THAILAND AND MALAYSIA'S COMPETITIVENESS ON ELECTRIC VEHICLE MANUFACTURING DEVELOPMENT TO INCREASE THE FOREIGN DIRECT INVESTMENT IN 2014-2019

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Abstrak

Perkembangan kendaraan listrik menjadi salah satu faktor bagi Thailand dan Malaysia dalam membuat sebuah kebijakan untuk mempercepat perkembangan kendaraan listrik yang disebabkan oleh ketertarikan mereka untuk mengembangkan sektor kendaraan listrik di negara mereka. Ketertarikan ini juga menimbulkan adanya daya saing di antara kedua negara tersebut. Dalam usaha mengembangkan sektor kendaraan listrik, baik Thailand dan Malaysia perlu memperbolehkan investasi asing langsung untuk membantu mereka untuk mendapatkan teknologi yang lebih maju dalam mengembangkan kendaraan listrik. Dengan hal ini, daya saing muncul di antara Thailand dan Malaysia dapat dianalisis melalui Porter Diamond Model agar dapat terlihat apa saja keunggulan dari masing-masing negara yang dapat menarik investasi asing langsung ke negara mereka. Thailand menunjukkan lebih kompetitif dibandingkan Malaysia dengan perkembangan kebijakan, infrastruktur, serta pengembangan riset di Thailand walaupun Malaysia memiliki beberapa keunggulan tetapi Thailand dapat lebih mampu menarik investor dibandingkan Malaysia.

***Kata Kunci**: Kendaraan Listrik, Thailand, Malaysia, Daya Saing, Investasi Asing Langsung, Porter Diamond Model*

Abstract

The Electric Vehicle (EV) development become one of the factors for Thailand and Malaysia to create a policy for accelerate electric vehicle development due their interest to develop the electric vehicle sector in their country. This interest led to the competitiveness between those countries. In order to help them developing their electric vehicle sector, Thailand and Malaysia need to allow foreign direct investment to their country to help them gain advance technology to develop their electric vehicle sector. The competitiveness that occurs between Thailand and Malaysia can be analyzed through Porter Diamond Model to understand the advantage from each country that can attract the foreign direct investment to their country. Thailand shows more competitiveness in EV than Malaysia because, in those several determinants, Thailand shows they keep developing through their policies, providing infrastructure, and continuing the research and development in production capability. Although Malaysia has several advantages over Thailand, Thailand could provide more benefits to the investor than Malaysia.

Keywords: Electric Vehicle, Thailand, Malaysia, Competitiveness, Foreign Direct Investment, Porter Diamond Model

1. Background

In recent decades, Southeast Asia has been the epicenter of automotive manufacturing. The shift of consumers' preferences to cleaner energy resources for their vehicles resulted in an increase in demand for electric vehicles (EV). This leads countries in Southeast Asia, such as Thailand and Malaysia, to pursue the new trend of EV and make policies to accelerate EV development. Thailand decided to make an policy that aim to promote Thailand to become an ASEAN EV Hub, promoting the use of EV on Thai roads, then promoting EV Production in Thailand and supporting local EV Company, supporting R&D of EV, EV Parts and Components and Charging Station and the last is supporting investment of EV in Thailand (Electric Vehicle Association of Thailand, 2019). Meanwhile, Malaysia decided to emphasize the development of the Energy Efficient Vehicle or EEV segment in 2014 under their automotive policy, which is the National Automotive Policy (NAP) launched by the government in 2006, in order to improve the competitiveness of the automotive industry in Malaysia with a focus on technology and engineering strategies that also include market expansion (Ariffina & Sahid, 2017). In NAP 2014, they emphasize on EV which can be seen in their aims, which focus on "green initiative, development of technology and human capital, market expansion, and enhancement of the automotive industry ecosystem" (Malaysian Automotive Association, p. 2).

Both countries are interested in developing electric vehicles in their respective countries, which will necessitate advanced technology. The solution that could help both countries receive advanced technology is allowing foreign direct investment, or FDI. Both countries could benefit from FDI by gaining access to advanced technology and improving their human capital (Tarzi, 2005, pp. 497-509). This study aims to do a comparative analysis about how the competitiveness of both countries—Thailand and Malaysia—could help them develop their automotive industries, especially in EV manufacturing, through foreign direct investment in their countries.

The automotive industry started to be concerned about energy consumption, emissions, and safety, which led to an eco-innovation that refers to eco-efficiency with the aim to reduce the amount of material and energy used in production, eliminate toxic substances, and increase the lifecycle of the product itself (Vaz, Rauen, & Lezana, 2017, pp. 2-3). The battery, which could provide high energy density, power density, cycle life, safety, and a low cost of production, is an important material to support the manufacture of the EV. The battery can be categorized into four types, which are battery EV (BEV), hybrid EV (HEV), Plug-in Hybrid EV (PHEV) and Fuel Cell EV (FCEV) (Vidyanandan, 2019, pp. 1-7). To produce the battery, it requires a material such as lithium-ion, which can be found in common devices such as mobile phones, laptops, and other electronic devices, but the lithium-ion that is used by EVs is different because the lithium that is used by electronic devices is lithium cobalt oxide cathode, or LCO (Drabik & Rizos, 2018, pp. 2-13). On the other hand, the lithium ion that has become the most common type of battery in EVs is supported by other raw materials like lithium, nickel, cobalt, and aluminum, also known as NCA (nickel cobalt aluminum oxide), LMO (lithium manganese oxide), and NMC (lithium, nickel, manganese, cobalt oxide) (Drabik & Rizos, 2018, pp. 2-13).

