

Future Directions of Electric Vehicles and the Thai Automobile Industry

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Abstract

“If we talk about the vehicles in the future, it’s impossible to forget the electric cars, so-called Electric Vehicles (EV) or Battery Electric Vehicles (BEV)”. EV means a car using only electric power from its battery. Nowadays, we are in the era of difficulties, so-called in Thai “the expensive cost of the living era”. Today, we face the augmentation of oil prices, the increase of labor wage, and the global warming phenomena. Thailand -as one of the world’s principal automobile part production and assembly bases- must adapt to the world’s current need for new and intelligent technologies. The government continues to support the automobile industry by implementing a plan to promote the use of EV. The government aims to reach a target of 1.2 billion EV cars by 2036. This emphasizes that the EV will become a prosperous “new industry”. It will strongly augment the overall economy of the country. For these reasons, the researcher is interested in studying the future directions of electric vehicles and the Thai automobile industry in order to help the Thai automobile industry develop to the international standard.

Keywords: Automobile Industry, Thailand, Electric Vehicles

Introduction

Nowadays, we are in the era of difficulty, so-called in Thai “the era of the expensive cost of the living”. Today, we face the augmentation of oil prices, the increase of labor wages, and the global warming phenomena. These make the electric cars, so-called Electric Vehicles (EV) or Battery Electric Vehicles (BEV) -which means a car using only electric power from its battery - interesting to the world. Being an environmental-friendly car and emitting less of the greenhouse gas, EV is the ideal car for many countries. Nowadays, there are - excluding the Hybrid Electric Vehicle (HEV) which has been already promoted for a moment - other three electric vehicles (concentrating on saving energy in its battery) as follows: Plug-in Hybrid Electric Vehicle (PHEV), Battery Electric Vehicle (BEV), and Fuel Cell Electric Vehicle (FCEV) (Yongpisanphob, 2 017). It is necessary to promote and develop the EV. Many countries pay very important attention to the EV. Even though many people think that it’s hard to make it evident, several sectors still have to work on it in order to make sustainably the EV functional in reality. For Thailand, the public sector is seriously going to promote this industry.

As one of the world’s principal automobile part production and assembly bases, Thailand must adapt to the world’s current need for new and intelligent technologies. The government continues to support the automobile industry by carrying out a plan to promote the use of EV. The government aims to reach a target of 1.2 billion EV cars by 2036. This emphasizes that the EV will become a prosperous “new industry” and will strongly augment the overall economy of the country. In 2019, the government starts continuously supporting the EV production investment. Now, it has been found that the project is in progress. It is very

interesting for the investment, the announcement, the EV investment of some automobile brands, the production of PHEV in Thailand, the announcement of EV's battery investment, the installation of charging stations, etc. This direction shows that the domestic automobile market, export and production tendencies can be changed in the future because of the increasing segment of the new automobile market. This direction is expected to help the Thai automobile industry since 2017. Overall it will be a good opportunity for the related business which could adapt itself to meet with the development of the future automobile market. SMEs must adapt their businesses, especially in product development to meet this direction and to make them competitive for the liberal market as the present. When Thailand steps into the era of changeable industry, to fulfill the need of world's market in the point of intelligence and environmental care and especially the support of EV production in Thailand, all sectors - public sector, private sector, SMEs, big companies and the educational institutions must learn and follow this direction. So, Thailand can maintain its principal world's automobile production base. SME's entrepreneurs should know the investment directives and the EV domestic market to enlighten the changing situation which will be useful for planning their business in a suitable way (Kasikorn Research Center, 2018).

