

# Appendix

Appendix 1. Summary of Inception Report

Appendix 2. Road Map for Development of Automotive Industry 2019 - 2035

Appendix 3. Summary of Interview Result

Appendix 4. Action Plans and Key Activities

Appendix 5. Export Potential Survey

Appendix 6. Meeting Materials for MOI

## APPENDIX 1. SUMMARY OF INCEPTION REPORT

### 1.1 Future Target Image of the Indonesia Automotive Industry Based on the Global Trend

#### 1.1.1 Transformation to the New Automotive Industry Model (CASE) and its Market Size

**(1) The automotive industry is undergoing the once in a century revolution.**

CASE refers to connectivity, autonomous driving, sharing/service and electrification. The waves of changes under these technical components are said to bring about a major revolution to the automotive industry that occurs only once in a century. All four components of CASE are interconnected and are transforming automobiles into a place of service provision. With the advancement of CASE, the value associated with vehicles will shift from “owing” to “using”, forcing auto makers to change their operational structures. Furthermore, as the market permeability of each component differs in speed, there are issues that need to be addressed. Under this situation, restructuring of companies through alliances and mergers have been accelerating in order to supplement technical know-how and gain additional funding for development.

	C コネクテッド (Connectivity)	A 自動運転 (Autonomous drive)	S サービス/シェアリング (Sharing/Service)	E 電動化 (Electrification)
Auto industry trend	<ul style="list-style-type: none"> <li>Vehicle data collection and Big Data analysis</li> <li>V2V/V2X connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Increase intelligence of car itself</li> <li>Self-driving vehicles</li> <li>Expect society with no accidents</li> </ul>	<ul style="list-style-type: none"> <li>MaaS/ Ride sharing</li> <li>Shift from "Owner" to "User"</li> </ul>	<ul style="list-style-type: none"> <li>Electric Vehicles (EV)</li> <li>Energy storage/Power Grid</li> </ul>
Current impact to SEA	<ul style="list-style-type: none"> <li>Telecom infrastructure and IT are required to serve this business; still under R&amp;D/ PoC</li> </ul>	<ul style="list-style-type: none"> <li>Numerous advanced technologies, infrastructure and regulation being studied; under R&amp;D</li> </ul>	<ul style="list-style-type: none"> <li>Easy market entry for new players; e.g. ride sharing services like Grab and Gojek as SEA local start-ups are successful</li> </ul>	<ul style="list-style-type: none"> <li>EV and battery business are still new for consumers but tend to gradually expand to SEA market</li> </ul>

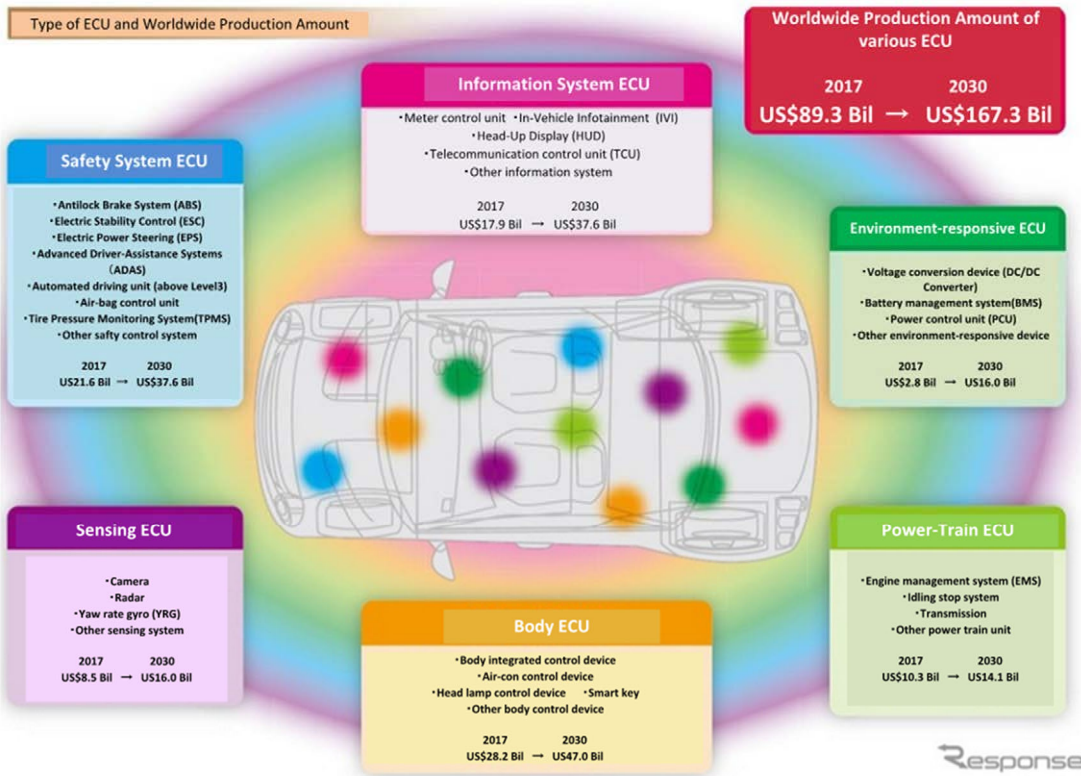
Source: NRI Thailand “The Current Situation of xEV in ASEAN market”, the seminar in Hamamatsu city, October, 2019

**Figure 1.1.1 Transformation to CASE and Impacts to the South East Asia Market**

CASE emerged in response to the global trend to tighten environmental regulations and to adapt more information technology in vehicles. The EU has mandated that all new cars sold in the region from 2021

should have carbon dioxide (CO<sub>2</sub>) emissions reduced under an average of 95 grams or less per kilometer traveled, which is about 30% less than what was required in 2015. In addition, the EU will penalize auto makers on cars whose CO<sub>2</sub> emissions exceed the required standard; fines will be computed based on the excess remission amount. In China, the electrification is supported by its New Energy Vehicle Mandate Policy (NEV Policy), which requires a certain portion of cars produced and sold domestically to be new energy vehicles (e.g. EVs).

In the area of autonomous driving, major American IT companies, such as Google, Apple, Facebook, and Amazon (collectively called GAFA) are entering the industry with the aim of setting a standard in autonomous driving. In order to secure massive funding for R&D and compete with these IT giants, a certain level of financial power and software technology are required; this has accelerated the industry-wide company restructurings through alliances and mergers for their survival into the next era.



Source: JICA Study Team translate of original figure created by IID, Inc.

**Figure 1.1.2 Market Sizes of Electric Control Units (ECUs), which Comprised CASE**

Given this, CASE will transform the industry structure itself; its market size will exponentially grow especially when MaaS (Mobility as a Service) is included, which will emerge as CASE advances. According to the Japan Electronics and Information Technology Industries Association (JEITA), the market size of one ECU product that supports the evolution of CASE is expected to expand twofold from 9.5 trillion yen in 2017 to 17.8 trillion yen in 2030 (see the figure above). As the popularity of eco-friendly vehicles grows, the market size of ECUs is expected to increase at an average of 13.5% per annum and become 5.2 times bigger in 2030 than in 2017.

In addition, the global production value of devices required for CASE is expected to increase at an average of 10.8% annually, and it is also estimated to quadruple from 3.5 trillion yen in 2017 to 13.30 trillion yen in 2030. The production volume of camera modules, that has high potential for growth in information collection functions, is expected to expand fivefold from 2017 to 2030. The production volume of inverters, which are the key to energy saving, will increase approximately six-fold in the same period.

These market forecasts cover only a small portion of the components of CASE. Each component has a growing market; with the inclusion of MaaS, which will emerge at an advanced stage of the CASE revolution, the future market will become substantial enough that it is unquantifiable at this moment.

**(2) Corporate restructurings through alliances with domestic and overseas companies is accelerating in response to the emergence of CASE.**

The objectives of company restructurings that are happening industry-wide are to expand their financial and technical power, secure enough funding for development and take a lead in setting CASE product standards. In the field of electrification, restructurings are centered on inter-industry alliances and mergers among traditional auto industry players such as assemblers and part makers. In the field of autonomous driving where software is the key, restructurings are centered on cross-industry alliances. In the development of self-driving cars, Chinese search engine giant Baidu and others are trying to catch up with Google, which is leading the competition while existing automakers are slightly behind. There are two main reasons why GAFA, led by Google, invests in CASE.

(a) To have access to user information

As autonomous driving and service sharing progress, it will provide various information related to a user while he/she is in a car, such as his/her physical condition and how he/she spends time. This information will then be used to provide the user related services by using the Connected function based on the 5G technology. GAFA companies are more skilled at information and communication technology than the cars themselves.

(b) To provide in-house services to users

When a user is in a car and not engaged in other activities, this creates a business opportunity for selling in-house products and services such as music, merchandise, internet services, and so on.

While Japanese auto companies see the necessity to secure funding for development through expansion, they also see that it is not possible to establish business relationships on an equal footing without having similar operation scales, even when partnering with other industries such as GAFA. Thus, many of them have opted to restructure through forming alliances with overseas companies, especially European and American companies. It is speculated that European companies see the alliances as a way to strengthen its efforts in electrification. This is in view of European countries lagging behind Japanese companies in electrification efforts despite stricter regulations on CO<sub>2</sub> emissions.



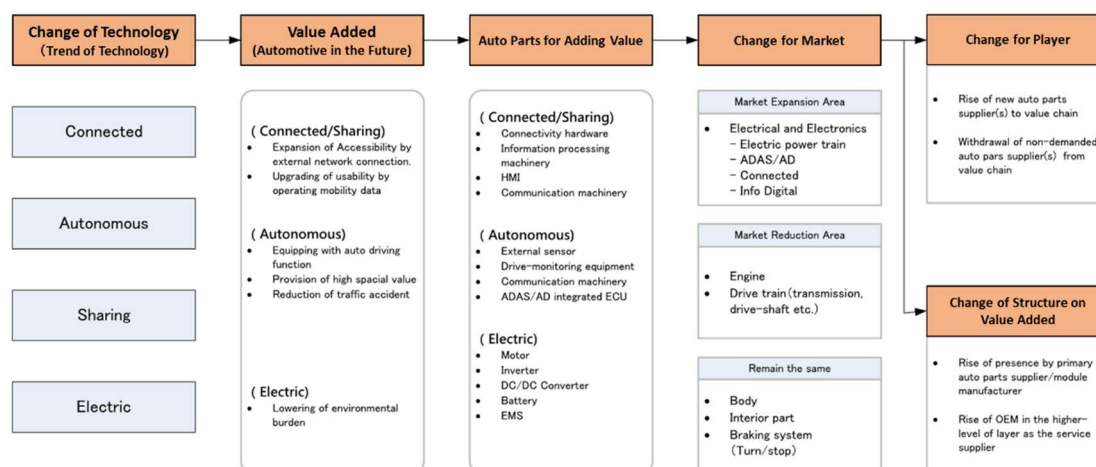
**Table 1.1.1 Major Company Restructurings in Recent Years**

Year	Enterprises	Purpose of Reorganization
Dec. 2019	Fiat Chrysler Automobiles (FCA) & Groupe PSA	To secure funding for R&D To have certain level of operation scale for establishing business relationships with GAFA To Promote EV development
Oct, 2018	Honda & GM	To reduction cost for R&D self-driving and FCV
Oct, 2019	Honda & Hitachi, Automotive Part Manufacturing enterprises	To establish major part manufacturing enterprises under the umbrella of corporate group (likewise Denso and Bosch)
Jan, 2019	Volkswagen (VW) & Ford Motor Company	To collaborate in the field of LCV and self-driving To maintain the profit resources in North America to avoid from being involved industry reorganization caused by
Past 1-2 years	Waymo (Under Alphabet), Renault S.A. & Jaguar LandRover & FCA	To establish De Facto Standard of self-driving by considerable experienced of driving test (more than 3,000 thousand km)
2019	Toyota & Subaru, Suzuki, Matsuda	To collaborate with mega IT in US for obtaining data collection and establishment of standard efficiently To prepare for New market such as India To promote Horizontally-opposed cylinder engine and four-wheel driving technology To promote R&D of self-driving and EV development

Source: JICA Study Team created from various materials

### (3) Responses to CASE by Indonesia

The economic impacts of introducing CASE is massive. This is because the technological development will change the way cars are used. The change will affect car parts that are used, which will then alter the business environment (markets, players, and value-added structures) in the automotive parts industry. The magnitude of impacts from the changes may be unquantifiable at this moment; the main impacts, however, will be found in the two changes as shown in the figure below.



Source: JICA Experts Team

**Figure 1.1.3 Changes in Business Environment for the Auto Part Industry Cased by New Auto Technologies**

## **1) Changes in players surrounding the automotive industry**

As new suppliers related to CASE technologies will emerge, suppliers for parts that are no longer used will be forced to exit the value chain. The most prominent sectors that will be affected are those companies that have been considered as star companies which produce engines, transmissions and chassis related to drivetrain for internal combustion engines (ICE).

## **2) Changes in the value-added structure surrounding the automotive industry**

In the assembling industry, parts manufacturers handling modules for key components (parts with a high potential for market expansion) will emerge. At the same time, service providers, which are the upper layers of automakers, will be the market leaders.

China and Europe have declared the transformation of their auto production scenes from ICE vehicles to EVs with a target by 2040. In this global climate, the transformation of platform modules from drivetrain to motors will start forcing structural changes in the Indonesian parts industry by 2025 which is within the period of the automotive industry roadmap. Assuming these changes will take place in Indonesia beyond 2028, the project will identify preparatory processes in the transition of the auto parts industry. These will be recommended to be included in the Automotive Industry Roadmap.

The main contents of the preparatory processes will be as follows.

- Infrastructure development for CASE (especially domestic communication infrastructure)
- Attraction of related investments
- Foster human resources capable of responding to Internet of Things (IoT) and Artificial Intelligence (AI)
- Identification and development of related domestic supporting industries
- Institutional development for CASE

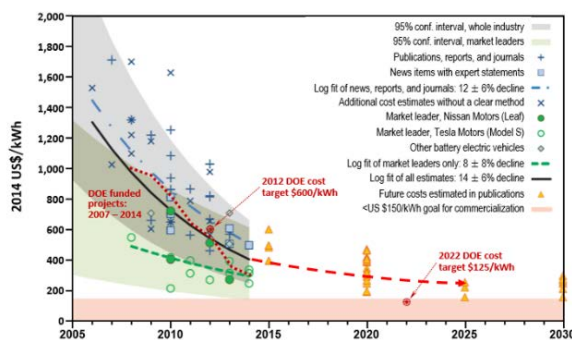
### 1.1.2 Growth Demand Prospect for Vehicles Using Driving System Other than ICEs

Executives and engineers who played active roles in shaping the ICE era are doubtful of the trend on vehicle electrification. Even on the point of the well-to-wheel (WtW) emission, many argue that when analyzed in totality, ICE vehicles still have an overall superiority over EVs. Meanwhile, newly emerging companies and young engineers have more positive assessments on the trend which includes electric vehicles and other xEVs. This section outlines the different views on the future EV market outlook and mainstream arguments from both sides.

#### (1) Key Viewpoints on the ICE Driving System’s Comparative Superiority by Staunch Believers

In general, product development engineers who experienced the product development process of ICE vehicle parts, which involves lengthy fine-tuning of product details between OEM and parts makers, consider it difficult to actualize vehicle electrification except in socialist countries wherein commitment by state leaders alone can control national policies. The bases of the viewpoint stem from the arguments below.

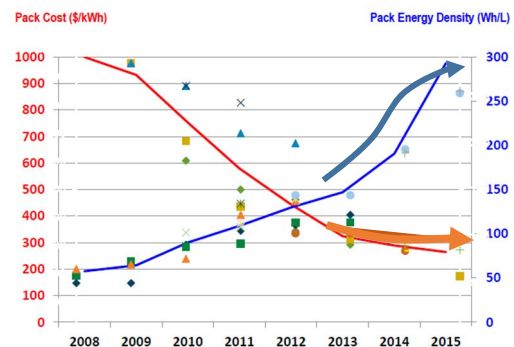
The lifeline of EVs lies in their energy storage systems. Currently, lithium batteries are the only battery source used in EVs. Some experts/professionals believe that there has been no major technological advancement in the performance of lithium batteries in recent years (see the figure below); therefore, it is impossible to expect drastic increase in power storage capacity unless other sources are used.



Source: DOE Vehicle Technology Office

**Figure 1.1.4 Price Forecast of Lithium Battery**

In 2016, the US Department of Energy (DOE) set a target for the lithium battery price to US \$ 125 / kWh by 2022. However, given the current trend in prices US \$ 200-250 / kWh is assessed to be a realistic price by then.



Source: DOE EV Everywhere Grand Challenge

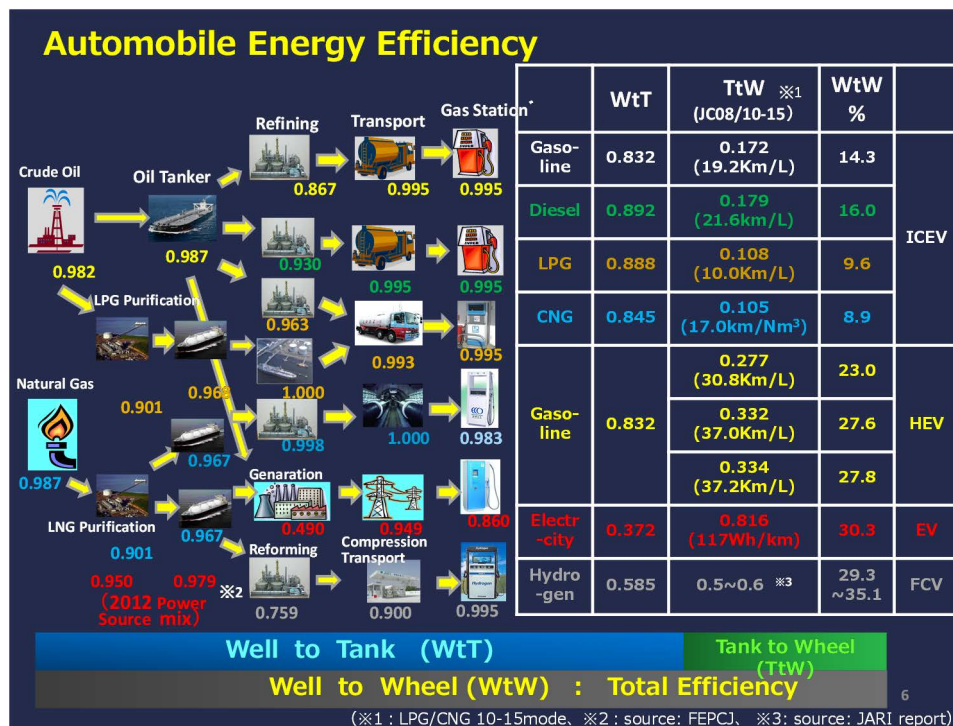
**Figure 1.1.5 Trend Forecast of Lithium Battery Energy Density**

DOE has set the target for energy densities of lithium batteries to be 400 wh/liter and 250 wh/kg by 2022. Even if feasible, the battery pack per vehicle would be enormous at 150 liters capacity and 250 kg in weight.

In terms of the global environment, EVs are low in carbon dioxide emissions when in operation. According to the WtW analysis, EVs have an energy efficiency of 30.3% while ICE vehicles run by gasoline have 14.3%; this shows that EVs have nearly twice the energy efficiency compared to ICE vehicles (see Figure 1.1.6). The calculation method of the WtW emissions is explained below based on the following figure.

Energy efficiency is defined as the process of extracting crude oil from an oil well to the transfer of oil / fuel to a gas station. Crude oil extraction has an energy efficiency of 98.2% with 1.8% of energy lost in the process. Similarly, the energy efficiency of transferring oil to an oil tanker is 98.7%, and so on. In this regard, a total of 16.8% energy is lost before oil is distributed to a gasoline station. Therefore, the well-to-tank (WtT) energy efficiency of gasoline is 83.2%. The WtW value (%) shown in the figure below is calculated by multiplying the WtT with TtW; the tank-to-wheel (TtW) calculation is done by using fuel efficiency (km/liter) based on the JC08 mode test (Japanese measurement method for fuel efficiency)<sup>1</sup>.

Staunch believers of the ICE driving system also point out that the well-to-tank process, which is mostly done in developing countries, has poor energy efficiency in electricity. Thus, these countries will shoulder the carbon dioxide emissions of wealthy countries; given this, EVs will widen the gap between have states and have-not states.

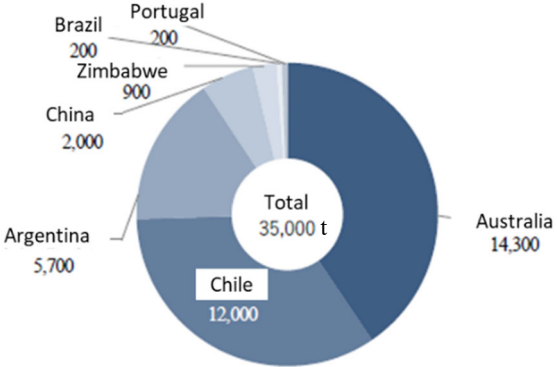


Source: Project for Elaboration of Industrial Promotion Plans using Value Chain Analysis

Figure 1.1.6 Energy Efficiency by Vehicle Type

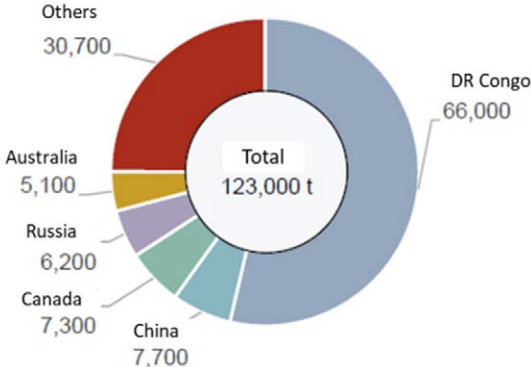
<sup>1</sup> For example, in the case of Mazda Axela (ICE vehicle priced at US\$20,00) with the 1.5-liter engine with the fuel efficiency of 19km/liter, the Tank to Wheel energy efficiency is calculated at 17%.

According to the World Mines Map, only a limited number of countries produce lithium and cobalt, which are key raw materials in the manufacture of lithium batteries. Lithium is mainly produced in Australia, Chile, and Argentina; these countries combined produce 91% of the global production (32,000 tons out of 35,000 tons). Cobalt is mainly produced in DR Congo, Canada, and Russia; these countries combined produce 71% of the global production (87,200 tons out of 123,000 tons). Given that most of the production is done in a handful of countries, these industries can be considered as oligopolistic (see the figure below).



Source: US Geographical Survey: USGS (2017), Mineral Commodity Summaries 2017

**Figure 1.1.7 Production Volume of Lithium (2016)**



Source: US Geographical Survey: USGS (2017), Mineral Commodity Summaries 2017

**Figure 1.1.8 Production Volume of Cobalt (2017)**

In addition to oligopolistic business climate in these industries, other characteristics that define these industries post considerable risks for newcomers. For example, the production of lithium heavily fluctuates depending on the weather. On the other hand, Chinese companies which own about 50% of the global lithium share based on ore mining has strengthened their control over lithium prices. Lastly, several cobalt mining companies were publicly condemned due to reports of their involvement in child labor in hand-dug mines in DR Congo.

**(2) Key Viewpoints by Those Who See an Exit from ICEs**

Environment conscious countries such as those in Europe have been actively addressing environmental issues, including waste gas from automobiles. Germany and France have set the target of completely abolishing ICE vehicles between 2030 and 2040 (although they are signs of slight delays) for the realization of an exhaust-free automobile society.

To convince progressive-minded engineers, EV promoters use positive impacts such as the reduction of pollution as a result of technological innovation based on Industry 4.0, and the economic impact through the involvement of GAFA in the promotion of EVs. In terms of electrification of vehicles in China, there has been speculative discussions that Chinese OEMs, which were greatly outperformed by Toyota in developing plug-in-hybrid vehicle (PHV), have been working under the surface with the Chinese Government to change the course of the EV game by mobilizing national resources and secure economic merits for the next generation.

**Table 1.1.2 International Trend of Exiting from the ICE System**

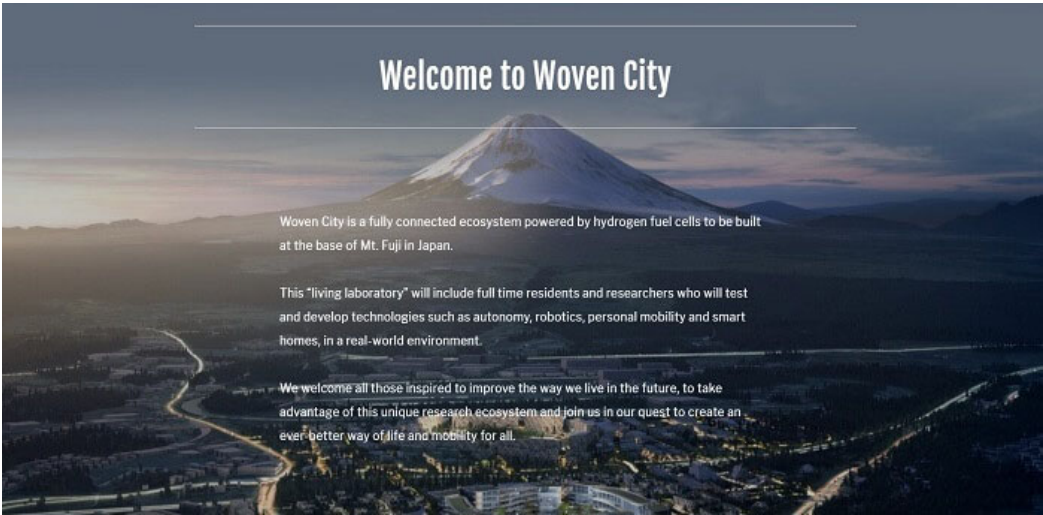
Ban Year	Country	Abstract
2025	Norway	It announced a policy that registration of new vehicles is limited to "zero emission car"
2030	Germany	Partly protecting diesel vehicles so that it is allowed to pass through the city
	Netherlands	"Vertrouwen in de toekomst", a policy manual, announced that all new vehicle are limited to emission-free car after 2030.
	Denmark	"Together for a Greener Future", a mitigation plan for climate change, plans to prohibited from producing gasoline and diesel vehicles after 2030, plug-in hybrid passenger vehicles (PHEV) after 2035.
	Slovenia	The government strategy announced that registration of new vehicles is limited to vehicles emission CO2 less than 50g/km .
	Israel	Minister stated that Israel will not imports gasoline and diesel vehicles since 2030.
	Austria	Set incentives and appropriate framework conditions to make all newly registered vehicles emission-free.
	India	In April 2017, Ministers of Ministry of Power, Ministry of Coal, Ministry of New and Renewable Energy, and Ministry of Mines mentioned that new vehicle policy is under preparation.
	Iceland	The new climate strategy was announced for enhancing the reduction of CO2 emission, as a part of the 34 measures aiming at climate change mitigation.
	Sweden	The new government announced new policy in the file of the environment and climate policy that aims at fulfill of the Paris agreement in January 2019.
	China (Hainan Island)	Province of Hainan released its Clean Energy Vehicle Development Plan (2019-2030) in March 2019. With this Plan, Hainan becomes the first province in China to announce official targets for a shift to all clean energy vehicles.
	Ireland	In May 2017, the Government approved and published the National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland 2017 to 2030. This policy framework sets an ambitious target that by 2030 all new cars and vans sold in Ireland will be zero emissions (or zero emissions capable).
Belgium	The new government announced that Walloon region promotes alternative fuels such as compressed natural gas, electricity and hydrogen, abolishes subsidies that encourage diesel vehicles, and bans diesel vehicle sales from 2030	
2032	Scotland	"The Government's Programme for Scotland 2017-2018" takes the lead in promoting the use of ultra-low emission vehicles (ULEVs) and phase out the need for new petrol and diesel cars and vans by 2032.
2035	Spain (Autonomous Region Balearic Islands)	The autonomous government of Spain's Balearic Islands has passed a climate protection law stipulating the cessation of the use of fossil fuels by 2050. The law also includes a ban on the registration of new diesel cars from 2025 and new petrol cars from 2035.
2040	France	"Plan Climate", the new climate mitigation plan, accounted the phasing out coal-fired power cars in 2040.
	England	"Air quality plan for nitrogen dioxide (NO2) in UK (2017)" announced that conventional car and van sales would end by 2040, and for almost every car and van on the road to be a zero emission vehicle by 2050.
	Indonesia	Ministry of Energy and Mineral Resources proposed the policy draft regarding exiting from the ICE System to automotive EOM such as Honda, Toyota, Mercedes-Benz, GAIKINDO and EV engineers in 2017. Although Indonesian government announced Presidential Regulation No. 55/2019 concerning the Battery Electric Vehicle Program for Road Transportation, the road map of development of EV and incentives to the investment into EV were not stipulated.
	Spain	The proposal in a draft document for an energy transition law banned new diesel and petrol cars by 2040, and completely decarbonize Spain economy by 2050.



	Japan	The Strategic Commission for the New Era of Automobiles released an interim report setting long-term goals toward 2050, which plans every vehicle produced by Japanese automakers will be electrified by 2050.
	Brazil	the PLS 454/2017 bill establishes a ban on fossil fuel-based vehicles for the 2060

Source: JICA Study Team based on Various Reports

The past viewpoint in which ICE vehicles are superior to EVs is strongly rooted within the Japanese Government given that Japan has been the dominant side during the ICE era. Meanwhile, OEMs and major parts manufacturers that make up Tier 1 are highly sensitive to movement surrounding CASE and have been engaged in R&D and product development operations with the next generation in mind. Even Toyota, which is one of the main creators of PHVs, is not only supplying EVs to the market but also starting the construction of a demonstration city, in which all things and services are connected. The “Woven City” (Connected City) Project, is led by Toyota President Akio Toyoda himself.



Source: <https://www.woven-city.global/>

**Figure 1.1.9 Toyota’s Woven City**

Market trends suggest that CASE and MaaS are gaining more attention than ever and that ICE vehicles are no longer the focus of market observers. As described above, a new era will come wherein the current ICE driving system will eventually shift to a modular type of electric powertrain. Experts around the world predict the following impacts on the shift.



**Table 1.1.3 Transition from ICE to Electric Powertrain and Its Impacts**

Country	Presenters	Impacts
Germany	"National Platform for Future Mobility" (NPM_ Government Research Institution)	The domestic automotive industry will lose up to 410,000 jobs between now and 2030 due to higher production of EVs instead of gasoline and diesel vehicles
India	NITI Aayog (National Institution for Transforming India)	At first, there was a setback of the policy on exiting ICE vehicles by 2030. The basic policy was that the transition would start with clean energy and gradually shift to EVs; this was based on the idea that the transition from ICEs using biofuels to EVs would run smoothly. The policy promoted the full transition into BS VI (EURO4) engines by 2020 and the electrification of public transport and private vehicles. However, the official plan was not launched successfully due to political disputes.
Thailand	Yosapong Laonewan, Chairman of Thai EV Association  Japan Society for the Promotion of Machine Industry	The Thai Government's "Eco-Car Project" fitted in the increasing trend of EVs, which created a wave of "Eco EVs." As a result, there has been an increase in the production of hybrid vehicles (HVs), PHVs, and EVs at an eco-car level; and an increase in sales of EVs. The extent to which EV sales will take off is still uncertain despite the increase in production and sales (since the supposed export destinations are Indonesia and Philippines).
Indonesia	Nomura Research Institute, Ltd.	As a resource-rich country, the domestic production and self-sufficiency rates of coal and natural gas in Indonesia are extremely high. Therefore, its need for EV conversion is less than its neighboring countries such as Thailand and Malaysia.

Source: JICA Study Team based on various reports

### (3) Policy Direction for Indonesia

The JICA Study Team speculates that the transition from ICE to electric engines in Indonesia and across Southeast Asia will begin beyond 2028, while the production of parts used in electric engines for EVs will begin by 2025, which is three years earlier than the transition.

The Indonesian Ministry of Industry has set three million units as the national target of the domestic auto production by 2030. The Ministry aims that 25% of the three million will be low-carbon emission vehicles (LCEVs) and 20% will be energy-efficient and affordable cars or Low-Cost Green Car (LCGC)<sup>2</sup> (KBH2: Kendaraan Bermotor Roda Empat yang Hemat Energi dan Harga Terjangkau).

The policy aims to create a market for LCEVs by following the success story of LCGC; however, it has not offered any incentives other than the exemption from luxury taxes and the preferential treatment

<sup>2</sup> In Indonesia, energy-saving and low-cost cars are commonly called Low Cost Green Car (LCGC). It was first announced in September 2013. LCGC is exempted from luxury tax by meeting specifications such as exhaust volume (980 -1200 cc), fuel efficiency (above 20 km / liter), pricing (less than 95 million rupiah [approx. 710,000 yen, 1 rupiah = about 0.0075 yen]), and local procurement rate (above 80%) (Regulation No. 33 issued in 2013 by the Minister of Industry, etc). Given its affordability, it became popular. In 2017, the sale volume is 230,000 units, occupying about 22% in the passenger vehicle segment.)

of tariffs as measures to promote expensive LCEVs. Furthermore, there is no uniformed stance among relevant ministries on the EV policy. While the Ministry of Industry has included EVs, hybrid-vehicles (HVs), PHVs, and fuel cell vehicles (FCVs) in its definition for LCEVs, the Ministry of Energy and Mineral Resources has proposed the ban on sales of gasoline and diesel-powered vehicles.

The mainstreaming of pure EVs, ones without internal combustion engines, requires considerable time and cost to develop charging facilities. The realistic first step is, as GAIKINDO Chairman Johannes Nangoi suggests, “to focus on specific geophysical areas such as Bali for intensive introduction of EVs or to use EVs as public transportation.”

The move towards electrification is expected to lead to the modularization of vehicles. Heavy investments, which used to be required in the past for manufacturing parts such as engines and transmissions, will no longer be needed. In addition, it becomes possible to conduct assembly operations anywhere in the world where modules can be sourced. As a result, existing component manufacturers located in Indonesia will have to adjust their operations accordingly.

At the time of preparing the inception report, the JICA Study Team considers that, among parts companies located in Indonesia, those in the segments summarized in the following table need to prepare measures to address electrification.

**Table 1.1.4 Companies Already Located in Indonesia that Need to Respond to Electrification of Drive Units**

Segment	No of Companies	Fields that Require Measures to Address Electrification	Main Companies
The information will be collected by field work			

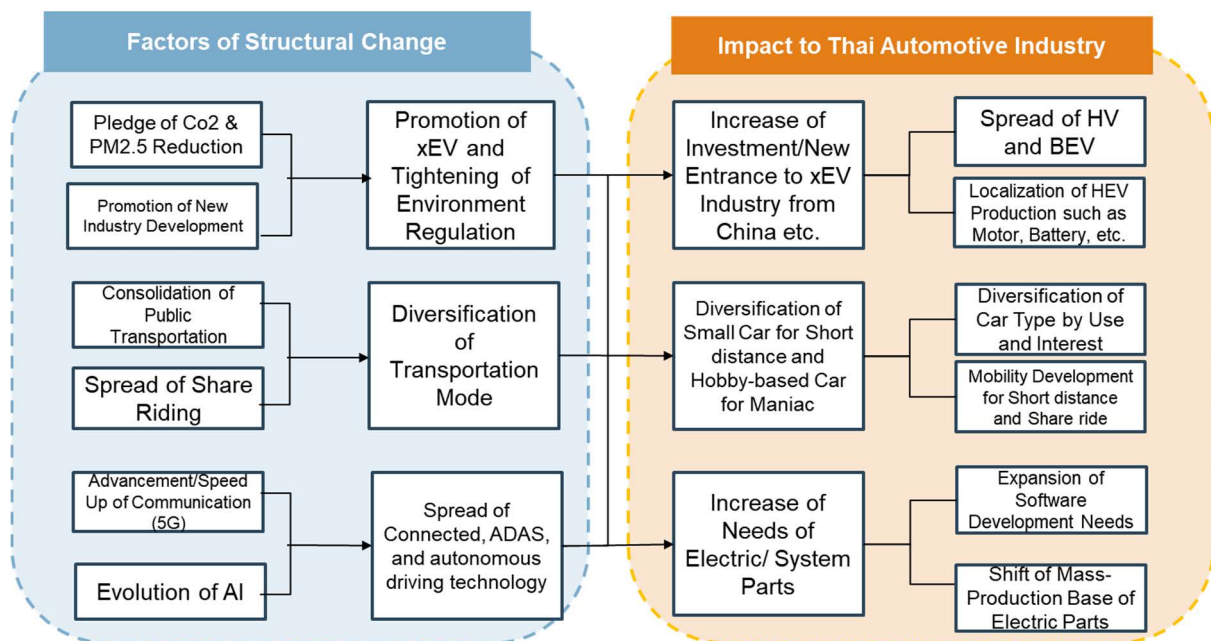
Source: the JICA Study Team

The JICA Study Team plans to conduct interviews with these companies during the second field work period in Indonesia and gather information on company measures in response to the electrification of vehicles. The JICA Study Team will then summarize the results and identify support measures for recommendation to the Indonesian Government.

### 1.1.3 Impacts of Regulations for Greenhouse Gas Control

#### (1) Progressive Measures in Thailand

The section below illustrates the impacts of environmental changes such as greenhouse gas control on the automobile industry. In this JICA Study, the case in Thailand will be used for comparative analysis. It is projected that battery electric vehicles (BEVs), which are electric vehicles powered by battery packs with no secondary source of propulsion, will start penetrating the market not later than 2025 in Thailand and 2028 in Indonesia. Since HEVs in the luxury car segment, or vehicles powered by two or more sources of propulsion which operate simultaneously or individually, are already in the market it is probable that the next generation strategy of Indonesia is to target high value-added auto parts manufacturing companies for investment promotion.



Source: “xEV Trends in Thailand and the ASEAN region and Their impacts on the Japanese Auto Industry,” Presented in Hamamatsu by NRI Thailand

**Figure 1.1.10 Impacts of Greenhouse Gas Measures on the Automobile Industry (Case in Thailand)**

In Thailand, biodiesel produced from palm oil is starting to penetrate the fuel market for vehicles. The Thai Ministry of Energy announced that the blending ratio of B100 in B7, which is a standard level for biodiesel, increases from 6.6% to 6.8% from November 2019 onwards. It is said that the increase will not affect the internal combustion system or drive system. In addition, buses, heavy trucks, and pickup trucks which use more fuel are required to use B20, which has a higher blending ratio of biodiesel fuel. In the first half of 2020, the government plans to enact laws and policies that will subsidize the increased cost from using B20.

## **(2) Current Situation in Indonesia**

Indonesia is an oil-producing country; while its oil consumption has been increasing with its economic development, its production has been declining since the 1990s. Subsequently, it became a net importer of oil since 2003. The country has changed since the time when PT Pertamina, the state-owned oil company, supported the national budget and was called the "State within the State." According to 2017 data, the country has an oil consumption volume of 73.7 million tons and an oil production volume of 46.4 million tons; this shows that the consumption volume is nearly 1.6 times bigger than the production volume (BP material).

Given that Indonesia is the world's largest producer of palm oil, there have been discussions that it should start producing biodiesel from palm oil. This idea stems from the viewpoint of energy security and reduction of CO<sub>2</sub>. The Presidential Decree No. 66 s.2018 which was signed in August 2018 and was put in effect on September 1, 2018 widened the coverage on the mandatory use of B20, which is made of 20% biodiesel and 80% diesel (SOLAR: cetane value sulfur 3,500 ppm). In the past, the mandatory use of B20 was for Public Service Obligation (PSO) activities and its enforcement was limited to the national railways and other state-owned enterprises. With the presidential decree in place, it is now applicable to all users (non-PSO). Following SOLAR, DEXLITE (cetane value 51, sulfur content 1,200 pp) is also required to have 20% biodiesel in its fuel mix from September 1, 2018. Moreover, B30 was introduced for PSO and Non-PSO in January 2020 through road tests in 2019. It is assumed that FAME biofuel technology is not able to produce more than B30 which can be used as propulsion source so far.

According to the Indonesian Truck Operators Association (APTRINDO), although B20 has been in the market since 2016, the diesel fuel used by the truck industry has 5 to 10% biodiesel content depending on engine specifications (CNN Indonesia, September 1, 2018). Diesel fuel with a mix of biodiesel above B20 will cause fouling of tank and require more frequent oil filter and engine oil changes. Since biodiesel easily binds to water, it is necessary to attach a water separation filter. Thus, it is crucial for end users to take appropriate measures when using B20. It should be noted that the Indonesian Government has not conducted a verification test on the use of B20 on trucks. The current situation also suggests that there have been insufficient public awareness activities conducted to end users. Another issue that needs to be addressed is the rising cost of logistics due to increased maintenance costs. Effects on B20 also need to be studied on diesel engine sport utility vehicles (SUVs), such as Mitsubishi Pajero and Toyota Fortuner, in addition to commercial vehicles such as trucks.

## **(3) Policy Direction for Indonesia**

The Indonesian Government sees the use of biodiesel as a means to curb the depreciation of Indonesian rupiah by reducing oil imports.

In particular, the value of Indonesian rupiah has been steadily declining against the U.S. dollar since 2018. The Bank Indonesia (BI), which is the central bank of the Republic of Indonesia, has increased

---

interest rates four times already; however, the countermeasures have not been able to stop the decline. Judging from the progress in regulating greenhouse gas in Indonesia, there are two directions in promoting the Indonesian automotive industry in terms of green gas control.

- (a) The research and development on the technology for upgrading fatty acid methyl esters (FAME) should advance further. FAME is the main component of vegetable oil whose market needs has been increasing as biofuel. The technology for producing higher quality FAME (H-FAME) entails the removal of toxic components from FAME through partial hydrogenation under mild reaction conditions and the improvement of its oxidation and thermal stability. The goals of this technological advancement are to reduce the production cost of biofuel and improve its quality. This requires government initiatives in promoting industry-academia collaboration.
  
- (b) There should be a stronger linkage between controlling the supply of biofuel and agricultural policies in Indonesia. In Thailand, the introduction of the its government policy on promoting biodiesel created positive effects on its agricultural sector. Through this policy, the price of palm oil used in producing palm oil-based biodiesel has been stabilized. However, this became possible since palm oil production in Thailand was originally for domestic use. Meanwhile, palm oil is one of the main export products of Indonesia. When the price of palm oil for automobile fuel rises, there needs to be a greater coordination of supply between domestic and export use.

### **1.1.4 Utilizing the Potentials of Existing Automotive Supply and Value Chains**

#### **(1) Changes in the Business Climate Linked to the Advancement of Supply and Value Chains**

Advances in information technology (IT) have supported the globalization of the value chain. Similarly, advances in transportation and information/communication technologies have facilitated the division of labor and distribution of production processes across geographical boundaries. The advancement made it easier for developing countries to participate in the global value chain (GVC) of the automotive industry. In particular, the conditions for developing countries to enter the automotive GVC are cheap labor and high domestic market potentials. Through this, the GVC has sustained its expansion by continuously incorporating countries that offer cheap labor and high market potential.

However, the situation is changing with the emergence of Industry 4.0. The automation of production processes has progressed with the introduction of autonomous robots, smart sensors, big data analysis, and so on; this reduced the economic value of human labor. As overseas outsourcing of production processes which require no specialized skills has become less cost-effective, the operations for these unskilled production processes are gradually returning to developed countries. In other words, cheap labor may no longer serve as an entry ticket to GVC in the future. According to a study by the World Bank, offshoring of production automation in developing countries are cut back when advances in automation technologies reach a certain point; as a result, the automation of production process and the advances in IoT will cause an average of 2-8% job loss in developing countries where their bargaining power relies on cheap labor (Hallward-Driemeier and Nayyar, 2018).

Industry 4.0 technologies enable an advanced integration of supply chains through synchronized multi-directional sharing of information and coordination within and between organizations. Through this technology, efficiency is maximized in various aspects such as equipment operation rate, defective inventory processing, yield, risk responses, and prediction accuracy; this leads to drastic increase in the productivity of companies which are part of the ecosystem created by the said technologies. Particularly, the advent of 3D printers has greatly reduced the time required in the design verification process using prototypes. In some cases, logistics and assembly processes are skipped/omitted which significantly shortens the lead time of products to enter the market. As shown by marketing practices of Ford and BMW, the limited production of diverse products using the value-added manufacturing technology enables product customization for customers with diverse tastes.

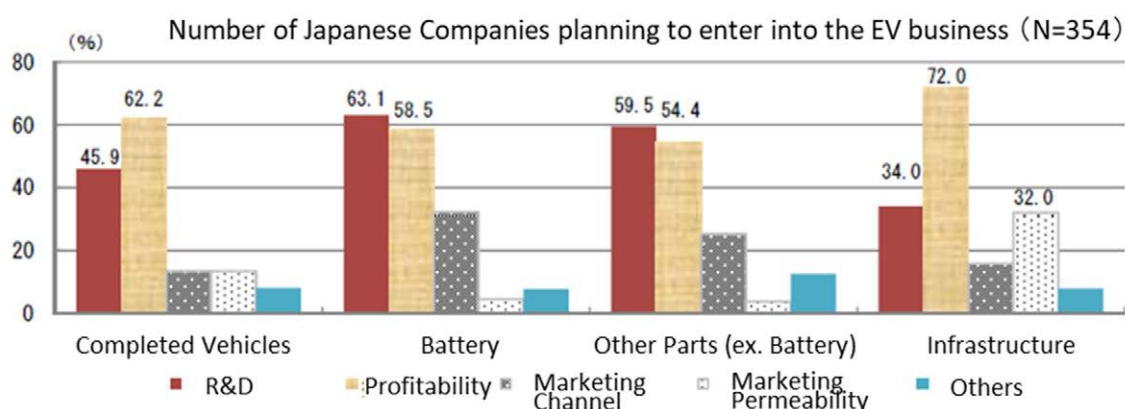
As this process progresses, the performance gap of companies which are within and outside the ecosystem will widen. Since it is costly to introduce the production equipment and cyber security systems using advanced information and communication technologies (ICT), and train employees on new technologies, only a few companies will be able to fully implement the digitalization of the production process. This implies that if Indonesia were to stay within the “trap of a middle-income country,” it is possible that the technology linkage with developed countries would be disrupted and the country’s status may return to an underdeveloped country. In short, if cheap labor ceases to function as

a competitive advantage, it would be meaningless for developed countries to stay connected with those outside the ecosystem.

On the other hand, there is still a possibility that the value chain will expand further through the development of transportation technology and ICT. Technologies for e-commerce, 3D printers, and virtual presence have enabled business matching between companies located far from one another and have brought about business opportunities to SMEs and individuals in countries that have been outside the global value chain.