When it comes to producing or manufacturing a battery to support the EV, it can be divided into six steps: mining and processing raw materials, cell component manufacturing, cell manufacturing, battery pack manufacturing, EV manufacturing, and recycling. (Drabik & Rizos, 2018, pp. 2-13). By using the raw material for producing the battery, it will raise a supply risk because of the high demand, and in order to prevent this situation, it's important to consider having a recycling process that can also lead to job opportunities, trying to remanufacture the battery in order to extend their lifetimes because they have different lifetimes for each material, and also anticipating the reduction of lithium-ion battery prices in future market (Drabik & Rizos, 2018, pp. 2-13).

2. Conceptual Framework

2.1 Foreign Direct Investment

Foreign direct investment is "an existence of a long-term relationship between the direct investor who is a resident entity in one economy and the direct investment enterprise, an entity resident in another economy, with a significant degree of influence of the investor on the management of the enterprise" (OECD, 1996). Dunning explained that O-L-I is variables that determines FDI and MNCs activities "likened to a three-legged stool; each leg is supportive of the others, and the stool is only functional if the three legs are evenly balanced" (Dunning J. H., 1980).

The first factor influencing foreign direct investment is ownership advantages, which are defined as competitive advantages based on the ownership of intangible assets that can help them profit through international production. Second, with the support of location, the company can gain other benefits, such as cheap labor that can help reduce the cost of extracting natural resources, skilled labor to increase competitiveness, a larger market size, and political stability. The last one is internalization, which explains how a company must be able to control their transaction costs, such as by using joint ventures to operate FDI, having a wholly owned subsidiary, or other options available (Dunning J., 1981).

To support the previous theory, Dunning creates another theory called "Investment Development Path" that talks about the influence of a country's level of economic development and the government. The first stage is the country's location, which can have a significant impact on attracting investors due to its natural resources. The second stage occurs when inward direct investment begins to move but outward investment remains low due to the increased size and purchasing power of the foreign company's local product. The third stage is more focused on increasing outward direct investment while decreasing inward direct investment because the country's technological capabilities are increasing in terms of production of standardized goods, which is caused by higher demand from consumers along with rising incomes, forcing the company to produce higher-quality goods (Dunning J. H., 1997, pp. 237-240).

The fourth stage is explaining how the outward direct investment of a country exceeds or is equal to the inward direct investment of a foreign company and how the outward FDI is still increasing faster than the inward FDI. In this situation, Dunning explains that domestic companies can compete with foreign companies inside and outside their country, then continues with the L advantage's role in this stage in terms of creating assets because of the development of production processes using capital-intensive production techniques that have a low cost rather than labor.

At this stage, the country with the lower level of development will engage in inward direct investment, with a focus on market-seeking, trade-related, and asset-seeking activities (Dunning J. H., 1997, pp. 237-240).

The last stage is stage five, when the company is trying to do an efficiency seeking investment through cross-border alliances, mergers, and acquisitions that make its position pluralistic. In this stage, the country can be seen as a success country through their technology, continuity of their economic growth, which is supported by the company, which could coordinate the resources at the regional and global level. At this point, the government's role is to become more proactive in engaging an efficient market and collaborating with business enterprises to reduce transaction costs (Dunning J. H., 1997, pp. 240-243). From Dunning's explanation it can be concluded that many determinants can influence the foreign direct investment such as location, technology, infrastructure, the market size, the human capital, the policies, the availability of natural resources and public goods.

3. Research Method

To analyze the competitiveness between Thailand and Malaysia in EV manufacturing to attract the foreign direct investment, this article uses Porter Diamond Model. This method also used by Tatoglu (1996) to analyze the competitiveness of automobile industry in Turkey. From Porter Diamond Model, the article will divide the variables into four determinants such as factor conditions, demand conditions, related and supporting industries and firm strategy, structure and rivalry (Thompson, Gamble, Peteraf, & Strickland, 2018).

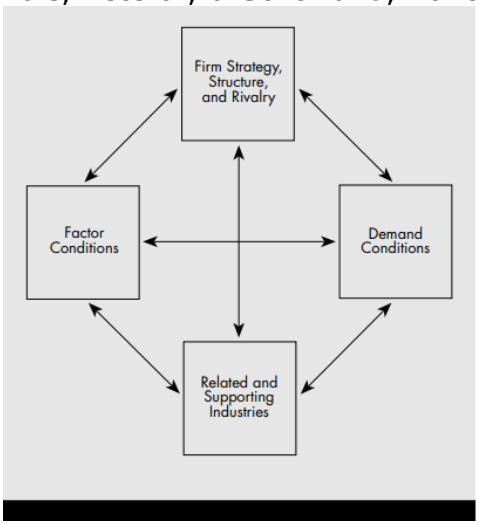

Figure 1: Porter's Diamond Model (Porter, 1990)

For factors of condition, this article uses labor wages, the human capital index, economic clusters, incentive policies for consumers, and government incentives for EV producers as sub-determinants. Through these sub-variables, it will help this article analyze the condition of the host countries, which are Thailand and Malaysia. The data that this article will use is from ASEAN Briefing, the Ministry of Labor in Thailand, the Board of Investment in Thailand, the World Bank, and Asia Perspective.