The Evolution of Electric Vehicle

The Electric Vehicle has been invented for more than 180 years before the invention of an Inner Combustion Vehicle (ICE) which signifies the using oil car. Its evolution can be classified in 6 periods as follows: In the 1st period from 1830 to 1930 "The era of invention", the EV moved in a short distance by its three wheels with battery. In the 2nd period from 1930 to 1940 "the era of commercial production", the EV car was very popular because it could run farther with its battery. It existed already the ICE. But it was not popular because it was hard to use and very expensive. In the 3rd period from 1940, 28% of all vehicles in the USA were EVs. However, its popularity drastically decreased because of the road expansion. To run in a far distance, it needed an ICE. Additionally, oil prices reduced because many petroleum sources had been discovered. In the 4th period from 1908 "the successful era of ICE", the success of oil-using cars in commerce reduced its price. It makes the EV lost its popularity because the EV had more disadvantages than the ICE whether in the point of distances or facilities. In the 5th period from 1970, there was a world's oil crisis. It made the EV interesting again. In this era, the EV was developed by applying hybrid technology in order to save energy. After the crisis passed at the end of 1970, the encouragement, the research and the development of EV were drastically reduced. So, the EV could not become a commercial product yet. And in the 6th period from 2000 to the present, according to the Communication and image of the organization direction, PTT Public Company Limited. (2018), the important reason which makes EV more popular than other vehicle technologies is its practical convenience and its clean technology. It doesn't emit air pollution while the Internal Combustion Engine (ICE) is difficult to use because we have to spin the engine to start and it emits a lot of pollution. However, the recent success of Hybrid vehicles, the environmental concern, global warming and the increase of oil prices, the EV technology becomes a hope for future transport technologies which must be effective and good for the environment. So, there are many countries supporting the EV by applying various measures such as the promulgation of the Law on Environment and Energetic Policy in the USA, the setting of the Emission Standard for new cars in European Union (EU), the subvention for EV development or the special taxes for EV in order to help this technology to be competitive with the ICE and the budgetary support for research and development relating to this technology, etc. These measures encourage American, European and Japanese manufacturers to interest and invest in the EV technology. So, the EV can compete widely in the future market (Pongthanaisawan, 2013).

Electric Vehicle and Popularity of the Thai

According to the statistic -dated 31st August 2019- of registered car classified by its fuel types from the Department of Land Transport, there are 1,933 registered (only) electric vehicles. This number represents the increase in 1,447 EV from last year. In 2019, there were 1,424 electric motorcycles (RY 12 type) and 109 personal vehicles (RY 1,2,3,4,6,8, and 10) and public transport vehicles (public transport, non-public transport and private). For the hybrid vehicle, there are 131,874 Benzyl-Electric hybrid vehicles, 11,448 Diesel-Electric hybrid vehicles and 34 LPG-Benzyl-Electric hybrid vehicles. Furthermore, the Kasikorn Research Center cited that the positive factors are the affordable prices of new EV, good perspectives about EV possession, continuous decreases of battery price and other factors such as vehicle and battery guarantees. These factors make the EV in Thailand increasingly progress. Concerning the automobile brands, they start developing many series of EV to the market such as Audi e-Tron 55 Quattro with a price of 5.09 million Baht, Nissan Leaf with a price of 1.99 million Baht or even FOMM One with a price of 6.6 hundred thousand Baht which is the lowest price for EV in Thailand (BIZ LIFE, 2019). To convince consumers to use EV, it is necessary to compare distinctively the cost of ownership, the purchase prices, the fuel prices, the maintenance fees, and other expenses. Nowadays, even comparing these costs, it is still not enough to convince consumers to use an EV, especially in the same segment vehicle. There are three factors influencing to consumer's decision: personal factor (1), education (2) and income (3). The inner factors are the vehicle prices, brand and vehicle's capacities. Lastly, there are external factors such as after-sale service, etc. So, if Thailand reaches 60 % of EV use objective with 1.2 billion within 2036, it will reduce 600 million liters of Benzyl, 313.9 million liters of Diesel and 174.7 million liters of LPG. At the same time, the need for electricity will just increase to 2,994 GWh overall. We will economize the fuel cost to 11,936 million Baht and reduce the social costs to 70.279 million Baht (Green Network, 2019).