## (2) Supply and Value Chains Surrounding xEV

Many companies recognize that issues on entry into the EV business are profitability in terms of setting up the necessary infrastructure for completed vehicles, and technology development for energy storage systems. Competitions in developing high-capacity and safe batteries for automobiles will further intensify. As EVs gain more popularity, some companies will be affected by the reduction of auto parts and the simplification of the production process; at the same time, it will bring about business opportunities for other companies which will venture into the EV business.



Note: The ratio of companies that have plan not to and don't have plan yet to enter EV market  
Source: Development Bank of Japan

Figure 1.1.11 Issues on the Entry into the EV Business

The table below breaks down the issues on entry into the EV business by industry. Specifically, it reflects the issues faced by 354 Japanese companies as shown on above figure.

Table 1.1.5 Issues on Entry into the EV Business by Industry

Industry	Issues
Material Industry	<ul style="list-style-type: none"> <li>Intensification of competition among iron, resin, and aluminum for vehicle weight reduction</li> <li>New entry of carbon fiber and other materials in the competition</li> </ul>
Parts	<ul style="list-style-type: none"> <li>Increase in functions of batteries, motors, and its effect on the functions of related components</li> <li>Fewer distinctions between mechanical control components and electronic components</li> <li>Emergence of fabless companies due to shortened manufacturing processes</li> </ul>

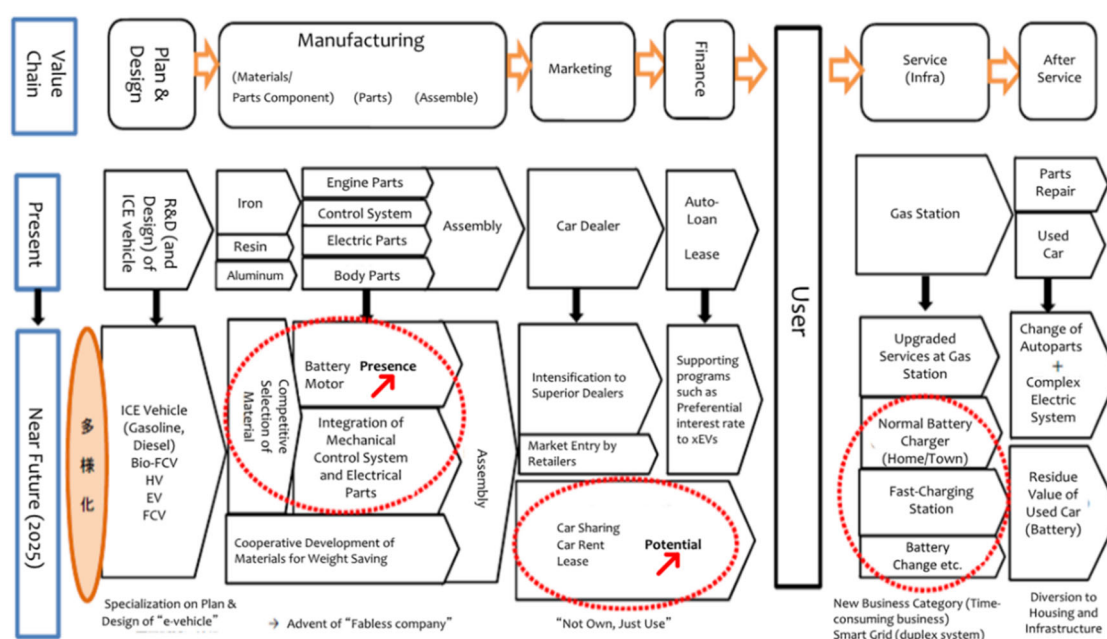


Sales	<ul style="list-style-type: none"> <li>Expansion of businesses that cater to the demand for using rather than owning vehicles (e.g. car sharing and leasing)</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>Progress in the installation of regular and quick charging stations</li> <li>Changes in the role of service stands</li> <li>Emergence of new value chains following operation systems (OS) and software updates</li> </ul>

Source: JICA Study Team based on Various Reports Prepared by the Development Bank of Japan

In developed countries, EVs are becoming more user-friendly and accessible due to improvements in cruising distance, price, charging infrastructure, and so on. However, the accessibility of EVs has not reached a satisfactory level in developing countries. Therefore, it is more likely that for the time being, the ICE value chain and the new and more diversified value chain will continue to exist in parallel.

As shown by the parts circled by the red dotted line in the figure below, key characteristics of the new value chain stem from the issues summarized in the table above. Furthermore, the new value chain will encompass new items such as "charging the battery" and "updating the OS", which did not exist previously.



Source: Development Bank of Japan

**Figure 1.1.12 Changes in the Auto Industry Value Chain due to the Electrification of Vehicles**

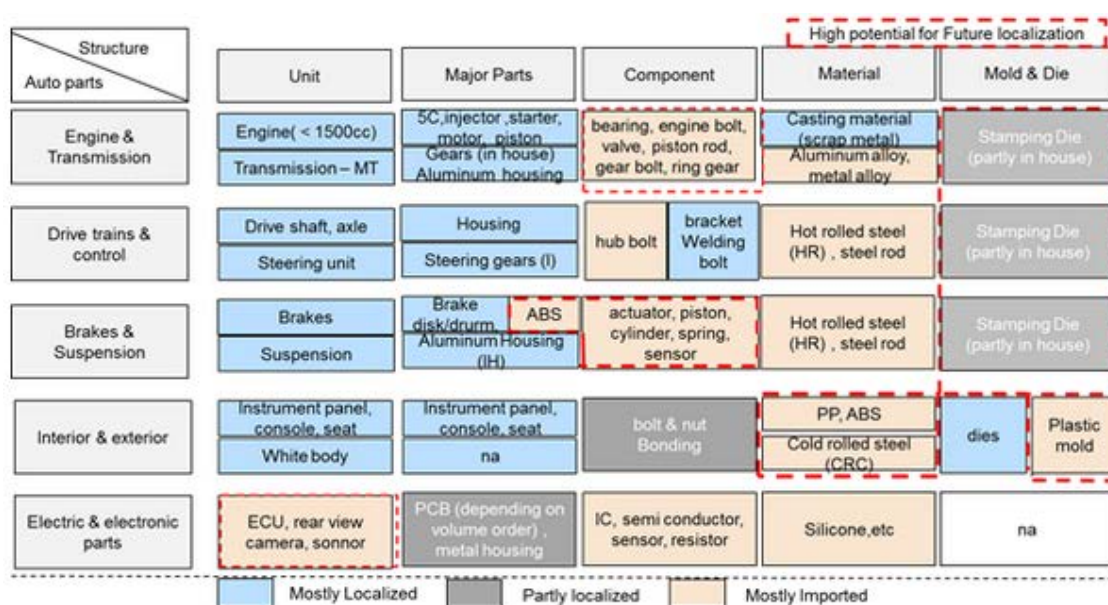
China has been a front-runner in the global race of EV policies. In its efforts to become an automobile powerhouse, China announced that it will foster several new energy vehicle makers in the country that will be ranked within the global top ten in the field; this will facilitate technologies in China to reach the global cutting-edge level by 2020 in the fields of not only core traditional technologies such as powertrains, transmissions, and car electronics, but also batteries and motors. According to Bloomberg, in 2020, five out of the top 10 and three out of the top five car battery manufacturers are Chinese companies. In brief, China accounts for three quarters of the global automotive battery production.

Currently, EVs hold a greater significance as a key technological field in the development of the automotive industry rather than a means to address environmental issues.

### (3) Policy Direction for Indonesia

In the previous JICA project, *Data Collection Survey on Promotion for Globally Competitive Industry*, the supply and value chains of the automotive industry were analyzed. In the supply chain analysis, the situations surrounding local sourcing were studied from two matrices: automotive structures (materials, components, systems, and units) and auto parts (engines, driving, braking, et al).

Strengthening the existing supply and value chains of ICE vehicles is an essential preparatory activity to realize the future supply and value chains as described above. Assuming that the industrial transition will occur by 2028, Indonesia should aim to achieve a fully integrated or full-set supply chain and attract companies that can bring in planning and development functions in the upstream portion of the smile curve of the value chain by then.



Source: Data Collection Survey on Promotion for Globally Competitive Industry, JICA

**Figure 1.1.13 Supply Chain Structure of the Automotive Industry in Indonesia**

The point of the supply and value chain-based strategy is to attract segments of the supply and value chains that do not exist domestically in order to realize the full-set chains. The figure above seen from the vertical axis shows that Indonesia still heavily imports components and materials as intermediate goods; while the horizontal axis shows that the country still heavily imports electric and electronic parts. This suggests that investment promotion and stronger competitiveness among companies in these fields are needed. As for raw materials, it is necessary to strengthen supply chains of iron, plastic raw materials, batteries, biofuels, and so on given that most raw materials can be procured domestically.

The utilization of potentials of supply and value chains is based on the idea that the tangible and intangible assets stored as stocks by Indonesian OEMs and parts manufacturers should be upgraded based on market needs. One example of an upgrade is to use the platforms of Avanza/Xenia by Toyota/Daihatsu and Expander by Mitsubishi Motors in manufacturing SUV crossover vehicles, which are popular in Asia, and to provide incentives for these compact and fuel-efficient vehicles. These measures will provide continuous incentives for companies that have already made investments in Indonesia. Furthermore, it will increase the tenant retention rate and attract R&D&D functions in designing the upper body of SUV crossovers and other parts.

Based on the value chain analysis in the previous JICA project, the automotive value chain was divided into three categories: upstream, midstream, and downstream; each category was then analyzed accordingly. Through this, the position of the Indonesian auto industry was clarified by benchmarking the situation in Thailand.

Function	Involvement of Indonesia	Role of HQ/ RHQ (Thailand )/ Indonesia	Involvement of Indonesia	Potential Role of Indonesia in future
Product concept /planning	△	<ul style="list-style-type: none"> <li>Global product in HQ</li> <li>Domestic / region product concept in Thailand or Indonesia</li> </ul>	○	<ul style="list-style-type: none"> <li>Transfer of country product planning function (→translate market needs to engineering terms)</li> </ul>
Upper Body D/D	△	<ul style="list-style-type: none"> <li>D/Din Head quarter for base model and D/D of derived models in Thailand</li> <li>Some OEMs started partial D/D in Indonesia (minor changes)</li> </ul>	○	<ul style="list-style-type: none"> <li>D/D for derived models in Indonesia (full model changes) – Around 40% of D/D tasks to be transferred</li> </ul>
Platform D/D (chassis , frame, etc)	X	<ul style="list-style-type: none"> <li>Development: Headquarter</li> <li>Testing/application : some OEMs in Thailand</li> </ul>	△	<ul style="list-style-type: none"> <li>some modification of platform in Indonesia (longer wheelbase, etc)</li> </ul>
Power train D/D	X	<ul style="list-style-type: none"> <li>All developed in Japan</li> <li>Homologation and modification/application (bio fuel) in Thailand</li> </ul>	X	<ul style="list-style-type: none"> <li>No power train development as global platform using latest PT technologies</li> </ul>

Note: ○=largely involved, △=partially involved, X= Not involved

Source: Data Collection Survey on Promotion for Globally Competitive Industry, JICA

### Figure 1.1.14 Measures to Improve the Indonesian Automotive Manufacturing Value Chain

The goal of analyzing the value chain is to get the planning portion, the upper portion of the smile curve, and the detailed design portion localized in Indonesia. These are the core portions of car manufacturing function that were previously performed at the OEM headquarters. In order to realize this, it is necessary to strengthen the R&D&D function in the country. The following are examples of specific measures:

- Consider incentives to attract R&D functions of component manufacturers
- Develop R&D&D human resources through industry-academia collaboration especially in the improvement of design ability
- Expand the base pool of human resources through improving the quality of higher education

### 1.1.5 Production, Sales and Use of Automobiles Utilizing Next-Generation Technologies (e.g. IoT, AI, and Robotics)

Technological innovations brought by Industry 4.0 are already being introduced across all fields from production to sales of automobiles; thus, it is moving in a more capital-intensive direction. Given this, technological innovations will not promote employment generation.

**Table 1.1.6 Changes in Automotive Product Development, Manufacturing, Logistics, and Sales Driven by Next-Generation Technologies**

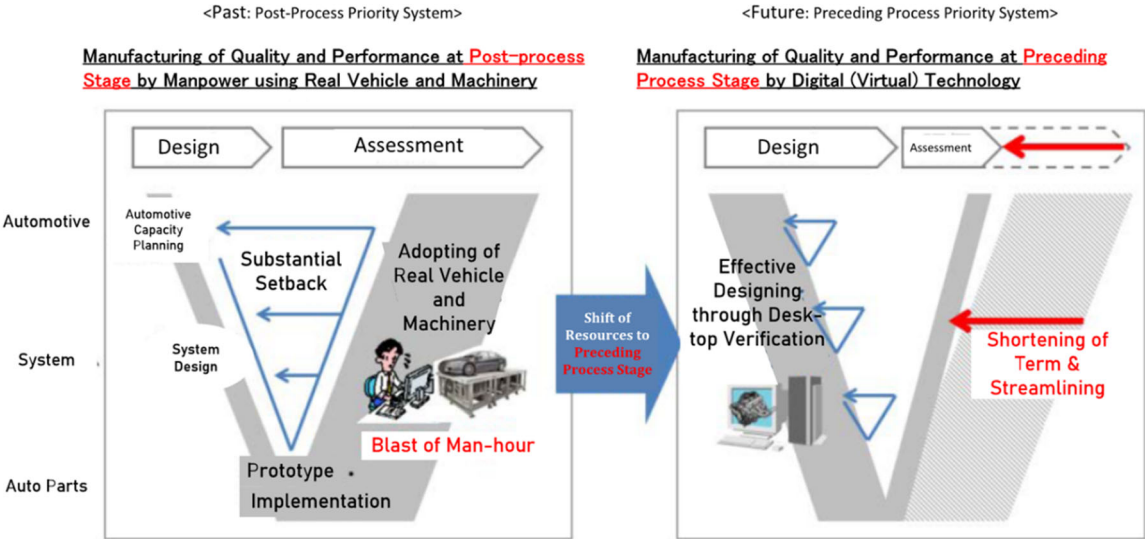
Process	Changes Brought by Next-Generation Technologies
Product Development	<ul style="list-style-type: none"> <li>• Simultaneous sharing of product designs and interactive processing have become possible.</li> <li>• The increased processing capacity of computers have made it possible for simulation experiments such as fine-tuning of automotive parts, and heat and pressure resistance experiments to be performed, which have led to cost reduction.</li> <li>• The lead time for manufacturing prototypes is greatly reduced by utilizing numerical control (NC) machines linked to computer aided design (CAD) data.</li> <li>• The introduction of 3D printers enables the manufacturing of more complex products.</li> <li>• It became feasible to display the CAD data in virtual reality (VR) space and then visually verify the actual size model through a head-mounted display (HMD), which facilitates an interactive review of products under development in virtual space with those who are in remote locations.</li> </ul>
Manufacturing	<ul style="list-style-type: none"> <li>• Through the development of autonomous robots called M2M (Machine to Machine), robots can now share information and reprogram operations without human interventions. (e.g. In case of an emergency during the parts transportation process, the control tower will look over the entire assembly line and optimize the assembly line process.)</li> <li>• Through advances in ICT, asset depreciation forecast becomes more accurate, which allows for timely actions to be taken, thus reducing the risk of line stoppage. According to a study by McKinsey &amp; Co., equipment maintenance costs can be reduced by 10-40% and machine downtime can be reduced in half through preventive maintenance.</li> <li>• Since robotized lines do not require personal identification or heating, companies can save on utility costs.</li> </ul>
Logistics	<ul style="list-style-type: none"> <li>• Increased efficiency in inventory management by using radio frequency identification (RFID) technology</li> <li>• Increased speed in transportation of goods inside the warehouse using the M2M technology.</li> <li>• Increased efficiency in unskilled work through the application of augmented reality (AR) technology in the warehouse operation.</li> </ul>
Sales	<ul style="list-style-type: none"> <li>• Increased efficiency in inventory management of store backrooms using RFID.</li> <li>• Reduction of sales staff for small auto parts stores and increase in walk-through and unmanned automated stores.</li> <li>• Simplification of the purchase procedure through e-commerce, and the realization of two-way communication between sellers and buyers.</li> </ul>

Source: JICA Study Team based on Various Reports

The following section discusses notable points on next generation technologies.

**(1) Improvements in Automobile Production Technology**

The first feature of the improvements of automobile production technology is the progress in productivity innovation. The innovation is made possible through digitization of design and development (virtual technology). For example, the designing process followed by an evaluation can be performed without leaving a desk. The new development process can be described as agile development, which refers to an iterative process of plan, develop and deploy to meet the changing client needs while ensuring fast development of prototypes, rather than a conventional waterfall type, which refers to a process whereby development activities are conducted in linear sequential phases. In agile development, the work process that used to place more weight on the back-end evaluation process will shift its weight to the front-end designing process.

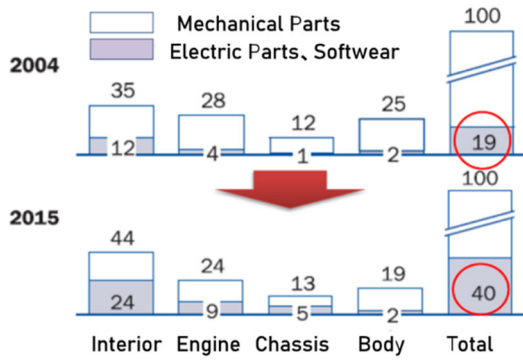


Source: 1st Study Group Meeting Material for the Strategic Commission for the New Automotive Era<sup>3</sup>

**Figure 1.1.15 Front-End Process Shift Toward Creating Productivity Innovation in Automobile Development**

The second feature is the progress in digitization of design and development (virtual technology). This is due to the increase in the proportion of automotive electronic parts/components in all auto parts to the complexity of software. The core technologies in vehicle electrification are motors, batteries, and inverters.

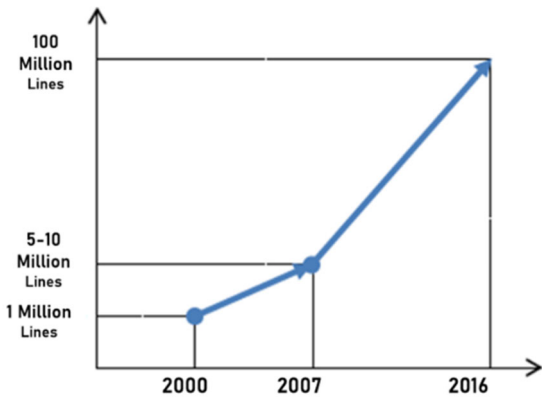
<sup>3</sup> [https://www.meti.go.jp/committee/kenkyukai/seizou/jidousha\\_shinjidai/pdf/001\\_01\\_00.pdf](https://www.meti.go.jp/committee/kenkyukai/seizou/jidousha_shinjidai/pdf/001_01_00.pdf)



Source: “Managing Innovations on the Road”  
McKinsey

\*The ratio of electronic parts/components is the cost of electronic parts/components to the total cost of the components that make up the vehicle.

**Figure 1.1.16 Comparison of Electronic Component Ratio**



Source: “Accelerating IT-Led Productivity Improvements,” Ministry of Economy, Trade and Industry (METI)

**Figure 1.1.17 Automotive Software Source Code Lines**

It should be noted that the proportion of electronic parts/components to all automotive parts has been growing with the improvement in the functionality of electronic parts (e.g. electronic control, safe driving system, networking). In addition, the proportion of electronic components has nearly doubled from 2004 to 2015 and reached 40%. The main changes can be seen below:

- Electronic control → ECU et al
- Safe driving system → Sensors (millimeter wave radar, acceleration sensor, camera, et al.)
- Connection with network → Inter-vehicle communication system, et al

Automotive software is also rapidly becoming more complex. In 2000, an automotive software used one million lines of source codes; today, it runs on 100 million lines<sup>4</sup>.

## (2) Sales and Use of Automobiles

The premise of understanding the future sales trend of automobiles is the shift from selling vehicles to selling sharing services. There are two business models for sharing: car sharing and ride sharing or carpooling.

<sup>4</sup> As the number of source code lines of other products, for example, Android OS uses 12 million lines, F-35 fighter system uses 24 million lines, and Microsoft Office 2013 uses 44 million lines. These figures illustrate the massive scale of automotive software code lines.



**Table 1.1.7 Business Model on Sharing Vehicles: Car Sharing and Ride Sharing**

Car Sharing (Model for sharing one vehicle by multiple users)	<ul style="list-style-type: none"> <li>• A common car sharing service in Japan is where multiple users or members share one vehicle parked in a public parking lot and use the vehicle only during the time slots which they reserved.</li> <li>• Various models of car sharing services exist around the world. One such service is where a user can reserve a vehicle, drive it and leave it in the designated parking area; another example is person to person (P2P) sharing or sharing of a car between individuals.</li> </ul>
Ride Sharing (Mechanism for sharing movement by car)	<ul style="list-style-type: none"> <li>• A member and owner of a car registers as a driver and shares / accepts a requested ride from another member through the ride sharing service (Uber in the United States and Didi in China)</li> <li>• This form of ride sharing service is illegal in Japan.</li> </ul>

Source: JICA Study Team

Many car sharing business models base their services on the precondition that a service vehicle is always connected to an external network. The connection to an external network is key in the future where cars shift from something individuals buy to something people share and use; thus, cars become shared entities. Businesses providing car sharing services will focus on running its operations with a small number of vehicles with high occupancy rate. This business model is projected as one of the factors in the decrease of vehicle sales in the future. Given this, auto makers may consider expanding their business scope to related businesses.

### **(3) Policy Direction for Indonesia**

Compared to its neighboring countries, Indonesia is not particularly advanced in the IT field. Despite this, transitions in the automotive technologies will inevitably happen in the future. Hence, Indonesia needs to take progressive measures in human resource development and foster a pool of human resources which has the same or higher skill set compared to its neighboring countries such as Thailand, Malaysia, and the Philippines which are competing in the same field. The development of human resources in the IT field should be done by utilizing the Human Resources Development Agency established in 2019 under the umbrella of the Ministry of Industry in response to Industry 4.0.

Based on interviews conducted with automotive companies in Indonesia, IT technicians who can design a powertrain part for existing ICE-related parts, and those who can design ECU units and IT programs are in-demand. The training for the former type (i.e. those who can design powertrain parts) can be done in-house since OEMs have its own training programs. On the other hand, capacity building for the latter type is a challenge since there is a shortage of IT instructors in the country who are knowledgeable in connected and telematics technologies.

The ideal scenarios in anticipation of the technological changes are the following: expand the IT technician base with basic IT knowledge; employ IT technicians in related industries in Indonesia; IT technicians who have had in-house training to start designing powertrain-related parts, and; newly trained human resources / personnel design connected and telematic parts. In this regard, Japan has an abundance of experience in providing technical assistance. Human resource development activities may



be considered as a pilot activity in this project. In order to actualize these situations, the following items will be reviewed:

- Current situation surrounding the human resource development in the IT field in higher education institutions
- Measures to assess the scale of IT labor pool in Indonesia
- Possibility of industry-academia collaboration
- Pilot activities to be supported by Japan

In order to make Making Indonesia 4.0 compatible with the higher-level Industry 4.0, new entities such as the Strategic Innovation Promotion Program (SIP<sup>5</sup>) and the Indonesia Council for Science, Technology and Innovation (I-CSTI) under SIP may need to be established in order to realize science and technology innovations. In particular, I-CSTI should function as a control tower or steering committee and play a lead role in managing cross-sectional issues that go beyond mandates of individual government organizations. The JETRO, the Japanese Chamber of Commerce and Industry (JCCI), Japanese manufacturing companies in Indonesia and JICA can provide the necessary support in the establishment and operation of I-CSTI.

**Table 1.1.8 Electrification, Electric Motorization, Computerization, and Standardization that Define the Ideal State of Next-Generation Vehicles**

Category	Definition and example
Digitization	Transformation of control system such as engine and safe driving control from mechanical to electrical. (e.g. ABS and car navigation system)
Electrification	Transformation of driving system from ICEs to electric power promoted by technical innovation. (e.g. HEV: Toyota Prius, BEV Nissan Leaf)
Telematics	Management overall transportation system safely and efficiently with connecting between vehicles and vehicles, as well as vehicles and out-vehicles.
Standardization	Solutions for promoting above-mentioned innovation in efficient and appropriate. (e.g. Harmonizing specification with electronic devices in the market, involving Connected projects lead by GAFA)

Source: JICA Study Team

---

<sup>5</sup> SIP is a national program led by Government with interdisciplinary management to realize scientific and technological innovation. Under the strong leadership of Program Directors (PD) for each subject, it promotes interdisciplinary research and development covering from fundamental study to industrial application with industry-academia-government cooperation.

## 1.1.6 Automotive Industry Upgrading and Growth in the Local Procurement Ratio

### (1) Concept of the Automotive Industry Upgrading

The upgrading of the automotive industry refers to the expansion of high value-added processes and products, the advancement and concentration of production technologies, the further utilization of information technology, and the diversification of business portfolios. The move towards industry upgrading is facilitated by the changes in consumer needs that have become more diverse and require more high-quality auto products. Among all indicators of industry upgrading, the local procurement ratio is seen as one of the key indicators in analyzing the level of value addition in the industry.

It should be noted that there is a huge difference between the local procurement rate that simply looks into whether parts are made locally (also known as *apparent local procurement rate*) and the true or actual local procurement rate that looks at the local value addition. *The true local procurement rate* is calculated based on the costs of local parts after subtracting the costs of materials and manufacturing machinery/equipment imported from Japan to make the local parts.

The commonly used local procurement rate is the apparent local procurement rate, rather than the *actual procurement rate* or the rate of procurement from purely local companies. Specifically, there are two types of apparent local procurement rate: the apparent local procurement rate in a narrow sense, and the apparent local procurement rate in a broad sense. *The apparent local procurement rate in a narrow sense* refers to the rate of procuring parts and components from local companies and foreign subsidiaries registered in destination countries with headquarters located in Japan, the United States or Europe. This narrowly defined rate is the most commonly used definition of local procurement rate and has the same meaning as the *domestic production rate of parts*, which is a concept often used in the discussion of import substitution policies in emerging countries. On the other hand, the *apparent local procurement rate in a broad sense* is the sum of the narrowly defined rate and the regional procurement rate from member countries in regional trade blocks. such as the ASEAN, the EU, the North American Free Trade Agreement (NAFTA), and so on.

An example of the broadly defined rate is when a Japanese subsidiary in Thailand procures parts from its group company in Indonesia, which constitutes import in principle. Another example is where multinational companies with headquarters in Japan practice intra-company trades or transactions between overseas subsidiaries. This practice is the prototype of the concept called global procurement or world optimal procurement.

### (2) Current Approach to Local Procurement

Among OEMs and Tier 1 companies, local procurement is being practiced based on the company's strategic decision-making framework; however, within the framework, the significance placed on local procurement rate is diminishing. When setting up factories overseas, Japanese auto parts companies tend to see localization as a means to strengthen its cost competitiveness. Therefore, the localization policy of overseas subsidiaries is led by their head offices as part of its strategic decision-making.

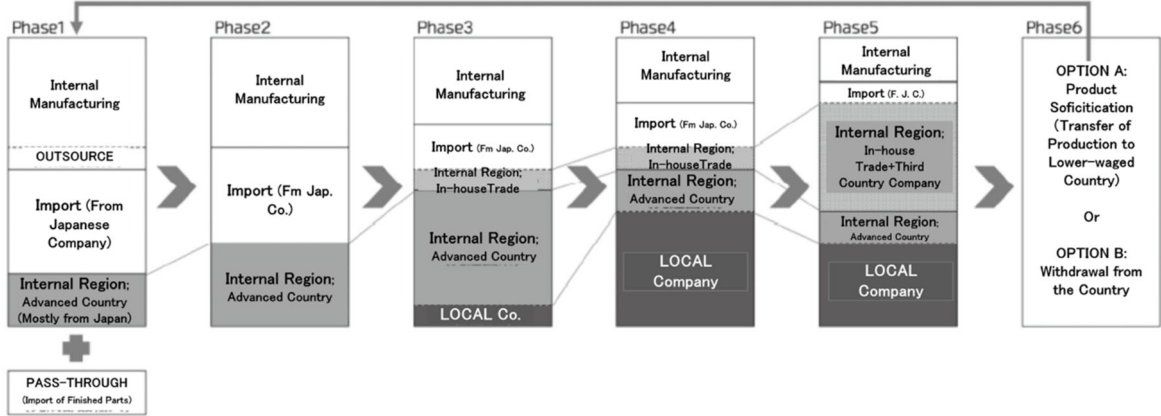
---

Japanese companies tend to impose extremely high-quality requirements when setting up operations overseas, which results in a low procurement rate for purely local companies. While the actual procurement rate (rate of procuring parts from local companies) tends to remain low, the apparent local procurement rate in a narrow sense (rate of procuring parts mostly from Japanese overseas subsidiaries registered locally) tends to rise.

Furthermore, due to the progress in setting up various trade frameworks such as the EPAs and Free Trade Agreements (FTAs), the focus of localization is shifting from *local production for local consumption* to regional production for local consumption. Many companies have not yet reached the stage where they heavily rely on procuring parts and components from third countries or member countries in regional trade blocks such as the ASEAN. However, if companies can no longer procure parts and components domestically at competitive prices in fast-industrializing countries like Thailand, it becomes inevitable that these companies will increase its procurement from neighboring low-wage countries like Laos and Myanmar. For example, Thailand will see a decline in the apparent local procurement rate in a narrow sense and an increase in apparent local procurement rate in a broad sense due to an increase in wages and prices.

When wage and price increases occur in destination countries, companies engaged in labor-intensive operations, such as wire harness manufacturing, tend to withdraw from the said countries. In addition, companies engaged in capital-intensive operations, such as manufacturing of ECUs and actuators, tend to streamline their operations on automation, for example, and remain locally. Meanwhile, the cost competitiveness of Japanese automotive parts companies based overseas are constrained by the quality requirements demanded by customers, which are mostly Japanese OEMs. quality requirements demand by customers (most of them are Japanese OEMs). This has limited the potential of procuring parts and components from local companies. It can also be said that Japanese auto companies have been passive in strengthening the competitiveness of local auto parts/components suppliers and have not provided much medium to long term initiatives in strengthening capabilities of local companies.

Figure 1.1.18 shows the procurement structure of Japanese auto parts subsidiaries when viewed on a value-added basis. In the medium to long term time span, the meaning behind local procurement will shift from domestic procurement to regional procurement, and then to optimal global procurement.



Source: “Key Strategy of Local Procurement for Japanese Auto Parts Suppliers,” Yasuo Saeki, Ritsumeikan University

**Figure 1.1.18** volution of Local Procurement Structure

The above figure illustrates the procurement structure of Japanese auto parts suppliers overseas on a value-added basis. The section below explains the six phases of the local procurement evolution. Most Japanese companies located in Indonesia fall under Phase 3 or Phase 4.

(Phase1) When Japanese auto parts companies first establish overseas subsidiaries, most parts and components used by the subsidiaries are either in-house production or procured from their headquarters in Japan. If there are options to procure locally, the procurement sources are almost exclusively Japanese local companies. Subsidiaries may also sell “pass-through parts,” which refers to completed parts produced in their Japanese headquarters that are sent to overseas subsidiaries to be sold under the subsidiaries’ labels.

(Phase2) As local operations proceed on track, the local procurement rate increases. In emerging economies like Indonesia, Japanese subsidiaries will still procure almost exclusively from other subsidiaries with headquarters in developed countries (mostly from Japanese subsidiaries).

(Phase3) Japanese subsidiaries start procuring low value-added parts and components from purely local companies. The actual procurement rate can now be recorded; however, in terms of the apparent procurement rate in a narrow sense, procurements are made mostly from foreign subsidiaries with headquarters in developed countries. Companies that have many overseas subsidiaries gradually start importing parts and components from third countries; in this situation, regional intracompany trade is more commonly practiced.

(Phase 4) When the purchasing function of overseas subsidiaries is strengthened, and the exploration and development of local companies progress along with an increase in apparent procurement rate in a narrow sense, the actual procurement rate (rate of procurement from purely local companies) which serves as a portion of the apparent procurement rate in a narrow sense also

increases drastically. At this stage, Japanese subsidiaries can fully enjoy the benefits of localization in its destination country.

(Phase 5) When industrialization progresses in the destination country and it becomes impossible to absorb the increase in wages and prices through the streamlining of production processes, procurement activities will become stagnant or fall back, and imports from third countries will increase significantly. At this time, depending on the conditions, subsidiaries may start procuring from third countries in addition to conducting regional procurements by utilizing benefits from EPAs and FTAs.

(Phase 6) Based on the production costs in the country, subsidiaries may choose product portfolio upgrading or withdrawal of their operations from destination countries.

### **(3) Policy Direction for Indonesia**

The local procurement ratio of the Indonesian automotive industry is currently at 90%. In the figure above, most automotive parts companies in Indonesia fall under Phase 3 or Phase 4. As long as Japanese companies continue to adhere to high quality requirements, it is expected that core materials, parts, components, equipment and facilities needed for production by Japanese subsidiaries will continue to be supplied by Japanese affiliate companies. As operations continue, the rate of procuring from Japanese local companies may decline to a certain extent; however, a certain portion of procurement will remain with Japanese local companies. Companies like Denso or Panasonic can upgrade its portfolio of numerous production items in the country and rearrange production lines.

Given how companies involved in automobile manufacturing perceive industry upgrading as discussed above, the policy direction of the Indonesian Government should focus on how to involve local companies in the domestic procurement processes of foreign subsidiaries in the country. In Indonesia, the target of the policy should be the materials segment given as it is comparatively superior to its counterparts in third countries, and the local companies that belong to Tier 3 or lower. Materials that hold a high potential for the automotive industry development in Indonesia are iron, plastic raw materials, energy (electric power), and biofuels. Lithium batteries for EVs also have the potential to contribute to the industry upgrading in the xEV era if Indonesia can produce raw materials such as lithium and cobalt even in small amounts and partner with promising companies at an early stage.

Regarding the biofuels, it is necessary to consider cooperation between automotive policies with agricultural policies especially in palm oil. Indonesia is the world's largest CPO produce and export country. Currently, CPO exported by Indonesia are certified by the international certification standard called RSPO (Roundtable on Sustainable Palm Oil), which is established by NGOs and several private companies in Europe. On the other hand, the Indonesian government established an Indonesia-domestic

CPO certification system called ISPO (Indonesian Sustainable Palm Oil<sup>6</sup>) in 2009 with reference to RSPO, that all oil palm farmers are required to obtain around Indonesia. Indonesian government has been lobbying the major CPO importing countries on recognizing ISPO as an international certification alongside RSPO<sup>7</sup>, and has implemented support program for small and medium-sized oil palm farmers to acquire ISPO. Thereby it is said that agricultural policies especially related to CPO should be reviewed continuously.

Therefore, the following policies should be promoted. In addition, concrete action plans will be discussed and developed during project implementation.

- Nurturing of the material industry with a focus on Tier 2 and Tier 3 companies (human resource development, technology transfer, SME finance, etc.)
- Deliberation of investment incentives for the material industry
- Linkage with agricultural policies

---

<sup>6</sup> Indonesian government plan to force all of CPO suppliers including smallholders whom are financially supported to obtain ISPO. ISPO is in line with SDGS 2030 at least to support the realization 10 of 17 global goals, particularly ending poverty, protecting environment, and ensuring prosperity for all, as well as minimizing discrepancies in different sectors such as health, economy and law.

<sup>7</sup> Recast to 2030 (RED II) proposed by EU commission accounted that CPO used for transportation will be gradually banned until 2030 as its production has caused deforestation. Moreover the consumption volume of biofuels on 2021 to 2023 which can negatively transform landscape are not exceed its on 2019, and will be completely not consumed until 2030.

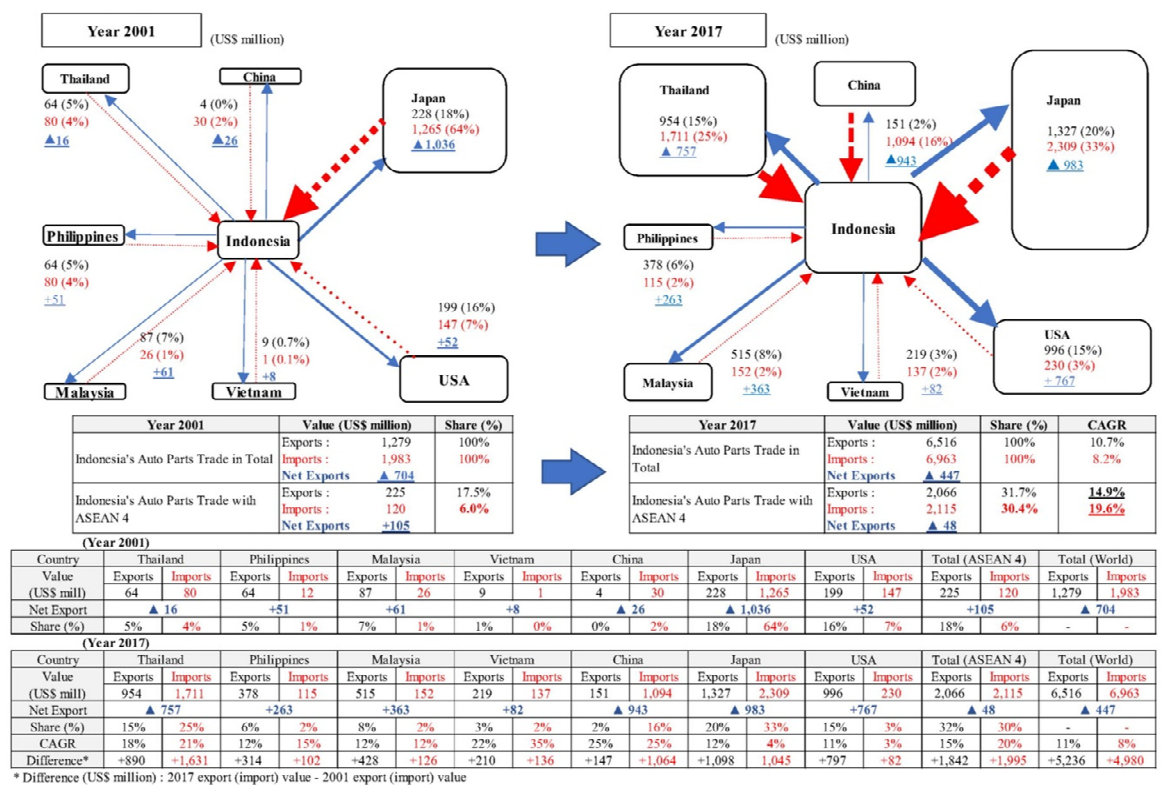
---

### 1.1.7 Expansion of Exports to Neighboring Countries

The figure below shows the transition of the automobile-related trade in Indonesia based on the *Project for Elaboration of Industrial Promotion Plans using Value Chain Analysis*.

Due to the development of GVC in the ASEAN region, the automotive trade or interdependency between Indonesia and the ASEAN increased nine times for exports, and 18 times for imports in value from 2000 to 2017. Moreover, the trade between Indonesia and the world increased by five times for exports and four times for imports during the same period. A comparison of the two trends shows that the Indonesian automotive industry has become more interdependent on the ASEAN automotive value chain.

Looking at Indonesia's automotive trade relationship with Japan, it should be noted that imports from Japan have doubled from 2001 to 2017. In the same period, exports from Japan have increased six-fold considering that Japanese auto parts manufacturers have set up their subsidiaries in the country. As a result, the trade deficit with Japan remains almost unchanged.



Source: "Project for Elaboration of Industrial Promotion Plans using Value Chain Analysis" Final Report, September 2019, JICA

Figure 1.1.19 Automotive Trade Situation of Indonesia

Since 2014-15, exports have slowed down in Indonesia due to the prices of natural resources; this caused the growth of the "export-oriented for emerging markets" to reach a turning point. In Thailand,



plant occupancy rate has fallen to almost 70%, which is directly linked to decline in profits. In addition to the soaring labor wages due to labor shortages, the profitability of operations in Thailand is further hindered by the increase in the recent baht exchange rate. There is a concern in the medium to long term outlook that the latest restrictions on environmental regulations may reinforce the backlash against vehicles with poor fuel economy such as pickup trucks and vehicles derived from SUVs.

Furthermore, it is inevitable that regional competition will intensify among automobile-producing countries within the ASEAN region, with cases such as China boosting its EV sales, India putting heavy efforts in exporting manufactured products labeled “Made in India”, and so on. Therefore, Indonesia should not be content with the success of the “export-oriented model for emerging markets.”. Instead, the country should take policy measures such as the development of new markets through FTAs, and human resources development to improve productivity as a countermeasure to cost increase, and financial support for equipment investments.

The number of Indonesia's CBU exports is expected to exceed 300,000 units for the first time in 2019, and CKD exceed 500,000 units, meaning overall exports keep growing. Furthermore, it is assumed that FTAs accelerate export that to Australia. However, the Australian market is limited for MPV, SUV, and LCGC of 1500cc or less, that Indonesia has market competitiveness, it is necessary to secure new market exploration including emerging market such as neighboring countries, South Asia (Bangla, Pakistan, etc.), Africa and South America.

A detailed GVC analysis of Indonesia's automotive industry will be covered in the upcoming JICA project, Automotive Industry Development Project. This project will study the possibility of expanding exports to neighboring countries through discussions within the JICA Study Team and interviews with experts. At the moment, the following ideas are likely to be adapted and explored further:

- SUV exports to ASEAN countries such as Thailand, Philippines and Vietnam should remain strong.
- The competition on small car exports is fierce. If Indonesia were to expand the exports of this segment, it could introduce environment-friendly cars that can compete in the market.
- The possibility of expanding the exports of public transport vehicles to the Pacific island nations should be explored (about 30,000 can be added).
- The possibility of exporting high-quality cars to Japan and China should be explored.

Japanese automotive manufacturers operating in Indonesia cannot generate profit if it is only focused on the sales of a single country. It is also important that the Indonesian Government works with other governments to align policies and facilitate the creation of the new divisions of labor in the region. In order to achieve global competitiveness, it is also necessary to pursue a region-wide strategy that will utilize not only suppliers from the ASEAN region or neighboring countries but also suppliers from countries that offer low material costs such as India and China.

## 1.2 Current State and Challenges of Indonesian Automotive Industry

### 1.2.1 Indonesian Automotive Roadmap

Indonesia's Ministry of Industry announced "Automotive Roadmap 2035 (Draft)" in 2018 to promote production of electric propulsion vehicles such as BEV and HEV and other low carbon emission vehicles LCEV (Low Carbon Emission Vehicle). In the Roadmap, the government stressed upon its intention to transfer the country to a production base for low-carbon emission vehicles such as EVs. In particular, Presidential Decree No. 55/2019 of August 2019 clarifies that development and domestic production of BEV should be promoted. Also, under the flag of "Making Indonesia 4.0", the government is aiming to upgrade VC by issuing Cabinet Order No. 45 of 2019<sup>8</sup> through significantly reducing taxes on investment in R&D&D and human resource development.

**Table 1.2.1 Outline of Indonesian Automotive Policy after 2018**

	Content	Related decree/draft
LCEV (Low Carbon Emission Vehicle) promotion measures and production base	<ul style="list-style-type: none"> <li>Expand the automobile production scale to 4 million units and export 1.5 million units by 2035</li> <li>Plan to increase LCEV production ratio from 10% in 2020 to 30% by 2035</li> <li>Amendment of luxury tax (Ppn) based on CO2 emission and fuel efficiency (reduction of tax rate for LCEV)</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Industry "2035 Automotive Roadmap (Draft)" (2018)</li> <li>Ministry of Industry "Making Indonesia 4.0" (March 2017)</li> <li>Presidential Decree No. 73, 2019 "Sales tax on luxury goods"</li> </ul>
EV (2W, 4W)	<ul style="list-style-type: none"> <li>Clarify the main policies (tax incentives, R&amp;D&amp;D promotion, inter-ministerial policy areas in charge) for the spread of electric vehicles.</li> <li>Specify domestic production rate targets for 2 wheels and 4 wheels or more</li> <li>Motorcycles: 40% to 80% by 2026</li> <li>4 wheels: 30% to 80% by 2035</li> </ul>	<ul style="list-style-type: none"> <li>BEV Presidential Decree (PP) No. 55, 2019 (August 2019)</li> </ul>
VC Upgrading measures, such as R&D&D, etc.	<ul style="list-style-type: none"> <li>Significant tax reduction on R&amp;D&amp;D and human resource development investment: Allow a large tax deduction (Super Deductable Tax) up to 3 times the investment amount (including land and building).</li> </ul>	<ul style="list-style-type: none"> <li>Government Decree No. 45, 2019</li> </ul>

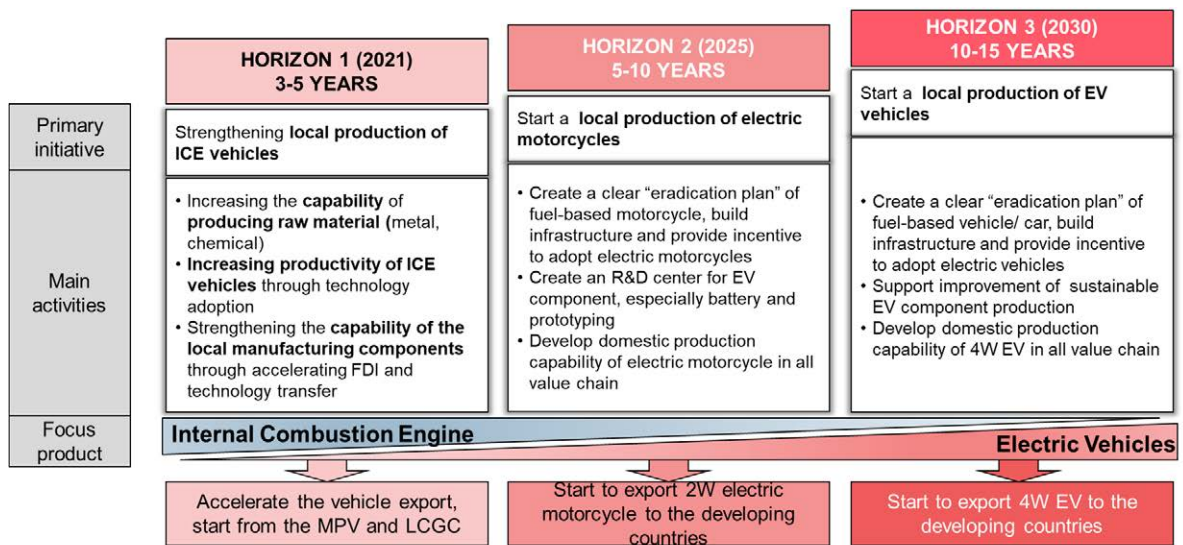
Source: Compiled by JICA Experts Team based on regulations issued by Indonesian government

According to the "2035 Vehicle Roadmap (Draft)", Indonesia plans to increase vehicle production to 4 million and export to 1.5 million by 2035. According to the plan, the ratio of LCEV production will be raised from 10% in 2020 to 30% in 2035. LCEV policy aims to promote eco-friendly and fuel-efficient vehicles by introducing vehicle luxury tax based on CO2 emissions and fuel efficiency standard.