For the demand condition, the article uses GDP per capita, car density ratio, and automotive annual sale as sub-determinants. The demand situation in this country can influence demand from buyers in the host country. The data will be retrieved from the World Bank, the National Economic and Social Development Council of Thailand, the Department of Statistics of Malaysia, the ASEAN Automotive Federation, the Malaysia Automotive Association, and ASEAN DataStats.

For the related and supporting industries, this article uses import tariffs on batteries, import tariffs on natural resources, availability of natural resources, and production capability as sub-determinants and gives more focus to the resources for batteries as the important parts of EV. The data will be retrieved from the World Trade Organization Report, Statista, U.S. Geological Survey, Bangkok Post, and Business Today.

This article will use saturated market level to see the dominant player on the market and ease of doing business to see how the company maintains its business before making an investment for firm strategy, structure, and rivalry. The data will be retrieved from Marklines and the World Bank.

4. Results and Discussion

No.	Determinant	Thailand	Malaysia
1	Labor Wage	1. Prachinburi = 9540 Baht (US$ 307.2) 2. Ayutthaya and Nakhon Ratchasima = 9600 Baht (US$ 309.2) 3. Pathum Thani and Chachoengsao = 9750 Baht (US$ 314) 4. Chonburi and Rayong = 9900 Baht (US$ 318.8) (US$ 1= 31.0470 THB)	All Region (2019) RM 1.100/ month or equal with US$ 270 (US$1= 4.08 MYR)
2	Human Capital Index	2018= 0.60	2018= 0.62
3	Economic Cluster	Super Cluster: 1. Ayutthaya 2. Pathum Thani 3. Chonburi 4. Rayong 5. Chachoengsao 6. Prachinburi 7. Nakhon Ratchasima	Selangor
4	Incentives Policies for Consumer	Excise Tax (Eco Car with seating not exceeding 10 seats Hybrid electric vehicle) 1. cylindrical volume not exceeding 3,000 cc and CO2	None

		emission not exceeding 100 g/km = 8% 2. cylindrical volume not exceeding 3,000 cc and CO2 emission exceeding 100 g/km but not exceeding 150 g/km = 16% 3. cylindrical volume not exceeding 3,000 cc and CO2 emission exceeding 150 g/km but not exceeding 200 g/km = 21% 4. cylindrical volume not exceeding 3,000 cc and CO2 emission exceeding 200 g/km = 26% 5. cylindrical volume exceeding 3,000 cc = 40% 6. Electric powered vehicle = 8% 7. Fuel cell powered vehicle = 8%	
5	Incentives Policies for Producer	HEV: 1. Exemption of import duties on machinery 2. 50% deduction of excise tax rate if the project also produces battery Plug-in EV PHEV: 1. Exemption of import duties on machinery 2. CIT Exemption for 3-6 years 3. 50% deduction of excise tax rate if produce battery in the project BEV: 1. Import duty exemption for CBU for 2 years 2. Import duty exemption for machinery 3. CIT exemption for 5-10 years 4. 2% of excise tax rate if produce battery in the project Battery Electric Bus:	Incentives for local assembly and manufacturing of EEVs a. 100% tax break for 10 years for FDIs b. 100% tax break for 10 years for corporate tax c. Subsidy provision for training and R&D d. Tax breaks (maximum 10%) for import duties e. Tax breaks (maximum 10%) for excise duties 2. Incentives for locally assembled and/or manufactured EEVs a. Tax breaks (50%) for excise duties b. Subsidy provision from the Industrial Adjustment Fund 3. Incentives for promoting EEV-related parts a. Electric motors, HEV and EV batteries, battery management systems,