Probable Problems to the Thai Automobile Industry

The world's production sector is going to change into a new aspect, especially the operational process development on the basis of 4.0 industry. It will increase the effectiveness and efficiency of product values. It could also handle with the domestic and international economic change among the following risks which could impact on the Thai automobile industry:

- 1) The risk from a stall of the world's economy: the impact of the economic war between the USA and China was represented by the fact that IMF reduces the rate of economic growth in 2019 only 3.7 percent. The disagreement of trade policy can obstruct the world's trade quantity and it can also impact the automobile export, especially principal trading countries such as ASEAN countries and Australia.
- 2) The risk from a volatile political situation: long political conflicts are the factor that diminishes the probability of investing in Thailand because investors are not confident to invest in Thailand. When they face many problems, how can governments help investors? Or, they will face the loss of profit. Thus, investors will be reluctant to invest in Thailand.
- 3) The risk from a structural change in automobile production and the automobile need: In particular, the electric vehicle industry is currently being increasingly popular. This will represent the need for using-oil automobile vehicle and automobile parts in the future. It is expected that the EV will play an important role in the next 20 years. Therefore, if the entrepreneurs do not well prepare their business, their businesses could encounter a future crisis of the Thai automobile industry. It is expected that the export of automobile and automobile parts would be the first impacted sector, followed by the domestic production sector (The Economy Research Center of the Government Savings Bank, 2019). For the last 2 to 3 years, the automobile industry increasingly expands and steps into the EV era. This

causes the change of automobile part supply chain - including Thailand - in 2 dimensions: the automobile part for the ICE supply chain and the new supply chain for EV. For the ICE supply chain, there is a diminution of the supply chain because many brands try to develop a corrective platform in order to augment their competitiveness. This includes the existing automobile parts which must be changed for supporting EV such as brake system and gear system, etc. For the new EV supply chain, it will have to produce specific gadgets for EV such as inverter battery and “Onboard” Charger, etc. In the past, it used to keep in the country owner of indeed technology such as Japan, China, and Germany. Now, there are investments in Thailand to develop the production base of EV part. It will be used for the domestic production process and for the exportation. Therefore, it causes the augmentation of the level of Thai EV supply chain into hi-technological automobile part production level which cost more value to the product (Moving up the value chain). This can relate to involving industries, especially the electronic industries which take an important role in the EV part supply chain. This change will impact most of the Thai manufacturers. The expected group which would be the most impacted by this change is Tier 2. More than 600 companies of Tier 2 could face a fierce competition or they could even be taken over after 2027. However, it depends on the company’s adaptation (Kasikorn Research Center, 2019).

4) The risk from 20% Thai baht appreciation: It was the most appreciated in history. Thus, the products of Thailand, which trading with others, are more expensive about 20%. It impacts on competitive advantage. While the “consumption” or purchasing power reduces in this year, especially durable goods such as the automobile has negative sales growth representing the slow growth of consumption. It also affects retail sales as well as restaurants. It should be concerned when these companies reduce their production capacity, it will affect the workforce. As the reduction of overtime works and manpower and the layoff phenomena, this could be a significant pressure to economic momentum from this year to early next year (Prachachart Business, 2019).

5) The risk from EV’s limitation: the slow growth of EV because there are many limitations. Firstly, the battery is the heart of the vehicle. It gives energy and makes the electric motor work instead of an engine. Secondly, normal charging at domicile, it takes 8 hours of charging for normal charging at domicile and it takes around 20-30 minutes for the quick charging at the station. Thirdly, the electrical expenses are still high compared to the ICE. It not enough persuasive for the consumers to use. Lastly, there are not enough infrastructures such as the charging stations. Therefore, it is not convenient to use (Witayanumas, 2018).

Roles of International Companies in the Thai Automobile Industry

The establishment and development of the Thai automobile industry are very related to the factory setting by international companies. Thailand is committed to developing the automobile industry and its own parts by profiting the resources of international companies. These investor companies play an important role in developing the local economy, elevating Industrial structure, expanding exportation and integrating the global supply chain.