<sup>8</sup> JETRO Business Report on 26th July, 2019

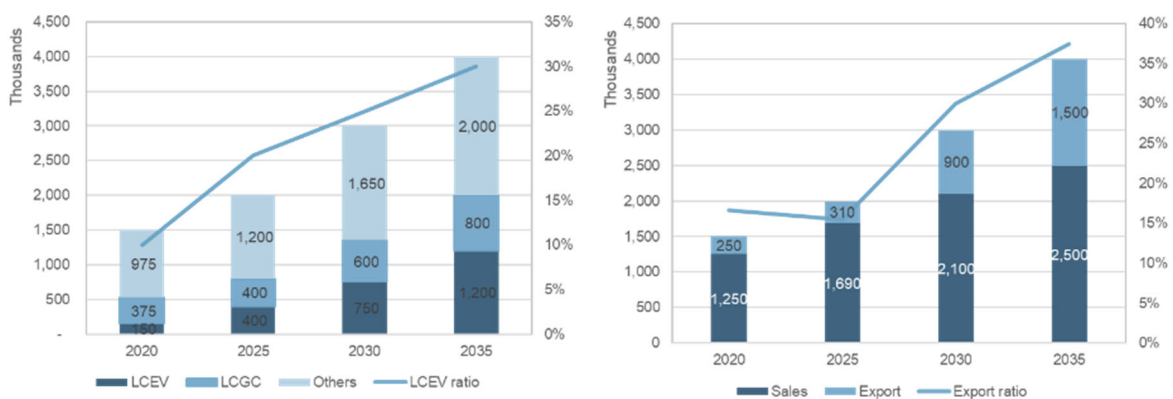
Specifically, the luxury tax will be reduced to 0% for EVs, PHEVs, FCVs and 2-8% for HEVs of 3000cc or less. On the contrary, the tax rate on MPV, which was previously favored, will be raised from the current 12% with internal combustion engine to 15%, the minimum rate in case of the lowest CO2 emission.

In addition, the Indonesian government is aiming to increase exports to 1.5 million units in the future, and is planning to increase incentives for vehicle models that are expected to expand due to tax incentives for fuel-efficient vehicles. In particular, Australia, which has a large market in the ASEAN Pacific region, is positioned as a priority potential market.



Source: Ministry of Industry "Roadmap towards Automotive 4.0"

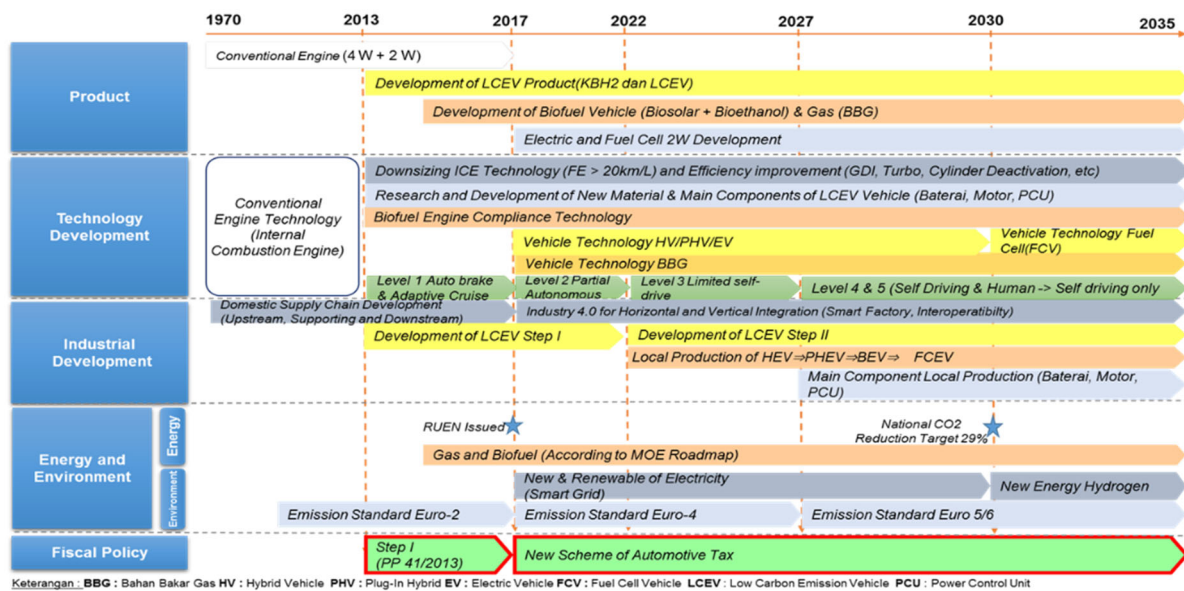
Figure 1.2.1 Indonesia Automotive Roadmap (Draft)



Note: LCEV=Low Carbon Emission Vehicle LCGC=Low Cost Green Car  
 Source: Ministry of Industry "Roadmap towards Automotive 4.0"

Figure 1.2.2 Volume Targets of Indonesia Automotive Roadmap

As shown in the Technology Roadmap of the Ministry of Industry in the figure below, the government is promoting research, development, and commercialization of the internal combustion engine, such as downsizing technology and biofuels, while at the same time advancing technology research and development of HV / PHV / EV (generally called xEV) . It can be said that such an ambidexterity strategy of “ICE + xEV” is an appropriate strategy considering the situation in Indonesia. This is because VC / SC for internal combustion engine (ICE), has been developing in last decades, while there are rooms left for further improvement in its competitive advantage; improvement through further expansion of domestic market and establishment of export base. In particular, the latter has potential to grow as an export base for emerging markets, where ICEs are still predominant in the market with new demand for further penetration.



Source: Ministry of Industry “Roadmap towards Automotive 4.0”

**Figure 1.2.3 Indonesia Automotive Technology Roadmap**

## 1.2.2 Positioning and Potential of Indonesia Market

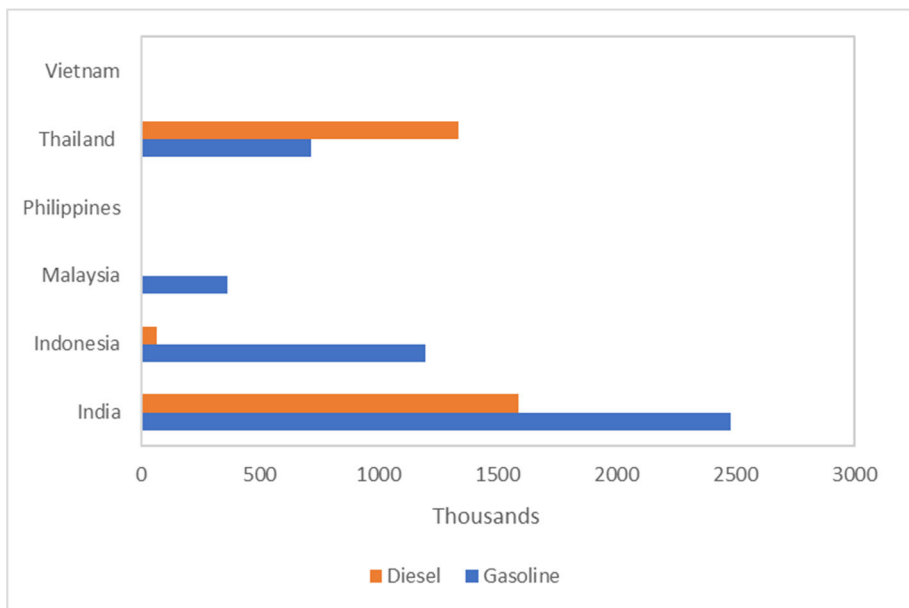
As shown in the roadmap, majority of market in Indonesia will still be consisted of ICEs around 2030. In addition, since LCEV includes hybrids, 70% to 80% of vehicles will be equipped with ICE. Therefore, as mentioned in the previous section, Indonesia has the potential to occupy a unique position in Asian region or emerging markets by developing the “ambidexterity strategy covering ICE + xEV”.

### (1) Potentials of ICE

There are two potential ICE bases: 1) small gasoline engines and 2) biofuel-based biofuel engines.

### 1) Small gasoline engines

Indonesia's gasoline engine production is 1.2 million units, which is the second largest in Asian region after India. On the other hand, Thailand, which is the production base for pickups, has 1.3 million diesel production units, which is the second largest after India. In the rest of other ASEAN countries, almost no engines are produced. This implies that Indonesia is the main supply base for gasoline engines. If developed countries such as Japan shift to xEV production in the future, Indonesia will become an alternative supply base. There is an increasing possibility that Indonesia may enjoy, so called “Last Survivor Profit” if Indonesia continues to make ICE, according to the interview with a former Astra Toyota Motor executive.



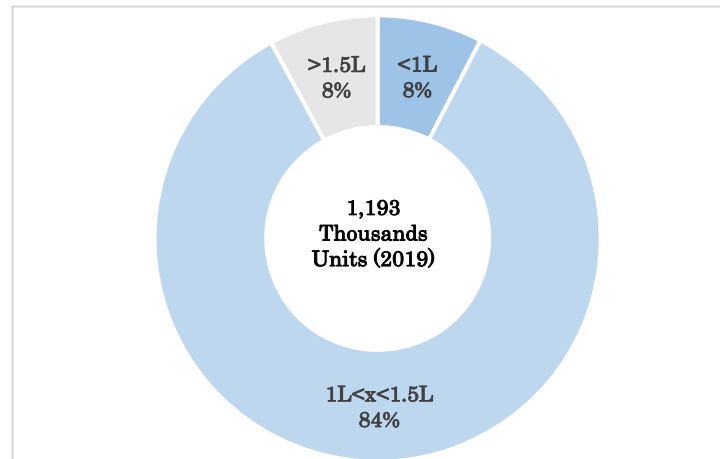
Source: Compiled by JICA Experts Team based on IHS data

**Figure 1.2.4 Engine Projection Volume by Fuel Type(2019)**

**Table 1.2.2 Potentials of Indonesia ICE**

- While developed countries are heading to xEV, etc., internal combustion engines are still main in emerging countries. Especially in Africa and elsewhere, demand for cars like Indonesia's Kijang Innova and Avanza will continue.
- If Thailand will not make diesel engines in the future due to the tightening of regulations, it can be consolidated in Indonesia. Even if it will be hard to use internal combustion engines for new vehicles in the future, existing vehicles on the road will continue to use internal combustion engines, therefore after-parts will still be in demand.
- Indonesia should continue to make parts related to internal combustion engines, aiming to gain “Last Survivor Profit”.

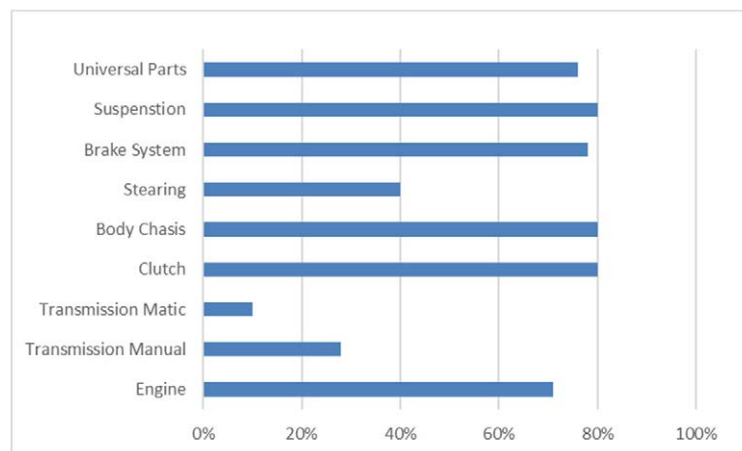
Source: Interview from former executive form Toyota Astra Motor(March, 2020)



Source: Compiled by JICA Experts Team based on IHS data

**Figure 1.2.5 Indonesia Engine Production by Engine Displacement (2019)**

As shown in the above figure, Indonesia has a high production ratio of over 80% of small gasoline engines for small cars under 1500cc, resulting to development of vertical division of labor; viz. material processing → component processing → component assembly<sup>9</sup>. It is desirable to utilize the existing industrial agglomeration of ICEs to meet growing demand for down-sizing engines and the smaller Range Extender engines<sup>10</sup> used in cars like Nissan Note.



Source: JICA Experts Team

**Figure 1.2.6 Localization of Major Autoparts of LCGC**

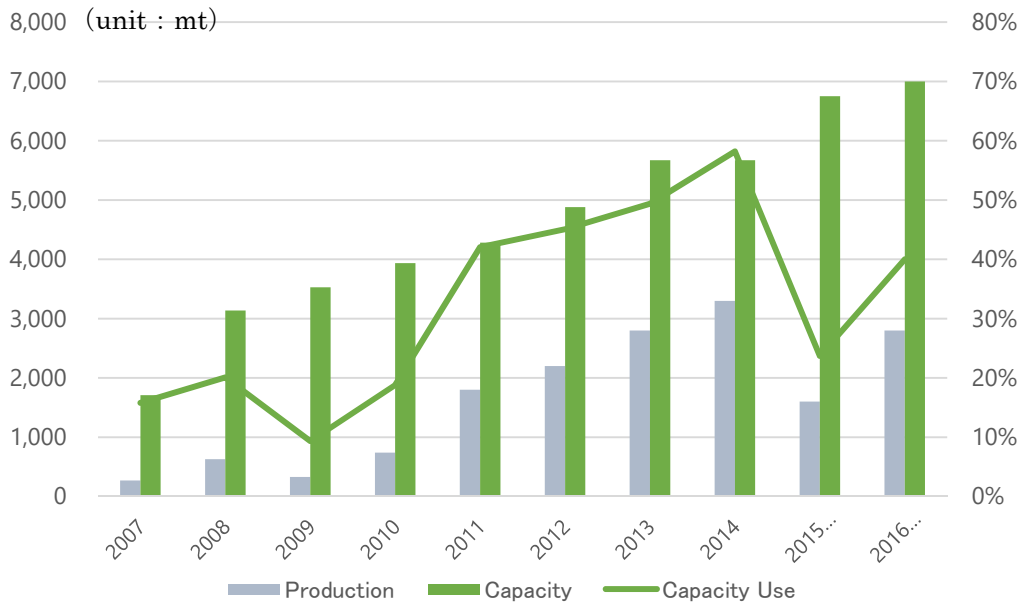
<sup>9</sup> The following two points can be cited as the background to the progress of engine localization. 1) In the framework of the BBC scheme (Brand to Brand Complementation) for the purpose of complementing parts in ASEAN in the latter half of the 1980s, Indonesia is becoming a production base within the region of gasoline engines such as "Toyota Kijang" and 5C. (Cylinder block, cylinder head, crankshaft, camshaft, connecting rod) etc. were localized. 2) LCGC, launched after 2015 made it compulsory to localize of 92 parts including engine parts (25 parts) and transmission parts (5 parts), resulting to advancement of local production of engines for small cars.

<sup>10</sup> In Range Extender, engine is not driven directly, but it is used as a generator to charge the battery, so a small engine becomes the mainstream.

In addition, as mentioned above in the technology roadmap of the Ministry of Industry, downsizing technology is important for internal combustion engines in order to comply with the stricter fuel consumption and Co<sub>2</sub> emission regulations. In order to meet the standard of CO<sub>2</sub> emission of 100g / km or less for Thai eco-cars, "Honda City" changed the 1500cc class 4-cylinder gasoline engine to 1200cc direct injection 3-cylinder engine for the new model. In order for Indonesia to become the base for downsizing engines, the country needs to face challenge of localization of technologies such as turbo charger, highly accurate fuel injection system (injectors, pumps), and EGR coolers, which are still highly dependent on imports.

## **2) Bio-Flex Engine Vehicle**

Indonesia has introduced CPO-derived biodiesel B20 from 2018 and decided to introduce B30 from January 2020 to promote diesel with the highest bioconcentration in the world. This is due to the fact that Indonesia is the largest CPO producer in the world, but the demand cannot keep up with the year-on-year increase in supply as shown in the figure below, viz. for the supply side, an accumulative inventory buildup and a drop in CPO market prices are observed. Similarly, B20 is planned in Thailand and Malaysia, which are CPO producing countries. As for Malaysia, which is the second largest producer of CPO though, the biodiesel market is limited as its automobile market is only about 600,000 units, of which most of them are consisted of gasolines engines. As for Thailand, which is the third largest producer in the world, despite being the largest producer of diesel vehicles in the region, the country can achieve limited level of biofuel due to supply constraint of CPO; B10 is now used in the market and only up to B20 will be available in the future. Therefore, Indonesia is expected to lead the way not only in terms of production of biodiesel but also in the development and commercialization of high-concentration fuel. Production volume of medium-sized or smaller trucks with GVW of over 10 ton to 24 ton is the largest in the region, standing at 80,000 to 100,000 units, and these types of diesel trucks can expect high potential domestic market. Moreover, a promotion of replacement of diesel with biofuels will make significant contributions to Indonesia government effort to reduce imports of crude oil and refined petroleum products, which has been prioritized policy since the 2000s. Given the market potential and policy needs described above, Indonesia can become a base for development and adaptation of high-concentration biofuel processing technology and biofuel-compatible diesel engine trucks.



Source: Association of Biofuel Producer Indonesia (APROBI)

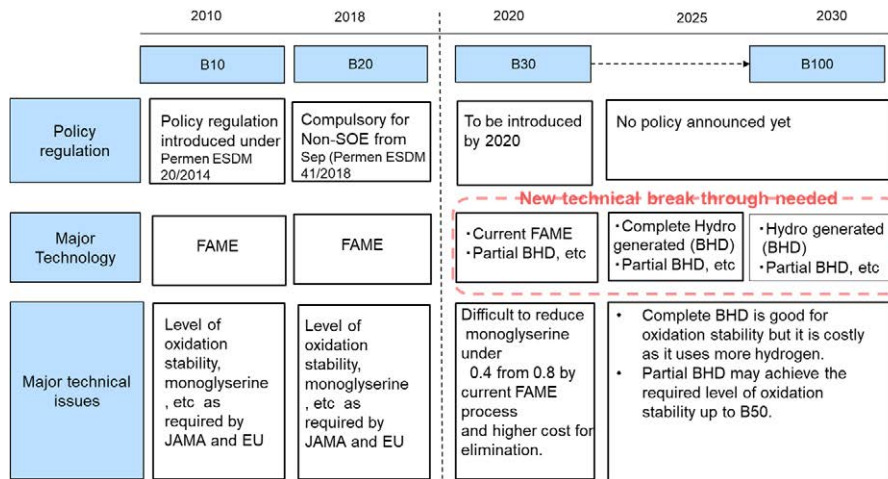
**Figure 1.2.7 Production volume of Biodiesel in Indonesia**

However, there are a number of issues in penetration and promotion of biofuels. Firstly, there are persistent criticisms especially from EU that palm plantation, which is the raw material of CPO, has led to the increase of Co2 emission by destruction of tropical rainforests and the removal of peat. This lead EU to plan on CPO import ban. Therefore, it can be said that consideration of impact on the ecosystem remains as a pending issue. Secondly, as shown in the biofuel technology roadmap below, FAME (Fatty acid methyl ester), which is an existing biofuel processing method, may not meet higher standard of oxidative stability and impurities such as monoglyceride as its concentration increases. To cope with this issue, new processing technologies such as partial hydrogenolysis (H-FAME) and complete hydrogenolysis (BHD) will be required. Thirdly, there will be a big challenge arising from engine adaptation for high concentration biodiesel. While EURO 4 will be applied to diesel commercial vehicles from 2021, changed from current emission standard of EURO 2, nozzles for EURO 4 compliant engines will not be compatible with impurities derived from high-concentration biofuels of B20 or more. This will impose higher technical hurdle for engine adaptation<sup>11</sup>.

From the above issues, if Indonesia strives to promote Bio-Flex engine vehicles, collaboration among government, industry and research institutes are desirable in the area of standardization of resources and fuels as well as in technical adaptation from engine side.

<sup>11</sup> Interviewed from DENSO International Asia Thailand (Mar. 2020)



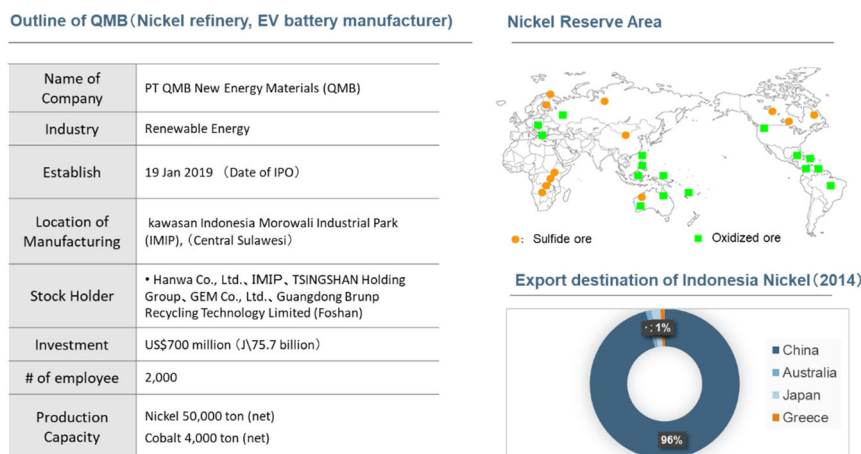


Source: JICA Experts Team

Figure 1.2.8 Roadmap of Biofuel and Issues

(2) Potentials of xEV

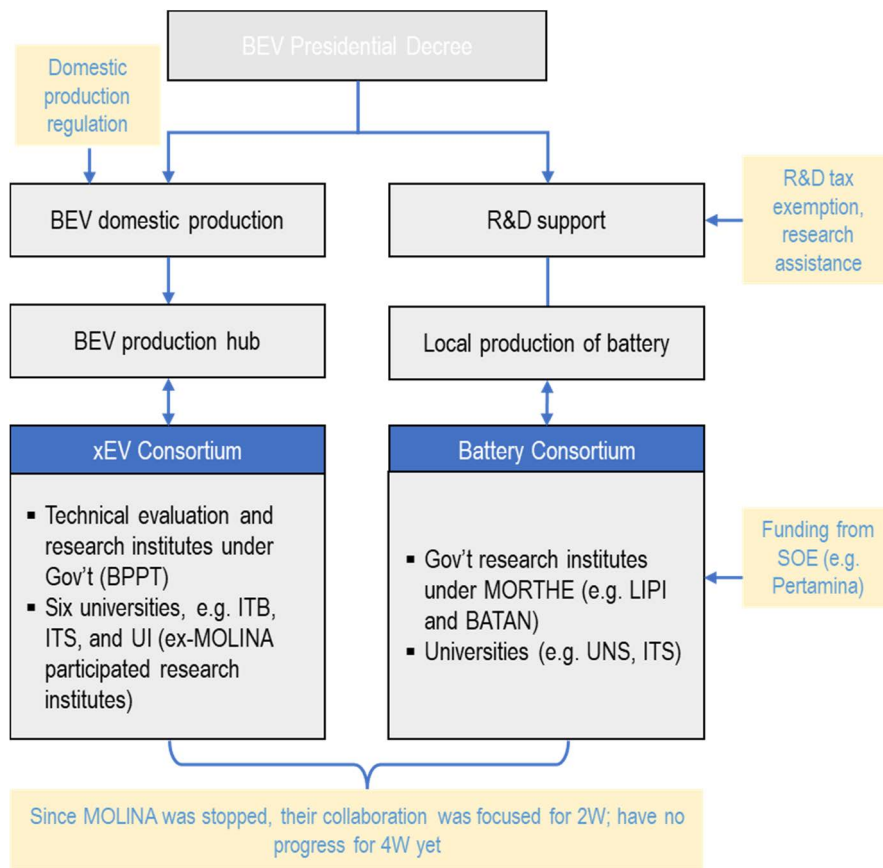
Indonesia xEV policy emphasizes the domestic production of lithium-ion batteries (LiB). Presidential Decree 55/2019 was issued in August 2019. It describes strengthening cooperation between ministries and agencies, industry-academia-government, and promoting domestic production and diffusion of BEV. Indonesia is a resource nation of nickel and cobalt, those are rare metals used for the material of the cathode material of Li-B. The government aims to advance the industry by utilizing the resources. In other words, starting from material processing for Li-B (refining of materials such as nickel), mass production of Li-B cells and integrated production of Li-B packs are aimed. As a national project, the government has begun a smelting project in the southwestern part of Sulawesi. In this project, Tsingshan Holding Group, a mining big group in China, and a group company of CATL, the largest Li-B manufacturer in China, set up a smelting plant and will assemble batteries in the future.



Source: NNA, Jakarta Post

Figure 1.2.9 Outline of Morowali Li– B Localization Project

The Indonesian government has subsidized a battery consortium composed of national research institutes and universities to support research and development of Li-B cells and pilot production. Also, in the past, the government has launched the MOLINA (national BEV) project centered on 6 universities such as ITB and ITS. The government aims to mass-produce mobility (wheels, motorcycles, etc.) equipped with domestically produced Li-B in the future in cooperation with universities and private and state-owned enterprises. In order to support these trends, Presidential Decree 55/2019 has set a target of 80% localization of motorcycles by 2025 and of automobiles by 2030. As a domestic BEV project, GESIT(Private) and UNS are planning to produce motorcycles equipped with their original Li-B.



Source: JICA Study team

**Figure 1.2.10 Domestic BEV development system in Indonesia**

A stable and inexpensive supply of Li-B is essential for BEV production. Indonesia's Li-B domestic production policy will support the initial launch of BEV-related industries. On the other hand, major foreign OEMs have a basic policy of sizeable production volume and global optimum procurement of parts and units such as batteries. The high localization ratio mandated by the government is likely to limit the FDI of major foreign OEMs.

In order to evaluate the BEV market, it is important to develop the preconditions for the spread of BEV. The BEV Market Readiness Indexes are as follows; (1)Stable power supply, (2)Dissemination of infrastructure, (3)Transport environment where BEV is easy to use (congestion, park and ride facility, etc.), (4)Presence of high-income middle class who can purchase BEV.

In Indonesia, these four indexes are not high compared to neighboring countries. Therefore, it is necessary to prepare the conditions for the spread of BEV. Otherwise, the BEV market will not expand and BEV-related industries will not develop. Japanese manufacturers like Toyota think that it is better to start electrifying vehicles from HEVs in Asia, where there are fewer restrictions than BEVs and the industrial cluster of existing ICEs can be utilized.

### **1) Value chain in the supply chain**

Regarding the supply chain, the current status and issues of small gasoline engines, bio-flex engines, and xEV (especially Li-B) are summarized.

#### **(a) Small gasoline engines**

In order for Indonesia to maintain and improve its competitiveness in small gasoline engines, it is necessary to localize downsizing technology and build an optimal supply chain for downsizing key components. Key components include turbo, EGR coolers, injector for direct injection engines, high pressure supply pumps and ECUs. Many of these are not localized in Indonesia and supply chains are not established. It is necessary to work on the localization of materials in cooperation with suppliers in the ASEAN region and major producing countries.

#### **(b) Bio-flex engines,**

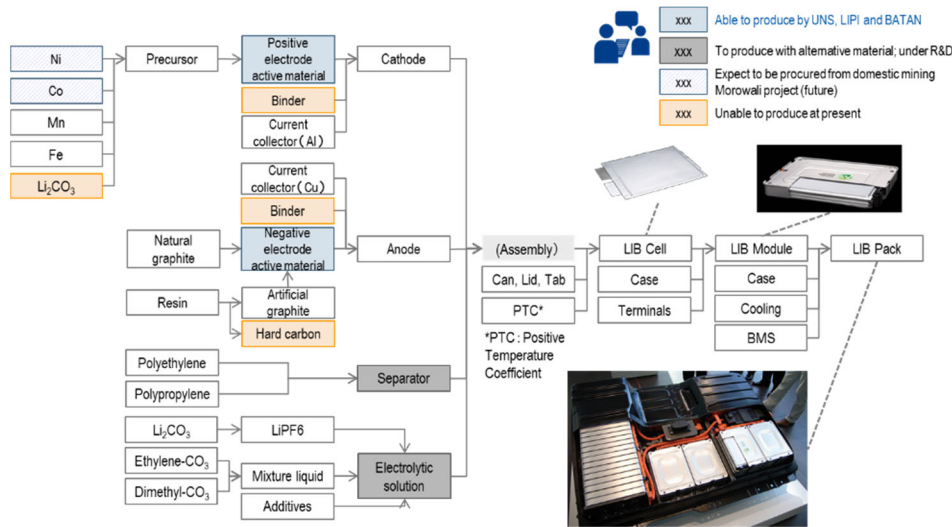
In order to enhance a base of bio-flex engines, it is necessary to develop and localize parts that are resistant to high-concentration biofuels and that also meet exhaust gas standards of EURO4 or higher. Key components include common rails, diesel fuel injection injectors, high pressure supply pumps, EGR coolers, ECUs, oxidation catalysts (DOC), etc. The main suppliers of these parts are many in Thailand at present. However, Thai suppliers are mainly for small engines such as pickups and SUVs, and few are for trucks with a GVW of 10 tons or more. Since there is no supply chain in ASEAN, it is desirable for Indonesia to strengthen its own development and local production system for parts that are compatible with high-concentration biofuels.

#### **(c) Li-B**

The Li-B supply chain is shown below. For Li-B production, Cathode, Anode, Separator, Electrolytic Solution, etc. are required. A former hearing survey with research institutions in Indonesia revealed that local production of Cathode is rather progressing. On the other hand, Separator and Electrolytic Solution seem to depend on imports for a while. Further, mass production of Li-B cells requires advanced automation and quality control technology. There are high technical hurdles for domestic battery manufacturers and for pilot production departments of research institutes. Global Li-B manufacturers

---

are being consolidated into several companies due to intensifying competition, and in order to mass-produce LiB in Indonesia, alliances with these global Li-B manufacturers and FDI are essential.

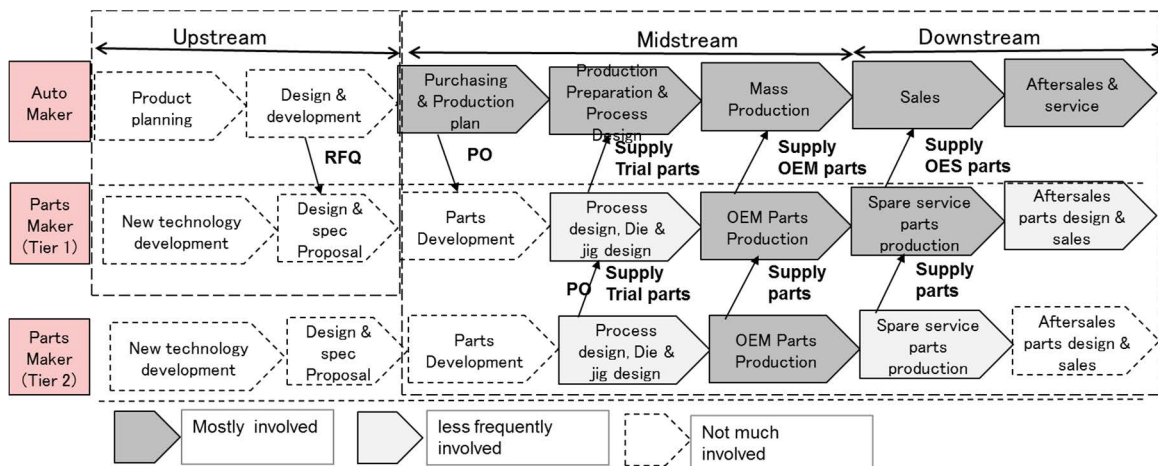


Source: NRI's compilation from Interview (LIPI)

Figure 1.2.11 Current status of the supply chain in Li-B

## 2) Challenges in the value chain

The following figure shows an overview of the current state of automobile VCs analyzed in the previous survey.



Source: JICA Study team

Figure 1.2.12 Value Chain of the auto industry in Indonesia

Indonesian vehicle VCs are missing the “Upstream and Midstream”. The Upstream in Indonesia is in primary stage because there is almost no R&D&D function. Some companies, such as Astra Daihatsu, have set up R&D&D centers. Most of these centers are positioned as satellite offices, and the main task is to localize parts, and the number of staff is less than 100.

The Midstream is also missing. Currently, changes in manufacturing and assembly processes for new models and big minor changes are being carried out mainly by the new model launch team dispatched from Japan and/or the Thai support team, which is the regional headquarters. The same applies to parts manufacturers (Tiers 1 and 2), and Kaizen activities can be implemented only for some Tier 1. The reasons are that there is little experience (there are few model changes so far), that old equipment and processes were used, lack of human resources involved in process design and Kaizen, and no policy support for capital investment, and so on. In developing the Industry 4.0 policy being promoted by the government, human resource development in the Midstream and corporate investment are essential.

The reasons why R&D&D and Midstreams do not progress in Indonesia are that there has been no incentive for R&D&D investment and human resource development until now, and there is no mechanism to promote industry-academia collaboration between higher education institutions and private companies. The “Considerable tax reduction measures for R&D&D and human resource development investment” of Decree No. 45 of 2019, which the JICA Study Team in the previous phase cooperated with, addressed such problems. However, there are challenges remained unsolved<sup>12</sup> such as low recognition by companies and the need to set detailed conditions. It is necessary to engage in activities such as attracting international road shows regarding the planned policies and launching industry-academia joint model projects.

**Table 1.2.3 R&D&D Incentive Scheme**

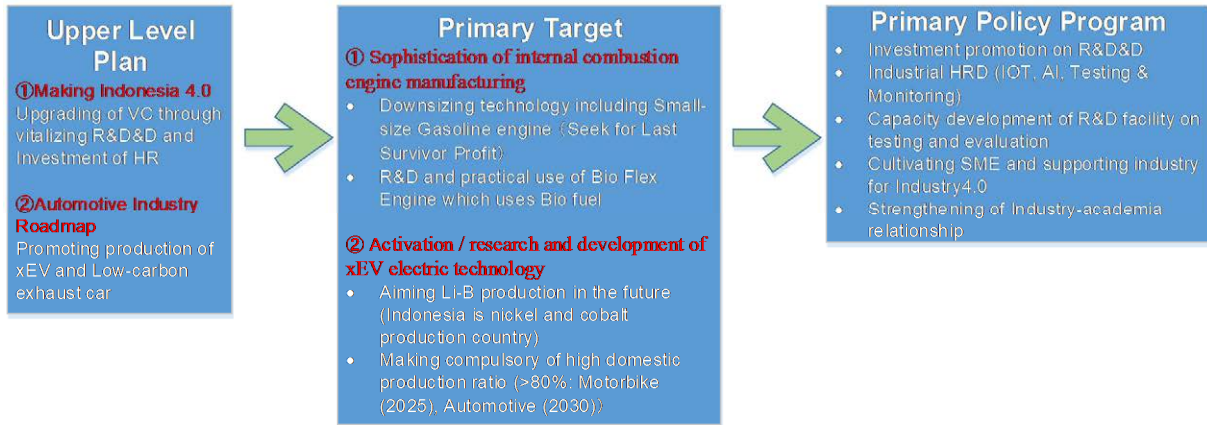
Item	R&D&D Incentive Scheme	
	MOI Draft (March 2018)	Final
Target	Domestic companies (except for Foreign companies)	Same as left
Deduction (Base)	100%	300%
Additional for obtaining Patent	+100%	-
Additional for Commercialization	+100%	-
Industry collaboration	-	Compulsory
Total(maximum deduction)	200%	300%
Period	1 year	5 years (100%×5 years)

Source : JICA Study Team

<sup>12</sup> As of Apt. 2020, PMK is not issued and the details are yet to be discussed.

### (3) Policy program in Indonesia

From the above analysis, the key policy programs for Indonesian automobile industry promotion are summarized as follows. These show the concept of policy programs in the "Indonesian automobile industry policy system" shown on the succeeding pages (refer to Figure 1.2.14).



Source: JICA Study team

**Figure 1.2.13 Priority policy program for Indonesian automobile industry promotion (draft)**

During the field survey, JICA Study Team will discuss with CPs and generate the direction regarding the future policy balances and schedules on 1) Sophistication of internal combustion engine manufacturing, 2) Activation and research and development of xEV electric technology, which are set as "Primary Target" above.

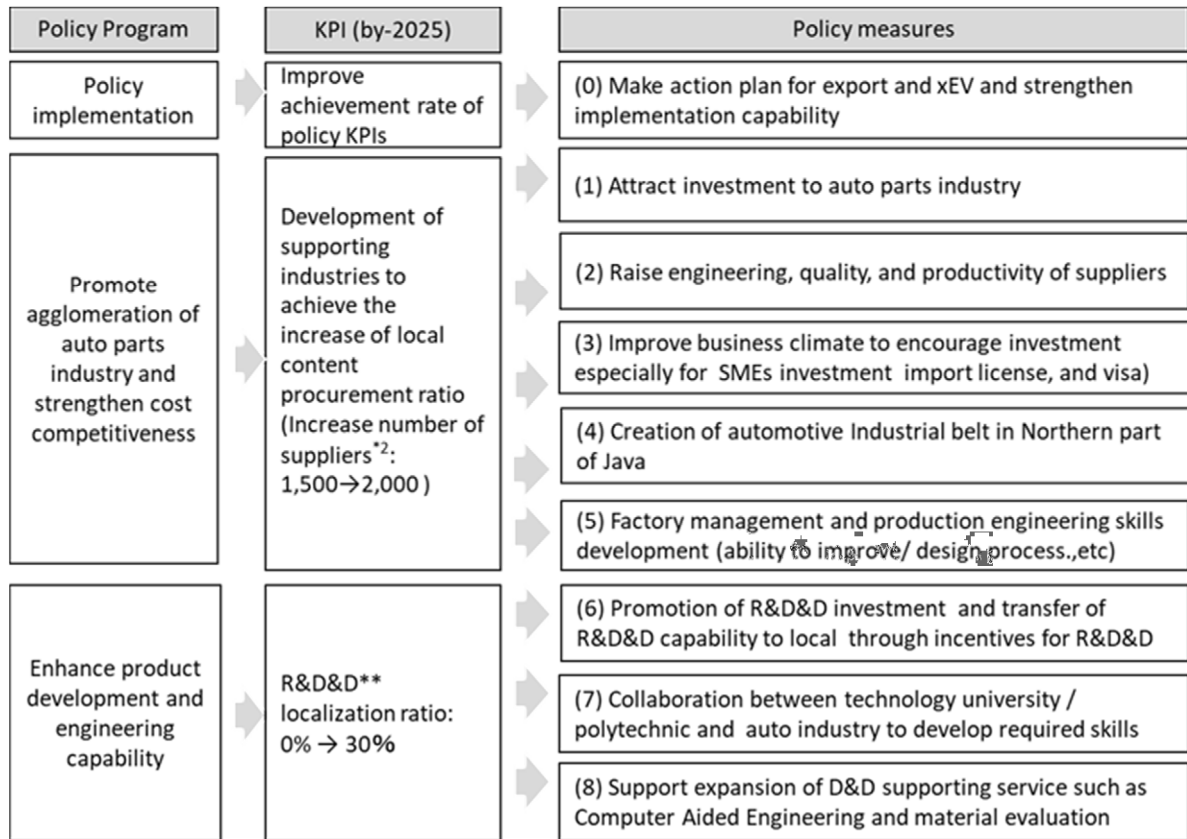
### **1.2.3 Assistance from Japan for the Indonesia Automotive Industry Development**

#### **(1) Basic Policies to support the Automotive Industry Roadmap**

This project aims to provide insights and suggestions for “the Automotive Industry Development Project” which is currently requested by the Indonesian government to the Japanese government, and to contribute to the continuous assistance from the Japanese government to the Indonesian government. The Automotive Industry Development Project is a technical cooperation to assist formulating policies based on the Automotive Industry Development Roadmap created by the Indonesian government. The major assistances of “the Automotive Industry Development Project” would include:

- Review of the existing policies related to the Automotive Industry Development (i.e. review and analyze data using global value chain analysis)
- Refine prioritized action plans linked with policies
- Provide capacity building trainings for planning, implementation, and managing programs
- Implement some pilot activities as advanced activities of prospective action plans

” Republic of Indonesia Data Collection Survey on Promotion for Globally Competitive Industry” conducted in 2019 (JICA) suggests the vision and policy system of the Indonesia automotive industry in 2025. The suggestions are consisted of the following 3 pillars, 1) Robust implementation of policies, 2) Enhance industrial agglomeration for auto-parts and cost competitiveness, 3) Improve capabilities of product development and engineering, and under the 3 pillars, investment promotions (e.g. attracting auto-parts companies and transferring R&D&D function), industrial human resources development (e.g. engineers for auto-parts and product design and development), enhancing exportation, and improvement of infrastructure (e.g. Java industrial belt) are suggested.



\*: Indonesia government issued these KPI.

\*\* : 1500 : according to GAIKINDO, 2000: number on par with Thailand which has around 2000 suppliers

Source: Republic of Indonesia Data Collection Survey on Promotion for Globally Competitive Industry, 2019, JICA

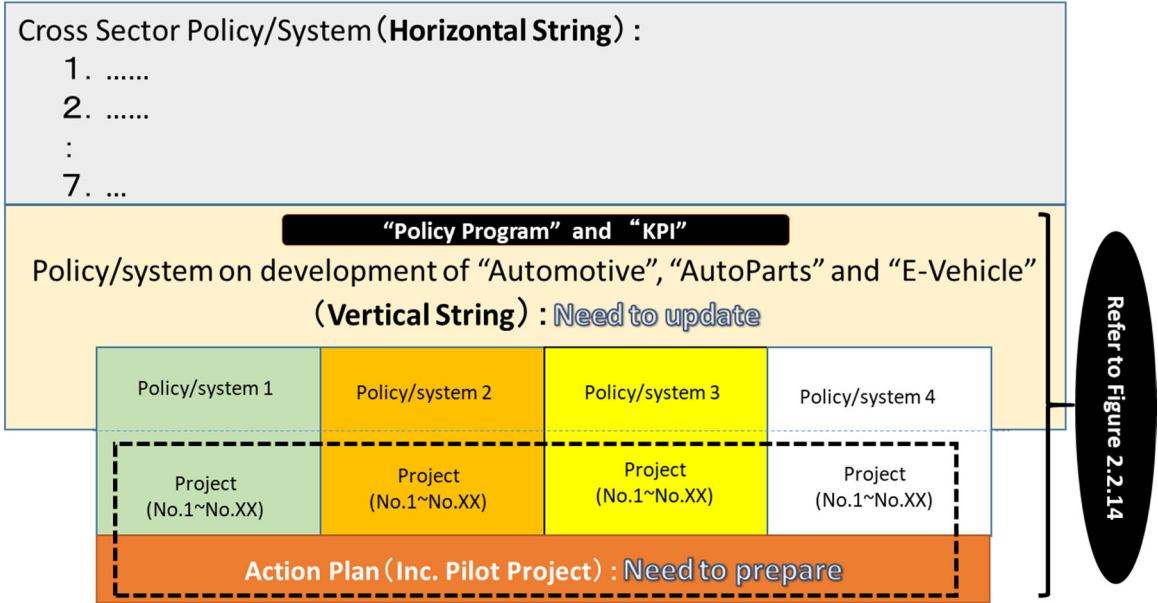
**Figure 1.2.14 Policy System for the Indonesia Automotive Industry Suggested by the JICA Project Team in 2019**

As of 2019 when the above policy system was suggested, the target growth rate of the automotive industry in 2020 was set as 6%, and the impact of the COVID-19 on the industry is not considered. This survey will carefully consider the impact of COVID-19 on the automotive industry by collecting data published by several institutions and economic trends and provide suggestions on the automotive industry roadmap to align with the post-COVID-19.

## (2) Action Plans Linked with Basic Policies

The policy shown in figure 2.2.14 is linked with individual action plan per area. Action plans will be developed and refined through data collection in Indonesia and discussion with the Indonesian government.





Source: JICA Study Team

**Figure 1.2.15 Structure of the Automotive Industry Development Plan**

The developed action plans will be further refined in the upcoming JICA project, “the Automotive Industry Development Plan”.

**(3) Pilot Activities as a Part of Action Plans**

The pilot activities, which form a part of Action Plan will be discussed in this project. The pilot activities shall be planned based on the needs of the Indonesian government and be aligned with the target areas of assistance by the Japanese government. The following candidate activities are currently proposed.