		1. Exemption of import duties on machinery 2. CIT exemption for 3-6 years	inverters, ACs, air compressors b. 100% tax break for 10 years for corporate tax c. 100% tax break for 10 years for FDIs
6	GDP Per Capita	Thailand: 2018= $7,295 2019= $7,808 Bangkok: 2018= THB 604,421 or equal with $18,706.60 (US$1= 32.3104 THB)	Malaysia: 2018= $11,373 2019= $11,414 Kuala Lumpur: 2018= RM 121,444 or equal with $30,134 (US$1= 4.03 MYR)
7	Car Density Ratio	2017= 547.8	2017= 896.7
8	Automotive Annual Sale	2018 = 1,041,739 2019 = 1,007,552	2018 = 598,714 2019 = 604,287
9	Import Tariff on Battery	lithium, silver oxide, mercuric oxide, manganese dioxide, air-zinc, primary cells and primary batteries, and waste and scrap of primary cells and primary batteries = 10%	lithium, silver oxide, mercuric oxide, manganese dioxide, air-zinc, primary cells, and primary batteries = 0% waste and scrap of primary cells and primary batteries = 5%
10	Import Tariff on Natural Resources	nickel, cobalt, manganese, graphite, lithium oxide = 0% aluminum= 3%	nickel, cobalt, manganese, graphite, lithium oxide, aluminum = 0%
11	Availability of Natural Resources	Manganese (2019) = 20,700 metric tons	Manganese (2019) = 420 metric tons
12	Production Capability	1. BMW Group Thailand with DRÄXLMAIER Group has a partnership for local high- voltage battery production plant to assembly the battery and the battery modules. 2. Mercedes- Benz and Thonbori Automotive Assembly Plant built sixth global battery production base 3. Thailand does battery production in mid- 2020	Malaysia Automotive, Robotics and IoT Institute (MARii) decided to have a partnership with Eclimo Sdn Bhd in battery technology for EV by combining the battery cells and battery management systems from MARii with Eclimo's battery pack designs

		under SET-listed Energy Absolute with producing 100-billion-baht lithium-ion battery	
13	Saturated Market	28 OEMs: Bangchan, Dongfeng, Hino, Mazda, Sammitr, Tan Chong, Toyota, BMW, FOMM, Honda, Mitsubishi, Scania, Tata, Volvo/UDA Trucks, Chery, Ford, Hyundai, Nissan, Subaru, Thai Rung, VW, Daimler, GM, Isuzu, SAIC/MG, Suzuki, Thonburi, and Yontraki. EV Manufacturer: Nissan (Battery), Honda, Thonburi/Mercedes (Battery), Scania, FOMM, Mitsubishi (Battery), Toyota (Battery), Ford/Mazda 2, Suzuki, SAIC/MG, and BMW	42 OEMs: Malaysian Manufacturers: Berjaya, Bufori, DRB-Hicom, Inokom, Naza, Perodua, Proton, Tan Chong. Foreign Manufacturers: BMW/MINI, Daihatsu, Daimler, Hino, Honda, Hyundai, Isuzu, Kia, Mazda, Mitsubishi, Fuso, Nissan, PSA, Renault, Renault Trucks, Scania, Subaru, Toyota, UD Trucks, Volvo, Volvo Car, VW. Chinese Manufacturers: BAIC, Beiben, Changan/Chana, CNHTC, Dongfeng, Foton, Great Wall, JAC, Jiangling, SAIC, King Long, Hualing, Xingma.
14	Ease of Doing Business	Rank in the World = 21 Rank in Asia-Pacific = 5 Score = 79.5	Rank in the World= 12 Rank in Asia-Pacific= 3 Score= 81.5

Figure 2: Competitiveness Comparison between Thailand and Malaysia. Source: ASEAN Automotive Federation, 2019; ASEANStats Database, 2017; Asia Perspective, 2020; BMW Group, 2019; Bangkok Post, 2019; Business Today, 2019; Department of Statistic Malaysia, 2019; Kimura, Suehiro, & Doi, 2017; Malaysian Automotive Association, 2020; Marklines, 2020; Ministry of Labour Thailand, 2020; Office of the National Economic and Social Development Council, 2018; Rastogi, 2020; Statista, 2020; Thailand Board of Investment, 2019-2020; The World Bank, 2018-2020; U.S. Geological Survey, 2020; World Trade Organization, 2020

4.1 Thailand Advantage over Malaysia

The first variable is the factor condition. Thailand's labor wage is unlike Malaysia's labor wage because Thailand differentiates the labor wage based on the region in their country. The labor wage in 2019 for Prachinburi is 9540 Baht/ month (US$ 307.2), for Ayutthaya and Nakhon Ratchasima is 9600 Baht/ month (US$ 309.2), for Pathum Thani and Chacheongsao is 9750 Baht/ month (US$ 314), for Chonburi and Rayong is 9900 Baht/ month or equal with US$ 318.8/ month (US$ 1= 31.0470 THB) (Ministry of Labour Thailand, 2020). It can be seen that

Prachinburi has the lowest labor wage among the other regions and this situation can influence the productivity due to the condition when a country is focusing on give an offer to investor in order to receive FDI, the labor costs or labor wage can be the consideration when the investors itself have an interest to have an efficiency- seeking that led to make the process easier and can minimize the costs of production (Grace, 2019, p. 121).

If the labor wage in Thailand is compared with the labor wage in Malaysia, it can be disadvantageous when the investor is focusing on cost-oriented efficiency seeking due to increasing productivity while reducing the labor cost, because in Malaysia they offer a minimum wage of $270/ month, and it's applied in all regions in Malaysia. However, Prachinburi may be an option for an investor, particularly an EV investor looking to invest in Thailand.

The human capital index, and as this article has already explained, the role of human capital is to see the contribution to productivity from survival, school, and health to measure productivity (The World Bank, 2019, p. 50). Thailand's overall human capital index score is 0.60, implying that a Thai child born today will grow up and be productive only 60% of the time if optimal investments in health and education are made (The World Bank, 2019, p. 46). Thailand is now ranked 65th out of 157 countries, with the average score among ASEAN members being 0.59, making Thailand the 4th highest HCI (The World Bank, 2019, p. 49).