1) The investment of international companies makes the automobile industry the principal industry in Thailand. There are 18 automobile manufacturers in Thailand which are western international companies and Japanese automobile manufacturers. There are seven Japanese automobile companies Investing in Thailand: Toyota, Mitsubishi, Honda, Nissan, Isuzu, Suzuki, and Hino. These companies produce about 2 million cars per year representing 72% of total automobile production in Thailand. Most manufacturers and Tier 1 suppliers are funded by these foreign companies. Most international brands are Japanese. The fundamental equipment, such as the engine required by most manufacturers, relies on importation. Meanwhile, these foreign companies also invest in the automobile parts industry. Currently, there are 709 automobile part manufacturers in Thailand - 54% of foreign

companies and 23% of Thai companies. There are around 1700 suppliers, mostly are local companies. Over the past few years, the automobile industry has developed rapidly and has become the main industry in domestic production. The development of the Thai automobile industry benefits from fund and technology transfer provided by the international companies. The development also promotes the transformation and elevation of industrial structures.

2) The automobile vehicles and parts exportations of multinational companies make Thailand one of the world's automobile exporter countries. The international companies keep their leader status and they are an important power to export automobiles in these countries. From 1980, the policy of the Malaysian Government is to promote the automobile industry. Malaysia has become the largest automobile exporter in ASEAN. In 1995, Malaysia's automobile exports were 33% of ASEAN countries meanwhile Thailand had only 28% proportion. In 1990, Thailand has implemented the Export-Oriented Automobile Industry Policy. So, foreign automobile manufacturers have started coming to invest in Thailand. In 2001, the Japanese automobile manufacturers were 81% of domestic sales and 60% of exportations in Thailand. Therefore, Thailand has replaced Malaysia as the largest automobile exporter in ASEAN. The automobile vehicles and parts exportations of Thailand continue to grow. From 2012 to 2017, Thailand's automobile exportations increased from 24.29 billion to 27.22 billion dollars. By the year 2017, the exportations of Thailand's personal cars were 11.629 billion dollars. In 2017, the truck exportations valued 6.464 billion dollars. At the same time, the market share of Thailand in the world's automobile market continues to increase. From 2000, 2005, 2010 and 2016, the automobile exportations of Thailand increase from 0.4% 0.9% 1.7% to 2% respectively. According to the World Trade Organization information (WTO), Thailand is - in 2019 - ranked 8th place among the world's largest automobile exporter from after the European Union, Japan, USA, Mexico, Canada, South Korea and China.

3) The demand for automobile parts of international companies promotes Thailand's integration into the global automobile industry supply chain while the World automobile Industry has divided work. The international companies have used a "Globalization Procurement Strategy". At the same time, they also operate a local strategy. Currently, many world-famous automobile companies have established a joint venture company or a single-holder company in Thailand. Many automobile manufacturers have gradually grown in Thailand and have been creating a relatively industrial chain. It promotes Thailand's integration into the world supply chain. According to the Thai Automobile Part Manufacturer Association, Thailand has been able to supply all types of car and car parts: rubber, brake, gear parts interior fittings, rubber and plastic parts products including rubber tube, rubber sheet, door, window, rubber carpet, molded parts for lamps, tires, and belts. The largest amount of exportation is tires due to the transfer of technology from foreign companies. The Thai foundry industry for automobiles has greatly improved its ability to produce drum brake, brake disc, foot pedal, clutch cover, barrel, engine, exhaust pipe, bearing power wheel, soft joints, north-cylinder, and other electronic products. The joint venture has dominated the leader position in the production of oscillators wire, electronic light, lamp tube, etc. Meanwhile, the factories in Thailand mainly produce products that primarily need labor work such as seat parts, mirror, steering, etc.