**Table 1.2.4 The Proposed Pilot Activities for “The Automotive Industry Development Project”**

Theme	Description	Details
Industrial Human Resources Development	Industrial Human Resources Development through industry-academia linkage	1. Enhance interaction between higher education institutions and the automotive industry <ul style="list-style-type: none"> <li>• Enhance courses for automotive-related topics (e.g. mechanical engineering, IoT/IT, and material engineering, etc.)</li> <li>• Organize events to linkage industry and academia (e.g. job fair, courses contributed by private companies)</li> <li>• Re-education of people in factories utilizing above mentioned activities.</li> </ul> 2. Human Resources Development for IoT/IT to realize Industry4.0

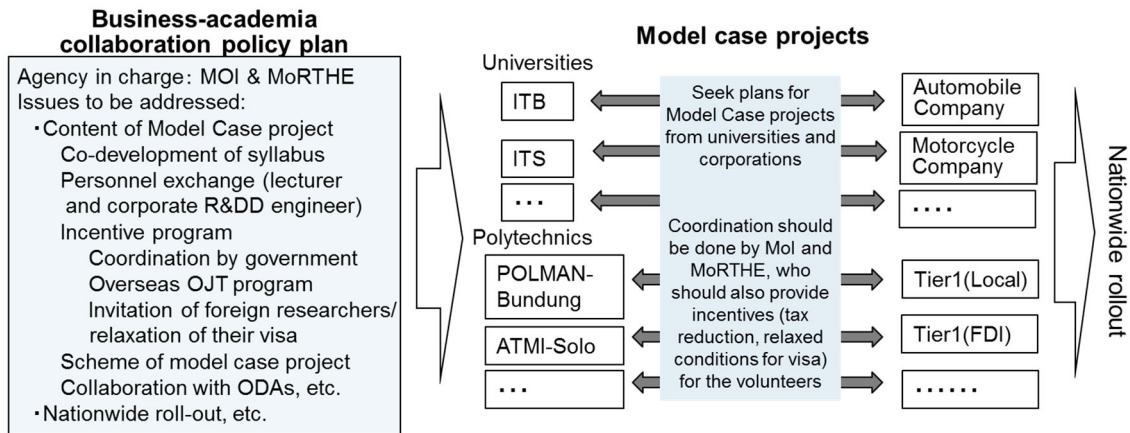
		<ul style="list-style-type: none"> <li>• Draft polytechnic curriculum for IoT/IT human resources development and streamline vocational training system conducted at private companies.</li> <li>• Strengthen capability of public training institutions (Balai Latihan Kerja: BLK) in industrial human resources development.</li> </ul> <p>3. Supports to enhance capability of testing centers for vehicles and auto-parts and to enhance human resources of institutions.</p> <ul style="list-style-type: none"> <li>• xEV, key components (battery, motor, etc.), biofuel/Flex engine pilot production, localization, improving testing items and capabilities of staff in the centers.</li> </ul>
Investment Promotion	Attract foreign companies	<p>1. Create promotion tools targeting CASE</p> <ul style="list-style-type: none"> <li>• Prepare investment promotion material for R&amp;D&amp;D, xEV related companies.</li> <li>• Select target companies using database for the automotive industry (MarkLines, etc.)</li> </ul> <p>2. Exclusive investment promotion for specific companies</p> <ul style="list-style-type: none"> <li>• Conduct an investment promotion event as a pilot activity collaborating with the embassy of Indonesia in Japan or other government agencies.</li> </ul>
Supporting Industry Development	<p>Capacity building on Kaizen consultation</p> <p>Organize information of local suppliers (Tier2-3)</p> <p>Financial Assistance</p>	<p>1. Provide Kaizen consultation as pilot activities</p> <ul style="list-style-type: none"> <li>• Capacity building on Kaizen consultation within SME development institutions (tentatively suggested)</li> <li>• Demonstrate on-site Kaizen consultation for local SMEs (5-6 companies)</li> </ul> <p>2. Develop SME profiling database</p> <ul style="list-style-type: none"> <li>• Capacity building on company profiling and managing database for the staff in MOI.</li> <li>• Information dissemination through website.</li> <li>• Assistance for reverse trade show</li> </ul> <p>3. SME financial program</p> <ul style="list-style-type: none"> <li>• Provide financial assistance managed by MOI and MOF for SMEs to support their innovation on process, products or service and inclusion in the global supply chain.</li> </ul>
Policy development/ Infrastructure development	Reviewed in the succeeding project	<p>1. Assistance in developing policies utilizing GVC analysis</p> <p>2. I-O Table Analysis related to infrastructure policies</p>

Source: JICA Study Team

#### (4) Industrial Human Resources Development as prospective pilot activities

Sequential assistance from development planning of the automotive industry to conducting pilot activities under Industrial Human Resources Development theme is one of the most effective assistance from JICA.

Pilot activities for Industrial Human Resources Development 1) Enhance interaction between higher education institutions and the automotive industry and 2) Human Resources Development for IoT/IT to realize Industry 4.0 will be planned based on the suggestions from the previous JICA project.



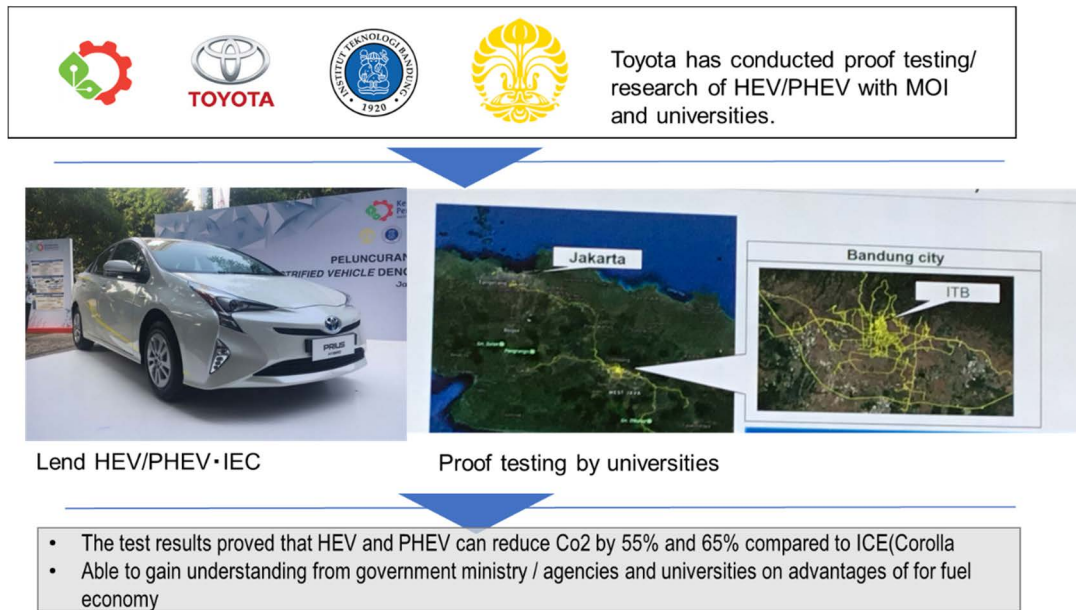
Source: JICA Study Team

**Figure 1.2.16 Image of Pilot Activities for Industry-Academia Linkage**

Pilot activities for Industrial Human Resources Development will be started with selecting 3 universities by competitive selection process, then implement industry-academia linkage programs such as exchanging students, faculties, and employees from private companies, and create practical curriculum aligned with industry needs. After evaluating effectiveness of the pilot activities, roll out the program to nationwide.

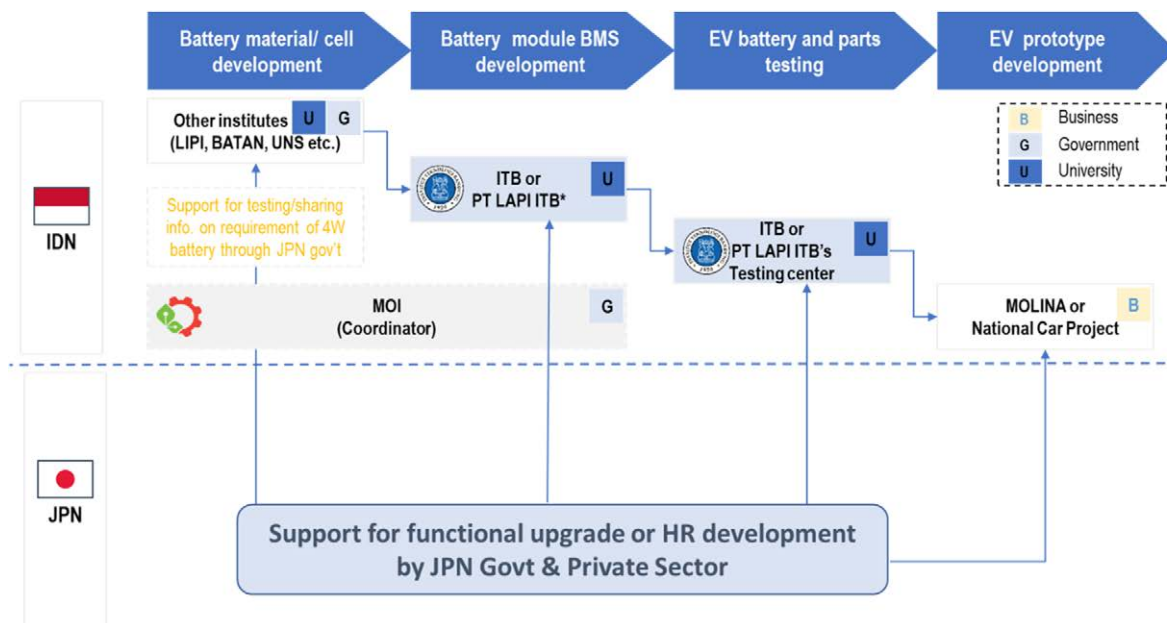
For supports to enhance capability of testing centers for vehicles and auto-parts and to improve human resources of institutions, building capabilities on R&D and testing functions for xEV and bioflex engine, and developing human resources to conduct R&D and tests in universities (ITB, ITS, UNS, etc.) and national research institutions or testing facilities (LIPI, BTAN, BPPT, etc.) are currently considered. These supports are based on the discussion in the previous JICA project where assistance needs on biodiesel pilot-scale production facilities and establishing xEV testing center planned by ITB<sup>13</sup>.

<sup>13</sup> Toyota participated the project of testing and evaluating the effects of CO<sub>2</sub> emission reduction by hybrid cars and plug-in hybrid vehicles. Participation to projects of testing and evaluation of xEV is getting attentions of Japanese OEM companies.



Source : JICA Study Team created from presentation by ITB at GAKINDO

**Figure 1.2.17 Project of Testing and Evaluation Of Hybrid/Plug-In Hybrid Vehicle Done by Toyota Motors and Universities**



Source : Created by JICA Study Team based on interviews with concerned institutions

**Figure 1.2.18 Image of The Collaboration for Testing and Evaluation of xEV and The Pilot Scale Production**

### 1.3 Recommendations

Recommendations result from the analysis previous chapter are summarized as follow. These recommendations are implemented in accordance with the policy structure showing in Figure 2.2.14.

Global Trend	Recommendations								
<p>a. Transformation to the New Automotive Industry Model (CASE) and its Market Size</p>	<p>China and Europe have declared the transformation of their auto production scenes from ICE vehicles to EVs with a target by 2040. In this global climate, the transformation of platform modules from drivetrain to motors will start forcing structural changes in the Indonesian parts industry by 2025 which is within the period of the automotive industry roadmap. Assuming these changes will take place in Indonesia beyond 2028, the project will identify preparatory processes in the transition of the auto parts industry. These will be recommended to be included in the Automotive Industry Roadmap.</p> <p>The main contents of the preparatory processes will be as follows.</p> <ul style="list-style-type: none"> <li>• Infrastructure development for CASE (especially domestic communication infrastructure)</li> <li>• Attraction of related investments</li> <li>• Foster human resources capable of responding to Internet of Things (IoT) and Artificial Intelligence (AI)</li> <li>• Identification and development of related domestic supporting industries</li> <li>• Institutional development for CASE</li> </ul>								
<p>b. Growth Demand Prospect for Vehicles using Driving System Other than ICEs</p>	<p>The mainstreaming of pure EVs, ones without internal combustion engines, requires considerable time and cost to develop charging facilities. The realistic first step is, as GAIKINDO Chairman Johannes Nangoi suggests, “to focus on specific geophysical areas such as Bali for intensive introduction of EVs or to use EVs as public transportation.”</p> <p>The move towards electrification is expected to lead to the modularization of vehicles. Heavy investments, which used to be required in the past for manufacturing parts such as engines and transmissions, will no longer be needed. In addition, it becomes possible to conduct assembly operations anywhere in the world where modules can be sourced. As a result, existing component manufacturers located in Indonesia will have to adjust their operations accordingly.</p> <p>At the time of preparing the inception report, the JICA Study Team considers that, among parts companies located in Indonesia, those in the segments summarized in the following table need to prepare measures to address electrification.</p> <p style="text-align: center;"><b>Same as Table 2.1.4 Companies Already Located in Indonesia that Need to Respond to Electrification of Drive units</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #d9ead3;">Segment</th> <th style="background-color: #d9ead3;">No.of Companies</th> <th style="background-color: #d9ead3;">Fields that Require Measures to Address Electrification</th> <th style="background-color: #d9ead3;">Main Companies</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">The information will be collected by field survey</td> </tr> </tbody> </table> <p>Source: JICA Study Team</p>	Segment	No.of Companies	Fields that Require Measures to Address Electrification	Main Companies	The information will be collected by field survey			
Segment	No.of Companies	Fields that Require Measures to Address Electrification	Main Companies						
The information will be collected by field survey									

	<p>The JICA Study Team plans to conduct interviews with these companies during the second field work period in Indonesia and gather information on company measures in response to the electrification of vehicles.</p>
<p>c. Impacts of Regulations for Greenhouse Gas Control</p>	<p>Judging from the progress in regulating greenhouse gas in Indonesia, there are two directions in promoting the Indonesian automotive industry in terms of green gas control.</p> <p>(a) The research and development on the technology for upgrading fatty acid methyl esters (FAME) should advance further. FAME is the main component of vegetable oil whose market needs has been increasing as biofuel. The technology for producing higher quality FAME (H-FAME) entails the removal of toxic components from FAME through partial hydrogenation under mild reaction conditions and the improvement of its oxidation and thermal stability. The goals of this technological advancement are to reduce the production cost of biofuel and improve its quality. This requires government initiatives in promoting industry-academia collaboration.</p> <p>(b) There should be a stronger linkage between controlling the supply of biofuel and agricultural policies in Indonesia. In Thailand, the introduction of the its government policy on promoting biodiesel created positive effects on its agricultural sector. Through this policy, the price of palm oil used in producing palm oil-based biodiesel has been stabilized. However, this became possible since palm oil production in Thailand was originally for domestic use. Meanwhile, palm oil is one of the main export products of Indonesia. When the price of palm oil for automobile fuel rises, there needs to be a greater coordination of supply between domestic and export use.</p>
<p>d. Utilizing the Potentials of Existing Automotive Supply and Value Chains</p>	<p>Strengthening the existing supply and value chains of ICE vehicles is an essential preparatory activity to realize the future supply and value chains as described above. Assuming that the industrial transition will occur by 2028, Indonesia should aim to achieve a fully integrated or full-set supply chain and attract companies that can bring in planning and development functions in the upstream portion of the smile curve of the value chain by then.</p> <p>The point of the supply and value chain-based strategy is to attract segments of the supply and value chains that do not exist domestically in order to realize the full-set chains.</p> <p>The goal of analyzing the value chain is to get the planning portion, the upper portion of the smile curve, and the detailed design portion localized in Indonesia. These are the core portions of car manufacturing function that were previously performed at the OEM headquarters. In order to realize this, it is necessary to strengthen the R&amp;D&amp;D function in the country. The following are examples of specific measures:</p> <ul style="list-style-type: none"> <li>• Consider incentives to attract R&amp;D functions of component manufacturers</li> <li>• Develop R&amp;D&amp;D human resources through industry-academia collaboration especially in the improvement of design ability</li> </ul>

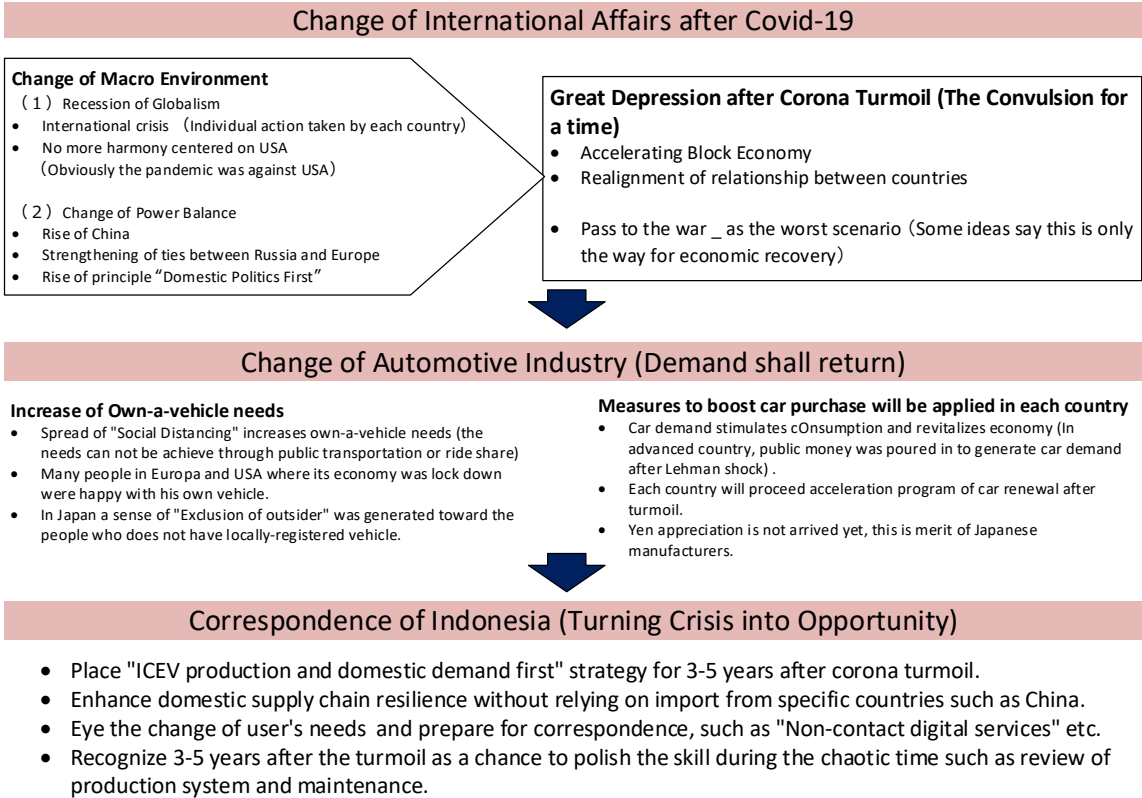
	<ul style="list-style-type: none"> <li>Expand the base pool of human resources through improving the quality of higher education</li> </ul>
<p>e. Production, Sales and Use of Automobiles Utilizing Next-Generation Technologies (e.g. IoT, AI, and Robotics)</p>	<p>The ideal scenarios in anticipation of the technological changes are the following: expand the IT technician base with basic IT knowledge; employ IT technicians in related industries in Indonesia; IT technicians who have had in-house training to start designing powertrain-related parts, and; newly trained human resources / personnel design connected and telematic parts. In this regard, Japan has an abundance of experience in providing technical assistance. Human resource development activities may be considered as a pilot activity in this project. In order to actualize these situations, the following items will be reviewed:</p> <ul style="list-style-type: none"> <li>Current situation surrounding the human resource development in the IT field in higher education institutions</li> <li>Measures to assess the scale of IT labor pool in Indonesia</li> <li>Possibility of industry-academia collaboration</li> <li>Pilot activities to be supported by Japan</li> </ul> <p>In order to make Making Indonesia 4.0 compatible with the higher-level Industry 4.0, new entities such as the Strategic Innovation Promotion Program (SIP) and the Indonesia Council for Science, Technology and Innovation (I-CSTI) under SIP may need to be established in order to realize science and technology innovations. In particular, I-CSTI should function as a control tower or steering committee and play a lead role in managing cross-sectional issues that go beyond mandates of individual government organizations. The JETRO, the Japanese Chamber of Commerce and Industry (JCCI), Japanese manufacturing companies in Indonesia and JICA can provide the necessary support in the establishment and operation of I-CSTI.</p>
<p>f. Automotive Industry Upgrading and Growth in the Local Procurement Ratio</p>	<p>Given how companies involved in automobile manufacturing perceive industry upgrading as showing above a ~ e, the policy direction of the Indonesian Government should focus on how to involve local companies in the domestic procurement processes of foreign subsidiaries in the country. In Indonesia, the target of the policy should be the materials segment given as it is comparatively superior to its counterparts in third countries, and the local companies that belong to Tier 3 or lower. Materials that hold a high potential for the automotive industry development in Indonesia are iron, plastic raw materials, energy (electric power), and biofuels. Lithium batteries for EVs also have the potential to contribute to the industry upgrading in the xEV era if Indonesia can produce raw materials such as lithium and cobalt even in small amounts and partner with promising companies at an early stage.</p> <p>Therefore, the following policies should be promoted. In addition, concrete action plans will be discussed and developed during project implementation.</p> <ul style="list-style-type: none"> <li>Nurturing of the material industry with a focus on Tier 2 and Tier 3 companies (human resource development, technology transfer, SME finance, etc.)</li> <li>Deliberation of investment incentives for the material industry</li> </ul>



g. Expansion of Exports to Neighboring Countries	<ul style="list-style-type: none"> <li>• <b>Linkage with agricultural policies</b></li> </ul> <p>It is assumed that following policies will be implemented;</p> <ul style="list-style-type: none"> <li>• SUV exports to ASEAN countries such as Thailand, Philippines and Vietnam should remain strong.</li> <li>• The competition on small car exports is fierce. If Indonesia were to expand the exports of this segment, it could introduce environment-friendly cars that can compete in the market.</li> <li>• The possibility of expanding the exports of public transport vehicles to the Pacific island nations should be explored (about 30,000 can be added).</li> <li>• The possibility of exporting high-quality cars to Japan and China should be explored.</li> </ul> <p>Japanese automotive manufacturers operating in Indonesia cannot generate profit if it is only focused on the sales of a single country. It is also important that the Indonesian Government works with other governments to align policies and facilitate the creation of the new divisions of labor in the region. In order to achieve global competitiveness, it is also necessary to pursue a region-wide strategy that will utilize not only suppliers from the ASEAN region or neighboring countries but also suppliers from countries that offer low material costs such as India and China.</p>
--	---

Source: JICA Study Team

The road map of automotive development and its related policies should be reviewed due to outbreak of COVID-19 around the world. The longer this incident lasts, the more the damage to economic activities are exponentially expanded. Automotive industry is expected to face with the paradigm shift; some experts argue that bloc economy will be formulated after converging COVID-19. Therefore, the strategy of export expansion remains to be reconsidered. This study basically assumes that automotive industry positively in the medium and long term as showing below.

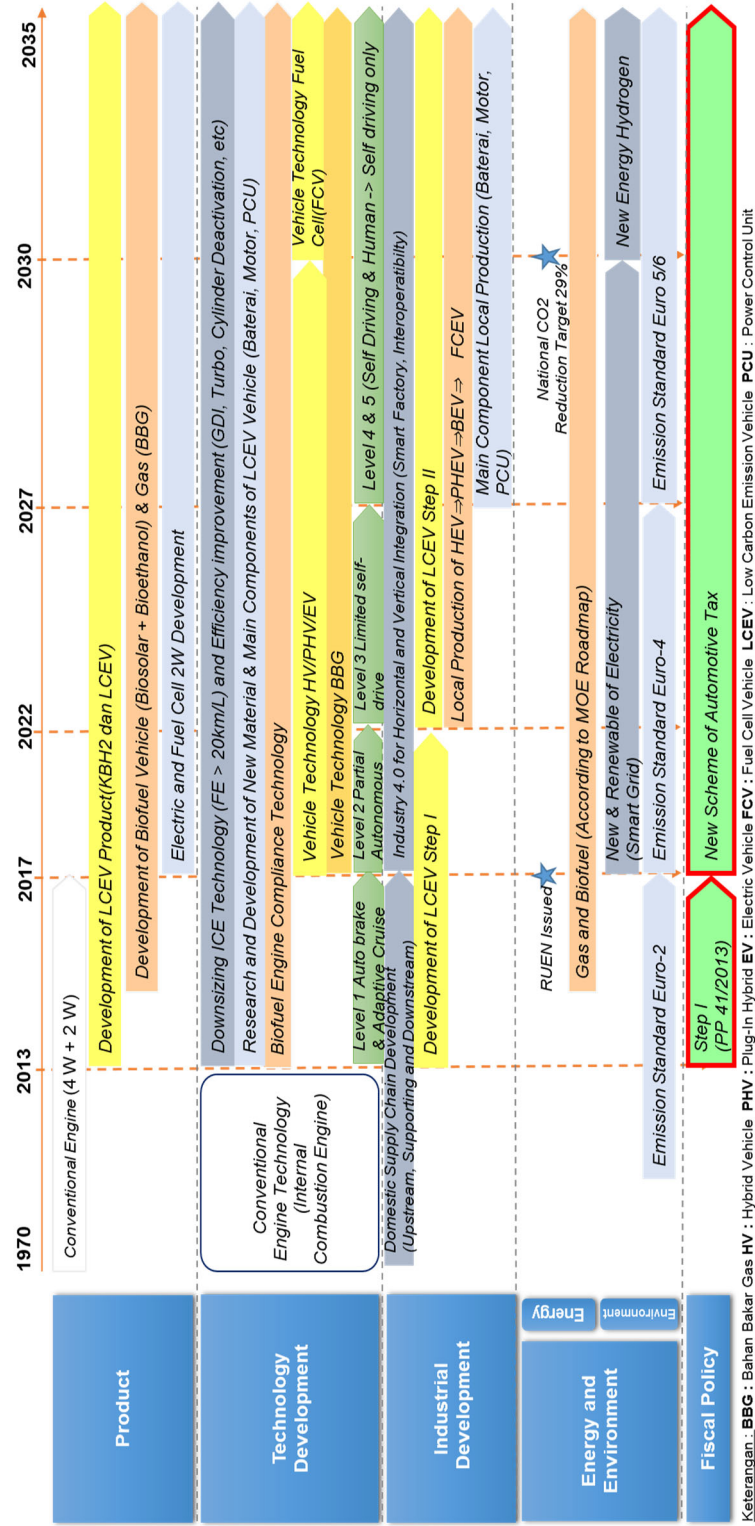


Source: JICA Study Team

**Figure 1.3.1 Change of Economic Climate after COVID-19 and its Effect to Develop Road Map**

## APPENDIX 2. ROAD MAP FOR DEVELOPMENT OF AUTOMOTIVE INDUSTRY 2019 - 2035

### 2.1 Road Map of Development of Automotive Industry



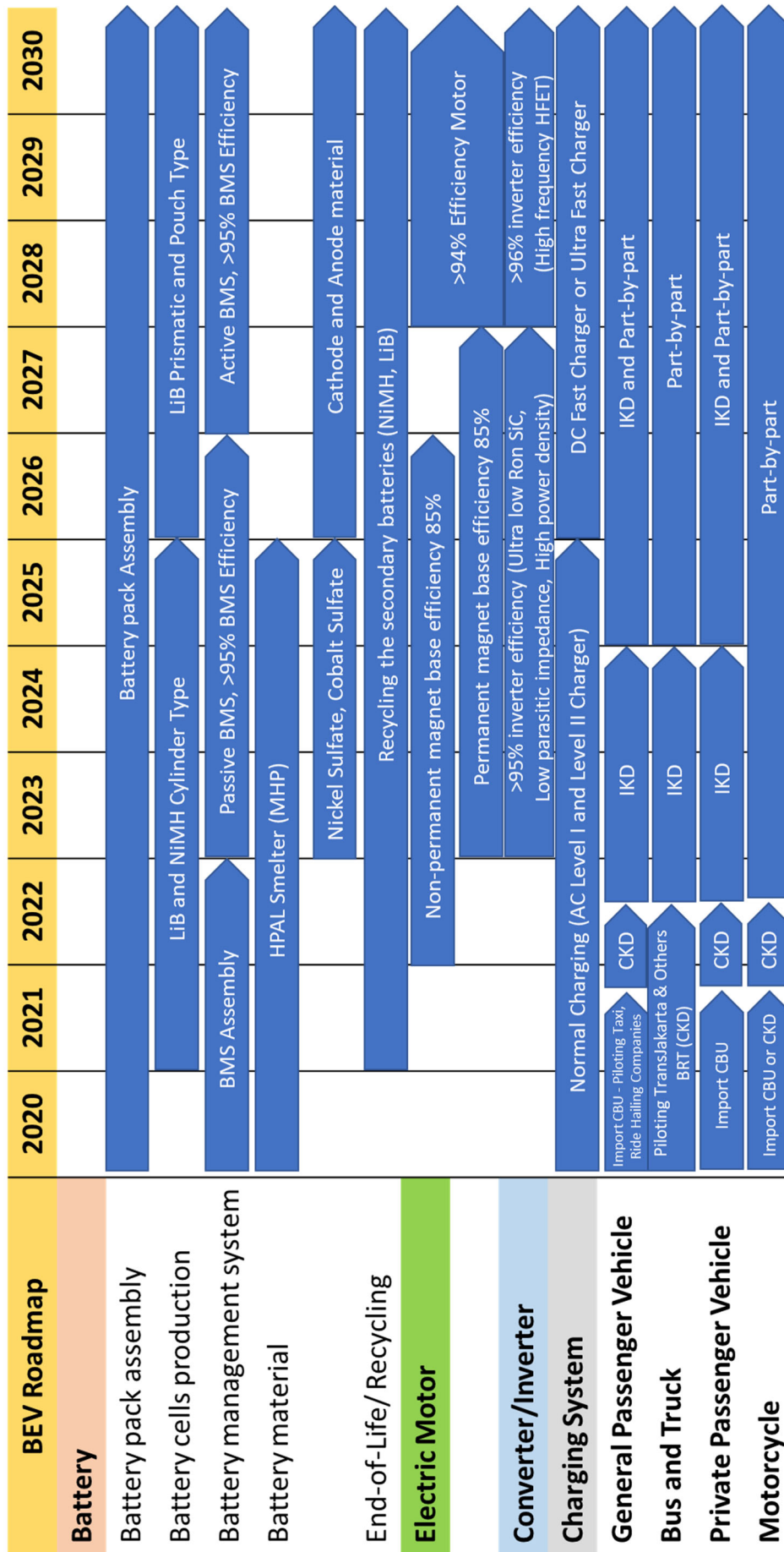
## 2.2 Qualitative target of Development of Automotive Industry

ITEM		2020	2025	2030	2035
MOTOR VEHICLE	Total (unit)	1.500.000	2.000.000	3.000.000	4.000.000
	Percentage LCEV(%)	10	20	25	30
	Percentage LCGC (%)	25	20	20	20
	Total (unit)	1.250.000	1.690.000	2.100.000	2.500.000
	Sales				
	Export	250.000	310.000	900.000	1.500.000
MOTOR CYCLE	Total (unit)	7.500.000	8.800.000	9.800.000	10.750.000
	Percentage Electric Motorcycle (%)	10	20	25	30
	Total (unit)	6.750.000	7.700.000	8.400.000	9.000.000
	Total (unit)	750.000	1.100.000	1.400.000	1.750.000
	Sales				
	Export				

### 2.3 Road Map of the Development of the Battery-Based Electric Motor Vehicle Industry 2020-2030



## 2.4 Road Map of the KBL Industry Based on Batteries, Main Components, and Chargers



## 2.5 Policy and Strategy

No.	Policy and Strategy	2020-2021	2022-2025	2026-2030	Responsible Agency
1.	Electric-Based Vehicle (KBL) domestic market development - Demand Side (Short and Medium Enterprises)				
	The creation of a domestic market through: Pilot Project of Electric-Based Vehicle (KBL) for comprehensive studies, mandatory use of Electric-Based Vehicle (KBL) in Min of Industry, State Owned Enterprises and public transportation, formation of special Electric-Based Vehicle (KBL) zoning, encouraging the use of Electric-Based Vehicle (KBL) on 3T islands ( <i>tertinggal, terdepan dan terluar</i> <sup>14</sup> ) along with power plants with EBT, and massive socialization to the community				Min of Industry, of Transportation, Min of State Owned Enterprises, Min of Home Affairs, Local government
	A. Implement fiscal and non-fiscal incentive schemes				Min of Finance, Min of Home Affairs, Local government
	C. Speed up the availability of the charging station				Min of Energy and Mineral Resources, Min of State Owned Enterprises
2.	Development of the domestic Electric-Based Vehicle (KBL) market - Demand Side (Long Term)				
	A. Enforcement of mandatory use of Electric-Based Vehicle (KBL) as a whole				Min of Transportation
	B. Extending the Electric-Based Vehicle (KBL) special zone throughout the Republic of Indonesia				Min of Tourism and Creative Economy

<sup>14</sup> *Tertinggal*: left behind, *terdepan*: foremost, *dan terluar*: outermost



	C.	Extending FTAs with Electric-Based Vehicle (KBL) export destination countries				Min of Foreign Affairs
		Industrial Development - Supply Side (Medium Long Term)				
3.	A.	Production of Electric-Based Vehicle (KBL) R4 or more through the CKD, IKD and Part by Part schemes				Min of Industry
	B.	Production of Electric-Based Vehicle (KBL) R2 through the CKD and Part by Part schemes				Min of Industry
	C.	Production of the charging station through the CKD and Part by Part scheme				Min of Energy and Mineral Resources
	D.	Build raw material and component industry				Min of Industry
		Technology Development				
4.	A.	Battery Cell and Pack by providing incentives for producers of lithium battery and start production of Non Lithium Based & Lithium Based Battery 2nd Generation				BKPM, Min of Finance, Min of Industry
	B.	Battery Management System (BMS) - Developed passive BMS, efficiency > 90%, and active BMS efficiency > 95%				Min of Industry
	C.	Raw materials for batteries through restrictions on the export of raw materials, construction of processing plants and production of raw materials for batteries (NMMH, Pure Ni, Pure Co, Ni Sulfate, Cobalt Sulfate)				Min of Trade
	D.	End of life of the battery				Min of Industry, Min of Environment and Forestry
	E.	Electric Motor (permanent and non-permanent based)				Min of Industry

## **APPENDIX 3. SUMMARY OF INTERVIEW RESULT**

---

JICA study team conducted intensive interview survey to automotive related companies in Indonesia to identify the impact of COVID-19 on automotive industries and forecast how and when they revive their business. The following table summarize the result of interview surveys.

Table 2.5.1 Summary of interview result

	Former OEM R&D Head	OEM Adviser	University Professor for Automotive Industry Development	Motorcycle Manufacturer	OEM R&D Center	Japanese Private Bank	Japanese OEM	Tier 2 Chemical Material Manufacturer	Tier 1 Parts Manufacturer	Indonesian OEM	Tier 2 Die, Press Stamping Company	Tier 1 Factory Manager	
Response to COVID-19		Possibility of lowering investment priorities for Indonesia	Long term recovery plan is needed.	Immediate recovery of auto finance sector is necessary. Lifting restrictions on Japanese technicians visiting Indonesia for factory upgrading is much awaited. Boosting domestic purchasing power of informal sector by providing assistances	Recovery of the automotive industry within 2020 is pessimistic, will be delayed compared to other ASEAN countries.	Additional investments in equipment or facilities of car model change are mostly suspended. Financial crisis worse than 1997 Asian Financial Crisis or the 2008 Financial Crisis is will be further delayed. (1 year delay) Autoprotective demand will come back after the recovery of auto-loan finance companies. Indonesia for factory upgrading is much awaited.	Expect recovery of domestic market in 3Q or 4Q 2020. Depends on the 2nd wave of COVID-19 spread, recovery will be further delayed. (1 year delay) Lifting restrictions on Japanese technicians visiting Indonesia for factory upgrading is much awaited.	Expect stimulation plan for the domestic automotive market.	The total car sales in 2020 will be up to 65-70% of 2019. Demand from domestic market will not recover soon, exports shall be focused instead. CASE will be accelerated.	Expect recovery of production in the 3Q of 2020 onwards. Stimulating domestic consumption is needed. Optimistic forecast should be announced.	Tier 2 Die, Press Stamping Company	Factory automation will be accelerated. There will be a decreasing trend in increasing employments.	
Automotive Industry Roadmap (Policy)	Accelerating EV promotion is not the right idea in post COVID-19. Accelerate implementing Euro4&5 for ICEV	Continue targeting customers who will buy ICEV. Direction of Indonesia government is the key for OEM's business.	ICEV will continue for the next 10 years. Clear direction on developing the automotive industry announced by the Indonesia government is awaited.		Prioritize ICEV until 2030. Development of engines comparable with biofuels shall be proceeded. Becoming the export hub will be difficult if an industry protection policy is prioritized.	There is not much impact even if it's announced this year.	Continue investing in the factory in Indonesia to become a hub for export. Infrastructure shall be developed to increase car sales.	To improve engineering skills of Indonesian employees, training by the Japanese exports are necessary. Hybrid cars will be needed during the transition from ICEV to BEV.	Demand for CEV will continue to grow. Development of the auto-parts suppliers supporting industry is important. The supply chain which can be completed within the country shall be established. Government shall collaborate to develop robust automotive industry.			Production capability in Vietnam or Philippines is advanced in terms of manufacturing functional auto-parts.	
(R&D)		Transferring R&D&D function to Indonesia from Japan HQ is difficult.			Academe-industry collaboration in process engineering could be realized.								
(Manufacturing EV Battery)	Manufacturing EV batteries in Indonesia is not a good direction for Indonesia. Enhancing auto-parts manufacturing and infrastructure development shall be prioritized.				If there is no market, mass production will not be realized. China still leads the market, but Indonesia has potentials. The government of Indonesia shall be more active in formulating testing and accreditation standards. A study for EV promotion based on the regional needs shall be conducted.								
(Promoting EV)	Infrastructure development aligned with the automotive industry is needed to increase domestic demand.						To promote EV infrastructure development is a must. Decreasing taxes (VAT, regional tax, etc.) and easing car importation are necessary.		Policy or program to provide assistances that anyone can purchase cars is needed to stimulate domestic market.				
(Export promotion / Investment promotion)	Exporting automotive parts is difficult to become the auto-hub if exporting products are only MPV or SUV. Balance in exporting volume of auto-parts and Indonesia shall be considered.					Investments in manufacturing sector are already peaked out. Review of investment promotion plan is needed.	Being cost competitive is a key for Indonesia (e.g utility cost, labor cost, raw material cost). Currently the wage increase is drastic (will be less competitive.) Reducing bases for suppliers is appreciated.		Incentive for export companies should be considered. Convenience for existing investors shall be prioritized.				
Assistances from Japan		Supports in ICEV R&D are needed to promote EV development.	Providing training program in Japan is better than providing assistances for R&D or EV promotion in Indonesia.		Training in Japan program will contribute to mitigating employment issues in Indonesia under COVID-19 impacts.	These much needs in developing capabilities of finance, production management, and quality control.							Database of company profiles of Tier 2 or below companies is useful. Kaizen training or training in Japan might be effective.

## APPENDIX 4. ACTION PLANS AND KEY ACTIVITIES

The main role of this Study is to create an Action Plan and to extract Pilot Activities from the created Action Plans and make them concrete (see the figure below). The Policy Measures examined in the previous project consists of a total of nine domains. For each domain, JICA Study Team examined the Action Plan and the activities that are important in realizing the Action Plan.

First, the Action Plans included in each Domain were summarized, and the Activities that are important for implementing the listed Action Plans were linked to each Domain. Each domain contains three to six action plans and several supporting activities, and in examining the activities, JICA Study Team described their contents, content, implementing entities, and implementation schedule etc. whenever possible. As for "Domain 2-4: Creation of automotive industrial belt in Northern part of Java", JICA Study Team did not examine it in detail because it was a domain outside the scope of this project.

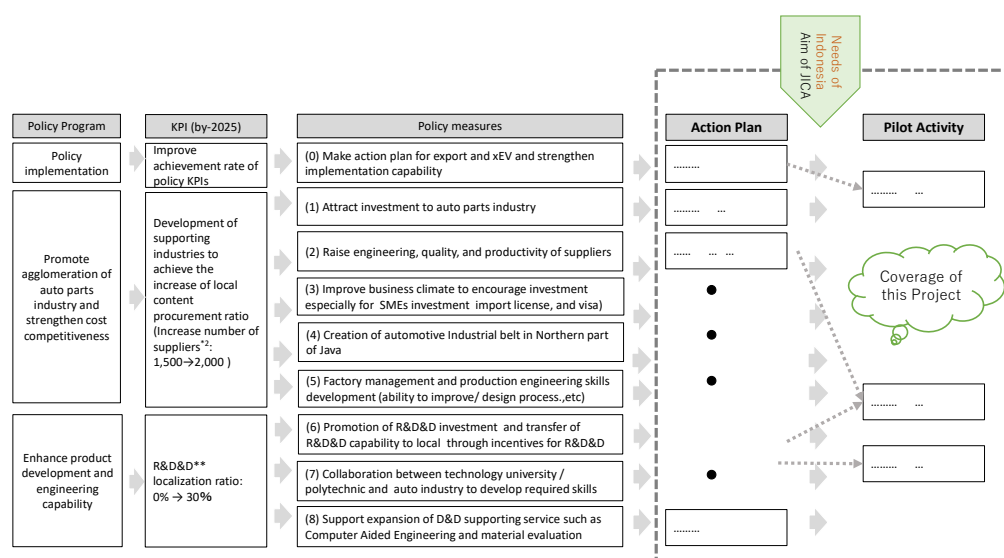


Figure 2.5.1 The role of the Project (the area enclosed by the dashed line)

Policy Measure	Action Plans	Activities
(0) Make action plan for export and xEV and strengthen implementation capability	2	8
(1) Attract investment to auto parts industry	5	7
(2) Raise engineering, quality, and productivity of suppliers	5	9
(3) Improve business climate to encourage investment especially for SMEs investment import	4	9
(4) Creation of automotive Industrial belt in Northern part of Java	NA	NA
(5) Factory management and production engineering skills development	4	6
(6) Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D	5	3
(7) Collaboration between technology university / polytechnic and auto industry to develop required skills	2	8
(8) Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation	4	6

**4.1.1 Domain 1-0: (0)Make action plan for export, xEV development and strengthen implementation capability**

The action plans on policy implementation are divided into two areas, i) Research, Framework Development/Policy Formulation, and ii) Quick Policy Implementation. The former includes research and development of policies which should be placed importance after Covid-19 turmoil. The latter aims quicker policy implementation supported by IoT, enabling for industry player to obtain equal/transparent services from the Government

The main agenda of the research activities includes the development strategy and KPIs of PIDI, export strategy of CBU/Auto Parts, development strategy of xEV/EV Battery, measures to stimulate domestic demand for automobiles, strategies to attract investment at a time of friction between China and the U.S., strategies to form a Center of Excellence for R&D and so on. These are just a few examples. Support from various donors should be considered for these studies, if necessary.

**Table 2.5.1 Policy Measures and Action Plan on “Policy Implementation”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Policy implementation		
<b>Policy Measures</b>	0 Make action plan for export, xEV development and strengthen implementation capability	<b>[Research and Framework Development /Policy Formulation]</b> <ul style="list-style-type: none"> <li>Policy formulation on PIDI and determine KPIs of auto sector</li> <li><u>CBU/Auto Parts export strategy</u></li> <li><u>xEV and EV Battery development strategy</u></li> <li>Measures to increase domestic sales</li> <li>Strategy to attract investment arises by US-China Friction</li> <li>Technology sophistication through establishing R&amp;D Center</li> </ul>	<b>Activity 01</b> ~ <b>Activity 07</b>
		<b>[Quick Policy Implementation]</b> <ul style="list-style-type: none"> <li>IoT supported quicker policy implementation</li> <li>Coordination with other concerned agencies</li> <li>Legalization by the cabinet</li> <li>Announcement by the Government</li> </ul>	<b>Activity 08</b>

<sup>1/</sup> See action plans for investment promotion

(\*) Activity 0-1 is to cope with Making Indonesia 4.0 through developing PIDI. Activity 0-6 aims to increase domestic sales for post-Covid-19 measures.

As mentioned above, Activities are the sources of activities that require special attention in implementing the Action Plan. In many cases, it is difficult to define the organization in charge and estimate the cost at this stage, so it should be understood that those items in the table are still tentative one. In particular, there are many expenses that are difficult to estimate, such as those related to logistics such as conferences and document distribution, holding seminars, overseas training, etc. Therefore, all expenses other than those that can be estimated at this stage, except for the procurement of specific equipment and services, have been excluded. Instead, for major expenses, the names of necessary cost items were listed whenever possible.

<b>#Activity 0-1</b>	Implementing Event: SS/S/M/L
Action	Research, Framework Development and Policy Formulation
<b>Activity</b>	<b>Policy Formulation</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Commitment to PIDI and determine KPIs of auto sector, and formulate the business plan on each target of 5 pillars of PIDI and determine the KPIs toward each business</li> </ul>

#Activity 0-1	Implementing Event: SS/S/M/L
Action	Research, Framework Development and Policy Formulation
<b>Activity</b>	<b>Policy Formulation</b>
	plan..
	<ul style="list-style-type: none"> <li>• Conduct research and develop new strategies to be applied after Covid-19. <ul style="list-style-type: none"> <li>✓ CBU/Auto Parts export strategy</li> <li>✓ xEV and EV Battery industry development strategy</li> <li>✓ Measures to increase domestic sales</li> <li>✓ Strategy to attract investment arises by US-China Friction</li> <li>✓ Technology sophistication through establishing R&amp;D Center</li> </ul> </li> <li>• Start discussion with international donors on assisting of implementation.</li> <li>• Release business plan and disseminate it to the stakeholders.</li> </ul>
Partners:	Concerned directorates and agencies under the Ministry of Industry (MOI) and Ministry of Research and Technology/ National Research and Innovation Board (RISTEK/BRIN), International donors (e.g. JICA),
Resources:	Testbed ideas prepared by the government and international donors
Challenge:	Approval process and term (too many players and too short time frame)
<b>【Responsibilities】</b>	
Responsible Agencies:	National Development Planning Agency (BAPPENAS), Agency for Industrial Human Resources Development (BPSDMI)
Implementing Agencies:	MOI-ILMATE (Metal, Machinery, Transportation Equipment and Electronic Industries), MOI-BPSDMI (Agency for Industrial Human Resources Development), MOI-BPPI (Agency for Industrial Research and Development)
<b>【Major Expenses】</b>	Total(Approx.): NA
	Meeting and conference, Presentation

#Activity 0-2	Implementing Event: SS
Action	Research, Framework Development and Policy Formulation
<b>Activity</b>	<b>CBU/Auto Parts export strategy</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Study the adapted standard, physical condition, and competitiveness of forwarding on export target countries and narrow down the target country from the viewpoint of said index.</li> <li>• Study the circumstances and strategy of export competitors such as Thailand, Malaysia, Turkey, etc.</li> <li>• Reflect the lessons learned from above activities to the export strategy of CBU/Auto Parts.</li> <li>• Motivate SME supplier for export by providing them relative information and practical matching with counterpart countries.</li> </ul>
Partners:	OEMs and suppliers, Research institutions
Resources:	Research on target companies and competitors, OEM and supplier interviews
Challenges:	Technical expertise to conduct the study (maybe the support by professional experts are necessary). MOI's policy assistance for export.
<b>【Responsibilities】</b>	
Responsible Agencies:	BAPPENAS, Coordinating Ministry of Maritime Affairs and Investment (CMMAI), MOI-ILMATE, Ministry of Trade (MOT), Investment Board (BKPM)
Implementing Agency:	MOI-ILMATE
<b>【Major Expenses】</b>	Total (Approx.): US\$30,000
	Consultant Fee, Meeting expenses
	Additionally, the expense on the government support to exporter is necessary.