Factor condition is economic cluster, and it can be categorized as the infrastructure that the government provides to the investor. The infrastructure itself, become one of the factors that can influence investor to invest in their country (Blomström & Kokko, 2003, pp. 4-5). In Thailand they have an economic cluster for manufacturing called "Super Cluster" that consists of Ayutthaya, Pathum Thani, Chonburi, Rayong, Chacheongsao, Prachinburi, Nakhon Ratchasima (Thailand Board of Investment, 2015). The advantage for the investor if they do an investment in Thailand, especially in EV manufacturing, is that Thailand has a policy that can be considered if the investor wants to invest in Thailand, especially in those specific areas that include the super cluster. The benefit that the investor can gain, such as "an 8-year corporate tax exemption with exemption cap and a 50 percent reduction from the normal rate of corporate income tax on the net profit deriving from the promoted activity for a period of 5 years," (Thailand Board of Investment, 2015).

The incentives policies for consumer and incentives policies for producer. Both can be categorized as the government intervenes to attract the investor to do investment (Dunning J. H., The Investment Development Path Revisited, 1997, p. 237). This can attract investors, especially if the policies are beneficial to the investor, because the investor seeks a country that can offer them favorable policies in order to minimize the investor's burden, and it can be a way to show that their country is an investment-friendly country (Bailey, 2017, p. 3). In Thailand, they provide the incentives for consumer and producer. The incentives policies for consumer itself divided into 8 points under *"Excise Tax (Eco Car with seating not exceeding 10 seats)"* that focused on HEV and divided with cylindrical volume, CO2 emission, electric powered vehicle and fuel cell powered vehicle (Thailand Board of Investment, 2019).

The incentives policies for producer in Thailand are categorized by the type of the electric vehicle. For HEV, they give *"exemption of import duties on machinery and 50% deduction of excise tax rate if the project also produces battery Plug-in EV"* and for PHEV, they have the same policies as HEV with additional policy, which is *"CIT*

exemption for 3-6 years." (Thailand Board of Investment, 2020, p. 5). For BEV, they give *"import duty exemption for CBU for 2 years, import duty exemption for machinery, CIT exemption for 5- 10 years and 2% of excise tax rate if produce battery in the project"* and the last type is Battery Electric Bus, they give *"exemption of import duties on machinery and CIT exemption for 3-6 years."* (Thailand Board of Investment, 2020, p. 5)

If compared to Malaysia, Thailand has advantages in incentive policies because the government offers both consumer and producer incentives, which not only persuade the investor to make an investment, but also persuade the consumer to consider buying an EV beside their other considerations such as cost, fuel efficiency, performance, and the design of the vehicle itself (Policies Studies Institute, 2006, p. 63).

Demand conditions as a company behavior in perceive, interpret, and respond to the buyer needs in the home market (Porter, 1990, p. 78). From the GDP per Capita, the investor can see the market size in the country and the condition of GDP per Capita for Thailand is increasing from US$7,295 to US$7,808 in 2019 (The World Bank). The GDP per Capita for Bangkok is US$18,706.60 in 2018 as the latest data that this article found (Office of the National Economic and Social Development Council, 2018). The market size is improving and increasing, which can be an indicator that Thailand has the potential demand reflected in the car density ratio.

The car density ratio Thailand in 2017 as the latest data found by this article is 547.8 per 1000 population (ASEANStats Database, 2017). The number of car density ratios in Thailand can be influenced by GDP per capita income; the income in 2017 was $6,592 and is expected to rise further in 2018 and 2019, but Thailand still lags Malaysia with 896.7 per 1000 population in 2017 (ASEANStats Database, 2017).

The last variable for demand conditions is automotive annual sales. For Thailand, the automotive annual sale decreasing in 2019 with is 1,007,552 meanwhile in 2018 the automotive annual sale is 1,041,739 (ASEAN Automotive Federation, 2019). The decrease was caused by the Federation of Thai Industries (FTI), which reduced automotive production from 2.15 million units to 2 million units in 2019, as well as several conditions such as tighter loan terms and rejection applications by local financial institutions, rising household debt, rural provinces suffering from widespread flooding, and then the export sectors, which had to reduce export activity from 1.1 million units to 1.1 million units (Maikaew, 2019).

According to Porter (Porter, 1990, p. 78)., the related and supporting industries are defined by the presence of a supplier in a country that is related to and supports internationally competitive industries. The variable that be used by this article will be import tariff on battery, import tariff on natural resources, availability of natural resources and production capability.