4) The result, from the technological transfer occurred by the establishment of the research and development center of international companies by consistently and vigorously sharing works at the international level, makes the international companies transfer its research and development to other countries. The government established the research and development center in Thailand. The Japanese companies such as Toyota, Honda, Mitsubishi and Mazda established their research and development centers in Thailand. Japanese manufacturers also created their academies in Thailand for example, TOYOTA Asia Pacific Safety Training

Center (TOYOTA Thailand), DENSO Training Academy (DENSO Thailand) and Summit Auto Body Industry, etc. These research centers have changed the method of Thai research from the research for application into the research for fundamental principles and innovation development. These international companies strengthen the investment in research and development in Thailand. It changes our country's industry by receiving new technology and become an exporter of some new technologies. Consequently, it is beneficial for the local manufacturers. They can access to new advanced product, technology, process and marketing knowledge from these international companies. In the same direction, Thailand enhances our domestic automobile research and development capacities. The National Office of science and technology created a special fund with a low-interest loan for technological automobile development. The Thai government established its academy in order to form our human resources to be skillful at technology and automobile industrial management.

The global warming and the change of industrial supply chain structure change the automobile competition model. Especially, the 4th wave of the industrial revolution will influence the automobile industry the most. With the new competitive model of the world's automobile industry, Thailand must explore automobile development models that are suitable for our condition. We have to implement a proactive policy and integrate into the new value and supply chain of the automobile industry. These are the lessons and experiences that we have to learn. Firstly, we have to choose a model of automobile development in accordance with our internal conditions (rules and regulations). In the decade of 1960, the Thai government implemented automobile policy by using tax measures. We determined the proportion of automobile part production in order to protect the domestic industry. Beginning in 1990, the Thai government policy changes into a free-market policy. The government opens freely automobile market. The ban on automobile importation was abolished. Taxes for automobile part importations were reduced. The rules on providing local automobile parts are encouraged by the foreign automobile manufacturer to invest in and set up a factory in Thailand. The automobile industries have been developed rapidly. The path to the development of the export-oriented the automobile industry was created. Secondly, it relies on international companies to integrate into the value chain and world supply chain of the automobile industry in the development of the automobile industry in Thailand. The international company maintains its leadership position with a majority of Japanese automobile companies. By executing the " Globalization procurement " and the localization strategy, many international automobile companies have established a joint venture company or a single-holder company in Thailand. The creation of a large number of automobile companies grows up and makes local companies integrate with the value chain and supply chain of the world automobile industry. The current globalization of the world automobile industry is accelerating. It contributes to the Globalization Procurement Strategy of the automobile parts industry. The division of work - done in emerging industries Integrating with the value chain and supply chain of the world automobile industry - is a challenge that the Thai automobile industry will face in the future. Lastly, it must elevate the international competitiveness for the automobile industry in their country. From the prosperity of emerging economies. The domestic automobile industry has flourished very quickly. Automobile companies in developed countries have invested in setting up a factory. It is a large-scale production chain of transfer and extension of research and development, design, procurement, sales, and after-sales service. Concerning the restructure of the automobile industry around the world, Thailand focuses on the development direction of the automobile industry, the promotion of the expertise and the size of automobile companies. Expecting to develop our automobile industry to meet the international competitiveness of the automobile industry, Thailand has become the eighth largest automobile exporter in the world.

Conclusion

As one of the world's principal automobile part production and assembly bases, Thailand must adapt to the world's current need for new and intelligent technologies. The government continues to support the automobile industry by carrying out a plan to promote the use of EV. The government aims to reach a target of 1.2 billion EV cars by 2036. This emphasizes that the EV will become a prosperous "new industry" and will strongly augment the overall economy of the country. The need for future vehicles focuses on their energy-saving and environmental-friendly capacities more than current vehicles. This change must also be in accordance with the world's automobile trend. If we want to maintain our industrial capacities, we must bring the energetic and environmental objectives into our industrial policies. The operational directive is to make Thailand the center of automobile part production bases covering new automobile parts and technologies for the purpose of industrial enhancement. We must also improve our current cluster capacities, especially the strong and light material. However, when do Thailand become a production base of new EV or how far increase the sources or quantities of EV, it depends on the direction of technological change. Furthermore, the risks which will impact the Thai automobile industry are also other conditions that will determine the directions of the Thai EV direction.

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