#Activity 0-3	Implementing Event: S/M/L
Action	Research, Framework Development and Policy Formulation
<b>Activity</b>	<b>xEV and EV Battery industry development Strategy</b>
<b>【Activity Direction】</b>	

Contents:	<ul style="list-style-type: none"> <li>Conduct frequent meeting with private sector (GAIKINDO etc.) and BKPM and grasp the impact of xEV/Battery industry development Strategy issued on August 2020.</li> <li>Monitor the movement of the investors to EV battery manufacturing sector.</li> <li>Report the result to the industry players and higher decision makers for modification.</li> <li>Monitor the situation of similar natured countries where vehicle electrification was set as a predominant strategy after corona turmoil (France, Germany and so on)</li> <li>Strategize the R&amp;D activities on this field.</li> </ul>
Partners:	, GAIKINDO,
Resources:	Investment record to EV sector, Activities of Hyundai
Challenge:	NA
<b>【Responsibilities】</b>	
Responsible Agencies:	Coordinating Ministry of Maritime Affairs and Investment (CMMAI), Coordinating Ministry of Economic Affairs (CMEA), MOI-ILMATE, Ministry of Energy and Mineral Resources (MESDM), Ministry of State-owned Enterprise (MBUMN), BKPM, MOI-ILMATE, Agency for Industrial Research and Development (MOI-BPPI)
Implementing Agency:	MOI-ILMATE
<b>【Major Expenses】</b>	Total (Approx.): NA

<b># Activity 0-4</b>	Implementing Event: S/M
Action	Research, Framework Development and Policy Formulation
<b>Activity</b>	<b>Release of EV Battery Production Plan</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Engage various stakeholders with the discussions on the action plan for xEV policy (Decree No. 55/2019) in order for the plan becomes a part of Indonesia government's project and is widely recognized by stakeholders.</li> <li>Decree No. 55/2019 to be recognized by stakeholders.</li> </ul>
Partners:	Automotive industry players (industry association, OEMs, and suppliers)
Resources:	Detailed action plan for implementation
Challenge:	Approval from MOF on financial requirements (government incentive/subsidy)
<b>【Responsibilities】</b>	
Responsible Agencies:	CMMAI, CMEA, MESDM, MBUMN, BKPM, MOI-ILMATE
Implementing Agency:	MOI-ILMATE
<b>【Major Expenses】</b>	Total (Approx.): NA

<b># Activity 0-5</b>	Implementing Event: SS/S
Action	Research, Framework Development and Policy Formulation
<b>Activity</b>	<b>Measures to increase domestic sales</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Study pros and cons of subsidies and incentives provided to a various stakeholder to increase domestic car sales.</li> <li>Study peoples' deciding factors of buying new cars</li> <li>Study historical policy operations and their effect on economic crisis</li> <li>Study how increase domestic demand of automotive in order to increase production and secure employment.</li> </ul>
Partners:	OEMs and suppliers, Research institutions
Resources:	Company interviews
Challenges:	Technical expertise to conduct the study. Cooperation of companies.
<b>【Responsibilities】</b>	
Responsible Agencies:	BAPPENAS, CMEA, Ministry of Finance (MOF), MOI-ILMATE, MOI-KPAII, MOT
Implementing Agency:	Ministry of Finance (MOF)
<b>【Major Expenses】</b>	Total (Approx.): US\$30,000



# Activity 0-5	Implementing Event: SS/S
Action	Research, Framework Development and Policy Formulation
Activity	<b>Measures to increase domestic sales</b>
	Consultant Fee, Meeting expenses

# Activity 0-6	Implementing Event: S/M/L
Action	Research, Framework Development and Policy Formulation
Activity	<b>Technology sophistication through establishing R&amp;D Center</b>
【Activity Direction】	
Contents:	<ul style="list-style-type: none"> <li>Familiarize the R&amp;D&amp;D incentives among auto parts suppliers and encourage them to utilize the incentive scheme.</li> <li>Establish government's technical assistance service on R&amp;D&amp;D activities by SMEs.</li> <li>Plan the COE on R&amp;D&amp;D in line with PIDI and other Making Indonesia 4.0 related developments.</li> </ul>
Partners:	Automotive industry players (industry association, OEMs, and suppliers)
Resources:	JICA's automotive industry development project (next phase).
Challenge:	Approval from MOF on financial requirements (government incentive/subsidy)
【Responsibilities】	
Responsible Agencies:	CMEA) RISTEK/BRIN, MOI ※JICA's support at the initial activity should be considered.
Implementing Agency:	MOI-ILMATE, MOI-KPAII (incentive and assistance service), MOI-BPSDMI (PIDI)
【Major Expenses】	Total(Approx.): NA

# Activity 0-7	Implementing Event: SS/S
Action	Research, Framework Development and Policy Formulation
Activity	<b>Strategy to attract investment arises by US-China Friction</b>
【Activity Direction】	
Contents:	<ul style="list-style-type: none"> <li>Study the move of the tenants falling into this category from China and ASEAN region.</li> <li>Develop the strategy to attract potential companies allowing for Indonesia's advantage.</li> <li>Reflect the strategy to the investment attraction policy</li> </ul>
Partners:	WEB Marketing firm, Economic and trade section of embassy in said countries
Resources:	Information from the company on critical situation
Challenges:	Diplomatic operation toward China and US
【Responsibilities】	
Responsible Agencies:	CMMAI, CMEA, BKPM, MOI, MOF, MOT, MBUMN
Implementing Agency:	Joint operation of MOI and other responsible agencies
【Major Expenses】	Total (Approx.): NA
	WEB site preparation for gathering information, Consulting fee, Information gathering cost

# Activity 0-8	Implementing Event: S/M/L
Action	Quick Policy Implementation
Activity	<b>Quick Policy Implementation</b>
【Activity Direction】	
Contents:	<ul style="list-style-type: none"> <li>Study how to introduce the IoT supported quicker policy implementation</li> <li>Coordination with other concerned agencies</li> <li>Legalization by the cabinet</li> <li>Announcement and implemented by the Government</li> </ul>

Partners:	BAPPENAS and other policy making agencies.	
Resources:	Government's present policy and precedents of other ASEAN countries	
Challenge:	Objection from remarkable persons and financial source of incentives	
<b>【Responsibilities】</b>		
Responsible Agencies:	BAPPENAS, CMEA, MOI, RISTEK/BRIN, Minister of Communication and Information Technology, Ministry of Education	
Implementing Agency:	Joint operation of MOI and other responsible agencies	
<b>【Major Expenses】</b>	Total (Approx.):	NA

#### 4.1.2 Domain 2-1: Attract investment to auto parts industry

In Indonesia, the minimum capital required for the establishment of a foreign company is 10 billion rupiah, and the capital stated in the articles of incorporation must be 10 billion rupiah, but the actual capital required to be paid into the bank account is 25% of the stated capital amount.

Even if a Japanese SME with a small amount of capital wants to set up a business in Indonesia, the amount of money required for the initial account transfer is also a big burden. For this reason, the minimum amount of capital required to establish a company in Indonesia is overwhelmingly high when compared to other ASEAN countries.

- ex.1: (Philippines) According to the Companies Act, the minimum paid-in capital for an export-oriented company in the Philippines is 5,000 pesos (about 10,400 yen). The minimum paid-in capital for export-oriented companies is 5,000 pesos (about 10,400 yen) according to the Companies Act. However, in practice, applications for incorporation are never approved with this amount, and a minimum.
- ex.2: (Thailand) The minimum capital amount for Thai companies is effectively 15 baht (THB). Although there are no legal restrictions on the minimum amount of capital, the fact that the par value of shares must be at least 5 baht per share & there must be at least 3 shareholders means that the minimum capital is effectively 15 baht.

**Table 2.5.2 Policy Measures and Action Plan on “Attract Investment to Auto parts Industry”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Attract investment to auto parts industry		
Industry and Strengthen Cost Promote Agglomeration of Auto-parts	Background		
	<ul style="list-style-type: none"> <li>• Support industries have not been able to accumulate.</li> <li>• It has always been pointed out that the minimum investment (fixed assets excluding land and buildings &amp; working capital for 3 months) is 10 billion rupiah (about 100 million yen), which is too high and the burden is too great.</li> </ul>	<b>【Investment Promotion of Tier2&amp;3 Companies】</b> <ul style="list-style-type: none"> <li>• Providing more attractive incentives for SME investment than in neighboring countries</li> <li>• Capturing the need for relocation due to US-China friction (see Activity 07)</li> </ul>	<b>Activity 1-1</b>
		<b>【Lowering the Minimum Capital Investment】</b> <ul style="list-style-type: none"> <li>• Monitor the voices from Tier2&amp;3 tenants which have an interest to invest to Indonesia.</li> <li>• Study the cases of neighboring countries (ASEAN countries as well as the other competitors which is attracting investment)</li> </ul>	<b>Activity 1-2</b>
		<b>【File and share company information contacted】</b> <ul style="list-style-type: none"> <li>• Share company information which are interested in investment to Indonesia</li> </ul>	<b>Activity 1-3</b>
		<b>【Attract FDI for increasing Export】</b>	

		<ul style="list-style-type: none"> <li>Establish export strategy by model (ex. exporting MPV and other models to target countries)</li> <li>Strengthen development of MPV for export</li> <li>Accelerate developing Industrial zone and attract Tier2&amp;3 companies to increase export of auto parts.</li> </ul>	<b>Action 1-4</b>
		<ul style="list-style-type: none"> <li>Capturing the need for relocation due to US-China friction (see Activity 07 and Activity 1-1)</li> </ul>	
		<b>[Implementation of Action Plan]</b> <ul style="list-style-type: none"> <li>Select target companies for investment</li> <li>Conduct investment attraction seminars</li> <li>Provide incentives on xEV related parts production for export</li> </ul>	<b>Activity 1-5</b> <b>Activity 1-6</b> <b>Activity 1-7</b>

# Activity 1-1	Implementing Event: SS/S/M/L
Action	Investment Promotion of Tier2&3 Companies
Activity	<ul style="list-style-type: none"> <li><b>Providing more attractive incentives for SME investment than in neighboring countries</b></li> <li><b>Capturing the need for relocation due to US-China friction</b></li> </ul>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Set better and more attractive incentives than Thailand and Malaysia.</li> <li>Pay special attention to incentivize to the investment on xEV, Bio Fuel, and EV battery related.</li> <li>Incentivize to Tier2&amp;3 companies on IoT, AI based manufacturers and Slers.</li> <li>Accelerate developing SEZ and attract Tier2&amp;3 companies to increase export of auto parts.</li> </ul>
Partners:	JETRO, Chamber of Commerce and Industry of concerned country, GAIKINDO, GIAMM, etc
Resources:	Existing law, Omnibus Law,
Challenge:	Estimation of negative benefit to local service providers
<b>【Responsibilities】</b>	
Responsible Agency:	CMMIA, CMEA, BKPM, MOI, MOF
Implementing Agencies:	BKPM, MOF
<b>【Major Expenses】</b>	Total (Approx.): INR NA
	Expenses associated with a series of discussions

# Activity 1-2	Implementing Event: 2022 - 2023
Action	Lowering the minimum capital investment
Activity	<ul style="list-style-type: none"> <li><b>Monitor the voices from Tier2&amp;3 tenants which have an interest to invest to Indonesia.</b></li> <li><b>Study the cases of neighboring countries (ASEAN countries as well as the other competitors which is attracting investment)</b></li> </ul>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Compare the minimum capital investment amount to neighboring countries.</li> <li>Discuss with concerned agencies in charge (DOF, DOT, MOI etc.)</li> </ul>
Partners:	BAPPENAS
Resources:	Economic impact study result
Challenge:	Approval by MOF
<b>【Responsibilities】</b>	
Responsible Agencies:	CMMIA, CMEA, BKPM, MOI, MOF
Implementing Agency:	BKPM, MOF
<b>【Major Expenses】</b>	Total (Approx.): INR NA

# Activity 1-3	Implementing Event: As Required
Action	File and share company information contacted

<b>Activity</b>	<b>Share company information which are interested in investment to Indonesia</b>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>Share information on the companies visited/met and the level of their interest to invest among different organizations involved.</li> <li>Achieve smoother disclosure of import/export statistics information (from the Ministry of Trade)</li> </ul>	
Partners:	Private companies and industry associations (GAIKINDO, GIAMM), Information Service/Agencies, Indonesian Embassies overseas concerning Business and Commerce	
Resources:	MM prepared by circle members, Periodical input from trade statistics.	
Challenges:	<ul style="list-style-type: none"> <li>Establishing a circle by interested agencies to share information.</li> <li>Involving financial source (such as a project from World Bank) for continuity of the circle activities.</li> </ul>	
<b>【Responsibilities】</b>		
Responsible Agencies:	MOI-ILMATE, MOT (Export Development), BKPM, Embassy/Ministry of State	
Implementing Agency:	MOI-ILMATE	
<b>【Major Expenses】</b>	Total (Approx.): INR 300 Mil (annually)	
	Information Service, Management expense of the circle	

<b># Activity 1-4</b>	Implementing Event: SS/S	
Action	Attraction of FDI Export Promotion	
<b>Activity</b>	<ul style="list-style-type: none"> <li><b>Establish export strategy by model (ex. exporting MPV and other models to target countries)</b></li> <li><b>Strengthen development of MPV for export</b></li> <li><b>Accelerate developing Industrial zone and attract Tier2&amp;3 companies to increase export of auto parts.</b></li> <li><b>Capturing the need for relocation due to US-China friction (see Activity 07 and Activity 1-1)</b></li> </ul>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>Clarify the export model/country and strategy in tandem with OEMs.</li> <li>Check import needs of target model by target country and study of competitors' (such as Thailand, Malaysia and Turkey) strategy.</li> <li>Provide incentives on R&amp;D&amp;D and export of MPV.</li> <li>Strengthen relocation attraction and contact to possible companies in US-China friction affected countries through facilitating the embassy of Indonesia in ASEAN region.</li> </ul>	
Partners:	Indonesia Embassy in ASEAN region and in Australia. GAIKINDO, etc	
Resources:	Information from OEMs on marketing and export needs of each country, Information from Embassy of Indonesia in targeting countries on relocation needs of auto industry players.	
Challenge:	Horizontal tie-up with Ministry of Foreign Affairs	
<b>【Responsibilities】</b>		
Responsible Agency:	BKPM, MOT, MOI, Ministry of Foreign Affairs (MOFA)	
Implementing Agencies:	MOI-ILMATE, MOI-KPAII	
<b>【Major Expenses】</b>	Total (Approx.): INR NA	
	Expenses associated with a series of discussions	

<b># Activity 1-5</b>	Implementing Event: SS/S/M/L	
Action	Implementation of Action Plan	
<b>Activity</b>	<b>Select target companies for investment</b>	
<b>【Activity Direction】</b>		
Contents:	Select promising companies to attract using Database, etc.	
Partners:	BKPM	
Resources:	BKPM, Indonesia embassies, central/local government agencies in designated country etc.	

Challenge:	<ul style="list-style-type: none"> <li>Securing good information sources</li> <li>Obtaining prior information before conducting investment promotion such as strengthening the linkage with JETRO and the chamber of commerce of each country</li> </ul>
<b>【Responsibilities】</b>	
Responsible Agencies:	BKPM, Indonesia Embassies overseas, MOT (Export Development)
Implementing Agencies:	BKPM in collaboration with Indonesian embassy of each country
<b>【Major Expenses】</b>	Total (Approx.): INR 30 Bil (annual)
Travel expenses including the cost of venue, updating of promotion tools etc,	

<b># Activity 1-6</b>	Implementing Event: As required
Action	Implementation of Action Plan
<b>Activity</b>	<b>Conduct investment attraction seminars</b>
<b>【Activity Direction】</b>	
Contents:	Investment seminar regularly conducted in partnership with the embassy of Indonesia in Japan
Partners:	JETRO, ASEAN Center of Japan
Resources:	IPAs, Indonesian Embassies overseas, central/local government agencies in designated country etc.
Challenges:	<ul style="list-style-type: none"> <li>Having network with remarkable persons (such as professors specialized in the automotive industry).</li> <li>Having empirical know-how on investment promotion in Japan.</li> <li>GIAMM's continuity of local supplier profiling as the participant to matching business session of investment promotion.</li> </ul>
<b>【Responsibilities】</b>	
Responsible Agencies:	BKPM, MOI-ILMATE, MOT, Embassy of Indonesia in Japan
Implementing Agencies:	BKPM
<b>【Major Expenses】</b>	Total (Approx.): INR 150 Bil (annual)
Travel Expenses, venue expenses, honorarium to guest speaker, hiring of translators, cost of meeting and setup, promotion cost .etc.	

<b># Activity 1-7</b>	Implementing Event: M/L
Action	Implementation of Action Plan
<b>Activity</b>	<b>Provide incentives on xEV related parts production for export</b>
<b>【Activity Direction】</b>	
Contents:	Check possibility to incentivize for export. Strengthening incentive system for export that manufactures products related to xEV components of compact cars (e.g. sensors and actuators etc.)
Partners:	Indonesian government agencies (MOF, Ministry of Transportation, etc.), Existing and attracted tenants (investors), JCCPI/ JETRO
Resources:	Discussion with OEM and Tier1 tenants in Indonesia
Challenges:	<ul style="list-style-type: none"> <li>Analysis on pure procurement ratio of xEV parts.</li> <li>Preparation of impact analysis and obtaining consensus on incentives from MOF and other government agencies.</li> <li>Institutional setup on approving/implementing/monitoring incentive provision.</li> </ul>
<b>【Responsibilities】</b>	
Responsible Agencies:	MOT, MOI-ILMATE, MOI-KPAIL, MOF
Implementing Agency:	MOT
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Cost of research and coordination. Cost of subsidy/Incentive.	

### 4.1.3 Domain 2-2: Raise engineering quality, and productivity of suppliers

In order to improve the technological capabilities and productivity of small and medium-sized suppliers, it is necessary to support the enhancement of the technological capabilities of auto parts suppliers by attracting the base industries of developed countries, and by promoting cooperation with local Indonesian companies (especially from Japan).

In addition, in order to strengthen the competitiveness of the Indonesian automotive industry, it is considered necessary to attract R&D functions of Japanese companies with cutting-edge technologies. This is because the products developed at the R&D institutions are expected to be manufactured in the same region, which will provide an opportunity for the accumulation of new suppliers and contribute greatly to the advancement of supporting industries in Indonesia.

Thus, strengthening the technological capabilities of local suppliers requires policies that can promote the attraction of investment and also promote technology transfer to local companies in order to raise the level of the industry through the introduction of foreign companies. Specifically, the following action plans can be considered.

1. Preferential treatment for foreign capital and deregulation
  - ① Minimum capitalization by industry and size (e.g., for auto parts manufacturers (small and medium-sized enterprises), lower the minimum capital and investment amount on the condition that they form a joint venture with a local company)
  - ② Preferential investment policies by industry and size
2. Attracting R&D centers (tax reduction effect by increasing the maximum amount of expenses).
3. Technology transfer to local companies (tax incentives for joint ventures based on the premise of technology transfer)

#### BOX.

##### Background of “1. Preferential treatment for foreign capital and deregulation”

- ① Minimum capitalization by industry and size
  - ✓ In Indonesia, there are restrictions on the minimum capital and minimum investment amount for foreign investment. In the case of Indonesia, the total initial investment the total initial investment is less than 100 million yen, which may be a hurdle for small and medium-sized companies that form the base of the industry.
  - ✓ In comparison with Thailand, the above barriers to entry may be a factor that hinders the improvement of competitiveness in the automotive industry. Therefore, it would be effective to implement partial relaxation measures according to the industries that need to be strengthened and the size of the companies that need to be attracted.

- ✓ Specifically, it would be effective to provide relaxation measures for suppliers and small and medium-sized enterprises that manufacture high value-added automotive parts, or to establish JVs with local companies for technology transfer.

**Table 2.5.3 Comparison of regulations related to company formation**

Classification	Indonesia	Thailand
Minimum Capital Requirement	Minimum Authorized Capital: 50 million rupiah Minimum subscribed authorized capital: Authorized capital (25% minimum) <u>Minimum capital for foreign invested companies</u> <u>2.5 billion rupiah (about 21 million yen)</u>	Obtaining work permits for foreigners: For each foreigner: 2 million-baht <u>(about 7 million yen) capital per foreigner is required.</u>
Minimum Capital Investment	Total investment exceeding <u>10 billion rupiah</u> (about 85 million yen) excluding land and buildings	Investment amount restrictions under the Companies Act <u>None</u>
Interview result	Minimum capital requirement (including minimum investment amount) is a hurdle for Japanese companies that have not yet entered the Indonesian market. (from Japanese companies that have not yet entered Indonesia)	No restrictions on minimum capital and minimum investment, making it easier to enter the market (compared to Indonesia).

② Preferential investment policies by industry and size

- ✓ In Thailand, there are preferential investment incentives such as corporate tax exemptions and tariff exemptions on raw materials for export as investment incentives according to manufacturing items and company size to strengthen suppliers.
- ✓ Since investment incentives are also an important factor when considering new investments by foreign capital, it is necessary to enhance preferential systems for specific industries in order to strengthen competitiveness in ASEAN.
- ✓ Specifically, as well as restrictions on minimum capital and minimum investment, benefits could be granted to suppliers of high value-added automotive parts and vehicle models (MPVs, SUVs, etc.) that have an advantage in Indonesia, and preferential treatment could be given to small and medium-sized enterprises that form supporting industries.



Background of “2. Attracting R&D centers (tax reduction effect by increasing the maximum amount of expenses)”

- ✓ In recent years, automakers have been establishing R&D centers in the ASEAN region where they have manufacturing bases and localizing their development, design, and evaluation functions.
- ✓ One of the reasons for this is that Thailand's 2012 Master Plan for the Automotive Industry sets out a policy of attracting development bases in order to secure a competitive advantage in ASEAN, and has established preferential benefits.
- ✓ The establishment of the R&D center is expected to introduce cutting-edge technologies and promote the sophistication of the industry. In addition, if the new products developed by the R&D center are manufactured in the region, it will lead to the attraction of new supporting industries, making the attraction of R&D centers an important point.
- ✓ Some major car manufacturers do not have development bases in more than one country, and considering the fact that it is difficult to relocate R&D centers once they are established due to their functions and facilities, early acquisition of R&D centers is essential.
- ✓ The Thai government just added a new benefit for attracting advanced technologies including R&D centers in 2017, and it is necessary to consider preferential policies for attracting development bases in order to improve competitiveness in ASEAN.
- ✓ The new system in Thailand does not provide a direct tax exemption to companies, but rather a tax reduction effect by raising the amount of expenses recorded in accordance with conditions.

Background of “3. Technology transfer to local companies (tax incentives for joint ventures based on the premise of technology transfer)”

- ✓ As mentioned above, while the accumulation of suppliers and the introduction of technology through the attraction of foreign companies are necessary for the upgrading of supporting industries, technology transfer to local companies is necessary for the further development of Indonesia's industrial base.
- ✓ In addition to strengthening preferential treatment for foreign-invested companies, from the perspective of promoting the development of local companies, it would be a method of industrial upgrading to provide further tax incentives to companies that are willing to transfer particularly advanced technology through joint ventures with local companies.
- ✓ In addition, Indonesia's national development plan states that local companies need to be integrated into the global supply chain in order to strengthen the competitiveness of the industry, and technology transfer to local companies is a useful method.

**Table 2.5.4 Examples of Local Business Growth in Thailand**

Company	Influence by Japanese Company
---------	-------------------------------

Thai Summit Group(TSG)	<ul style="list-style-type: none"> <li>✓ Rapid expansion in the production of parts for Japanese automobiles by actively introducing Japanese technology</li> <li>✓ In 2009, the company acquired Ogihara, which manufactures molds for automobile bodies.</li> </ul>
Siam Motors Group	<ul style="list-style-type: none"> <li>✓ Since the 1960s, the company has expanded its business to include the manufacture of various automotive parts, and has actively established joint ventures with Nippon Battery, Riken, NSK, and Kayaba Industries to incorporate Japanese technology and know-how.</li> </ul>
Somboon Advance Technology(SAT)	<ul style="list-style-type: none"> <li>✓ Expanding business through Japanese business with major customers such as Mitsubishi Motors, Isuzu, Toyota and Honda.</li> <li>✓ In order to incorporate Japanese technology, the company has established many joint ventures such as Nisshinbo Somboon Automotive, Yamada Somboon, and Tsuchiyoshi Somboon.</li> </ul>

The action plans on “Raise Engineering, Quality, and Productivity of Suppliers are as follows:

**Table 2.5.5 Policy Measures and Action Plan on “Raise Engineering, Quality, and Productivity of Suppliers”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Raise engineering, quality, and productivity of suppliers	<b>[Incentives for Human Resource Development]</b>	<b>Activity 2-1</b>
Background <ul style="list-style-type: none"> <li>• The introduction of high-dimensional engineering adapted to the Digital Transformation (DX) is required.</li> <li>• Most of R&amp;D(&amp;D) functions are concentrated in Thailand, jeopardizing Indonesia's position as the next generation production hub.</li> <li>• PIDI will be built in Jakarta to promote the realization of Making Indonesia 4.0 and to showcase it at home and abroad.</li> </ul>		1 Incentives on R&D&D promotions (e.g., the tax reduction effect of raising the amount of expenses recorded according to conditions) 2 Relaxation of capital and minimum capital requirements 3 Utilization of PPDI for R&D&D and HRD	
		<b>[Technology Transfer to Local Companies]</b>	<b>Activity 2-2</b>
		1. Promotion of capital investment such as automation 2. Tax incentives for companies entering into joint ventures on the premise of technology transfer to local companies, etc.	
		<b>[Enhancing Kaizen Activity]</b>	<b>Activity 2-3</b>
		<ul style="list-style-type: none"> <li>• Develop Kaizen leaders</li> <li>• Kaizen consultation to Tier 2&amp;3 companies by Japanese Senior Volunteer</li> </ul>	
	<b>[Preparation of Technology Database for Advanced Tier2 and 3 companies]</b>	<b>Activity 2-4</b>	
	<ul style="list-style-type: none"> <li>• Prepare Technology Database and display at PIDI</li> </ul>		
	<b>[Implementation of Action Plan]</b>	<b>Activity 2-5</b>	
	1 Review and improve the contents of board exams on subjects related to auto manufacturing		
	2 Upgrade tools and equipment based on newly updated / developed curriculums to new production technology	<b>Activity 2-6</b>	
	3 Study the possibility of lowering logistics costs	<b>Activity 2-7</b>	
	4 Study the possibility of lowering materials	<b>Activity 2-8</b>	

	5 costs Support business matching and expansion of local suppliers	<b>Activity 2-9</b>
--	---	---------------------

- Technology and business upgrading services will be realized through the following processes; i) Profiling of local suppliers and their technology level, ii) Technical support from Tier 1 and 2 companies to local suppliers, iii) Promotion of business matching, and lastly, iv) Capacity development of local suppliers (Kaizen, production planning, safety, business management, etc).

<b># Activity 2-1</b>		Implementing Event: M/L
Action	Incentives for Human Resource Development	
<b>Activity</b>	<ol style="list-style-type: none"> <li>1 Incentivize to R&amp;D&amp;D promotions</li> <li>2 Relaxation of capital and minimum capital requirements</li> <li>3 Utilization of PIDI for R&amp;D&amp;D and HRD</li> </ol>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>• Review R&amp;D&amp;D incentives at present improve/disseminate them. (e.g., the tax reduction effect of raising the amount of expenses recorded according to conditions)</li> <li>• Relaxation of capital and minimum capital requirements                             <ul style="list-style-type: none"> <li>- Suppliers of high value-added automotive components</li> <li>- SMEs with competitive edge.</li> </ul> </li> <li>• Study how the R&amp;D and HRD should focus on academia continuously.</li> <li>• Discuss how to utilize PIDI for those activities.</li> </ul>	
Partners:	OEMs and suppliers, The government agencies/research institutions in charge	
Resources:	Company interviews	
Challenges:	Although the government of Indonesia will be the main player, consultation and promotion by the Public-Private Partnership Council will be necessary.	
<b>【Responsibilities】</b>		
Responsible Agencies:	Inter- coordination of concerning directorates and research agencies under MOI and BRIN	
Implementing Agency:	MOI-BPSDMI	
<b>【Major Expenses】</b>	Total (Approx.): NA	
	Travel expenses to Japan,	

<b># Activity 2-2</b>		Implementing Event: M/L
Action	Technology transfer to local companies	
<b>Activity</b>	<ol style="list-style-type: none"> <li>1. Tax incentives for companies entering into joint ventures on the premise of technology transfer to local companies, etc.</li> <li>2. Promotion of capital investment such as automation</li> <li>3. Granting capital investment incentives (As related to Activity 2-1 above)</li> </ol>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>• Review digital and robotic production technologies in automotive manufacturing.</li> <li>• Plan corroborating activities with GAIKINDO to attract FMS experts to academic side of Indonesia.</li> <li>• Study how to incentivize to the investment on FMS related activities.</li> <li>• Discuss how to utilize PIDI for those activities.</li> </ul>	
Partners:	OEMs and suppliers, GAIKINDO, GIAMM	
Resources:	Company interviews (Need to hear requests from local companies in Indonesia.)	
Challenges:	Possibility to link with donor's support.	
<b>【Responsibilities】</b>		
Responsible Agencies:	CMEA, MOI, BRIN, MOF	
Implementing Agency:	MOI-ILMATE	
<b>【Major Expenses】</b>	Total (Approx.): NA	

Cost of events to work together with FMS provider, Initial research cost on FMS study, Testing equipment, etc

# Activity 2-3	Implementing Event: SS/S/M/L
Action	Enhancing Kaizen Activity.
Activity	1. Develop Kaizen leaders 2. Kaizen consultation to Tier 2&3 companies by Japanese Senior Volunterr
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Develop Kaizen leaders at 3 to 5 companies to form a group and conduct Kaizen training using actual production processes of each company as learning materials.</li> <li>Conduct Kaizen seminars to develop managers who can implement process improvements at production site.</li> <li>Include HEI researchers in the field of industrial engineering to participate in the group learning process for documentation and hand-on learning experiences</li> </ul>
Partners:	Indonesian Automotive Industry Association (GAIKINDO), member companies (Tier 1 and 2) of Indonesian Automotive Parts and Industries Association (GIAMM), Association of Small and Medium Automotive Components Industry (PIKKO), Indonesian Automotive Institute (IOI)
Resources:	_____
Challenge:	_____
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-ILMATE, MOI-BPSDMI
Implementing Agencies:	MOI-ILMATE
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Kaizen Consultant Fee	

# Activity 2-4	Implementing Event: M/L-
Action	Preparation of Technology Database for Advanced Tier2 and 3 companies
Activity	Prepare technology database and display at PIDI
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Clarify and choose the useful and necessary technologies for Tier 2&amp;3 companies.</li> <li>Compile the technology in advanced companies and put them into a database.</li> <li>Profile the successful examples in Indonesia's company and illustrates technology level of the company (technologies owned, facilities, human resources, technical linkage with OEMs, etc.)</li> <li>Launch the on-line database for public use and investment promotion</li> <li>Display those examples and companies at PIDI</li> </ul>
Partners:	GIAMM, GAIKINDO
Resources:	-
Challenge:	Coordination (making appointments) to obtain those information
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-ILMATE, MOI-BPSDMI
Implementing Agencies:	MOI-BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Editing (fact-checking) costs, travel expenses etc	

# Activity 2-5	Implementing Event: M/L
Action	Implementation of Action Plan
Activity	Review and improve the contents of board exams on subjects related to auto manufacturing
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Hold consultative meetings with industry partners and quality assurance agencies in ASEAN countries</li> </ul>

Partners:	<ul style="list-style-type: none"> <li>Conduct research on high education evaluation in other ASEAN countries</li> <li>Improve contents of board exams on subjects related to auto manufacturing</li> </ul>
Resources:	Industry partners and quality assurance agencies in other countries (e.g. Japan Institution for Higher Education Evaluation: JIHEE)
Challenge:	Consultation fee
<b>【Responsibilities】</b>	
Responsible / Implementing Agencies:	MOI-BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Consultants' fee	

# Activity 2-6	Implementing Event: 2022 -2022
<b>Action</b>	Implementation of Action Plan
<b>Activity</b>	Upgrade tools and equipment based on newly updated / developed curriculums to new production technology
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Outline the specifications of tools and equipment that need to be procured based on the newly updated/developed curriculums at vocational schools, colleges and universities</li> <li>Outline budget sources and develop procurement plan</li> </ul>
Partners:	Private colleges and universities, private companies
Resources:	Industry partners, external consultants
Challenge:	Finding sufficient budget for procurement
<b>【Responsibilities】</b>	
Responsible / Implementing Agencies:	MOI-BPSDMI, Ministry of Education and Culture (Kemdikbud)
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Tools, software, and equipment	

# Activity 2-7	Implementing Event: M/L
<b>Action</b>	Implementation of Action Plan
<b>Activity</b>	Study the possibility of lowering logistics costs
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>To lower logistics costs, study the possibility of joint delivery (cooperative delivery) and/or mixed loading, etc.</li> </ul>
Partners:	Logistics company
Resources:	Sample companies for cost simulation
Challenge:	Optimization system across the companies (who to initiate, lead and manage the alternative logistic operation)
<b>【Responsibilities】</b>	
Responsible Agencies:	MOT, MOI/ILMATE, BKPM, Ministry of Transportation (DGST)
Implementing Agencies:	MOT
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Consultant Fee	

# Activity 2-8	Implementing Event: S/M
<b>Action</b>	Implementation of Action Plan
<b>Activity</b>	Study the possibility of lowering materials costs
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>To lower material costs, study and understand the current practices of purchasing (material, quantity, manufacturer etc.) of major raw materials suppliers and consider the possibility of joint purchase.</li> <li>MOI initiates the initial setup (including feasibility study by auto part) and industrial association will establish the group to join collective purchase.</li> </ul>

Partners:	Companies (recipient of the raw materials), Raw material suppliers	
Resources:	Sample companies for cost simulation	
Challenge:	Identifying the common raw materials among the companies.	
<b>【Responsibilities】</b>		
Responsible Agency:	MOI, Ministry of Energy and Mineral Resources (MESDM)	
Implementing Agency:	MOI	
<b>【Major Expenses】</b>		Total (Approx.): INR NA
Consultant Fee		

<b># Activity 2-9</b>	Implementing Event: S/M/L
Action	Implementation of Action Plan
Activity	Support business matching and expansion of local suppliers (Conducting Matching Hub)
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Foster local Slers by implementing Matching Hub (part1) event with internationally known Slers and form JV.</li> <li>• Conduct Matching Hub (part2) between local Slers (above) and local suppliers which need to introduce automated manufacturing system.</li> <li>• The Government subsidize a part of expenses to introduce automated manufacturing system throughout above-mentioned activities.</li> </ul>
Partners:	Private colleges and universities, private companies
Resources:	-
Challenge:	Securing budget for subsidization.
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-ILMATE, MOI-BPSDMI, BKPM
Implementing Agencies:	MOI-ILMATE
<b>【Major Expenses】</b>	
Total (Approx.): INR NA	
Financial resources for trade shows and incentives	

#### 4.1.4 Domain 2-3: Improve business climate to encourage investment especially for SMEs investment, import license, and visa

In Indonesia, there is a shortage of local human resources to pass on the skills, as the employees who teach the work also change jobs. Therefore, it is necessary to dispatch Japanese skilled workers to transfer technology to the local employees. However, there are educational and age requirements and work location rules for obtaining visas, and the operation of these rules is unclear. As a result, the number of personnel dispatched from Japan has been decreasing, hindering human resource development and factory operations. In addition, there are cases where short-term and medium-term technology transfer and machine maintenance and adjustment are also hindered.

The Corona disaster in 2020 made it extremely difficult for Japanese employees to enter Indonesia compared to Thailand and Malaysia, and this certainly delayed the recovery in the second half of the year.

The following improvements on immigration management are considered necessary.

1. Relaxing the requirements for foreigners to obtain a work visa

Contrary to the active attraction of foreign investment, the regulations on the issuance of IMTAs (Work Permit) are too strict in line with the strengthening of the protectionist policy (ensuring work opportunities for our own citizens).

- a The period of validity of IMTA for non-manufacturer Advisor title has been reduced from one year to six months, making it difficult to increase the number of Manager titles.
- b The number of days for issuance of TA01 by the Department of Labor and Transmigration has been significantly increased from the previous maximum of approximately one month, with some cases exceeding four months.
- c A copy of the applicant's bank balance certificate or a copy of the bankbook is required for all VISA applications except VISA on Arrival.

## 2. Simplification of the procedure for obtaining a working visa

It takes a long time for the supervisory authorities to issue visas to expatriates, and in some cases the process does not go as planned.

- a In the case of a short-term on-site support person from Japan to provide on-site support before the start of production, it is necessary to obtain a working visa or temporary visitor visa. However, the procedure is cumbersome, time-consuming, far from reality, and unreasonable.
- b It takes a lot of time and effort to obtain a business visa (other than a Visitor's Visa (VOA)), and it is not possible to make an urgent business trip even if a problem occurs and an emergency response is needed.
- c Cable VISA (Visa Issuance Permit) is required for a Business VISA, which is a document that must be obtained within Indonesia, and it takes time to obtain a Business VISA.
- d In addition to meetings, the interpretation of VISA on Arrival, which can be obtained at the airport, also depends on the interpretation, and needs to be improved.

**Table 2.5.6 Comparison of Visa Requirements for Indonesia and Thailand**

	Indonesia	Thailand
Requirement of Foreign Worker	(1) Educational background appropriate to the position (2) Certificate of competency for the position or at least 5 years of work experience (3) Submission of a written pledge to transfer knowledge and technology to Indonesians. (3) Submission of a written pledge to transfer knowledge and skills to Indonesian employees.	(1) Basically, there are no clear requirements for foreign workers in terms of educational background or work experience. (2) Although there are no explicit requirements for educational background, submission of a graduation certificate is required, and the decision will be made based on a comprehensive assessment of work experience and other factors.



	<p>(4) Foreign workers who have been working for more than 6 months must have a taxpayer identification number (NPWP) and join the social insurance system (BPJS).</p> <p>(5) Enrollment in insurance of Indonesian insurance company</p>	
Policy toward Industrial Human Resources	<p>✓ The employer company shall first obtain the approval of the Recruitment Plan for Foreigners (RPTKA) (see description under "Regulation of Employment of Foreigners") and then apply for IMTA to the Director General of the Department of Foreign Labor Employment Management, Directorate General of Labor Placement, through the "Foreign Workers Online" of the Ministry of Labor.</p> <p>✓ The IMTA is valid for a maximum of one (1) year, which may be extended depending on the RPTKA.</p> <p>&lt; Requirements for IMTA application &gt;</p> <p>(1) Letter of Approval from RPTKA, (2) Passport of the foreign worker, (3) Proof of payment of DKP-TKA, (4) Color photograph (5) Letter of appointment of the Indonesian (successor) to the foreign worker (6) Graduation certificate of the foreign worker (7) Resume of the foreign worker (8) Draft employment contract (9) Insurance certificate from the insurance company incorporated in Indonesia</p>	<p>✓ In 2017, the Thai government set up a new framework for foreign professionals called "Smart Visa". Specifically, foreign experts and investors in 10 specific industries that Thailand has identified as priority industries will be granted four-year residence permits and relief from periodic reporting requirements. The ten specific industries are as follows;</p> <p>(1) Next-generation automobiles, (2) Smart electronics, (3) Medical and wellness tourism, (4) Agriculture and biotechnology, (5) Advanced food, (6) Robotics, (7) Medical care, (8) Aviation and logistics, (9) Biofuels and biochemistry, (10) Digital</p> <p>✓ The Board of Investment of Thailand (BOI) has been accepting applications since February 1, 2018 and expects to receive about 1,000 applications per year.</p>

Other problem faced by Japanese companies is the frequent rejection of certificates of origin when using preferential tariffs such as those in Economic Partnership Agreements (EPAs) and Free Trade Agreements (FTAs). Certificates of origin are checked by the customs of the importing country in accordance with the respective agreements, but in Indonesia in particular, there is a strict practice of denying certificates of origin if the information on the certificate of origin does not exactly match the invoice. In addition, special care must be taken when the goods leave the port of origin and are transshipped in a third country before entering Indonesia.

In addition to the standards for the goods themselves, there are also standards for shipping in each agreement regarding certificates of origin, and if unpacking is carried out during the process, it could be a factor in the loss of origin status. Indonesia is particularly strict about this, and in some cases, when transshipment of goods is involved at a port in the third country, even if the goods are not unpacked, a non-processing certificate issued by the authorities at the transshipment site is required. The procedures for issuing such a non-processing certificate are different at each transshipment point, and the procedures are complicated. Issuance of such certificates is relatively easy in Singapore, but in many other transshipment destinations, the issuance of such certificates is not required. In the absence of a non-processing certificate, there have been a number of cases reported in which Indonesian customs denies a certificate of origin.

There have also been problems with customs officials making decisions on customs clearance of cargoes with different tariff classifications than they have in the past, resulting in the collection of additional taxes.

The action plans and affiliated activities fall into this domain are the followings;

**Table 2.5.7 Policy Measures and Action Plan on “Improve Business Climate to Encourage Investment especially for SMEs Investment, Import license, and Visa”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Improve business climate to encourage investment especially for SMEs investment, import license, and visa	<p><b>[Improvement of Immigration Management for Foreign Experts (engineers, researchers, and management staff)]</b></p> <ul style="list-style-type: none"> <li>Clarification of standard for obtaining visa: educational background, age, period of stay, etc. by numerical values in the regulations of the Minister of Manpower (Eliminate the discretion of the person in charge)</li> <li>Relaxation of visa requirements</li> <li>Other adjustment</li> </ul> <p><b>[Review of trade barriers]</b></p> <ul style="list-style-type: none"> <li>Proper application of national standard (ex. Application of high-tensile steel)</li> <li>Appropriate safety standard inspections</li> <li>Proper operation in customs</li> </ul> <p><b>[Expansion of the Approval System for Green Line Treatment]</b></p> <ul style="list-style-type: none"> <li>Disseminate the status of usage of Green Line and MITA Line in order to expand the approval system of such privilege.</li> </ul>	<p><b>Activity 3-1</b></p> <p><b>Activity 3-2</b></p> <p><b>Activity 3-3</b></p> <p><b>Activity 3-4</b></p> <p><b>Activity 3-5</b></p>
<u>Background of Trade Barriers and Greenline Treatment</u>			
The following issues have become apparent.			
<ul style="list-style-type: none"> <li>Imports of goods that do not meet Indonesian standards cannot be imported, and even if they meet the standards, if they are produced domestically, they are applied to high tariff products.</li> </ul>			

<ul style="list-style-type: none"> <li>• Non-processing certificates are strictly required for transshipment at the time of importation.</li> <li>• Bribery is rampant in customs.</li> </ul> <p>※ SNI and ISO are controlled by Badan Standardisasi Nasional (BSN). The SNI is, in principle, a voluntary standard, but from the standpoint of safety, health and environmental protection, the relevant ministries and other government agencies impose compulsory application of the SNI in some cases, and the products subject to the SNI are not allowed to be distributed in the country unless they are SNI-certified. For businesses that do not have a manufacturing base in Indonesia, the system imposes a heavy burden on them in terms of time and cost for screening.</p> <p>For items with the name of the ISO or IEC standard next to the SNI number, the ISO or IEC accreditation standards are applied directly to the SNI. As this is not a mutual recognition system, SNI registration is required even if the company has ISO or IEC certification.</p>	<p><b>[Implementation of Action Plan]</b></p> <ol style="list-style-type: none"> <li>1 Set up "Direct Appeal Site" on BKPM Website to gather request from related investors.</li> <li>2 Discussion/review of Omnibus Law by representative chamber of commerce from abroad</li> <li>3 Rental factory for small sized investors</li> <li>4 Establish a collaborative working group and Support the collaborative working group's activities</li> <li>5 Regular review of safety/environmental standard</li> </ol>	<p><b>Activity 3-6</b></p> <p><b>Activity 3-7</b></p> <p><b>Activity 3-8</b></p> <p><b>Activity 3-9</b></p>
---	--	---

<b>Activity 3-1</b>	Implementing Event: S/M/L
Action	Improvement of Immigration Management for Foreign Experts (engineers, researchers, and management staff)
Activity	<b>Clarification of standard for obtaining visa: educational background, age, period of stay, etc. by numerical values in the regulations of the Minister of Manpower (To eliminate the discretion of the person in charge)</b>
<b>【Activity Direction】</b>	
Contents:	(1) Specify that the final educational background of foreign engineers in the manufacturing industry is a high school or technical college degree. (2) Specify work permit for foreign engineers aged 60 and over. (3) Specify that foreign engineers who meet visa requirements are allowed to stay for more than one year.
Partners:	JETRO, Industrial Association of concerned commodity, Chamber of Commerce and Industry of concerned country, GAIKINDO, member companies (Tier 1 and 2) of GIAMM, etc
Resources:	The Labor Law (Law No 13 of 2003)
Challenge:	NA
<b>【Responsibilities】</b>	
Responsible Agencies:	Ministry of Manpower (MOM), BKPM, MOI, Ministry of Law and Human Rights (MOL)
Implementing Agencies:	(same as above)
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Expenses associated with a series of discussions	

# Activity 3-2	Implementing Event: S/M/L
Action	Improvement of Immigration Management for Foreign Experts (Engineers, researchers, and management staff)
<b>Activity</b>	<b>Relaxation of visa requirements</b>
【Activity Direction】	
Contents:	(1) For engineers who work or stay for a short period of time for the purpose of providing technical guidance to local personnel. (2) Eliminate or relax educational background and age requirements for visa issuance, allow a broader period of stay, and relax IMTA work site rules.
Partners:	RPTKA, BKPM, GAIKINDO, JETRO, Chamber of Commerce of each country
Resources:	Company interviews
Challenges:	Possibility to link with donor's support.
【Responsibilities】	
Responsible Agencies:	Ministry of Manpower (MOM), BKPM, MOI, RISTEK/BRIN, MOL, MOFA
Implementing Agencies:	(same as above)
【Major Expenses】	Total (Approx.): NA
Cost for internal research, Cost for adjustment of inter-agencies.	

# Activity 3-3	Implementing Event: S/M
Action	Improvement of Immigration Management for Foreign Experts (Engineers, researchers, and management staff)
<b>Activity</b>	<b>Other adjustment</b>
【Activity Direction】	
Contents:	(1) Coordination among Ministry of Foreign Affairs, Ministry of Labor and Migration, and Ministry of Industry regarding VISA requirements (2) Coordination between the Ministry of Foreign Affairs of Indonesia and the Ministry of Foreign Affairs of Japan
Partners:	RPTKA, BKPM, GAIKINDO, JETRO, Chamber of Commerce of each country
Resources:	Company interviews
Challenges:	Possibility to link with donor's support.
【Responsibilities】	
Responsible Agencies:	Ministry of Manpower (MOM), BKPM, MOI, MOL, MOFA
Implementing Agencies:	Same as above
【Major Expenses】	Total (Approx.): NA
Cost for internal research, Cost for adjustment of inter-agencies.	