In terms of import tariff on battery, Thailand offers the import tariff based on the raw material to produce the battery itself such as lithium, silver oxide, mercuric oxide, manganese dioxide, air-zinc, primary cells and primary batteries and waste and scrap of primary cells and primary batteries. Those variables have the same tariff with 10% (World Trade Organization, 2020). The import tariff on natural resources, this article chooses the important raw material to produce the battery for EV such as, nickel, cobalt, manganese, lithium, graphite, and aluminum. The import tariff for nickel, cobalt, manganese, lithium and graphite, Thailand implemented 0% tariff while for aluminum is 3% (World Trade Organization, 2020). Thailand has a high tariff for

imports of batteries at 10%, compared to imports of batteries in Malaysia at 0% for the same raw material and 5% for waste and scrap of primary cells and primary batteries (World Trade Organization, 2020). It can have an impact on the supply chain of a country itself, because raising the tariffs or implementing higher tariffs can be interpreted as an effort to protect the domestic industry, which can have another impact such as higher costs for domestic producers (Meinen, 2019).

To support the development of EV manufacturing, Thailand is also trying to provide the natural resources needed to produce the battery for EVs. This article discovered that the availability of natural resources, particularly raw materials for battery production, is only for the manganese sector in Thailand, with 20,700 metric tons in 2019 (Statista, 2020). Thailand has more than Malaysia because the availability of natural resources in Malaysia, especially for manganese, is only 420 metric tons in 2019 (U.S. Geological Survey, 2020, p. 105). This condition can be a beneficial to attract FDI inflows as Dunning's perspective that the L-specific advantages can be insufficient if not supported with the availability of natural resources (Dunning J. H., The Investment Development Path Revisited, 1997, p. 236).

As previously stated in this article, BMW Group Thailand collaborates with the DRXLMAIER Group to manufacture a local high-voltage battery (BMW Group, 2019). Mercedes- Benz and Thonbori Automotive Assembly Plant also built sixth global battery production base due to the demand of EV in Thailand that keep increasing (Bangkok Post, 2019). Thailand also has another plan to do battery production in mid- 2020 under SET-listed Energy Absolute with producing 100-billion-baht lithium-ion battery with aim to building an efficient battery to support the switch to EV more practical and affordable (Phoosuphanusorn, 2019). The last is Toyota Motor Thailand decided to start the battery assembly from mid-2019 to early 2020 and do an investment that worth 19 billion baht for hybrid EV that produced in gateway plant in Chachoengsao (MAIKAEW, 2018).

The market saturation in Thailand consist of 28 OEMs such as Bangchan, Dongfeng, Hino, Mazda, Sammitr, Tan Chong, Toyota, BMW, FOMM, Honda, Mitsubishi, Scania, Tata, Volvo/UDA Trucks, Chery, Ford, Hyundai, Nissan, Subaru, Thai Rung, VW, Daimler, GM, Isuzu, Saic/MG, Suzuki, Thonburi, and Yonkrakit (Marklines, 2020). Nissan, Honda, Thonburi/Mercedes, Scania, FOMM, Mitsubishi, Toyota, Ford / Mazda 2, Suzuki, SAIC/MG, and BMW were among the OEMs that produced EV batteries (Marklines, 2020). There are a lot of OEMs in Thailand's market, and if it's compared to the OEMs in Malaysia, which has 42 OEMs, Thailand's market can be considered not saturated because they have fewer competitors or rivals than Malaysia.

The last variable for firm strategy, structure, and rivalry is ease of doing business. For Thailand, the overall score of EODB in 2019 is 79,5 with ranked 21st in the world and also ranked 5th in the East Asia and Pacific and the overall score is measured through several topic such as "starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contract and resolving insolvency" (The World Bank, 2020). This score and measurement, Thailand can provide a good environment to the investors, even though the overall score for Malaysia is higher than Thailand with 81,5 in 2019.

In the comparison of Thailand's advantage over Malaysia, Thailand leads in several determinants such as economic clustering, incentive policies for consumers and producers, automotive annual sales, availability of natural resources, and production

capability. With these benefits, it can assist the investor in making Thailand a consideration for doing an investment activity, particularly in EV manufacturing.

4.2 Malaysia's Advantage over Thailand

The first variable is factor condition. This article finds that labor wage in Malaysia where the government of Malaysia decided to implement the same labor wage in all regions in Malaysia with RM 1.100 or equal with US$ 270/ month (US$1= 4.08 MYR) (Rastogi, 2020). This condition can be an advantage for Malaysia to attract investors to invest in Malaysia because Malaysia pays the same labor wage in all regions, whereas Thailand pays a different range of labor wages. Malaysia is also an option for investment because the labor wage there is lower than in Prachanburi, which has the lowest labor wage among Thailand's seven regions. For the investor seeking higher or longer-term profit and more of a "cost-oriented" company, lowering labor costs by finding a location with a lower labor wage can help the investor increase efficiency and labor productivity (Donnelly, 2014, p. 3).

Human capital index or HCI and overall score for Malaysia is 0.62 percent, means that a child born in Malaysia will be 62 percent as productive when they grow up and supported with complete education and full health (The World Bank, 2018, p. 52). This overall score makes Malaysia rank 55th out of 157 countries and 3rd between ASEAN members (The World Bank, 2018, p. 53). For the contribution to productivity from survival, Malaysia and Thailand have same situation where 99 out of 100 children born in Malaysia survive to age 5 that led to the contribution to productivity from school when expected years to complete their study school in Malaysia is 12.2 years by their 18th birthday and the expected years of their adjustment when their actually learn at school is 9.1 years (The World Bank, 2018, p. 54). If it's being compared to Thailand, the expected year to complete their study at school in Thailand is 12.4 years and it can be seen that Malaysia's score is lower than Thailand and this is can be happened because the condition in Malaysia when the enrollment for upper-secondary is lower (The World Bank, 2018, p. 54).

