, it can significantly effect on the labor market in the future. Thus,

the policymaker may need to collaborate with the educational sector and firm for supporting the creation of skill labor to serve the industry. Besides, the social value and perspective for vocational school needed to be recreation. The collaboration among firms, governments, and educational sector are important to drive the automotive industry forward and maintain the competitive advantage for attracting automobile firms for developing and increasing the employment rate and economic growing in Thailand.

The further study of this research is (1) to gain more information and be able to clarify the overall situation of AEC implementation in Thailand, in-depth interview more experts in any field which is related with AEC2015 (2) SWOT analysis is beneficial for implementing to determine the positive and negative effect on automotive industry in Thailand due to the AEC2015. (3) to suggest policies and strategies to maintain the competitive advantage of the automotive industry in Thailand among ASEAN. The suggestion will be including policymaker perspectives as well as firm perspectives.

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