# Activity 3-4	Implementing Event: SS/S/M/L
Action	Review of Trade Barriers
<b>Activity</b>	<ul style="list-style-type: none"> <li>• <b>Proper application of national standard (ex. Application of high-tensile steel)</b></li> <li>• <b>Appropriate safety standard inspections</b></li> <li>• <b>Proper operation in customs</b></li> </ul>
【Activity Direction】	
Contents:	<ul style="list-style-type: none"> <li>• Aline existing issues and problems on application of national standard by industrial group and chamber of commerce of concerned party.</li> <li>• Grasp the root cause laid in Indonesia side and find solution to solve this issue.</li> <li>• Legalize this solution. (Logistics companies and importers need to understand the provisions for applying preferential tariffs in EPAs/FTAs, the provisions for classification of goods and the system for determining customs valuation.)</li> </ul>
Partners:	JETRO, Industrial Association of concerned commodity, Chamber of Commerce and Industry of concerned country, GAIKINDO, member companies (Tier 1 and 2) of GIAMM, etc
Resources:	SNI and ISO controlled by Badan Standardisasi Nasional (BSN)

Challenge:	Dissemination to field level, Corruption of customs	
<b>【Responsibilities】</b>		
Responsible Agency:	MOT, MOI-ILMATE, MOF	
Implementing Agencies:	MOT	
<b>【Major Expenses】</b>	Total (Approx.): INR NA	
Expenses associated with establishing a collaborative working group		

In import procedures, logistics companies or importers frequently face the following problems: (1) customs officials deny the certificate of origin submitted by the importer, which prevents the importer from receiving preferential tariffs under the EPA/FTA; (2) when there is a discrepancy between customs officials and the importer regarding the HS code or customs valuation, customs officials determine the tariff rate or customs valuation, and the importer is subject to administrative penalties in the form of additional import taxes or fines. or customs valuation, and at the said valuation, the importer pays additional import tax or receives administrative penalties in the form of fines.

<b># Activity 3-5</b>	Implementing Event: M/L	
Action	Expansion of the Approval System for Green Line Treatment	
<b>Activity</b>	<b>Disseminate the merit of Green Line and MITA Line system.</b>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>Announce the procedure of obtaining privileged custom service and disseminate the effect to the tenants in Indonesia.</li> <li>Disseminate of the name of forwarder and custom dealer who have good experiences on green lane approval.</li> <li>Prepare case book of the green lane treatment approval dealt by Japanese tenants in Indonesia and promulgate these cases widely.</li> </ul>	
Partners:	JETRO, GAIKINDO, member companies (Tier 1 and 2) of GIAMM	
Resources:	Meeting room at MOI/BKPM	
Challenge:	-	
<b>【Responsibilities】</b>		
Responsible Agency:	BKPM, MOT, MOI-ILMATE	
Implementing Agencies:	MOT	
<b>【Major Expenses】</b>	Total (Approx.): INR NA	
Expenses associated with establishing a collaborative working group		

The number of days required for each category of customs clearance at the Port of Tanjung Priok			※ Green channel (lane), this channel is intended for exporter/importer with a good track record and the export/import commodities are low risk. Physical inspection of goods may be carried out if selected as random sampling by the system or customs intelligence indicates requirement for further inspection of the goods.
Customs clearance classification	Operation	The number of days required	
Red Line	Take-off Inspection	4.9	
Yellow Line	Document Inspection	2.5	
Green Line	None	0.07	
MITA Line	None	0.06	
Source) JETRO (as of December 2016)			

<b># Activity 3-6</b>	Implementing Event: As required	
Action	Implementation of Action Plan	
<b>Activity</b>	<b>1 Set up “Direct Appeal Site” on BKPM Website to gather request from related investors.</b> <b>2 Discussion/review of Omnibus Law by representative chamber of commerce from abroad</b>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>Monitor investors (companies invested) and facilitate the access with them to obtain their needs through establishing “On-line Direct Appeal Site”.</li> <li>Comprehend the contents of Omnibus Law issued on Oct. 5 2020 and use it in optimal manner.</li> <li>Use MarkLines, etc. effectively when searching for such companies in the supporting industries.</li> </ul>	

Partners:	<u>BRIN (technical support to refer technology), GAIKINDO, GIAMM</u>
Resources:	<u>Information database (ie. MarkLines), Needs survey from OEM and Tier 1-3 companies</u>
Challenges:	<ul style="list-style-type: none"> <li>• Conducting one-on-one meeting and attracting designated company (conducting a new style of investment attraction)</li> <li>• Close linkage among players.</li> </ul>
<b>【Responsibilities】</b>	
Responsible Agencies:	<u>BKPM, MOI-ILMATE, Embassy of Indonesia in Japan</u>
Implementing Agencies:	<u>BKPM</u>
<b>【Major Expenses】</b>	Total (Approx.): INR 1.5 Bil (annually)
<u>Travel Expenses, Expenses for the use of MarkLines, Translator in Japan</u>	

※Omnibus Law outline: The national sectoral minimum wage will be abolished and the setting of minimum wages will be left to local governments. It will also reduce the maximum severance payment from 32 months' salary to 19 months' salary while extending the unemployment insurance benefits paid by the government for six months. In addition, overtime will be allowed up to four hours a day, or 18 hours a week, and weekly holidays will be reduced from the current two days to one day. The government has also expanded the scope of work that can be outsourced and that can be performed by expatriates.

<b># Activity 3-7</b>	Implementation of Action Plan	Implementing Event: As required
Action	Implementation of Action Plan	
<b>Activity</b>	<b>Rental factory for small sized investors</b>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>• Rent out small sized factory for test running of production.</li> <li>• Provide rental equipment and product test centers used collectively with small sized investors and local suppliers.</li> <li>• Provide one-stop registration etc. which secure earliest start of operation by SME investors.</li> </ul>	
Partners:	<u>Industrial park operators</u>	
Resources:	<u>Information on designated investors, MOI/BKPM/Private sector WEB sites</u>	
Challenge:	<ul style="list-style-type: none"> <li>• Customizing the factory based on SME's specific needs</li> <li>• Establishing business network with private sector</li> <li>• Establishing institutional setup to support private industrial park operator</li> </ul>	
<b>【Responsibilities】</b>		
Responsible Agencies:	<u>BAPPENAS, MOI, private industrial park</u>	
Implementing Agencies:	<u>MOI, private industrial park</u>	
<b>【Major Expenses】</b>	Total (Approx.): INR NA	
<u>Subsidy for renting factory, Rental equipment</u>		

<b># Activity 3-8</b>	Implementation of Action Plan	Implementing Event: M/L
Action	Implementation of Action Plan	
<b>Activity</b>	<b>Establish a collaborative working group and Support the collaborative working group's activities</b>	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>• Organize a collaborative working group, and regularly hold meetings led by the chair selected in the group.</li> <li>• Conduct regular information exchange and study sessions on buyers' needs in terms of both core production technologies, production management technology, and any other issues that affect their relationships with local suppliers</li> <li>• Conduct research on external factors, such as listed below, that affect local suppliers: <ul style="list-style-type: none"> <li>➢ Supply and value chains of major sectors that supply parts to the auto and auto parts industry to validate reported issue of a lack of locally-sourced raw materials and to identify materials or components that have higher potentials to be procured domestically,</li> <li>➢ Ease of access to finance and government supports such as R&amp;D grants, and</li> <li>➢ New technology for the auto and auto parts manufacturing.</li> </ul> </li> <li>• Study items that are currently produced by FDI companies that can be outsourced to</li> </ul>	

	local companies (e.g. Resin painting and ED coating) and list up companies that provide such services.
	· Develop policy recommendations based on the information shared and researched
Partners:	GAIKINDO, member companies (Tier 1 and 2) of GIAMM,
Resources:	Research expenses
Challenge:	-
<b>【Responsibilities】</b>	
Responsible Agency:	BKPM, MOI
Implementing Agency:	MOI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Research expenses, meeting expenses	

# Activity 3-9	Implementing Event: L
Action	Implementation of Action Plan
Activity	Regular review of safety/environmental standard
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Review regulations related to safety and environment protection.</li> <li>Dispatch monitoring and advisory teams to enforce pollution control and safety, especially in the area of Resin painting and ED coating waste fluids and welding.</li> </ul>
Partners:	NGO agencies concerned with environment, Ministry of Environment and Forestry
Resources:	
Challenge:	Finding appropriate talents and enforcement
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI, BSN and BPPT under BRIN, Ministry of Environment and Forestry
Implementing Agency:	National Standardization Agency (BSN)
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Travel expenses and meeting expenses	

#### 4.1.5 Domain 2-4: Creation of automotive Industrial belt in Northern part of Java

※ Infrastructure related projects are out of scope.

**Table 2.5.8 Policy Measures and Action Plan on “Creation of automotive Industrial belt in Northern part of Java”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Creation of automotive Industrial belt in Northern part of Java	<b>【Development Direction】</b> <ul style="list-style-type: none"> <li>Check progress and monitor the effectiveness of concerned infrastructure projects. <ul style="list-style-type: none"> <li>✓ Highways (from Semarang to Tegal, Surakarta and Surabaya)</li> <li>✓ Railway Project (Cilbon-Sumaran)</li> <li>✓ Kendall Industrial Park (dedicated automobile port, assembly plant attraction, imported vehicle center)</li> </ul> </li> </ul>	NA
		<b>【Implementation of Action Plan】</b> <ul style="list-style-type: none"> <li>Raise awareness about the government’s infrastructure development policies</li> <li>Accelerate utilization of Patimban New Port</li> <li>Improve access road to seaports and airports</li> <li>Develop power sources</li> <li>Develop more industrial parks to accommodate</li> </ul>	NA



		new investments	
<b>Background</b>			
<b>1. Institutional Aspects:</b>			
<ul style="list-style-type: none"> <li>• The administration is modal and inter-modal links are weak.</li> <li>• Some administrative entities are regulatory bodies and supplying traffic services at the same time.</li> <li>• Customs clearance takes time, notifications are unclear and rules change frequently.</li> </ul>			
<b>2. Physical Aspects :</b>			
<ul style="list-style-type: none"> <li>• Industrial concentration is concentrated in the eastern part of Jakarta (Bekasi and Karawang provinces), causing congestion on the Jakarta-Cikampek road.</li> <li>• All trade cargoes are concentrated in Tanjung Buriok Port. Container dwell times are long.</li> <li>• Truck-dependent land transport. There is a potential shift to rail for longer distances.</li> <li>• Inadequate use of dry ports in Cikarang (Bekasi province) and Gedevage (Bandung city).</li> <li>• Intercity highways are not well developed.</li> <li>• Cold chain (cold transport) is not sufficiently developed and cold containers may not be available.</li> </ul>			
*The study on infrastructure development is out of scope of the Project			

**4.1.6 Domain 2-5: Factory management and production engineering skills development (ability to improve/ design process, etc)**

This Domain is highly related to Domain 2-2 and has many common action plans and activities. It also has a strong relationship with the action plans shown in the other Domains.

a) Expand Automotive Industry Course run by Polytechnical College

Indonesia will need more than double the number of workers and engineers by 2030 compared to 2015. On the other hand, SMK-Polytechnic is a source of human resources to support Indonesia's supporting industries. However, SMK-Polytechnic has not been able to produce the quality of human resources expected by the industry due to issues such as the curriculum not being practical and the low quality of teachers. While the development of human resources at the worker level can only be achieved through the improvement of primary education in Indonesia, the enhancement of the educational content at Polytechnic will contribute to the development of mid- to upstream engineers who will support the automotive industry.

Currently, STMI is the only polytechnic with an automotive department, and it has only 200 graduates. This number should be increased to at least three schools with 1,000 graduates.

Box. Interview with a Japanese Company

According to the interviews with companies in this survey, the following opinions were heard.

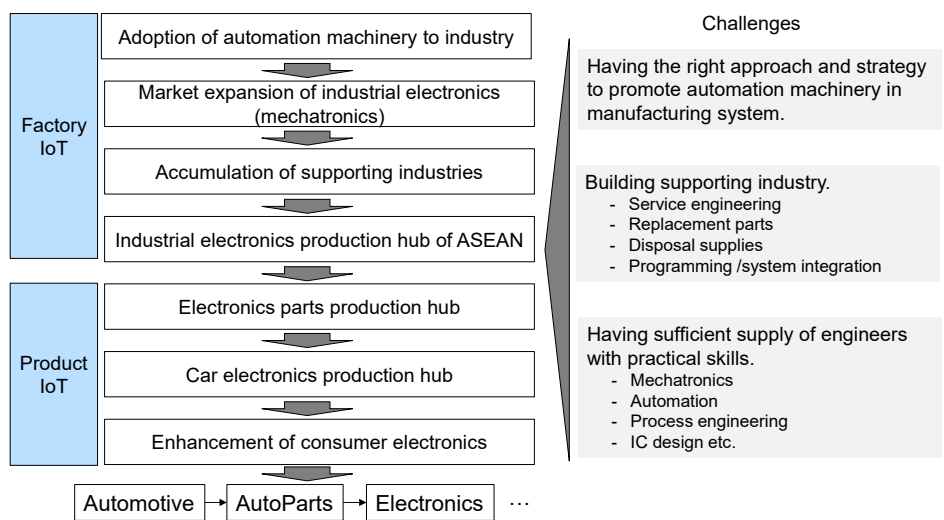
- It is difficult to attract engineers, and even high school graduates lack knowledge of electricity and machinery.
- The operator class has fundamental problems such as not being able to do calculations and not knowing how to clean. Employees who work as workers are

too poorly educated to begin with, not in terms of education and academic skills. Workers have almost no skills, so it is more efficient to train them yourself.

- In comparison with Japan, education up to university is probably about 10 years behind. There is a gap between the skills cultivated in school and actual business, but the level of technical high schools in Indonesia and Japan is different, so we should not think that they are the same.

b) Quality Upgrading

Improving the quality and productivity of manufacturing through factory IoT (Internet of Things) and product IoT.



Source: Survey on Promotion for Globally Competitive Industry in Indonesia (JICA, 2017)

**Figure 2.5.2** Image of Quality Upgrading

In its roadmap aiming for "Industry 4.0", the Indonesian government has set "doubling productivity relative to labor costs" as one of its goals of "Making Indonesia 4.0". In doing so, the need for automation using robots and other means is expected to increase.

There are few such SIer and Line Builder<sup>15</sup> companies in Indonesia, including Japanese and local companies, and it is necessary to attract and train SIers and Line Builders in order to improve the quality of suppliers' products.

c) FMS based HRD

Industry 4.0 offers new opportunities to improve the efficiency of resources and processes by combining information and communication technologies such as autonomous robotics, Internet of

<sup>15</sup> The "System Integrator (SIer)," who identifies factory specifications and builds the production line system using robots and processing machines to meet those specifications, and "Line Builder," who prepares unsolicited proposal including designs the production line, receives orders for the entire production line, and provides it after optimizing the entire system.

Things, cloud computing, big data, augmented reality, and additive manufacturing. The FMS is a factory production system that enables the manufacture of small quantities of a wide variety of parts, where manufacturing operations are automated<sup>16</sup>.

Teaching Factory is one of the work-based learning models in which students learn marketable skills. The benefits of Teaching Factory are: i) Giving students the opportunity to practice their skills in teaching factory activities, ii) Direct involvement of students in the entire process could have contributed to the development of entrepreneurship.

Learning Factory, with its real-world systems, is often used to train students a new set of competencies through practical and direct experience. Therefore, Learning Factory can make a great contribution to improving the ability of students in industrial engineering.

d) Implementation of Action Plan

The FMS should be combined with the Teaching Factory and Learning Factory to educate students. Furthermore, in order to implement the Action Plan, it is necessary to utilize aid from international donors and bilateral ODA, as it is believed that Indonesia lacks sufficient resources to do so.

For the time being, the Teaching Factory and Learning Factory can be started with the cooperation of major OEMs, but eventually it will be appropriate to position them as part of the ongoing PIDI functions.

Considering the importance of introducing a Flexible Manufacturing System (FMS) and the fact that Indonesia does not have sufficient technical resources to promote this, JICA Study Team proposes the implementation of the Matching Hub project using Japanese ODA as a Pilot Activity. The Matching Hub is a short-term activity to promote production automation by matching Indonesian Siers and Line Builders with local suppliers who have production automation as their goal. The details of the Matching Hub project are shown in the main report.

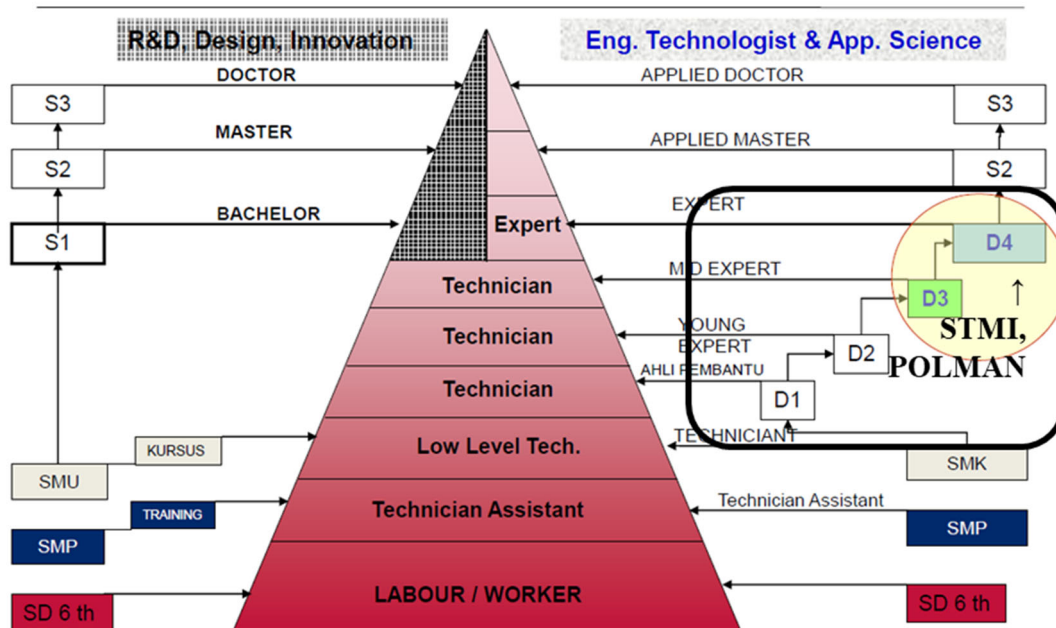
**Table 2.5.9 Policy Measures and Action Plan on “Factory management and production engineering skills development”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Factory management and production engineering skills development (ability to improve/ design process, etc)	<b>[Expand Automotive Industry Course run by Polytechnical College]</b>	
Background	<ul style="list-style-type: none"> <li>• Making Indonesia 4.0 does not see a way to incorporate digitalization and automation technologies.</li> <li>• In the implementation of Making Indonesia 4.0, there is a shortage of human resources that can handle digitalization and robotization.</li> </ul>	1 D4 and Recurrent Education	<b>Activity 5-1</b>
		<ul style="list-style-type: none"> <li>• Strengthening STMI, POLMAN, ATMI etc. and increase engineer graduates from 5,000 to 20,000/year</li> </ul>	<b>Activity 5-2</b>
		2 Develop an OJT training plan on processing technologies at Polytechnical College	
		3 Provide training and seminars on in-demand processing skills identified	
		<b>[Quality Upgrading]</b>	<b>Activity 5-3</b>
		<ul style="list-style-type: none"> <li>• Shortlist technologies to improve</li> </ul>	

<sup>16</sup> The system consists of automated manufacturing equipment and machinery such as industrial robots, transfer equipment and facilities such as automated guided vehicles and automated warehouses, and a system that controls the entire production process by connecting them via a network, thereby reducing facility downtime and improving production efficiency.

<ul style="list-style-type: none"> <li>Implementation of Making Indonesia 4.0 (linkage between this domain and the functions of PIDI) through the construction of PIDI is expected.</li> <li>In cooperation with PIDI, German and French companies are already preparing to go.</li> </ul>	<ul style="list-style-type: none"> <li>Strengthening/Expanding of Industry 4.0 based education (Upgrade the level of teachers)</li> <li>Conduct seminars for technology sophistication</li> <li>Support the procurement of equipment and machinery</li> </ul>	<p><b>Activity 5-4</b></p> <p><b>Activity 5-5</b></p>
	<p><b>[FMS based HRD]</b></p> <ul style="list-style-type: none"> <li>Functionalizing “Learning Factory” and “Teaching Factory”.</li> <li>Introduction of FMS through industry-academic collaboration (supported by a pilot activity “Matching Hub”)</li> </ul>	
	<p><b>[Implementation of Action Plan]</b></p> <ul style="list-style-type: none"> <li>Partnering with Japanese companies to promote digital technology and robotics in manufacturing as required by Making Indonesia 4.0 (supported by a pilot activity “Matching Hub”)</li> <li>Provide training and seminars on in-demand processing skills identified                             <ul style="list-style-type: none"> <li>✓ Improving student-level engineering skills</li> <li>✓ Strengthen plant management and manufacturing technologies by proactively utilizing the various ODAs provided by Multi-National and Bilateral Donors.</li> </ul> </li> <li>Strengthening engineering skills through PIDI (leveraging the five pillars of PIDI)</li> </ul>	<p>(Activity 5-5)</p> <p>Activity 5-6</p>

## NATIONAL EDUCATION SYSTEM



Source: STMI

Figure 2.5.3 Supplementary figures for Activity 5-1 and Activity 5-2

# Activity 5-1	Implementing Event: S/M/L-
Action	Expand Automotive Industry Course run by Polytechnical College
Activity	<b>D4 and Recurrent Education (Utilize and strengthen SMK/Polytechnic Program )</b>
【Activity Direction】	
Contents:	<ul style="list-style-type: none"> <li>D4 and Recurrent Education</li> </ul>

# Activity 5-1	Implementing Event: S/M/L-
Action	Expand Automotive Industry Course run by Polytechnical College
<b>Activity</b>	<b>D4 and Recurrent Education (Utilize and strengthen SMK/Polytechnic Program)</b>
	<ul style="list-style-type: none"> <li>Strengthening STMI, POLMAN, ATMI etc. and increase engineer graduates from 5,000 to 20,000/year</li> <li>Use of the SMK/Polytechnic Program budget</li> <li>Establishment of new SMKs and polytechnics and upgrading of facilities</li> <li>Sharing of know-how and horizontal development of SMKs in industrial parks (MM2100, etc.)</li> <li>Consideration of collaboration strategies between SMKs/polytechnics and Japanese companies according to their regions and departments</li> </ul>
Partners:	Government and Public-Private Partnership Council of Indonesia
Resources:	Interviews to the government agencies
Challenges:	Cooperation by private sector
<b>【Responsibilities】</b>	
Responsible Agencies:	Ministry of Education (MoE) ,MOI-BPSDMI
Implementing Agency:	MoE, MOI/ BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
	Consultant Fee

# Activity 5-2	Implementing Event: M/L
Action	Expand Automotive Industry Course run by Polytechnical College
<b>Activity</b>	<b>Develop an OJT training plan on processing technologies at Polytechnical College</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Improving the curriculum to be more practical by shifting from a classroom-based curriculum to one that emphasizes practical skills <ol style="list-style-type: none"> <li>Development of teaching materials that reflect the needs of industry</li> <li>Sharing the internal training and evaluation systems of Japanese companies</li> </ol> </li> <li>Dispatch students to Japanese companies for internships (to gain work experience)</li> <li>Provide training and seminars on in-demand processing skills identified</li> </ul>
Partners:	Government and Public-Private Partnership Council of Indonesia
Resources:	Intention of Polytechnical schools
Challenge:	Cooperation from private sector, especially Japanese tenants in Indonesia
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-ILMATE, MOI-BPSDMI, RISTEK-BRIN,
Implementing Agency:	MOI/BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
	Seminar expense

# Activity 5-3	Implementing Event: S/M
Action	Quality Upgrading
<b>Activity</b>	<b>Choose necessary technology and implement education both at academia and at businesses</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Shortlist technologies to improve</li> <li>Strengthening/Expanding of Industry 4.0 based education <ul style="list-style-type: none"> <li>✓ Dispatch of lecturers from companies to SMK/Polytechnic (implementation of practical classes)</li> <li>✓ Dispatch of faculty members to companies for internships and learning of advanced technologies at companies</li> </ul> </li> <li>Conduct seminars for technology sophistication</li> <li>Support the procurement of equipment and machinery</li> </ul>
Partners:	Government, Academia, and Public-Private Partnership Council of Indonesia
Resources:	Intention of Polytechnical schools
Challenge:	Cooperation from private sector, especially Japanese tenants in Indonesia
<b>【Responsibilities】</b>	
Responsible Agencies:	RISTEK-BRIN, MOI-BPPI, MOI-BPSDMI

Implementing Agency:	MOI/BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Seminar expense	

[Processing Technologies]

# Activity 5-4	Implementing Event: S/M
Action	FMS based Human Resource Development
<b>Activity</b>	<b>Develop a training plan based on the needs on processing technologies and flexible manufacturing system (FMS).</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Based on the meeting results with line agencies and research on the topics below, identify the most in-demand skills and technologies. <ul style="list-style-type: none"> <li>➢ What technologies are accumulated in each value chain</li> <li>➢ Current state of locations of R&amp;D functions.</li> </ul> </li> <li>• Map out human resources (=experts and trainers from OEMs and Tier 1 and 2 companies as well as government organizations) that are domestically available to conduct training on topics identified.</li> <li>• <u>Functionalize “Learning Factory” and “Teaching Factory” in the training designed (refer to Activity 7-4).</u></li> <li>• Based on the training plan developed in Activity 5-4 above, implement training activity under the initiative of IMATAP. <ul style="list-style-type: none"> <li>➢ Firm-level consultation and training</li> <li>➢ In-class seminars</li> </ul> </li> <li>• Support the private sector to access government grants or schemes necessary to obtain necessary resources</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Map out various schemes available to support the plan (e.g. Balik Scientist Program by LIPI, LIPI Grants-In-Aid Program, and technical assistance projects by donor countries)</li> <li>• Note: Areas of training that may be needed in Indonesia are: pattern making techniques (casting and forging), precision aluminum die casting, use of CAD/CAM in machining, molding techniques to be used for engineering plastic products, and energy efficient and cleaner production technologies</li> </ul>
Partners:	GAIKINDO, member companies (Tier 1 and 2) of GIAMM, PIKKO, IOI Government and Public-Private Partnership Council of Indonesia
Resources:	Study result by JICA
Challenge:	Trans-agency implementation in Indonesia
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI, MOI-ILMATE
Implementing Agencies:	MOI-BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Meeting expenses, research expenses	

# Activity 5-5	Implementing Event: SS/S/M
Action	FMS based Human Resource Development
<b>Activity</b>	<b>Introduction of FMS through industry-academic collaboration (supported as a pilot activity “Matching Hub”)</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Cultivate local SIER and Line Builder by matching with Japanese advanced players.</li> <li>• MOI organizes “Matching Hub” to meet SIERs and local suppliers who want to introduce automated manufacturing system into their factory.</li> <li>• Conduct Matching Hub project <ul style="list-style-type: none"> <li>• Map out technical upgrading needs in terms of machinery and equipment based on the study conducted by SIER and/or Line Builder.</li> <li>• Outline loan schemes accessible to SMEs in Indonesia</li> <li>• Develop subsidies (government guarantee loan schemes) for equipment and</li> </ul> </li> </ul>

# Activity 5-5	Implementing Event: SS/S/M
Action	FMS based Human Resource Development
<b>Activity</b>	<b>Introduction of FMS through industry-academic collaboration (supported as a pilot activity “Matching Hub”)</b>
	<p>machinery that enables mass production and are in line with the needs identified and facility.</p> <ul style="list-style-type: none"> <li>Announce the schemes and start the implementations</li> <li>The Government of Indonesia subsidizes the cost of automation of local supplier when automation plan was implemented.</li> </ul>
Partners:	GAIKINDO, member companies (Tier 1 and 2) of GIAMM, donor agencies
Resources:	Recommended to implement under JICA7s technical assistance
Challenge:	Subsidy funding by the GOI
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI, MOI-IMATAP
Implementing Agencies:	MOI-IMATAP, IOI, STMI,
<b>【Major Expenses】</b>	Total (Approx.): INR                      Mil
Expenses arose for JICA project, Subsidy to local supplier	

# Activity 5-6	Implementing Event: M/L
Action	Implementation of Action Plan
<b>Activity</b>	<b>Provide training and seminars on in-demand processing skills identified</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Based on the training plan developed in 3-2-1, implement training under the initiative of the private sector. <ul style="list-style-type: none"> <li>Firm-level consultation and training</li> <li>In-class seminars</li> </ul> </li> <li>Support the private sector to access government grants or schemes necessary to obtain necessary resources</li> <li>Implement the training <ul style="list-style-type: none"> <li>Improving student-level engineering skills</li> <li>Strengthen plant management and manufacturing technologies by proactively utilizing the various ODAs provided by Multi-National and Bilateral Donors.</li> </ul> </li> </ul>
Partners:	GAIKINDO, member companies (Tier 1 and 2) of GIAMM, LIPI, donor agencies, International/Bilateral donors
Resources:	Recommended to utilize JICA’s supporting scheme
Challenge:	Support by donor
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI (in charge of Industry 4.0 Center/ PIDI)
Implementing Agencies:	MOI-BPSDMIR&D under MOI i.e. ASTI and MIRDC
<b>【Major Expenses】</b>	Total (Approx.): INR                      Mil
Expenses relating to bringing in experts (honorarium, travel expenses, accommodation etc.), seminar expenses, coordination expenses	

#### 4.1.7 Domain 2-6: Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D

In recent years, automakers have been setting up R&D centers in the ASEAN region where they have manufacturing bases and localizing their development, design, and evaluation functions, but a comparison of the status of development bases established by major automakers shows that even those

OEMs and Tier1 companies with manufacturing and sales bases in Indonesia often have development bases in Thailand as well.

One of the reasons for this is that Thailand's 2012 Master Plan for the Automotive Industry sets out a policy of attracting development bases in order to secure a competitive advantage in ASEAN and has established preferential benefits.

The establishment of the R&D center is expected to introduce cutting-edge technologies and promote the sophistication of the industry. In addition, if the new products developed by the R&D center are manufactured in the same region, it will attract new supporting industries. Thus it will become an important measure to attract R&D centers.

Some of the major OEMs do not have development bases in more than one country and considering the fact that it is difficult to relocate R&D centers once they are established due to their functions and facilities. Allowing for this circumstance it is imperative to attract R&D center immediately.

In the year 2017, the Thai government has just added a new benefit for attracting advanced technologies including R&D centers, and Indonesia needs to consider preferential policies for attracting development bases in order to upgrade competitiveness in ASEAN.

Indonesia's Ministry of Finance promulgated Finance Minister Regulation No. 153 of 2020 on October 9, 2020, effective immediately. The regulation introduced a super tax reduction system that exempts research and development (R&D) expenses from corporate tax for 105 items from specific 11 sectors. The provision is a subdivision of Decree No. 45 of 2019, which provides for large-scale tax breaks for human resource development and R&D investment.

- Eligible companies will be able to deduct 100% of their R&D expenses from their gross income, and up to an additional 200% if they meet the following conditions
- 50%: If the company registers a patent or other intellectual property in Indonesia as a result of research and development.
- 25%: In the event that the above domestic intellectual property is also registered abroad.
- 100%: When the research and development has reached the commercialization stage.
- 25%: If the research or development has reached the licensing or commercialization stage and is conducted in collaboration with a government research and development institute and/or an Indonesian higher education institution.

However, according to actual interviews with companies, the expectation of this incentive is low especially among Tier 2&3 suppliers by the reasons below, and the effectiveness of this measure seems to be uncertain.

- Lack of familiarity with the application process
  - Lack of sufficient technical support and questionable R&D effectiveness
  - Many companies keep double books and do not want to disclose their financial status to the authorities.
-



One of the reasons why R&D has not taken root in Indonesia's supporting industries is that the MOI's internal organization does not have a clearly defined department that is responsible for R&D in the automotive industry. For this reason, JICA Study Team firstly proposes to clarify the process to receive incentives for R&D within companies. And the secondly, within the framework of JICA support(as the Pilot activities), leave this know-how as a guideline .

**Table 2.5.10 Policy Measures and Action Plan on “Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D	<b>[Establish R&amp;D&amp;D support system]</b> Review and expand the existing R&D related incentives <ul style="list-style-type: none"> <li>Review and expand R&amp;D related incentives by establishing protocol (supported by a pilot activity “R&amp;D&amp;D protocol”))</li> </ul>	Refer to Domain 2-8  Activity 6-1
	Background <ul style="list-style-type: none"> <li>Incentive policy on R&amp;D&amp;D (No. 45), which was enacted into a law last year, is under-recognized and under-utilized.</li> <li>R&amp;D&amp;D is a key agenda in Making Indonesia 4.0, with Bio Fuel, Lithium Battery and Upper Body Design of MPV being the central theme.</li> </ul>	<b>[Push R&amp;D&amp;D Implementation Policy on Bio Fuel, Lithium Battery and Upper Body Design of MPV]</b> <ul style="list-style-type: none"> <li>Strengthen institutional tie-up with advanced OEMs, research institute, and academe.</li> <li>Allocate necessary budget for R&amp;D&amp;D</li> <li>Industry-Academia Tie-Up</li> <li>Examine a probability on establishing the Sistem Inovasi Nasional : SINAS</li> </ul>	Activity 6-2  Refer to Domain 2-7
		<b>[Improve Immigration Management toward R&amp;D&amp;D Experts]</b>	Activity 6-3  Refer to Activity 3-1 ~Activity 3-3
		<b>[Encourage communication on Academic Network in order to establish a Project in the Target Fields]</b> <ul style="list-style-type: none"> <li>For example, SATREPS of Japan has dealt with similar theme in Thailand</li> <li>Tie up with oversea universities and support outstanding students to go on an overseas study program</li> </ul>	Refer to Domain 2-7
		<b>[Implementation of Action Plan]</b> <ul style="list-style-type: none"> <li>See above action plans on Domain 2-3, for more information on R&amp;D&amp;D Incentive.</li> <li>Awareness and improvement activities on the Indonesian side by strengthening top diplomacy and public relations</li> <li>Formulate SATREPS projects related to Bio Fuel and Lithium Battery by utilizing the network of researchers between Indonesia and Japan.</li> <li>Technology Sophistication through Establishing R&amp;D Center (Utilization of PIDI)</li> </ul>	Activity 6-1 ~ Activity 6-4

According to a series of interview (based on the interview from Economic Research Institute for ASEAN and East Asia (ERIA)), the situation of biofuel-related R&D in Indonesian side is summarized as follows and there are no information on R&D for EV battery so far.

- R&D on biodiesel is progressing steadily, and the country is adequately addressing technical issues.

- The challenge is to coordinate with the agricultural sector regarding Crude Palm Oil, which seems to require no external support.

As for bioethanol, the price is still high and further research and development is needed. Since the introduction of Euro 5 requires government subsidies for the price stability of bioethanol blended fuel, it is essential to provide the low-cost bioethanol through R&D to reduce this price.

In Thailand, the consumption of diesel fuel exceeds that of gasoline fuel, but bioethanol production is more common than biodiesel production. There should be cooperation between Indonesia's biodiesel and Thailand's bioethanol in terms of import and export.

# Activity 6-1	Implementing Event: SS/S
Action	Establishing the Support System
<b>Activity</b>	<b>Review and expand R&amp;D related incentives by establishing protocol (No.45)</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Clarify the definition and conditions of application on new incentive policy (reg.45) and study awareness, issues, and prevalence of existing incentives on R&amp;D and vocational training(Reg.45/2019)</li> <li>• Demonstrate a series of incentive application and establish the protocol of incentive application</li> <li>• Check possibility to work with international and bilateral donors on above matter.</li> <li>• Promote utilization of useful incentives through advertisement</li> <li>• Incentivize more to the companies applying digital and AI technologies.</li> </ul>
※ Propose above idea to implement in JICA assisted Pilot Activity as “R&D&D Protocol”	
Partners:	The Government agencies (BKPM etc.), Existing and attracted tenants (investors), JCCIP/ JETRO
Resources:	Study result on awareness, issues, and prevalence of existing incentives
Challenges:	<ul style="list-style-type: none"> <li>• Obtaining consensus on incentives from MOF and other government agencies.</li> <li>• Institutional setup on approving/implementing/monitoring incentive provision.</li> </ul>
<b>【Responsibilities】</b>	
Responsible Agencies:	RISTEK/BRINMOI-KPAII, MOI-BPII, MOI-ILMATE, MOF-BKF
Implementing Agency:	MOI-KPAII
<b>【Major Expenses】</b>	Total (Approx.): NA
Cost of research and coordination..	

# Activity 6-2	Implementing Event: S/M/L
Action	Push R&D&D Implementation Policy on Bio Fuel, Lithium Battery and Upper Body Design of MPV
<b>Activity</b>	<b>Strengthen institutional tie-up with advanced OEMs, research institute, and academe.</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Study what technologies should Indonesia focus for R&amp;D (Biofuel and EV battery production are recognized as the main issue)</li> <li>• Study and tie up with advanced R&amp;D&amp;D institutions to work with Indonesia. (Check co-R&amp;D scheme, for example Japan’s SATREPS: <a href="https://www.jst.go.jp/global/english/index.html">https://www.jst.go.jp/global/english/index.html</a>)</li> <li>• Enhance digital and IoT based R&amp;D&amp;D and increase opportunities to utilize digital platform</li> <li>• Plan for establishing SINAS as a decision center of science and technology at national level. CSTI (Council for Science, Technology and Innovation) of Japan is a model organization.</li> <li>• Plan for utilizing PIDI as the training hub of engineering skill.</li> </ul>
Partners:	OEMs, Research institutions, Academic institutions, Vocational schools
Resources:	Internet information, SATREPS guidance

# Activity 6-2	Implementing Event: S/M/L
Action	Push R&D&D Implementation Policy on Bio Fuel, Lithium Battery and Upper Body Design of MPV
<b>Activity</b>	<b>Strengthen institutional tie-up with advanced OEMs, research institute, and academe.</b>
Challenges:	Securing R&D&D budget in Indonesia
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI, RISTEK/BRIN, ,
Implementing Agency:	MOI-BPPI i.e. CABI and MIRDC, MOI-BPSDMI to coordinate vocational schools, RISTEK/BRIN to coordinate universities, and research agencies i.e. BPPT, LIPI
<b>【Major Expenses】</b>	Total (Approx.): NA
Budget for R&D&D	

# Activity 6-3	Implementing Event: M/L
Action	Push R&D&D Implementation Policy on Bio Fuel, Lithium Battery and Upper Body Design of MPV
<b>Activity</b>	<b>Establish the Sistem Inovasi Nasional : SINAS</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Study what technologies should Indonesia focus for R&amp;D (Biofuel and EV battery production are recognized as the main issue)</li> <li>• Study investors' deciding factors of locating R&amp;D center</li> <li>• Enhance digital and IoT based R&amp;D&amp;D and increase opportunities to utilize digital platform</li> <li>• Plan for establishing SINAS as a decision center of science and technology at national level. CSTI (Council for Science, Technology and Innovation) of Japan is a model organization.</li> <li>• Plan for utilizing PIDI as the training hub of engineering skill.</li> </ul>
Partners:	OEMs and suppliers, Research Institutions, Academic Institution, Vocational Schools
Resources:	Company interviews
Challenges:	Technical expertise to conduct the study. Cooperation of companies.
<b>【Responsibilities】</b>	
Responsible Agencies:	BAPPENAS, MOI, RISTEK/BRIN
Implementing Agency:	MOI in coordination with RISTEK/BRIN
<b>【Major Expenses】</b>	Total (Approx.): NA
Technical	

#### 4.1.8 Domain 2-7: Collaboration between technology university /polytechnic and auto industry to develop required skills

Cooperation from industry is necessary to resolve issues such as the establishment of a practical curriculum, reflection of the needs of industry, and the shortage of experienced teachers.

- Thailand has been strongly promoting industry-academia collaboration since the 1990s, and is working on human resource development.
- In Indonesia, some Japanese companies have established SMKs in industrial parks, but these efforts are limited.

**Table 2.5.11 Government Policy on Industry-Academia Tie-up and Its Precedents**

Government Policy	Example of Industry-Academia Tie-up in Indonesia
<ul style="list-style-type: none"> <li>• SMK Initiative (Ministry of Education and Culture)</li> <li>✓ The goal is to establish 1,650 more advanced SMK schools by 2020.</li> <li>✓ As of 2015, 90 schools have been established.</li> <li>• SMK revitalization strategy (implemented by the SMK Education Committee)</li> <li>✓ 10 steps to reform SMKs (1)Improve the quality of teachers, (2) computerize administration and management, (3) strengthen cooperation with industry, (4) reorganize the curriculum, (5) establish a technology development laboratory, (6) introduce video teaching materials and an e-Report system using video, (7) promote professional certification exams, (8) improve school facilities, (9) expand SMKs in rural areas, and (10) collaborate with local businesses to improve the local environment.</li> <li>• Polytechnic Program (Ministry of Industry)</li> <li>✓ The Ministry of Industry and Trade (MOIT) is working with automobile manufacturers to improve the curriculum to match the needs of the automobile industry.</li> <li>• Link and Match Program (Ministry of Industry)</li> <li>✓ Participation of industry in vocational education and training at SMK to develop human resources that match the needs of industry</li> </ul>	<ul style="list-style-type: none"> <li>• Indonesia Institute of Automotive Industry (IOI)</li> <li>✓ Established in 2016 by the Ministry of Industry, universities, and companies to strengthen the competitiveness of the automotive industry. Provides human resource development support and consulting services to companies, and also owns a polytechnic specializing in automotive technology.</li> <li>• Establishment of SMK in the industrial park</li> <li>✓ In 2012, Marubeni Corporation and Argo Manunggal, a local conglomerate, established SMK "Mitra Industry MM2100" in MM2100 Industrial Park.</li> <li>✓ The vision is to "connect industry and education," focusing not only on knowledge and skills, but also on attitude and stance.</li> <li>✓ The school has been designated as a model school by the Ministry of Education and Culture, and has attracted considerable attention in Japan.</li> <li>• Establishment of educational courses at SMK</li> <li>✓ Isuzu Astra Motor Indonesia established the "Isuzu Education Program" at SMK in Medan, North Sumatra, to teach the latest diesel technology.</li> <li>✓ Isuzu Astra Motor Indonesia has established a similar educational course at SMK in Medan, North Sumatra.</li> </ul>

<ul style="list-style-type: none"> <li>Establishment of polytechnics in industrial parks and special economic zones</li> </ul>	
--	--

Currently, the Ministry of Industry has initiated reforms for SMKs and polytechnics, such as the "SMK Initiative", "Polytechnic Program", and "Link and Match Program", and these efforts need to be further developed in combination with industry-academia collaboration (this is in line with Domain 7).

The industry-academia collaboration that the automotive industry expects is not just for securing excellent human resources. European and U.S. OEMs sometimes order research and design work after signing confidentiality agreements with research institutions (universities and research centers). In addition, they often order the same research from multiple research institutes in Japan and compare the results. In many cases, research institutions with excellent researchers conduct joint research and obtain patents together.

In Indonesia, such cases are still rare, so the R&D capacity enhancement proposed in Domain 2-6 will be implemented in higher education institutions and research facilities, and opportunities for joint research with academia will be formed at the initiative of the government.