Even though the expected years to complete study in Malaysia is lower than Thailand, but in term of harmonized test score based on PISA is 468 of 625 and with that score, Malaysia is above average between ASEAN members with 468 of 451 (The World Bank, 2018, p. 56). For the contribution to productivity from health, the adult survival rate in Malaysia is 88 percent of 15 years will survive until age 60, but from not stunted rate in Malaysia the number is lower due to the condition of stunted rate that higher which 21 out of 100 children are stunted (The World Bank, 2018, pp. 59-60). From the explanation above, Malaysia's overall score is higher than Thailand's, and to have skilled labor to help the productivity of a company, Malaysia can offer it better than Thailand based on the harmonized test scores and the adult survival rate.

In the variables of manufacturing clusters, they offer Selangor as one of their region to become the economic cluster because Selangor is the most important region especially for manufacturing hub in Malaysia and Selangor contribute 29.9% in form of manufacturing value to Malaysia (Asia Perspective, 2020, p. 7). When Thailand provides policies to the investor that has an investment in their economic cluster, Malaysia, through Selangor, provides the infrastructure with two major airports and the largest container port, "Port Klang," that can help the investment come to Malaysia (Asia Perspective, 2020, p. 7). In 2018, the amount of domestic investment

was US$ 1,959, and the amount of foreign investment was US$ 2,617.60; in 2019, the amount of domestic investment was US$ 1,619.90, and the amount of foreign investment was US$ 2,546.40, demonstrating that Selangor can attract investors, both domestic and foreign, to do investment in that area (Asia Perspective, 2020, p. 7). Even though Malaysia did not offer a policy at their economic cluster like Thailand did, but through providing the infrastructure such as located near two airport and port can be advantage that investor can consider because with providing better infrastructure can help to attract FDI and with better infrastructure it can help to convince the investor that the country provide advantage in terms of locations (Dunning J. H., 1997, p. 237).

Malaysia still lacks a policy that regulates consumers when they consider purchasing an EV, whereas Thailand has policies for both consumers and producers. This can be a disadvantage for Malaysia because, as this article explained before, the existence of a policy can influences the consumer to buy the EV(Policies Studies Institute, 2006, p. 63). But for producer incentives policies, Malaysia provides them, and they are more general and applied to all types of EV, unlike Thailand, which made the policies and differentiated them by types of EV. Having policies that regulate incentives, particularly those focused on production, can be advantageous in attracting investors and gaining FDI (Bailey, 2017, p. 3). The details of the incentives policies for producer including:

> *"1. Incentives for local assembly and manufacturing of EEVs: a) 100% tax break for 10 years for FDIs, b) 100% tax break for 10 years for corporate tax, c) Subsidy provision for training and R&D, d) Tax breaks (maximum 10%) for import duties, e) Tax breaks (maximum 10%) for excise duties.*
>
> *2. Incentives for locally assembled and/or manufactured EEVs: a) Tax breaks (50%) for excise duties, b) Subsidy provision from the Industrial Adjustment Fund.*
>
> *3. Incentives for promoting EEV-Related parts: a) Electric motors, HEV and EV batteries, battery management systems, inverters, ACs, air compressors, b)100% tax break for 10 years for corporate tax, c) 100% tax break for 10 years for FDIs"* (Kimura, Suehiro, & Doi, 2017, p. 50).

The GDP per Capita of Malaysia and Kuala Lumpur is higher than Thailand and Bangkok with US$ 11,373 in 2018 and US$ 11,414 in 2019 for Malaysia (The World Bank) then for Kuala Lumpur is US$ 30,134 in 2019 (Department of Statistic Malaysia, 2019). Thailand and Bangkok only reached US$ 7,295 in 2018 and US$ 7,808 in 2019 (The World Bank) followed with Bangkok in 2019 that reached US$ 18,706 (Office of the National Economic and Social Development Council, 2018).

The condition of car density ratio in Malaysia is higher than Thailand with 896.7 per 1000 population (ASEANStats Database, 2017). It proved that higher income influences the demand and supported by the condition of the road traffic itself, the congestion level in Malaysia, especially in Kuala Lumpur in 2017 is 35% meanwhile Bangkok is 55% (TomTom Traffic Index). With higher income, the result can be seen in the automotive annual sales in 2018- 2019 that increasing from 598,714 units to 604,287 units (Malaysian Automotive Association, 2020).

The import tariff on battery and the import tariff on natural resources between Malaysia and Thailand. For import tariff on battery in Malaysia, they are focusing on Lithium, Silver Oxide, Mercury Oxide, Air- Zinc, Manganese Dioxide, Primary Cells and Primary Batteries and give the import tariff 0% and for Waste and scrap of

Primary Cells and Primary Batteries is 5%, while in Thailand they are also focusing on the same component but with different tariff which is 10% that applied to all components (World Trade Organization, 2020). The import tariff on natural resources for Malaysia is 0% for all natural resources such as Nickel, Cobalt, Graphite, Manganese, Lithium Oxide and Aluminum, while Thailand applied the same tariff except for Aluminum is 3% (World Trade Organization, 2020).