**Table 2.5.12 Policy Measures and Action Plan on “Collaboration between technology university /polytechnic and auto industry to develop required skills”**

Policy Measures		Action Plan	Ref
<b>Overall</b>	Collaboration between technology university /polytechnic and auto industry to develop required skills	<b>[Industry-Academia Joint Program]</b>	
	Background <ul style="list-style-type: none"> <li>This is the main agenda of the Making Industry 4.0.</li> <li>Enable to expect to create Learning Factory and Teaching Factory through the construction of PIDI, .</li> <li>Adopt an internship system in the automotive industry for 4th year university students, which has not been common in the past.</li> <li>To apply the concept of industry-university cooperation to improve the technology of factory management and engineering through the cooperation with Domain 2-5.</li> <li>The possibility of establishing a COE was increased while ensuring collaboration with Domain2-5.</li> <li>An increasing number of countries have been steered</li> </ul>	1 Strengthening collaboration between polytechnic and industry, including POLMAN Bandung (under the Ministry of Higher Education), STMI (under MOI) and ATMI (private)	<b>Activity 7-1</b>
		<ul style="list-style-type: none"> <li>Training of 5,000 design personnel per year (currently about 0: OJT in the design department after employment)                             <ul style="list-style-type: none"> <li>Training of FMS skills and human resource development (See Activity 2-2)</li> <li>Strengthen the capability of engineering on modern technology.</li> <li>Increase the number of faculties on automotive related engineering course at higher educational institutions.</li> </ul> </li> </ul>	Refer to Domain 2-5 and Domain 2-6 Refer to Activity 5-1 ~5-6, 6-2
		<ul style="list-style-type: none"> <li>Create more opportunities for universities/colleges/TVET institutions to learn more about Indonesia auto industry.</li> </ul>	<b>Activity 7-2</b>
		2 Formulate the COE concept, create a syllabus for industry-university collaboration, and provide incentives for donating courses and accepting interns.	<b>Activity 7-3</b>
		3 Functionalize “Learning Factory” and “Teaching Factory” in the training of academe.	<b>Activity 7-4</b> Refer to Activity 5-4
		<b>[Implementation of Action Plan]</b>	
		<ul style="list-style-type: none"> <li>Conduct endowed lecture at STMI: Business efficiency technology (FMS, etc.)" (for students).</li> <li>Develop a pool of human resources that can teach educational institution in auto manufacturing.</li> </ul>	<b>Activity 7-5</b> <b>Activity 7-6</b>

	from ICEVs to xEVs in response to the corona disaster.	<ul style="list-style-type: none"> <li>Develop incentives for companies to work closely with academia/TVET institutions.</li> <li>Facilitate a greater linkage among government agencies for the industrial-academe linkage</li> <li>Human resources development for students through the establishment of donated courses at technical schools (STMI, etc.)</li> </ul>	<b>Activity 7-7</b>  <b>Activity 7-8</b>
--	--	---	--

<b># Activity 7-1</b>	Implementing Event: S/M/L	
Action	Industry-Academia Joint Program	
Activity	Industry-Academia Tie-up Strengthening collaboration between polytechnic and industry, including POLMAN Bandung (under the Ministry of Higher Education), STMI (under MOI) and ATMI (private)	
<b>【Activity Direction】</b>		
Contents:	<ul style="list-style-type: none"> <li>Conduct an interagency working group</li> <li>Standardize procedures, documents and formats used by universities, colleges, TVET providers, and secondary schools for industrial – academe linkage programs (e.g. OJT, dual training system, faculty immersion, guest lectures, adopt a school program etc.)</li> <li>Develop an inter-agency directive (e.g. Policies, Standards, and Guidelines) on how to facilitate industry-academia linkage, outlining government support programs, rules and regulations, appropriate advice to be given to both the industry and the academia</li> <li>Conduct training on digital, automation, lean manufacturing through industry-academia linkage.</li> </ul>	
Partners:	Auto /automotive companies, Research institutions, Academia institutions	
Resources:	N/A	
Challenge:	N/A	
<b>【Responsibilities】</b>		
Responsible Agencies:	MOI-BPSDMI, MOI-ILMATE	
Implementing Agencies:	MOI-BPSDMI to coordinate academia	
<b>【Major Expenses】</b>		
		Total (Approx.): NA
Meeting expenses and research expenses, Honorarium to lecturer, Cost of OJT and training materials		

<b>a# Activity 7-2</b>	Implementing Event: 2021 - 2022	
Action	Industry-Academia Joint Program	
Activity	Create more opportunities for <b>universities/colleges/TVET institutions</b> to learn more about Indonesia auto industry.	
<b>【Activity Direction】</b>		
Contents:	Conduct auto industry-academia linkage events (= seminar, networking between industry coordinators and companies, career guidance orientation, and job fair)	
Partners:	Recruitment agencies (e.g. Jobstreet Indonesia), universities/colleges, TVIs, industry associations, and companies	
Resources:	Venue, booths, staff, marketing	
Challenge:	As coordination of such events involve many stakeholders, it is very time-consuming.	
<b>【Responsibilities】</b>		
Responsible Agencies:	BKPM, MOI, Ministry of Education and Culture (MOEC/Kemdikbud), Ministry of Manpower, TESDA	
Implementing Agencies:	BKPM, MOI-BPSDMI – might use regional offices (Dinas)	
<b>【Major Expenses】</b>		
		Total (Approx.): INR NA
Venue (incl. booths), event organization costs, staff allocation to the event secretariat		

<b># Activity 7-3</b>	Implementing Event: S/M	
Action	Industry-Academia Joint Program	
Activity	<b>Formulate the COE concept, create a syllabus for industry-university collaboration, and</b>	

<b>provide incentives for donating courses and accepting interns.</b>	
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Hold consultative meetings between Ministry of Education and Culture (Kemdikbud) and industry partners to review current programs and curriculums for engineering programs related to the auto industry.</li> <li>• Study the possibility of developing an interdisciplinary program on auto manufacturing and car-electronics</li> <li>• Facilitate faculty members to go industry immersion to learn new technologies,</li> <li>• Incentivize to the contribution from the private sector, such and endowed chair, accepting intern.</li> <li>• Examine the possibility to utilize PIDI as the COE, and appropriate assistance from donor country.</li> </ul>
Partners:	Industry partners, Universities, vocational schools
Resources:	Equipment (incl. software) deemed necessary
Challenge:	Coordination (i.e. involvement of industry partners from various positioning in the value chain)
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI in collaboration with Ministry of Education and Culture (Kemdikbud) particularly at Office of Programs and Standards Development,
Implementing Agencies:	(same as above)
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Meeting costs, procurement of necessary equipment	

# Activity 7-4	Implementing Event: SS/S
Action	Industry-Academia Joint Program
Activity	<b>Functionalize “Learning Factory” and “Teaching Factory” in the training of academe (refer to Activity 7-3, and Activity 5-4)</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Conduct public announcement through automotive associations i.e. GAIKINDO for the mentor company who can cooperate with academia through the endowed chair and intern program.</li> <li>• Discuss on implementation of “Learning Factory” and “Teaching Factory” with applied company.</li> <li>• Determine necessary process, term, budget, etc.</li> <li>• Subsidize travel expense of lecturer if the company in question agree to facilitate “Learning Factory” and “Teaching Factory” in the curriculum.</li> <li>• Implement “Learning Factory” and “Teaching Factory” operation.</li> </ul>
Partners:	GAIKINDO, GIAMM, IOI, University, Vocational/ Polytechnical college, Jakarta Japan Club (JJC)
Resources:	Implementation process of Learning factory and Teaching factory
Challenge:	Cooperation from Japan side
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI,
Implementing Agencies:	MOI-BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Meeting costs, procurement of necessary equipment	

# Activity 7-5	Implementing Event: SS/S/M/L
Action	Implementation of Action Plan
Activity	<b>Conduct endowed lecture at STMI: Business efficiency technology (FMS, etc.)" (for students)</b>
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Request Japanese companies with expertise in FMS and design to donate courses.</li> </ul>



	<ul style="list-style-type: none"> <li>Logistics, classroom lectures (overview), and confirmation of results are handled by experts.</li> <li>Introduce educational equipment necessary for efficient curriculum management (not involving large equipment). (e.g. CATIA, Pro-E, Denso program, etc.)</li> <li>Two to three in-house instructors will provide a total of 10 classroom lectures and on-the-job training in Indonesia.</li> </ul>
Partners:	Universities, Vocational/ Polytechnical college, Industry partners, Jakarta Japan Club (JJC)
Resources:	Implementation process of Learning factory and Teaching factory
Challenge:	Cooperation from Japan side
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI
Implementing Agencies:	MOI-BPSDMI i.e. STMI Jakarta
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Meeting costs, procurement of necessary equipment	

# Activity 7-6	Implementing Event: M/L
Action	Implementation of Action Plan
Activity	Develop a pool of human resources that can teach educational institution in auto manufacturing.
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Source appropriate human resources to teach the BS course in auto manufacturing (e.g. use the Balik Scientist Program)</li> <li>Develop the consortium for faculty members specialized in auto manufacturing</li> <li>Hold annual conference to improve share knowledge and the curriculum for BS in auto manufacturing</li> </ul>
Partners:	Auto companies in Indonesia and overseas
Resources:	
Challenge:	Finding sufficient numbers of human resources who can teach the BS course in auto manufacturing
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-BPSDMI, RISTEK-BRIN, Ministry of Education and Culture (Kemdikbud), Ministry of Manpower
Implementing Agencies:	(same as above)
<b>【Major Expenses】</b>	Total (Approx.): INR NA
Sourcing and retaining costs of appropriate talents, conference costs	

# Activity 7-7	Implementing Event: SS/S
Action	Implementation of Action Plan
Activity	Develop incentives for companies to work closely with academia/TVET institutions
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>Review and outline various industry academia linkage programs, frequently-reported challenges that companies encounter in taking a part in the programs, regulations that companies need to abide by when participating in the programs, and government support on industry-academia partnerships.</li> <li>Study incentives or training schemes offered in other countries.</li> <li>Offer incentives for: <ul style="list-style-type: none"> <li>Joint research and development (R&amp;D) projects</li> <li>Corporation sponsored R&amp;D competitions</li> <li>Faculty member training/industry immersion</li> <li>Equipment donation</li> </ul> </li> </ul>
Partners:	Automotive companies, universities, vocational/ polytechnic colleges
Resources:	N/A
Challenge:	N/A
<b>【Responsibilities】</b>	



Responsible Agencies:	<u>MOI, RISTEK-BRIN, Ministry of Education and Culture</u>
Implementing Agencies:	<u>MOI-BPSDMI, MOI-KPAII</u>
<b>【Major Expenses】</b>	Total (Approx.): INR NA
<u>Research expense</u>	

<b># Activity 7-8</b>	Implementing Event: S/M/L
Action	Industry-Academia Joint Program
Activity	Facilitate a greater linkage among government agencies for the industrial-academe linkage
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Conduct an interagency working group</li> <li>• Standardize procedures, documents and formats used by universities, colleges, TVET providers, and secondary schools for industrial – academe linkage programs (e.g. OJT, dual training system, faculty immersion, guest lectures, adopt a school program etc.)</li> <li>• Develop an inter-agency directive (e.g. Policies, Standards, and Guidelines) on how to facilitate industry-academia linkage, outlining government support programs, rules and regulations, appropriate advice to be given to both the industry and the academia</li> </ul>
Partners:	<u>Automotive companies, universities, vocational/ polytechnic colleges</u>
Resources:	<u>N/A</u>
Challenge:	<u>N/A</u>
<b>【Responsibilities】</b>	
Responsible Agencies:	<u>MOI-BPSDMI, Ministry Of Education And Culture (Kemdikbud), Ministry of Manpower,</u>
Implementing Agencies:	<u>MOI-BPSDMI, Ministry of Manpower, Kemdikbud,</u>
<b>【Major Expenses】</b>	Total (Approx.): INR NA
<u>Meeting expenses and research expenses</u>	

#### 4.1.9 Domain 2-8: Support expansion of R&D&D supporting service such as Computer Aided Engineering and material evaluation

According to the interview with GAIKINDO conducted in November 2020, the following points were mentioned.

"Our current concern is the revival from Corona turmoil and the optimization of production capacity. In addition, no Indonesian parts manufacturer has its own R&D center, and also TOTs such as STMI does not match urgent issues, so we are not interested in R&D&D projects which are offered from the Government. In other words, there is often a general consensus in favor of R&D action plans and a general opposition to them simultaneously.

Having seen, the success or failure of R&D&D support projects requires a clear distinction between those areas that should be implemented by the private sector and those that require government support. In addition, there are areas where R&D&D can be conducted jointly with OEMs and areas where OEMs tend to conduct it on their own.

**Table 2.5.13 Percentage of joint applications filed by the four automakers by major technology area**

	2015					Sole & Joint Filing
	Toyota	Nissan	Honda	Matsuda	Total4	
Necessities of life	37.9	21.6	18.1	23.8	26.6	0.9
Processing Operations:	24.7	10.5	9.2	7.4	15.1	40.1
Chemistry: Metallurgy	47.7	36.6	33.7	14.9	40.1	3.4
Textiles: Paper	70.5	26.3	67.3	50.0	38.3	0.2
Fixed Structures	55.3	33.1	23.4	16.4	36.9	1.1
Mechanical	17.0	10.0	7.7	2.6	11.8	31.7
Physics	28.8	7.9	11.2	10.4	18.1	9.6
Electricity	25.5	8.7	12.8	17.7	19.1	13.0
Total	24.0	11.1	10.5	6.4	16.1	100

Source: "Empirical Study on R&D Activities of Major Automobile Manufacturers : Technological Domains, Series, and Industrial Clusters", Kansei Gakuin University, 2018

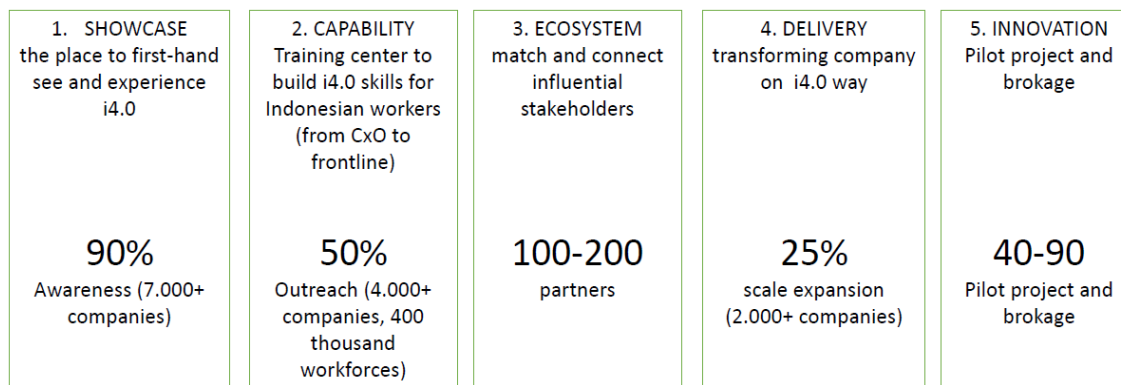
In the case of Japan, for example, in the area of mechanical engineering, the number of patent applications is about one-third of all patent applications, but the percentage of joint applications is the lowest at 11.8%. Since this section includes technological areas that define the basic performance of automobiles, such as engines, it is believed that companies are increasing the ratio of R&D conducted independently for these most important technologies.

As mentioned above, the two areas of R&D that MOI is expecting Japan to provide technical assistance are BioFuel and EV batteries. However, from the context above, it is difficult to say whether the EV battery field is one in which the government should be directly involved. Japan has a system to provide support through SATREPS (as stated in Activity 6-2), and Indonesia should take advantage of this system.

The following is a summary of the Indonesian government's intentions regarding PIDI, which it hopes to link to R&D&D.

#### Operation needs of Indonesia Digital Innovation Center (PIDI)

The Indonesia Digital Innovation Center (PIDI) 4.0 is expected to raise awareness of the country's industry players toward Industry 4.0. The goals include building capacity, connecting with relevant stakeholders, supporting the implementation of Industry 4.0, and becoming a research and testing center for innovation and new technologies.



**Figure 2.5.4 Target of PIDI4.0**

In an effort to support the implementation of Industry 4.0 as underlined above, the standard called INDI 4.0 has been launched to measure the level of readiness of Industry 4.0. This standard is called the Indonesia Industry 4.0 Readiness Index (INDI 4.0). The index is formed based on a survey conducted by McKinsey & Company, which is also used by member countries of the World Economic Forum.

It may be possible for the Government of Indonesia (GOI) to request international/bilateral donors to support as the PMO for PIDI's "Automotive Industry". The terms of reference of this PMO service will be as follows;

**Table 2.5.14 Possible support by international/bilateral donors**

Area on Major Focus	Contents
2.Capacity	<ul style="list-style-type: none"> <li>- Organize the human resource development system, its educational contents, and candidate companies for tutors.</li> <li>- Identify the parts of the system that the players (especially Japanese companies) are responsible for and implement human resource development (5-6 courses during the 3-year period)</li> </ul>
3.Ecosystem	<ul style="list-style-type: none"> <li>- Participate as a consultant in the Ecosystem. Participate as a consultant in the Ecosystem and provide think tank functions.</li> <li>- Encourage active participation of Japanese companies.</li> </ul>
3. Delivery (may not be specific to the automotive industry)	<ul style="list-style-type: none"> <li>- Support the development of Mentors in the public sector</li> <li>- Support the creation of a training process after the implementation of INDI4.0</li> </ul>
5.Innovation	<ul style="list-style-type: none"> <li>- Since DetaCenter will be introduced and IMATAP is expecting a lot from Japanese government in COE realization.</li> <li>- "Fablabo Jakarta" may able to be formed here.</li> <li>-</li> </ul>

At this stage, there may be focused on five pillars of the PIDI, especially the Capability pillar. According to the interview to BPPI on Aug.2020, they were expecting the involvement of the Japanese

public and private sectors to PIDI, such as Toyota's human resource development and Suzuki's active participation in SINDO 4.0. However, specific human resource development needs have not yet been raised (as of Dec.2020). Orange colored items may have possibility for Japan's technical assistance to support PIDI operation.

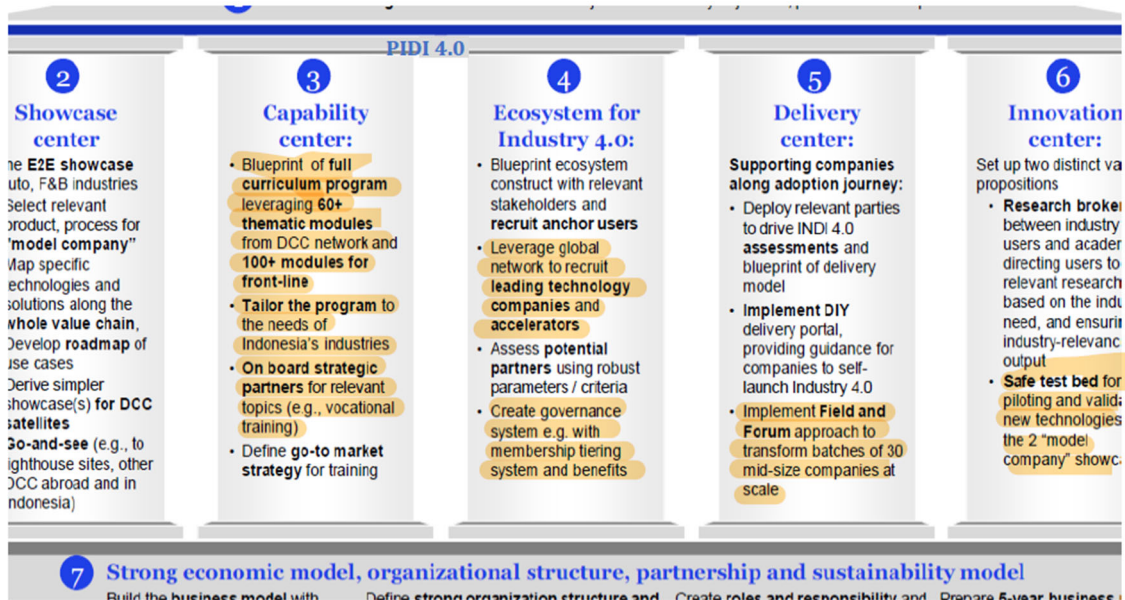


Figure 2.5.5 Action Plan of PIDI by Pillar

Table 2.5.15 Policy Measures and Action Plan on “Support expansion of R&D&D supporting service such as Computer Aided Engineering and material evaluation”

Policy Measures		Action Plan	Ref
Overall	Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation	<b>[Strengthening the capacity of testing and certification bodies (e.g. R4T) on xEV]</b> • Enhancement of evaluation functions for new parts and systems such as batteries and new materials related to weight reduction and human resource development	<b>Activity 8-1</b>  Refer to Activity 6-1, 6-2
		<b>[Fostering D&amp;D Supporting Function and System]</b> • Plan for establishing SINAS as a decision-making forum of R&D and Innovation activity • Relaxation of restrictions on investment in foreign service companies such as SIers, test and evaluation outsourcing companies and design companies. (Possibly with the enactment of the Omnibus Act.)	<b>Activity 8-2</b>  <b>Activity 8-3</b>
	Background • There is an expectation on Indonesia side to accumulate DataCenter and COE in PIDI's "Innovation". • Relaxation of restrictions on foreign investment is included in the Omnibus Law. • There is an increase in the establishment of venture companies, especially among	<b>[Synergizing with PIDI Development]</b> 1 Support for entrepreneurship using PIDI's "Innovation" function (fostering university-born ventures) 2 Adapting to corporate digitalization and automation using PIDI's "Delivery" function • Supporting Corporate Self-Assessment through INDI 4.0 • Public Mentor Training • Helping companies to improve their certification levels 3 Industrial human resource development that utilizes the "Capability" function of PIDI	<b>Activity 8-4</b>

	the millennial generation.	4 Displays of success stories using the PIDI "Showcase" function	
		<p><b>[Implementation of Action Plan]</b></p> <ul style="list-style-type: none"> <li>Facilitate the project-based learning at the higher education institutes</li> <li>Unified procedural and managerial activities to support D&amp;D supporting functions</li> <li>Coordination with various donor support</li> <li>Relaxing restrictions on foreign service companies' investments in CAD companies, test and evaluation outsourcing companies, design companies and other foreign service companies in line with PIDI's goals</li> <li>Detailing PIDI planning and assigning roles</li> </ul>	<p><b>Activity 8-5</b></p> <p><b>Activity 8-6</b></p>

# Activity 8-1	Implementing Event: SS/S/M
Action	Strengthening the capacity of testing and certification bodies (e.g. R4T) on xEV
Activity	<b>Enhancement of evaluation functions for new parts and systems such as batteries and new materials related to weight reduction and human resource development</b>
<b>[Activity Direction]</b>	
Contents:	<p>The number of completed vehicles exported from Indonesia has been increasing every year. Although the local procurement rate of parts, one of the indicators of export competitiveness, has improved with the advancement of parts manufacturers, Indonesia still relies on imports for raw materials such as steel and synthetic resins. Labor costs, another indicator, have more than doubled in the past five years and have become an issue for all companies. In order to increase labor productivity, companies are developing <b>their own industrial human resources</b>.</p> <p>The development of parts for EV metrology, selection of raw materials, and the development of industrial human resources to support these activities are areas where <b>companies can demonstrate their strengths, and therefore do not correspond to areas where the government should be involved in promoting R&amp;D</b>. Therefore, the following activities are the only ones that can be implemented for this activity.</p> <ul style="list-style-type: none"> <li>Build good relationships with OEMs.</li> <li>Involve excellent Indonesian engineers in the R&amp;D activities conducted in Japan.</li> <li>As a result, technical know-how will be transferred to the domestic market and human resource development will be promoted..</li> </ul>
Partners:	Universities, Research institutions under MOI (i.e. MIRDC), and RISTEK-BRIN (i.e. BPPT, LIPI), Industrial Organizations (incl. GAIKINDO)
Resources:	International donors (incl. JICA)
Challenges:	Japan's precedents on CSTI
	NA
<b>[Responsibilities]</b>	
Responsible Agencies:	BPPT
Implementing Agency:	BPPT (as a technology clearinghouse)
<b>[Major Expenses]</b>	
	Total (Approx.): NA
	Cost of research and coordination, Cost of overseas ocular trip

# Activity 8-2	Implementing Event: S/M/L
Action	Fostering D&D Supporting Function
Activity	<b>Plan for establishing SINAS as a decision-making forum of R&amp;D and Innovation activity</b>
<b>[Activity Direction]</b>	
Contents:	<ul style="list-style-type: none"> <li>Study present innovation governance and the interactions among 'triple-helix' innovation actors – government, university, and industry –.</li> </ul>

	<ul style="list-style-type: none"> <li>Plan the development of the Sistem Inovasi nasional (SInAS) (national Innovation System) for a formal, integrated, and well-functioning national innovation system for improving Indonesia's innovation capacity and science and technology (S&amp;T) performance.</li> <li>Japan's precedent on Council for Science, Technology and Innovation (CSTI) is of great help.</li> </ul>
Partners:	Indonesian government agencies (BRIN [incl. BPPT, BSN, LIPI], MOI [incl. CABI, MIRDC), etc.), Universities, Industrial Organizations (incl. GAIKINDO) International donors (incl. JICA)
Resources:	Japan's precedents on CSTI
Challenges:	<ul style="list-style-type: none"> <li>Preparation of development plan and obtaining consensus on positioning and institutional power of the organization among entire government organization.</li> <li>Choosing of cooperative donor</li> </ul>
<b>【Responsibilities】</b>	
Responsible Agencies:	Ministry of Research and Technology (RISTEK-BRIN)
Implementing Agency:	RISTEK-BRIN
<b>【Major Expenses】</b>	Total (Approx.): NA
Cost of research and coordination, Cost of overseas ocular trip	

<b># Activity 8-3</b>	Implementing Event: S/M
Action	Fostering D&D Supporting Function
<b>Activity</b>	<b>Relaxation of restrictions on investment in foreign service companies such as SIers, test and evaluation outsourcing companies and design companies. (Possibly with the enactment of the Omnibus Act.)</b>
<b>【Activity Direction】</b>	
Contents:	The 2016 Negative List sets foreign investment restrictions (up to 67%) in many business areas of the "Information and Communication Technology Sector", and SIers and Line Builders may be in conflict with that category. <ul style="list-style-type: none"> <li>Ensure the investment by SIer and Line Builder does not fall into this category</li> <li>Announce the fact through WEB and the Chamber of Commerce and Industry of concerned countries.</li> </ul>
Partners:	Jetro
Resources:	Company interviews
Challenges:	Inter-agency & Trans-agency arrangement
<b>【Responsibilities】</b>	
Responsible Agencies:	BKPM, CMEA, MOI, RISTEK-BRIN, MOF
Implementing Agency:	BKPM
<b>【Major Expenses】</b>	Total (Approx.): NA
Technical	

<b># Activity 8-4</b>	Implementing Event: S/M
Action	Synergizing with PIDI Development
<b>Activity</b>	<b>Determine the function of PIDI's 5 Pillars and Create Grand Design of Each Pillar</b>
<b>【Activity Direction】</b>	
Contents:	The function of PIDI is still under discussion by the Government so that Action Plan is yet to be discussed in detail. The followings the possible contributions that GOI can request to GOI or to Japanese investors. <ul style="list-style-type: none"> <li>➤ Support for entrepreneurship using PIDI's "Innovation" function (fostering university-born ventures)</li> <li>➤ Adapting to corporate digitalization and automation using PIDI's "Delivery" function <ul style="list-style-type: none"> <li>Supporting Corporate Self-Assessment through INDI 4.0</li> <li>Public Mentor Training</li> <li>Helping companies to improve their certification levels</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>➤ Industrial human resource development that utilizes the "Capability" function of PIDI</li> <li>➤ Displays of success stories using the PIDI "Showcase" function</li> </ul>
	Simultaneously, MOI needs to proceed the following activities.
	<ul style="list-style-type: none"> <li>• Study investors' deciding factors of locating R&amp;D centers after Covid-19</li> <li>• Formulate the strategy how to link with PIDI</li> </ul>
Partners:	OEMs and suppliers
Resources:	Internal discussion in MOI
Challenges:	NA
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-ILMATE, MOI-BPPI, MOI-BPSDMI
Implementing Agency:	MOI-BPSDMI
<b>【Major Expenses】</b>	Total (Approx.): INR NA
	Consulting Fee

<b># Activity 8-5</b>	Implementing Event: S/M/L
Action	Implementation of Action Plan
Activity	Facilitate the project-based learning at the higher education institutes
<b>【Activity Direction】</b>	
Contents:	<ul style="list-style-type: none"> <li>• Participate in international contents for engineering students (i.e. ABU Robocon)</li> <li>• Design grants available to companies who will organize inter-school engineering competitions</li> <li>• Conduct domestic inter-school engineering competitions with the support of industry partners</li> </ul>
Partners:	universities, colleges, and industry partners
Resources:	Engineering competition grants
Challenge:	
<b>【Responsibilities】</b>	
Responsible / Implementing Agencies:	MOI/BPSDMI, RISTEK-BRIN, Ministry of Education and Culture (Kemdikbud)
<b>【Major Expenses】</b>	Total (Approx.): INR NA
	Engineering competition grants, venue,

<b># Activity 8-6</b>	Implementing Event: S/M
Action	Establishing the Support System
Activity	<b>Unified procedural and managerial activities to support D&amp;D supporting functions</b>
<b>【Activity Direction】</b>	
Contents:	ILMATE manages concerned projects in unified manner. <ul style="list-style-type: none"> <li>• Review of action plan and decision of implementation</li> <li>• Secure the budget and decide on the Indonesian implementation setup</li> <li>• Contracting with donors/assigning consultants</li> </ul>
Partners:	NA
Resources:	Approved projects under Automotive Industry Road Map
Challenges:	Technical expertise to conduct the study. Cooperation of companies.
<b>【Responsibilities】</b>	
Responsible Agencies:	MOI-ILMATE
Implementing Agency:	Related agencies defined in the Automotive Industry Road Map
<b>【Major Expenses】</b>	Total (Approx.): NA
	Cost of digitalization of the government offices, Consulting fee



## **APPENDIX 5. EXPORT POTENTIAL SURVEY**

---

### **5.1 Research and Analysis for Studying Export Strategies in Indonesia**

#### **5.1.1 Screening of target countries for export**

This analysis is positioned as a dry run for the export analysis that we are proposing to conduct in the next phase. We began this analysis by narrowing down the list of countries to be exported to. Since Indonesia mainly produces MPVs for export, MPV exports were set as the assumption. In addition, two indicators were set to screen the export destinations.

1. There are more than 10,000 MPVs sold domestically in target country. (i.e., if they are not familiar with MPVs, Indonesia needs to pay for advertising, which will reduce the cost competitiveness at that stage.

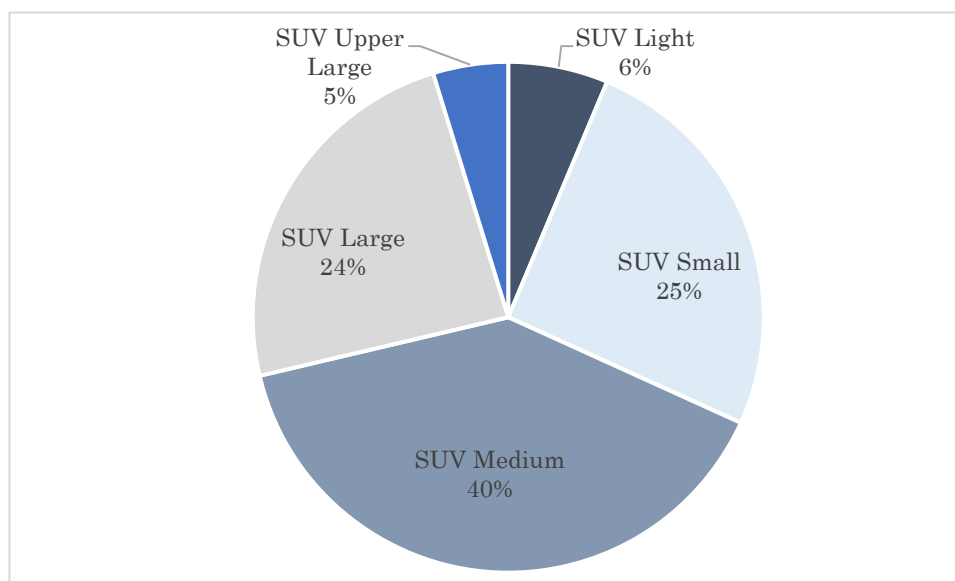
2. The CAGR of the MPV market growth of the country of origin has been positive for the past 10 years. (Sales volume cannot be earned in non-growth countries.)

The results of the trial analysis showed that 11 countries have the potential. Unfortunately, however, Australia could not be extracted due to the low CAGR of MPVs in the past. In this sense, the number of countries with export potential is limited. Looking at the potential countries shown in yellow, the Philippines and Vietnam, which are already export destinations of Indonesia, appear. In addition, Mexico, South Africa, Thailand, and Turkey, which have nearly the same technological capabilities as Indonesia, are also included.

SUV is the highest growing segment in the global market at CAGR of 15% in the past 10 years, so we have added SUV as the potential export product for Indonesia, although its ranking (global No.16) by market volume is not as high as that of MPV (global No.5). As Indonesia is the largest SUV market in ASEAN, reaching around 200,000 units, it can utilize its capacity to increase its export to neighboring countries. Recently, Toyota has transferred midsize SUV, Fortuner, export base to Middle East from Thailand to Indonesia. By using the 2 indicators, 1) more than 100,000 units & 2) positive CAGR market growth, we have identified export potential markets marked in yellow on the table below. Australia and Saudi Arabia are major potential export markets as India and Brazil have less priority for export targets, due to their strong domestic vehicle production capacity. The challenges to export to Australia from Indonesia will be safety regulations such as ANCAP which requires stringent crash tests. Also, as we can see from the sub-segments of SUV in Australia in the graph below, the majority of SUV market is consisted of medium and large SUVs, thus requiring high power, strong torque, and high spec safety features. In order to adopt to the Australia market, Indonesia models produced in Indonesia need to be upgraded with regard to safety regulations, powertrain, and other features.

---





Source: Federal Chamber of Automotive Industries (FCAI).

Figure 5.1.1 Graph ; Australia SUV Market by size

Table 5.1.1 Global MPV Market (2010-2019): Countries with Annual Sales of 10,000 above units

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
Total MPV	5764466	5710717	6406878	6345112	6470680	6415026	6778220	6902990	6428038	5974599	0.4%
Japan	1130427	928201	1410073	1335185	1425737	1354050	1404086	1646956	1709534	1764891	5.1%
Mainland China	675594	705883	724456	790100	912352	1128051	1395152	1413901	1216201	968846	4.1%
Germany	483945	556705	545745	501137	481118	507816	533280	531191	466287	475366	-0.2%
Indonesia	331503	363788	475126	525141	511886	366204	443266	474868	470727	416692	2.6%
United States	554827	536206	609269	609978	628092	572431	591940	515096	492477	410556	-3.3%
India	240039	230452	306669	334798	326638	340049	341543	324992	314943	368403	4.9%
France	434714	411563	356975	308649	281146	286331	270192	250375	189487	157261	-10.7%
South Korea	80954	109155	142460	138608	152024	176192	156172	152381	163847	135009	5.8%
Italy	224836	203629	174734	178177	183185	180672	201557	191161	136277	112283	-7.4%
Spain	117940	105225	90143	90103	102570	110389	109298	100227	147398	110775	-0.7%
United Kingdom	213278	194639	179648	205224	201624	172275	160819	140366	94466	88956	-9.3%
Philippines	24991	24841	25108	26323	31377	38298	46796	57252	56201	66666	11.5%
Brazil	170881	191639	192452	174984	154878	105916	73633	67641	70680	64174	-10.3%
Canada	101731	98989	101499	99500	103178	95983	95699	92813	74457	59847	-5.7%
Belgium	100000	97242	96399	92663	85031	87778	84782	75397	61514	54243	-6.6%
Austria	65978	78191	70321	62940	59951	59190	61150	58172	45894	42771	-4.7%
Poland	37309	29766	27228	27559	29254	32947	43080	50923	44994	41961	1.3%
Vietnam	10892	10937	6217	7458	9075	12881	17018	15751	20334	39533	15.4%
Mexico	20024	24901	25360	23907	25222	26233	28381	30345	31584	38955	7.7%
Taiwan	53653	61976	60764	61796	54917	53252	53296	44957	42340	36973	-4.1%
South Africa	28503	27220	29237	33490	33238	31598	34707	33815	32942	36520	2.8%
Malaysia	107499	93786	102531	95682	96049	73468	57899	57844	53438	34926	-11.7%
Thailand	16621	30622	53914	25770	18390	16670	9610	18781	22408	34377	8.4%
Switzerland	40880	45994	46627	40486	37561	40102	39370	36097	29687	30682	-3.1%
Czech Republic	20539	22129	23727	22625	26280	31437	34355	36725	31430	30311	4.4%
Morocco	10244	13125	23148	21914	19107	27067	33199	31951	32991	27443	11.6%
Turkey	15827	18559	13837	29648	39789	55903	55495	51730	29090	23074	4.3%
Pakistan	0	0	0	0	3326	7606	13209	24247	31146	21085	126.0%
Egypt	25924	18849	26525	26317	32685	34735	22813	11140	15519	19558	-3.1%
Netherlands	57528	60718	52704	38258	32439	34486	29401	27281	20225	16815	-12.8%
Hungary	4925	5670	5929	6807	9625	9785	9332	11040	10618	16494	14.4%
Denmark	23036	26753	20680	18597	17730	16939	19642	19815	18163	14757	-4.8%
Saudi Arabia	26695	26176	30197	36561	38151	40513	32796	23936	10972	14057	-6.9%
Sweden	21568	25022	22668	21432	21818	24401	26514	26424	19406	12694	-5.7%
Argentina	50289	58198	62615	65806	46866	37273	31526	39897	25728	12690	-14.2%
Russia	41463	68700	68493	61837	36883	11870	7388	8461	12161	11905	-12.9%
Australia	12901	11377	12292	12202	12622	15266	13943	13056	11457	11498	-1.3%

Emerging countries or neighboring countries with negative growth (2010-2019)  
Emerging countries or neighboring countries with positive growth (2010-2019)

Source: IHS

**Table 5.1.2 Global SUV Market (2010-2019): Countries with Annual Sales of 100,000 above units**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
Total SUV	6745981	7851564	9083435	10867975	13038984	15626672	19350112	22187549	23225007	23354291	14.8%
Mainland China	1655655	2059827	2495692	3647374	4835336	6850634	9463631	10724498	10285072	9708607	21.7%
Germany	340247	432358	498328	497241	558618	631870	740967	865074	994714	1193022	15.0%
United Kingdom	235374	276439	326332	420125	523626	640286	771866	822981	911902	989602	17.3%
United States	605133	588407	584733	598820	698772	737915	797872	813675	906585	901861	4.5%
India	233579	277582	370003	407107	437302	466718	618957	846799	914956	864716	15.7%
France	214971	297496	301827	339872	414080	485322	549681	675054	796629	856544	16.6%
Italy	230460	268877	238990	238069	292344	392640	494591	609353	741957	818866	15.1%
Japan	239714	228176	278346	285987	550938	574916	604776	692429	736134	770654	13.9%
Russia	421206	656766	852185	938624	924919	548166	521038	634335	753907	752958	6.7%
South Korea	223190	227456	255304	301410	349834	483081	491617	502718	555234	612735	11.9%
Spain	147441	142154	133328	145688	192131	265854	344027	432166	551826	595497	16.8%
Brazil	204239	241042	262892	278400	292643	308853	295440	404944	503448	581510	12.3%
Australia	233393	242819	305337	332000	351023	397101	426919	453129	484107	475589	8.2%
Belgium	61907	76838	77291	85422	101888	113445	145488	172369	208827	224410	15.4%
Poland	55808	48366	56110	63186	75453	85501	107439	134209	170363	200865	15.3%
Indonesia	112315	123688	148320	169245	120074	136927	197494	187019	220958	190822	6.1%
Taiwan	60051	74664	65440	82132	102884	113154	128036	152614	166410	179707	13.0%
Saudi Arabia	133552	130402	148080	176674	199784	198409	162940	132318	112910	155147	1.7%
Sweden	40812	50663	50198	58260	76471	94836	106001	118423	122141	144507	15.1%
Netherlands	41399	47414	39268	43500	53794	70243	75385	100721	127602	142318	14.7%
Thailand	56613	66745	89458	72697	86910	127336	109501	119754	155925	141576	10.7%
Switzerland	50613	60297	78892	78663	84379	92503	100917	114197	123784	137925	11.8%
Malaysia	19192	22181	21619	30493	32077	62404	67189	83692	90529	135632	24.3%
United Arab Emirate	74797	81402	96705	114201	126957	131148	146241	145419	132881	134237	6.7%
Chile	64987	75211	72584	88993	86526	80989	88824	122635	153083	130631	8.1%
South Africa	64614	69490	91584	102208	103005	102600	98984	115095	118914	127680	7.9%
Austria	46648	55886	66205	71777	69058	75587	88919	105806	126259	126586	11.7%
Israel	19442	24867	27019	32929	45621	59813	84771	88933	109752	116305	22.0%
Philippines	53411	51871	57928	63861	80208	85705	117902	152237	112667	101466	7.4%

Emerging countries or neighboring countries with negative growth (2010-2019)  
 Emerging countries or neighboring countries with positive growth (2010-2019)

In this regard, an article on the Internet, which was about a Japanese general trading company trying to sell Indonesian MPVs to Australia, says that Australian dealers seem to think that Indonesian MPVs are still underpowered. In the next phase of the project, it may be necessary to figure out if Indonesia can still be competitive in exports, because it will cost a lot of money just to power up the MPV to meet Australia's needs.

### 5.1.2 Analysis of export competitors (Thailand, Malaysia, and Turkey)

Next is a case study of Thailand, Malaysia, and Turkey, which are potential competitors for Indonesia's exports. The three competitor countries, Thailand, Malaysia, and Turkey are chosen and studied the characteristics of each. As can be seen from the figures below, among the exporting countries, there are two categories. One is CBU-dominated exporting countries such as Thailand and Turkey, and the other is auto-parts-dominated exporting countries such as Malaysia. Regarding CBU, Thailand exports 52% of its total production volume, Malaysia at 7%, and Turkey at 85%.

**Table 5.1.3 Ratio of exports of automobiles and automotive parts in Indonesia and its three competitors**

	Indonesia (2019)	Thailand (2019)	Malaysia (2018)	Turkey (2018)
Production (1,000 units)	1,286,848	2,013,710	564,971	1,550,150
Domestic Sales (1,000 units)	1,030,126	1,007,552	598,714	641,541
Export (1,000 units)	332,023	1,054,103	40144	1,318,869
CBU Export Ratio(%)	25.8%	52.3%	7%	85%
Theoretical number of imports (1,000 units)	73,876	–	–	410,260
CBU Export Amount (Million USD)	6,065	38,643.5	520	21,350
Auto Parts Export Amount (Million USD)	2,050*	21,908	3,025	10,881
Auto Parts Export Ratio (%)	25.3%	36%	85%	34%

\*compiled from Comtrade data (HS8708, HS840734, HS840820, HS851140, HS851290)

Source : UN Comtrade, Marklines

Indonesia is in the middle of the four competing countries in terms of both CBU and parts exports. Every country has raised the Middle East and Africa as the next exporting destinations and Thailand as an export competitor, but Turkey cannot be ignored either<sup>17\*\*</sup>. Turkey stands out in terms of its export ratio, but Malaysia stands out in terms of auto parts exports.

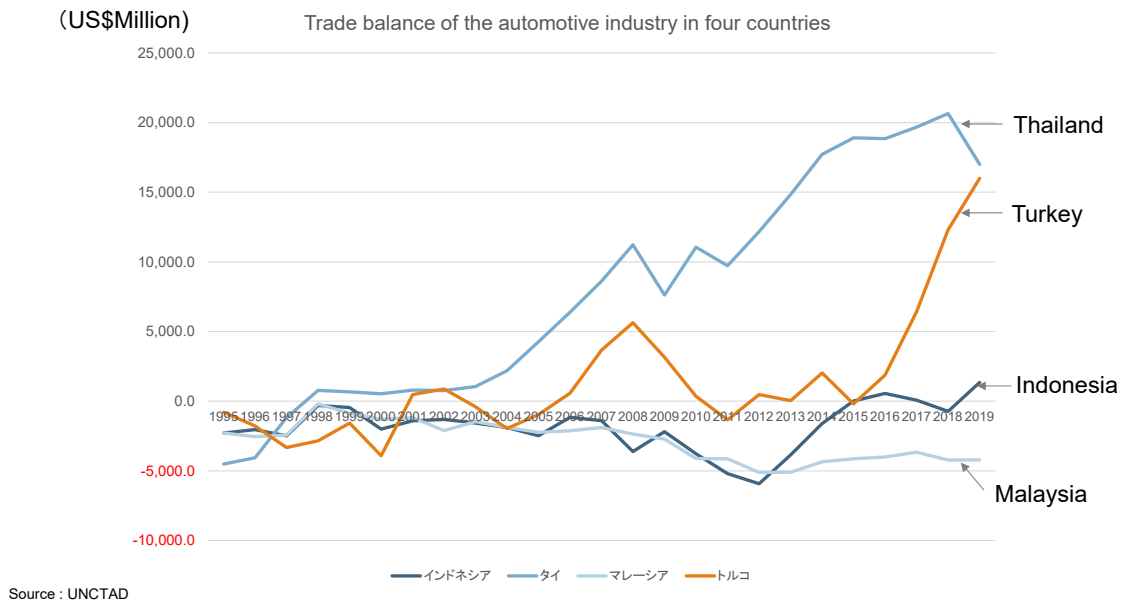
Next, the survey focused on the share of parts in the total export value of the automobile industry. Here again, Indonesia is in the lead. Malaysia's share is very high at 85%, but this is probably due to the export of electrical and electronic components, which is Malaysia's forte.

The question is what kind of strategy Indonesia should adopt in the future, since it has a low ratio of exports of finished vehicles and a low ratio of exports of parts.

### 5.1.3 Trade balance of the automobile industry of competing countries

The following chart, created from the UNCTAD trade balance, shows the evolution of the trade balance of the automobile industry in the four countries. Turkey has become a major positive gainer in the trade balance. Malaysia, which exports a high percentage of parts, is still in the red when looking at the industry as a whole.

<sup>17</sup> Turkey has not been a subject of discussion when dealing with ASEAN's automobile industry, but after conducting this survey, I realized that there are many things that can be learned in terms of the development of the automobile industry. The 85% export, that is, exporting 1.3 million units out of 1.5 million units manufactured, is a case that one has never seen in ASEAN.



**Figure 5.1.2 Trade Balance of the Automotive Industry in Four Competitive Countries**

There are two implications of this graph.

1. After all, exporting CBU will not lead to an improvement in the trade balance.

2. Looking into the background of Turkey's rapid progress, the Turkish lira has been on a downward trend against major currencies since 2015, which in turn has led to export competitiveness. In other words, automobile exports provide a significant buffer in the trade balance against currency depreciation.

With regard to the export strategy of Indonesia's automobile industry, it may be necessary to consider in the next phase that whether Indonesia should take direction to export CBU while competing with Thailand and Turkey, or to consider preferably a trade balance of  $\pm 0$  as Malaysia does.

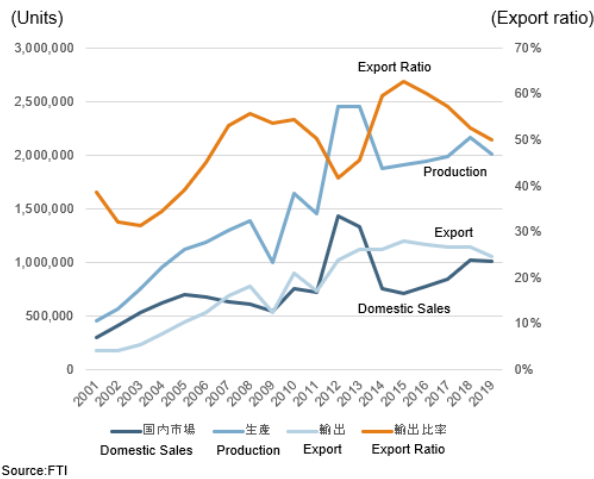
#### 5.1.4 Reference: Individual information on the three competitive countries

##### (1) Thailand's exports of automobiles and automobile parts

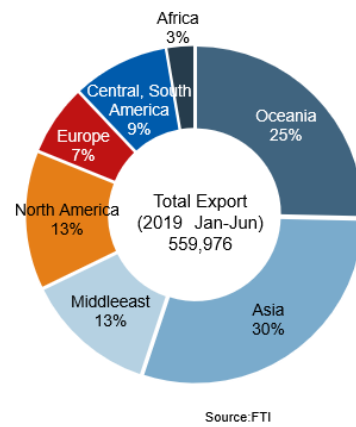
The following is the summary of the production and export of automobiles and automobile parts in each country.

For Thailand, the destinations of exports of automobiles and automobile parts are different. As for the destination of parts exports, the influence of ASEAN GVCs is strongly felt. On the other hand, the destination of exports of CBU is determined from a broader, global perspective.