Malaysia implemented an import tariff on batteries and natural resources, and both import tariffs are lower than Thailand's import tariff on batteries and natural resources. With this condition, it can benefit Malaysia to attract investors to invest in Malaysia because when a country implements higher tariffs, it can be interpreted as an effort to protect the domestic industry (Meinen, 2019).

The availability of natural resources in Malaysia is lower than Thailand especially in the availability of manganese with amount 420 metric tons in 2019 (U.S. Geological Survey, 2020, p. 105). This can be a disadvantage for Malaysia because investor also seeking a location that is near between the supplier and the consumer for faster communication and exchange ideas (Porter, 1990, p. 83).

The production capability in Malaysia is not a lot like Thailand. Malaysia is currently doing a cooperation with Eclimo in battery technology for EV by combining the battery cells and battery management systems from MARii with Eclimo's battery pack designs who also have another purpose to do promotions and awareness on battery manufacturing, identify the potential EV platform and explore the potentials of lithium-ion battery recycling (Business Today, 2019).

The last is firm strategy, structure and rivalry and the saturated market in Malaysia. The market has a lot of OEMs than Thailand with 42 OEMs and the market are divided into three types such as Malaysian manufacturers, foreign manufacturers, and Chinese manufacturers. In Malaysian manufacturers there are Berjaya, Bufori, DRB-Hicom, Inokom, Naza, Perodua, Proton and Tan Chong, continue with foreign manufacturer such as BMW/MINI, Daihatsu, Daimler, Hino, Honda, Hyundai, Isuzu, Kia, Mazda, Mitsubishi, Fuso, Nissan, PSA, Renault, Renault Trucks, Scania, Subaru, Toyota, UD Trucks, Volvo, Volvo Car, and VW, followed by Chinese Manufacturer such as BAIC, Beiben, Changan/Chana, CNHTC, Dongfeng, Foton, Great Wall, JAC, Jiangling, SAIC, King Long, Hualing, Xingma (Marklines, 2020).

When compared to Thailand, the Malaysian market is saturated because the number of competitors is higher, with 42 OEMs. Aside from that, Malaysia ranks 12 in the world for ease of doing business and 3 in Asia-Pacific, with a total score of 81.5 (The World Bank, 2020).

5. Conclusion

Due to the fact that Thailand and Malaysia want to make their country an ASEAN EV Hub, competition among them will emerge, which can be analyzed through Porter's perspective with the Porter Diamond Model that discusses four determinants such as factor condition, demand condition, related and supporting industries, firm strategy, structure, and rivalry. Based on this, there are also a lot of factors that influence the competitiveness and the flow of FDI to enter a country. Through the four determinants, this article can conclude that each country has its own advantages in several determinants to compete in the market.

Malaysia gains an advantage in labor wages and the human capital index as a result of the factor condition, whereas Thailand gains an advantage in consumer and producer incentives policies. The country gains an advantage for an economic cluster because Thailand offers 7 regions in the cluster with policies that are implemented in the cluster, whereas Malaysia offers one location near two airports and a port.

In terms of demand, Malaysia leads in 2 determinants: GDP per capita and car density ratio. This condition will be beneficial for the country and the investor because Malaysia offers a better market than Thailand, and this will help Malaysia gain more FDI. But the automotive annual sales in Thailand are higher than Malaysia, so this will be an advantage for Thailand.

Continuing in related and supporting industries, Malaysia gains an advantage in the import tariff on batteries and natural resources by offering a lower tariff than Thailand, while Thailand gains an advantage in the availability of natural resources and production capability because they are providing the natural resources in larger amounts and doing more cooperation in order to develop their EV manufacturing. This is also something the investor must consider to make an investment in their country.

The last determinants are firm strategy, structure, and rivalry. For Malaysia and Thailand, their markets have different conditions. For Malaysia, the market has more competitors than Thailand, so the company that wants to invest or establish their company there must make sure that their product can sustain itself in the market. Because many competitors will influence the buyer's decision to choose the cheaper option, the types of products will be more diverse, and the company will need to upgrade its product and come up with new ideas to produce it to stay competitive. Malaysia leads with higher EODB scores (81,5) than Thailand (79.5), which can be an advantage for Malaysia in attracting investors to invest in Malaysia.

The attractiveness of a country to an investor can be influenced by many factors, and as this article already explained, both countries have their own advantages and disadvantages on several determinants. Thailand has six advantages out of 14 compared to Malaysia, and Malaysia has eight advantages out of 14 compared to Thailand. But looking back, Thailand can show more competitiveness in EV than Malaysia because, in those several determinants, Thailand shows they keep developing through their policies, providing infrastructure, and continuing the research and development in production capability rather than Malaysia. Malaysia has a lot of advantages over Thailand, but in terms of EV, Thailand can provide more benefits to the investor than Malaysia.

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