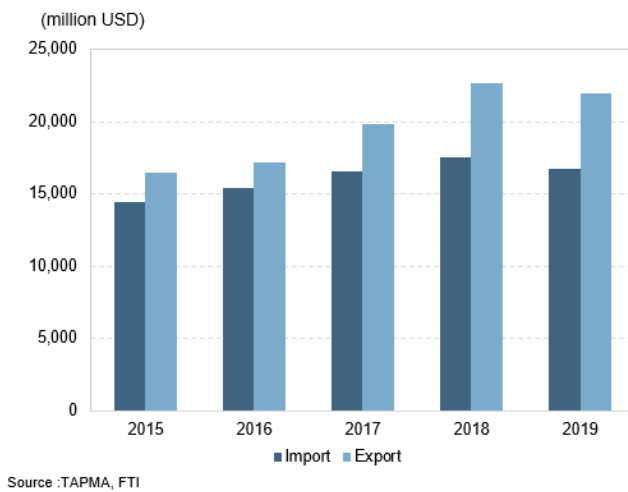
Vehicle production, sales, and exports of Thailand



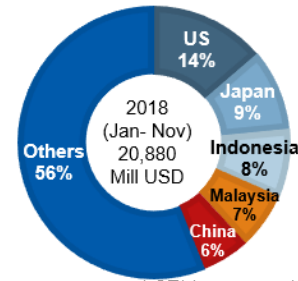
Export Destination by Region (2019 Jan-Jun)



Trends of Auto Parts Import and Export in Thailand



Thailand's Parts Exports by Region



Components and CBU export value composition in Thailand

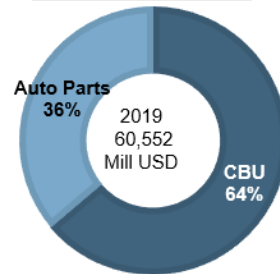


Figure 5.1.3 Automotive and Autoparts Export Situation in Thailand

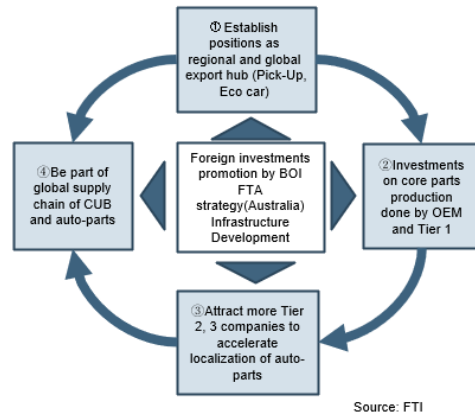
The policies specific to parts exports are mainly related to location cases, and incentives for the parts industry are determined in order to equalize regional development.

Investment incentives for export-oriented automotive manufacturing projects

	Requirements of Investment incentives	Investment incentives
<b>Cars</b>	<ul style="list-style-type: none"> <li>Export automotive manufacturing projects must be packaged with auto-parts manufacturing projects with a total investment amount of at least 10 billion baht (not including land and working capital).</li> </ul>	<ul style="list-style-type: none"> <li>No corporate income tax exemption for companies located in Zone 1 (6 provinces around Bangkok); Zone 2 (12 provinces including Rayong, Chonburi, Phuket, etc.) was granted a 3-year tax exemption, but this has been extended to a maximum of 8 years.</li> <li>Regardless of the zone, duty exemption on machinery imports is granted (50% tax reduction for zones 1 and 2).</li> </ul>
<b>Auto-Parts</b>		<ul style="list-style-type: none"> <li>Companies can locate in Zone 1 while it's limited to Zone 2 and 3 before.</li> <li>3-year corporate tax exemption granted for Zone 1 locations.</li> <li>Import duty exemption for machinery regardless of zone</li> </ul>

Source: JETRO Bangkok Center, Investment Promotion and Cooperation Division, Nariya Sukegawa, JETRO BSCT Report, October 2003.

Thailand's Automotive Policy and development of GVCs



Source: FTI

Figure 5.1.4 Automotive and Autoparts Export Policy in Thailand

(2) Turkey's exports of automobiles and automobile parts

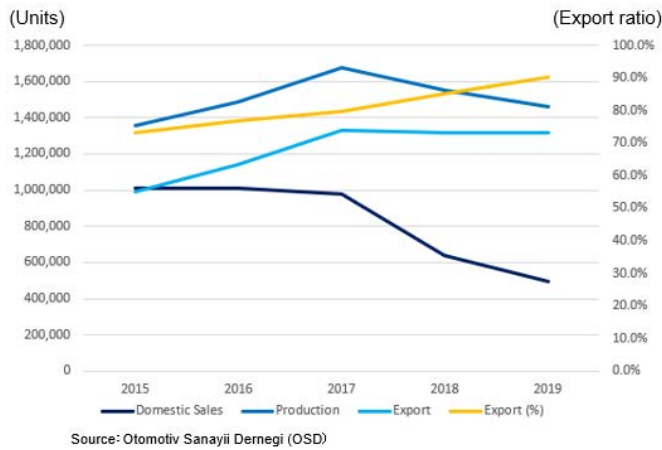
For Turkey, as mentioned above, domestic demand has been declining since 2015, and the depreciation of the currency (lira depreciation) is expected to have a significant impact. On the other hand, the domestic demand depressed by the depreciation of the lira is reflected in the improvement of the trade balance through export promotion, contributing to the stability of the economy.

As shown in the figure below, 80% of Turkey's exports of finished vehicles (CBU) and parts are destined for Europe, and the country has not yet reached the level of exporting CBU from a global perspective like Thailand.

On the other hand, a news report in January 2021 drew attention to the fact that Turkey's exports to countries other than the EU, such as Brazil, Azerbaijan, and the UAE, showed significant growth in 2020, and it is thought that Turkey's exports will expand to a broader level in the future, with Middle Eastern and African countries in view.



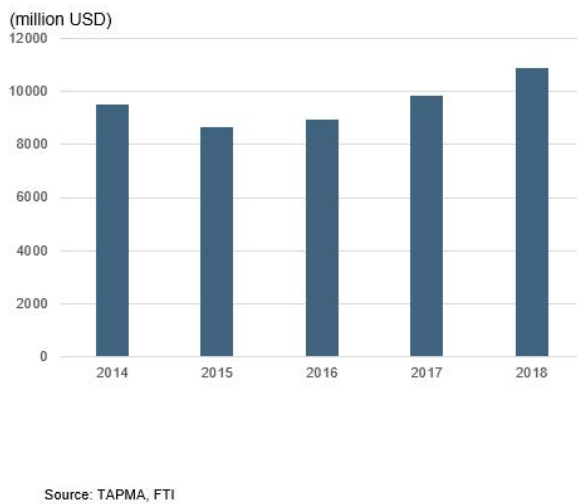
Turkey's automobile production, sales, and exports



Turkey's Auto parts Exports by Region



Turkey's Import and Export of Auto Parts



Turkey's Auto parts Exports by Region



Value Composition for Auto parts and CBU Export of Turkey



**Figure 5.1.5 Automotive and Autoparts Export Situation in Turkey**

In terms of policy, Turkey, like Thailand, does not have a specific policy to promote parts exports.

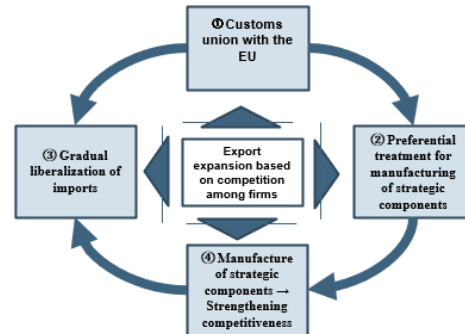
A major milestone in Turkey's export promotion was the Customs Union with the EU in 1985, and common tariffs cannot be achieved without common standards for goods and services with the EU. Therefore, Turkey began by standardizing type certification.

Furthermore, the government's policy is to protect key components with generous incentives in order to strengthen domestic business, while at the same time promoting liberalization of imports and gradually expanding the scope to include key components. As a result, the government has been able to attract investment in the key components sector, and at the same time, has gradually liberalized the sector, which has intensified competition and created an environment of free competition.

Incentives for export-oriented automobile manufacturing projects

- The Customs Union signed with the EU in 1985.
- The government needed to lend tariffs on goods and services passing through the customs union with the EU on the same basis, and for this purpose, it was necessary to set up a system in which goods and services could be evaluated based on uniform quality standards (this is compliance with the same international standards and conventions).
- The export-oriented growth strategy of the 1980s had two pillars\*\*. The first pillar was to provide subsidies to domestic producers to steer them towards selling in international markets. In other words, without increasing exports, it was impossible to control the balance of trade. The second pillar was the gradual liberalization of imports, which included easing quantitative restrictions and lowering tariffs.
  - \*\*/Theoretically, as domestic producers begin to face competition from imports, they will be forced to increase productivity and upgrade their products to survive.
- Since the abolition of the import license system in 1996, imports have been free in principle, and no special incentives have been granted for the export of auto parts.
- As for investment incentives\*\*, there are a variety of exemptions, which can be combined according to the type of business, region, and sector. By so doing, a sound environment has been created to promote free competition, improve QCD, and enhance the international competitiveness of the parts industry.
- \*\*/Top priority investment incentives offered include VAT and customs duty exemptions, social security assistance, corporate tax exemptions, and free land allocations. Incentives will be granted on a case-by-case basis to parties that meet the criteria, and new entrants will not affect the incentives that incumbents are eligible to receive.

Policy Implementation to Enhance Turkey's Export Potential



Source : FTI

**Figure 5.1.6 Automotive and Autoparts Export Policy in Turkey**

Furthermore, from a social aspect, the development of the parts industry in Turkey was based on the Islamic Mamluk system of training Turkish apprentices.

The Turkish apprenticeship system is similar to the Japanese apprenticeship system, and it is suitable for transmitting tacit knowledge rather than manual-oriented formal knowledge. In a world of mainly tacit knowledge, craftsmen cannot learn skills quickly, but once they learn a skill, it is said to be stable.

**(3) Malaysia's exports of automobiles and automobile parts**

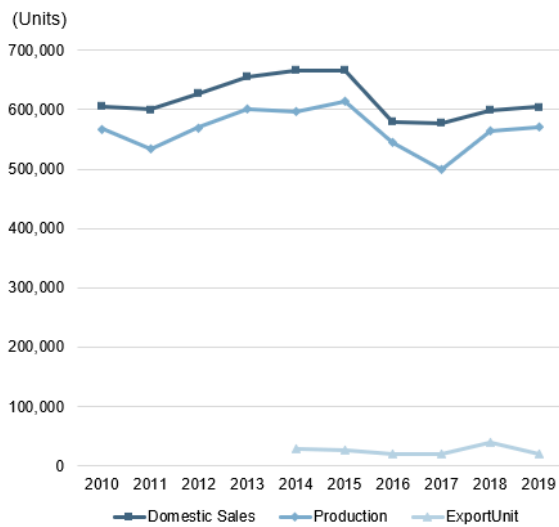
While Malaysia's export ratio of finished vehicles is low at 7%, the ratio of domestically produced vehicles is high. This is one of the results of the industrial promotion formed under the "National Car Concept", but the export of Perodua and Proton, which are equivalent to national cars, has not been accepted in other countries. Some experts consider this to be a failure of the national car concept.

Based on this experience, Malaysia is aiming to export auto related products to emerging Islamic countries and is currently on the offensive to export the Perodua and Proton to Pakistan and Islamic countries in the Middle East.

Looking at the trade balance of the automobile industry, Malaysia has not been running up a deficit over the years. If the export of parts continues at this rate, the authorities will be able to achieve a trade balance of  $\pm 0$  for the entire automobile industry, and it is thought that they want to protect this level at a minimum. This is the auto industry's "balanced trade" strategy.

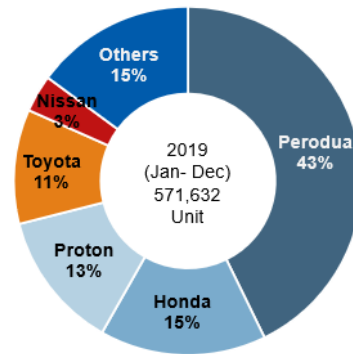


Domestic Sales, Production and Export Unit in Malaysia



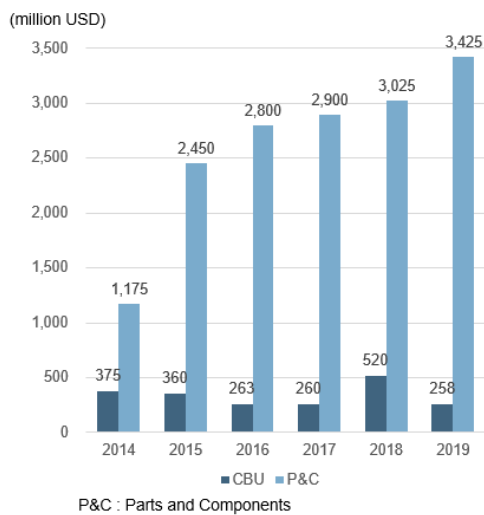
Source: Malaysian Automotive Association (MAA)

Major Automotive OEM in Malaysia



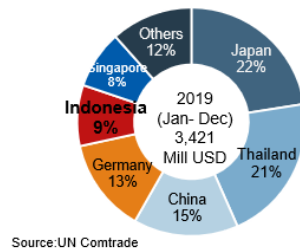
Source: MarkLines

CBU/P&C Export in Malaysia



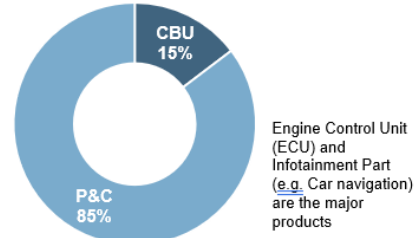
Source: Malaysia Automotive Robotics and IoT Institute (MARII)

Destination Country for P&C Export from Malaysia



Source: UN Comtrade

Export Ratio of CBU/P&C



Source: Malaysia Automotive Robotics and IoT Institute (MARII)

Figure 5.1.7 Automotive and Autoparts Export Situation in Malaysia

On the policy front, parts export has been promoted by the Malaysian National Automotive Policy (NAP) since around 2009 and is also a focus of NAP2020.

The NAP 2020 has set ambitious targets for auto parts, which are being promoted through tax incentives and other measures.

## The National Automotive Policy (NAP)

### THE NATIONAL AUTOMOTIVE VISION

1. SUPPLY CHAIN INTEGRATION  
Malaysia as the hub for:
  - Exports of vehicles;
  - Exports of components and spare parts;
  - Automotive R&D;
  - Technology development related to automotive and mobility; and
  - Vehicle and component testing.
2. LOCAL MANUFACTURING  
Enhance local manufacturing of vehicles and components as well as promotion of remanufacturing
3. ENGINEERING CAPABILITIES  
Enhance local manufacturing of vehicles and components as well as promotion of remanufacturing
4. LATEST TECHNOLOGY TREND  
Adopt and adapt the latest technology trend through application of IR4.0 technologies
5. SUSTAINABLE DEVELOPMENT  
Sustainable development of the automotive industry through application of environmental friendly products and processes which aims to reduce carbon emission etc.



### Target of NAP2020

Items	Target
GDP Contribution	RM 104.2 BIL
TOTAL PRODUCTION VOLUME (TPV)	1.47 MIL. UNITS
TOTAL INDUSTRY VOLUME (TIV)	1.22 MIL. UNITS
EXPORTS - CBU VEHICLES	RM 12.3 BIL
EXPORTS - NEW AUTOMOTIVE PARTS & COMPONENTS	RM 28.3 BIL
EXPORTS - REMANUFACTURED AUTOMOTIVE PARTS & COMPONENTS	RM 10 BIL
EMPLOYMENT OPPORTUNITIES - MANUFACTURING	128,000 JOBS
EMPLOYMENT OPPORTUNITIES - AFTERMARKET	46,000 JOBS
EMPLOYMENT OPPORTUNITIES - MaaS	75,000 JOBS
TOTAL EMPLOYMENT OPPORTUNITIES	323,000 JOBS
EMPLOYMENT OPPORTUNITIES - ROBOTICS	30,000 JOBS
EMPLOYMENT OPPORTUNITIES - IoT	44,000 JOBS
SUPPLIER DEVELOPMENT - TOTAL AUTOMOTIVE SUPPLIERS	TOTAL - 1,295 SUPPLIERS TIER 1 - 409 SUPPLIERS TIER 2 & BELOW - 885 SUPPLIERS
SUPPLIER DEVELOPMENT - SUPPLIER COMPETITIVENESS LEVEL	LEVEL 5 - 360 CO. LEVEL 4 - 660 CO. LEVEL 3 - 880 CO.
SUPPLIER DEVELOPMENT - INDUSTRY4WRD READINESS	LEADER - 280 CO. EXPERIENCED - 300 CO. LEARNER - 660 CO.
SUPPLIER DEVELOPMENT - NEW SYSTEM INTEGRATOR (S.I)	350 ROBOTICS CO. 350 IoT CO.
TECHNOLOGY DEVELOPMENT	Establishment of full-fledge Vehicle Type Approval (VTA) testing centre, Establishment of Electric Vehicle Interoperability Centre (EVIC), etc...

### TAX Incentives for export

Eligibility	Tax Reliefs
Manufacturers of motor vehicles, automobile components or parts which export these manufactured goods provided the export sales of the products attained at least 30% value added	Tax exemption of statutory income (restricted to 70% in a year of assessment) equivalent to: <ol style="list-style-type: none"> <li>(a) 30% of the value of increased exports (attained at least 30% value added); or</li> <li>(b) 50% of the value of increased exports (attained at least 50% value added).</li> </ol>

Source: Income Tax (Exemption) Order 2011)

Items	NAP2014 (by 2020)	Actual Value 2018	NAP2020 (by 2030)
Export CBU	250,000 units	RM 2.08 billion	RM12.3 billion
Export P&C	RM 10 billion	RM 12.1 billion	RM 28.3 billion
Export Remanufactured P&C	RM 2 billion	RM 0.52 billion	RM 10 billion

RM: Malaysian Ringgit

**Figure 5.1.8 Automotive and Autoparts Export Policy in Malaysia**

From the above, it seems that there are two directions in which the country's export strategy can be taken: to increase the trade balance to a positive level, as Thailand and Turkey have done, or to balance the trade balance to the extent that it does not become a large excess of imports.

In other words, in the next phase of the development study, the project should analyze and report on such trade-related research, while implementing the Pilot activities discussed in the main report.

## 5.1.5 Supplemental survey for analyzing potential export countries

### Australia



Auto Market and Sales Volume	Number of cars owned 18.31 million units Passenger cars 14.28 million units 1.7 people per passenger car Gross national income per capita \$51360 Taxation of imported vehicles Customs duty (maximum rate 5%) and GST (Goods and Services) 10%. Luxury cars are subject to LCT (Luxury Car Tax) 33% instead.	Automotive Environment Affecting Development	<b>Ambient Temp</b> High outdoor temperatures are severe, and there are concerns about hot restart and air conditioning performance. The coastal slopes of the eastern mountain range have a temperate humid climate, while the southeastern part has a western maritime climate. The southwestern coast has a Mediterranean climate, while the northern coast has a Savannah climate. Temperatures are mild to hot throughout the entire region. There were 33 days in 2019 when the average daily maximum temperature across the country exceeded 39°C. In Oudna Datta (a desert settlement in the deep south), 50.7°C was recorded. The lowest temperature was 14.2°C in Riaweni, Tasmania. <ul style="list-style-type: none"> <li>· Sydney 22.9°C in January, 11.2°C in July.</li> <li>· Darwin 28.2°C in January 24.7°C in July</li> </ul>
	Safety Regulations Adopted UN rules in 1958 agreement member countries of WP29 <ul style="list-style-type: none"> <li>· Frontal impact standard Yes</li> <li>· Electronic stability control Yes</li> <li>· Pedestrian protection Yes</li> <li>· Motorcycle anti-lock braking system Yes</li> </ul>		<b>Altitude conditions</b> It is divided into the eastern mountains, the central lowlands of the Dahurui Basin, and the desert - rich western plateau. The average altitude of the country is 300 meters. Mount Kosciuszko is the highest mountain on the Australian mainland, at 2,228 meters above sea level, and the road is 2,100 meters above sea level.
	Emission Regulations Emission regulation ADR79/04(Euro5b+) Diesel smoke regulation ADR30/01 Fuel consumption regulation ADR81/02		<b>Road paving rates and infrastructure</b> World Economic Forum Rating Score 4.9 (33rd/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2) Expressways are well maintained, with many roads having four-lane separation zones.

### Philippines



Auto Market and Sales Volume	Number of vehicles owned 4.09 million units Passenger cars 1.03 million units Gross national income per passenger car 102 people per capita 3,660 USD Taxation of imported vehicles Import tax from Indonesia is 0%, however, VAT is 12%, and excise tax is 4-50% depending on the price of the vehicle. However, 0% for EVs.	Automotive Environment Affecting Development	<b>Ambient Temp</b> Tropical monsoon climate with high temperature and humidity. Mindanao in the south has a tropical rainforest climate. The climate is mild throughout the year. The minimum and maximum temperatures range from 27°C to 30°C. <ul style="list-style-type: none"> <li>· Manila 26.1°C in January 27.9°C in July</li> </ul>
	Safety Regulations NOT yet adopted UN rules in 1958 agreement member countries of WP29 <ul style="list-style-type: none"> <li>· Frontal impact standard No</li> <li>· Electronic stability control No</li> <li>· Pedestrian protection No</li> <li>· Motorcycle anti-lock braking system No</li> </ul>		<b>Altitude conditions</b> The Philippines belongs to the Pacific Rim orogenic belt, and has a mountainous terrain with many active volcanoes. Baguio, the central city in the northern part of Luzon, the largest island in the Philippines, is 1,500 meters above sea level.
	Emission Regulations Emission regulation Euro4 Diesel smoke regulation None Fuel consumption regulation None		<b>Road paving rates and infrastructure</b> There are concerns about poor road surfaces, runnability, and road interference. <ul style="list-style-type: none"> <li>· World Economic Forum Rating Score 3.7 (87th/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)</li> <li>· Priority is given to repairing and maintaining roads rather than building new ones, and the paving rate is low.</li> </ul> The total length of the road network is about 200,000 km, with 30,000 km of general national roads and 30,000 km of state roads. 97% of national roads are paved, but the paving rate including local roads is about 21%. The development of expressways is lagging behind.

## Vietnam



Volume Auto Market and Sales	Number of vehicles owned 600,000 units Passenger cars 320,000 units 295 people per passenger car Gross national income per capita: \$2,160 Taxation of imported vehicles 0% tariff from Indonesia, 10% VAT, 60% special consumption tax SST	Automotive Environment Affecting Development	<b>Ambient Temp</b> The northern part of the country experiences a subtropical monsoon with a rainy season from July to June, while the southern part experiences a tropical monsoon with a rainy season from August to September. In general, the climate is hot and humid throughout the year. April is the hottest month of the year, with a maximum temperature of about 33°C to 35°C. - Hanoi 16.0°C in January 29.0°C in July
	Safety Regulations NOT yet adopted UN rules in 1958 agreement member countries of WP29 - Frontal impact standard No - Electronic stability control No - Pedestrian protection No - Motorcycle anti-lock braking system No		<b>Altitude conditions</b> Drivability is a concern depending on the presence of high altitude roads. 75% of the country is mountain and plateau area with Annam Mountains as the core Highest peak: Mount Fansipan 3148m.
	Emission Regulations Emission regulation Euro4 Diesel smoke regulation UN-R24 Fuel consumption regulation UN-R101 (Test method)		<b>Road paving rates and infrastructure</b> There are concerns about poor road surfaces, runnability, and road interference. World Economic Forum Rating Score 3.4 (104th/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2) Generally poorly maintained, but improvements have been made considerably.

## Bangladesh



Volume Auto Market and Sales	Number of vehicles owned 420,000 units Passenger cars 170,000 units 954 people per passenger car Gross national income per capita \$1,470 Five levels of general tariffs CD0: 1, 5, 10, 25%; adjustment tax RD3-25%; VAT 15%.	Automotive Environment Affecting Development	<b>Ambient Temp</b> Severe high outdoor temperatures, concerns about hot restart and air conditioning performance. Subtropical monsoon climate. The southwest monsoon blows from June to October, which is a hot and humid rainy season with temperatures ranging from 25 to 41°C. - Dacca 19.0°C in January 28.9°C in July
	Safety Regulations NOT yet adopted UN rules in 1958 agreement member countries of WP29 - Frontal impact standard No - Electronic stability control No - Pedestrian protection No - Motorcycle anti-lock braking system No		<b>Altitude conditions</b> A country on the Ganges Delta. Most of the country is lowland, less than 9 meters above sea level.
	Emission Regulations Emission regulation : Catalysts for gasoline vehicles and DPFs for diesel vehicles are mandatory as emission control measures. Diesel smoke regulation: Euro 2 for gasoline vehicles and Euro 1 for diesel vehicles Fuel consumption regulation : None		<b>Road paving rates and infrastructure</b> There are concerns about the durability of the suspension and road interference due to the poor road surface. World Economic Forum Rating Score 3.2 (107th/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)



## Ethiopia



<b>Auto Market and Sales Volume</b>  <b>Safety Regulations</b>  <b>Emission Regulations</b>	Number of vehicles owned 180,000 units 100,000 passenger cars 1012 people per passenger car Gross national income per capita \$740 Taxation of imported vehicles 35% customs duty, 15% VAT, 30%-100% excise tax (by fuel and displacement), 10% additional tax, 3% withholding tax Aiming for TOP position in African automobile industry with the help of China	<b>Automotive Environment Affecting Development</b>	<b>Ambient Temp</b> Relatively cool alpine climate due to its high altitude location The plateau region has a mild climate, almost like an everlasting spring. - Addis Ababa 15.7°C in January 16.2°C in July
	NOT yet adopted UN rules in 1958 agreement member countries of WP29 - Frontal impact standard No - Electronic stability control No - Pedestrian protection No - Motorcycle anti-lock braking system No		<b>Altitude conditions</b> There are many areas with high altitude, and drivability at high altitude is a concern. - Plateau country in the upper reaches of the Nile River. Plateau region 2000-3000m - Abyssinia plateau above 2000m is flat and has many lakes and marshes.
	<b>Emission regulation :</b> None <b>Diesel smoke regulation :</b> None <b>Fuel consumption regulation :</b> None  Note: There are regulations on air pollution, but there are no regulations on harmful gases for cars alone.		<b>Road paving rates and infrastructure</b> There are concerns about the durability of the suspension and road interference due to the poor road surface. World Economic Forum Rating Score 3.0 (116th place / 141 countries Average score 4.07 Japan 6.1 Indonesia 4.2)

## Nigeria



<b>Auto Market and Sales Volume</b>  <b>Safety Regulations</b>  <b>Emission Regulations</b>	Number of vehicles owned: 1.63 million units Passenger cars: 1.05 million units 183 people per passenger car Gross national income per capita \$2,100 Taxation of imported vehicles: 10% tariff (from 2020), 7.5% VAT (value added tax)	<b>Automotive Environment Affecting Development</b>	<b>Ambient Temp</b> High outdoor temperatures are severe, and there are concerns about hot restart and air conditioning performance. It has a tropical rainforest climate with high temperature and humidity throughout the year. Maximum and minimum temperatures have ranged from 43.1°C in Yola (northeast) to 10.2 in Jos (north-central). - Lagos 27.2°C in January 25.6°C in July
	NOT yet adopted UN rules in 1958 agreement member countries of WP29 - Frontal impact standard No - Electronic stability control No - Pedestrian protection No - Motorcycle anti-lock braking system No		<b>Altitude conditions</b> Flat terrain not exceeding 500m above sea level, except for the Joss Plateau in the center and the Adamawa Plateau on the eastern border.
	<b>Emission regulation :</b> Euro2 <b>Diesel smoke regulation :</b> None <b>Fuel consumption regulation :</b> None		<b>Road paving rates and infrastructure</b> There are concerns about poor road surfaces, runnability, and road interference. World Economic Forum Rating Score 2.5 (131st/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)

## Kenya



<b>Auto Market and Sales Volume</b>  <b>Safety Regulations</b>  <b>Emission Regulations</b>	Number of cars owned 1.6 million units Passenger cars 980,000 units 51 people per passenger car Gross national income per capita 1460 USD Import tax on automobiles (used new cars) 35%, VAT 16% in principle, additional tax on used cars 20%.	<b>Automotive Environment Affecting Development</b>	<b>Ambient Temp</b> In the coastal areas facing the Indian Ocean, there are concerns about hot restart and air conditioning performance. Most of the living areas are located at altitudes of more than 1,000 meters, so although the climate is tropical, it is close to a dry savannah climate. The coastal areas facing the Indian Ocean, however, have a tropical climate, with an average annual temperature of 26 to 27 degrees Celsius. On the coast, the temperature peaks at 37°C and the humidity is high. <ul style="list-style-type: none"> <li>Nairobi 19.9°C in January 17.2°C in July</li> <li>Mombasa 27.2°C in January 24.4°C in July</li> </ul>
	NOT yet adopted UN rules in 1958 agreement member countries of WP29 <ul style="list-style-type: none"> <li>Frontal impact standard No</li> <li>Electronic stability control No</li> <li>Pedestrian protection No</li> <li>Motorcycle anti-lock braking system No</li> </ul>		<b>Altitude conditions</b> Drivability is a concern depending on the presence of high altitude roads. Most of the country is a plateau above 1,200 meters above sea level, and the altitude increases as one moves westward. Kenya Volcano, just below the equator, is 5200m above sea level Nairobi 1624m
	<b>Emission regulation</b> : Require gasoline vehicles to have Catalyst. Special regulatory values have been set for gasoline and diesel vehicles. <b>Diesel smoke regulation</b> : None <b>Fuel consumption regulation</b> : None		<b>Road paving rates and infrastructure</b> World Economic Forum Rating Score 4.1 (64th place/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2) Main roads are generally in good condition, but minor road maintenance is a binadequate. The overall road paving rate is 15%.

## Egypt



<b>Auto Market and Sales Volume</b>  <b>Safety Regulations</b>  <b>Emission Regulations</b>	Number of cars owned 5.83 million units Passenger cars 4.38 million units 22 people per passenger car Gross national income per capita \$3,010 Taxes 40% customs duty, 14% VAT, 0.5% industrial and commercial profits tax, 3% resource exploitation fee, 1% additional tax	<b>Automotive Environment Affecting Development</b>	<b>Ambient Temp</b> High outdoor temperatures are severe, and there are concerns about hot restart and air conditioning performance. The northern part of the country has a Mediterranean climate, while the southern part has a desert climate. The southern interior is hot and dry, sometimes exceeding 40 degrees Celsius. <ul style="list-style-type: none"> <li>Cairo 14.1°C in January 28.0°C in July</li> </ul>
	Adopted UN rules in 1958 agreement member countries of WP29 <ul style="list-style-type: none"> <li>Frontal impact standard Yes</li> <li>Electronic stability control Yes</li> <li>Pedestrian protection Yes</li> <li>Motorcycle anti-lock braking system No</li> </ul>		<b>Altitude conditions</b> Except for the valleys along the Nile River and the delta at the mouth of the river, most of the land is flat and completely desert.
	<b>Emission regulation</b> : Special regulatory values have been set for gasoline and diesel vehicles. <b>Diesel smoke regulation</b> : Yes <b>Fuel consumption regulation</b> : None		<b>Road paving rates and infrastructure</b> World Economic Forum Rating Score 5.1 (29th/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2) The quality of roads is high, ranking second in Africa. (Paved 188,247 km, unpaved 8,341 km)

## Pakistan



Volume	<b>Auto Market and Sales</b>	Number of cars owned: 3.73 million units Passenger cars: 3.02 million units 65 people per passenger car Gross national income per capita \$1,580 Sales Tax General tariffs High tariff on automobiles, sales tax equivalent to VAT in other countries, standard 17%.	Automotive Environment Affecting Development	<b>Ambient Temp</b>	The high outdoor temperature conditions are severe, and there are concerns about hot restart and air conditioning performance. Most of the country has a subtropical arid climate, with a mountainous climate in the north and a temperate monsoon climate in the southern plains. 53.5°C was recorded in Mohenjo Daro and Turbat in the past. This is the hottest temperature ever recorded on the Asian continent.
	<b>Safety Regulations</b>	The signatory to the 1958 WP29 agreement but has not yet adopted UN rules as a new signatory. <ul style="list-style-type: none"> <li>Frontal impact standard No</li> <li>Electronic stability control No</li> <li>Pedestrian protection No</li> <li>Motorcycle anti-lock braking system No</li> </ul>		<b>Altitude conditions</b>	Drivability is a concern due to the presence of high altitude roads. The terrain gradually decreases in altitude from the northwest to the southeast. In the north, the Himalayas, Karakoram, and Hindu Kush mountains run east to west, and in Kashmir, the K2, Nanga Palpat, and other high peaks of 8,000 meters rise. In the west are the Sulaiman Mountains, and in the southwest is the Baluchistan Plateau.
	<b>Emission Regulations</b>	<b>Emission regulation :</b> Euro 2 regulations for gasoline vehicles also Euro 2 regulations for diesel vehicles exist but are not yet operational. <b>Diesel smoke regulation : Yes</b> <b>Fuel consumption regulation :</b> None		<b>Road paving rates and infrastructure</b>	World Economic Forum Rating Score 4.0 (71st/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)  Paving rate 71.59%

## Saudi Arabia



Volume	<b>Auto Market and Sales</b>	Number of cars owned 7.51 million units Passenger cars 5.17 million units 6.4 people per passenger car Gross national income per capita \$20,090 Taxation of imported vehicles 15% tariff, 15% VAT	Automotive Environment Affecting Development	<b>Ambient Temp</b>	High outside temperatures are severe, and there are concerns about hot restart and air conditioning performance. The inland areas have an arid climate, while the Arabian Gulf coast has four seasons with widely varying temperatures. While the coastal areas are hot and humid, the inland areas have a typical continental desert climate, with extreme heat exceeding 50 degrees Celsius in the summer and often below freezing in the winter. <ul style="list-style-type: none"> <li>Riyadh 14.5°C in January 36.6°C in July</li> </ul>
	<b>Safety Regulations</b>	NOT yet adopted UN rules in 1958 agreement member countries of WP29 <ul style="list-style-type: none"> <li>Frontal impact standard No</li> <li>Electronic stability control No</li> <li>Pedestrian protection No</li> <li>Motorcycle anti-lock braking system No</li> </ul>		<b>Altitude conditions</b>	Drivability is a concern depending on the presence of high altitude roads. Occupying 80% of the Arabian Peninsula, most of the country is a plateau with a high west and low east, with the Nefud Desert in the north and the Rub al Khali Desert in the south. In the west, the Hejaz Mountains run along the Red Sea, reaching 3,000 meters in the south.
	<b>Emission Regulations</b>	<b>Emission regulation :</b> Equivalent to Euro 2 for gasoline passenger cars and Euro 1 for gasoline light commercial vehicles. <b>Diesel smoke regulation : Yes</b> <b>Fuel consumption regulation :</b> None		<b>Road paving rates and infrastructure</b>	World Economic Forum Rating Score 5.2 (27th/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)  The country is putting a lot of effort into improving roads with a lot of budget.

## Colombia



Auto Market and Sales Volume	Number of cars owned 5.9 million units Passenger cars 4.08 million units 12 people per passenger car Gross national income per capita: \$5,890 Taxation of imported vehicles: 35% customs duty, 16% VAT, 16-60% consumption tax	Automotive Environment Affecting Development	<b>Ambient Temp</b> The climate is divided into two main areas: the Caribbean coast has a mild climate, while the mountainous areas have slightly cooler temperatures, but the temperature varies greatly during the day. 900-2000m 17-24°C, 2000-3000m, 12-16°C.. · Bogota 14.5°C in January 36.6°C in July
	Safety Regulations		<b>Altitude conditions</b> Drivability is a concern depending on the presence of high altitude roads. The Andes Mountains are divided into three mountain systems in this country: Eastern, Central, and Western, each of which has a 3000meter range. As a result, 40% of the country is mountainous. The northeastern part of the country is covered with prairies called Lianos in the basin of the Meta River, a tributary of the Orinoco River, and the southeastern part is a densely forested area in the upper reaches of the Amazon River.
	Emission Regulations		<b>Road paving rates and infrastructure</b> There are concerns about poor road surfaces, runnability, and road interference. World Economic Forum Rating Score 3.4 (102nd/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)

## Argentina



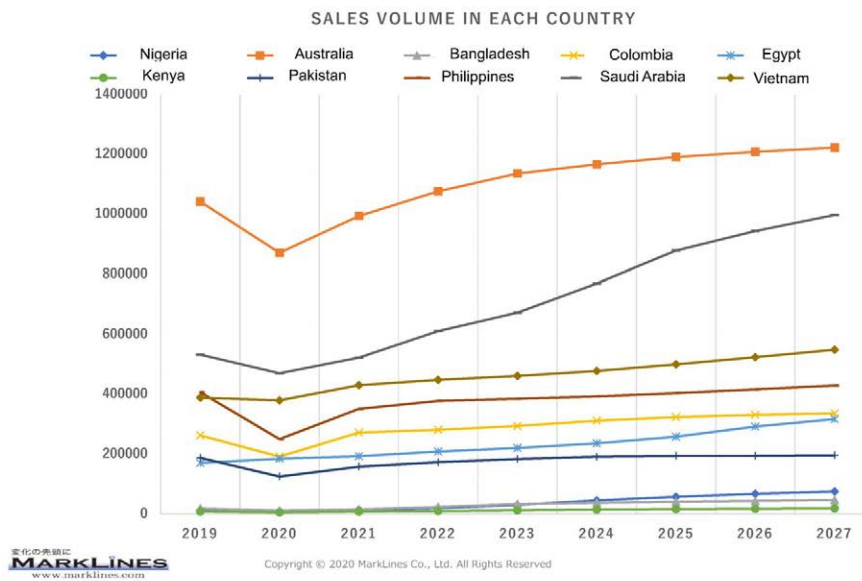
Auto Market and Sales Volume	Number of cars owned 14.11 million units Passenger cars 10.69 million units 4.1 people per passenger car Gross national income per capita \$13,030 Taxation of imported vehicles Customs duty 12%, VAT 25%, consumption tax 20%.	Automotive Environment Affecting Development	<b>Ambient Temp</b> Subtropical climate in the north, temperate climate in the Great Plains, arid climate in the western Andes, and cold climate in the southern Patagonia region. · Buenos Aires 24.8°C in January 11.0°C in July
	Safety Regulations		<b>Altitude conditions</b> Drivability is a concern depending on the presence of high altitude roads. The region is divided into four main areas: the Gran Chaco (forested area) in the north, the Pampa (temperate grasslands) in the La Plata River basin, arid Patagonia in the south, and the steep Andes Mountains on the western border.
	Emission Regulations		<b>Road paving rates and infrastructure</b> There are concerns about poor road surfaces, runnability, and road interference. World Economic Forum Rating Score 3.6 (91st place/141 countries, average score 4.07, Japan 6.1, Indonesia 4.2)  Paving rate 34.39%. Road network is 240,000 km, 34% of which is paved. 80% of all roads are deteriorated.



### 3. Sales volume in each country

16

Forecast of sales volume trends by LMC Automotive※



**LMC Automotive**※

UK-based research firm providing automotive market forecasting services

The company forecasts global production and sales volume by model and powertrain type, etc., by analyzing many social conditions such as GDP of each country and the automotive industry.

Forecast of sales volume trends by LMC Automotive

	2019	2020	2021	2022	2023	2024	2025	2026	2027
Nigeria	12,152	9,421	14,287	19,485	30,373	45,738	57,351	67,376	75,709
Australia	1,042,411	871,610	993,960	1,076,559	1,136,336	1,167,027	1,191,641	1,208,812	1,223,204
Bangladesh	18,492	11,400	15,264	23,568	33,660	37,596	41,064	44,076	47,208
Colombia	263,134	191,716	272,615	281,460	294,460	312,120	323,958	331,663	336,694
Egypt	170,734	184,818	193,467	208,686	221,073	236,285	258,219	292,430	317,590
Kenya	8,522	5,589	8,258	10,118	12,448	14,893	16,283	17,513	18,832
Pakistan	187,675	124,976	158,427	173,445	183,845	191,910	194,162	194,426	196,329
Philippines	407,166	250,440	351,606	378,071	385,416	392,871	404,082	416,823	429,670
Saudi Arabia	532,846	470,545	522,922	611,530	673,306	770,341	879,067	944,254	997,691
Vietnam	388,948	380,111	430,866	448,655	461,566	478,326	500,458	524,395	549,251
South Africa	516,307	358,446	458,662	506,469	547,730	601,425	651,273	705,911	736,452

## 4. Conclusion

Country,	Number of people per car	Per capita GDP (US\$)	Sales growth	Safety regulation	Environmental regulation	Market environment adaptability/development potential
Australia	(18,310 T units) 1.7	51,360	Slight upward trend in sales volume	Adopted UN regulations for frontal collision, pedestrian protection, ESC, and 2-wheel ABS standards	Euro 5+ exhaust gas regulations, smoke regulations, fuel efficiency regulations.	No particular development concerns
Philippines	(4,090 T units) 102	3,660	No sales volume increase, maintaining status quo	NOT adopted UN regulations	Euro4 No other	Need to check for rough road performance and road interference
Vietnam	(600 T units) 295	2,160	No sales volume increase	NOT adopted UN regulations	Euro 4 , smoke regulation, fuel consumption label	Need to check for high altitude drivability, rough road performance and road interference
Bangladesh	(420 T units) 954	1,470	No sales volume increase, maintaining status quo	NOT adopted UN regulations	Catalyst for gasoline vehicles and DPF for diesel vehicles, Emission regulations equivalent to Euro 2 for gasoline vehicles and Euro 1 for diesel vehicles	Hot restart and air conditioning performance at high outside temperatures, rough road driving performance and road interference need to be checked.
Ethiopia	(180 T units) 1,012	740	No data	NOT adopted UN regulations	No regulations	Need to check for high altitude drivability, rough road performance and road interference
Nigeria	(1,630 T units) 183	2,100	No sales volume increase, maintaining status quo	NOT adopted UN regulations	Euro2 No other	Need to check for high altitude drivability, rough road performance and road interference
Kenya	(1,600 T units) 51	1,460	No sales volume increase, maintaining status quo	NOT adopted UN regulations	Catalyst required for gasoline vehicles and special regulations for smoke regulation	Need to check hot restart and air conditioning performance at high outside temperatures and high altitude drivability
Egypt	(5,830 T units) 22	3,010	No sales volume increase, maintaining status quo	Adopted UN regulations, frontal collision, pedestrian protection, ESC standards	Exhaust gas regulation: special regulation values for gasoline and diesel vehicles, Smoke regulation	Need to check hot restart and air conditioning performance at high outside temperatures
Pakistan	(3,730 T units) 65	1,580	No sales volume increase, maintaining status quo	Adopted UN regulations No standards currently in place	Euro2 for gasoline vehicles and diesel vehicles (yet to be valid), Smoke regulations	Need to check hot restart and air conditioning performance at high outside temperatures and high altitude drivability
Saudi Arabia	(7,510 T units) 6.4	20,090	Slight upward trend in sales volume	NOT adopted UN regulations	Euro2, Euro1 equivalent for small business vehicles, Smoke regulations for diesel vehicles	Need to check hot restart and air conditioning performance at high outside temperatures and high altitude drivability
Colombia	(5,900 T units) 12	5,890	No sales volume increase, maintaining status quo	NOT adopted UN regulations	Euro2 or US94 for gasoline vehicles, Euro4 smoke regulations for diesel vehicles, Evaporative emission	Need to check for high altitude drivability, rough road performance and road interference
Argentina	(14,110 T units) 4.1	13,030	No sales volume increase, maintaining status quo	NOT adopted UN regulations	Euro 5a for all car type, Smoke regulations, Evaporative emission	Need to check for high altitude drivability, rough road performance and road interference

Country,	Number of people per car	Per capita GDP (US\$)	Sales growth	Safety regulation	Environmental regulation	Market environment adaptability/development potential
Australia	(18,310 T units) 1.7	51,360	↗	Adopted UN regulations for frontal collision, pedestrian protection, ESC, and 2-wheel ABS standards	Euro 5+ exhaust gas regulations, smoke regulations, fuel efficiency regulations.	No particular development concerns
Philippines	(4,090 T units) 102	3,660	→	NOT adopted UN regulations	Euro4 No other	Need to check for rough road performance and road interference
Vietnam	(600 T units) 295	2,160	→	NOT adopted UN regulations	Euro 4 , smoke regulation, fuel consumption label	Need to check for high altitude drivability, rough road performance and road interference
Bangladesh	(420 T units) 954	1,470	→	NOT adopted UN regulations	Catalyst for gasoline vehicles and DPF for diesel vehicles, Emission regulations equivalent to Euro 2 for gasoline vehicles and Euro 1 for diesel vehicles	Hot restart and air conditioning performance at high outside temperatures, rough road driving performance and road interference need to be checked.
Ethiopia	(180 T units) 1,012	740	No data	NOT adopted UN regulations	No regulations	Need to check for high altitude drivability, rough road performance and road interference
Nigeria	(1,630 T units) 183	2,100	→	NOT adopted UN regulations	Euro2 No other	Need to check for high altitude drivability, rough road performance and road interference
Kenya	(1,600 T units) 51	1,460	→	NOT adopted UN regulations	Catalyst required for gasoline vehicles and special regulations for smoke regulation	Need to check hot restart and air conditioning performance at high outside temperatures and high altitude drivability
Egypt	(5,830 T units) 22	3,010	→	Adopted UN regulations, frontal collision, pedestrian protection, ESC standards	Exhaust gas regulation: special regulation values for gasoline and diesel vehicles, Smoke regulation	Need to check hot restart and air conditioning performance at high outside temperatures
Pakistan	(3,730 T units) 65	1,580	→	Adopted UN regulations No standards currently in place	Euro2 for gasoline vehicles and diesel vehicles (yet to be valid), Smoke regulations	Need to check hot restart and air conditioning performance at high outside temperatures and high altitude drivability
Saudi Arabia	(7,510 T units) 6.4	20,090	↗	NOT adopted UN regulations	Euro2, Euro1 equivalent for small business vehicles, Smoke regulations for diesel vehicles	Need to check hot restart and air conditioning performance at high outside temperatures and high altitude drivability
Colombia	(5,900 T units) 12	5,890	→	NOT adopted UN regulations	Euro2 or US94 for gasoline vehicles, Euro4 smoke regulations for diesel vehicles, Evaporative emission	Need to check for high altitude drivability, rough road performance and road interference
Argentina	(14,110 T units) 4.1	13,030	→	NOT adopted UN regulations	Euro 5a for all car type, Smoke regulations, Evaporative emission	Need to check for high altitude drivability, rough road performance and road interference

Source: JICA Study team based on the materials by MarkLines

\*The above slide is added by JICA Study Team in according with the request by MOI

Country,	Number of people per car	Per capita GDP (US\$)	Sales growth	Safety regulation	Environmental regulation	Market environment adaptability/development potential
Australia	(18,310 T units) 1.7	51,360	↗	+	-	++ (engine power)
Philippines	(4,090 T units) 102	3,660	→	+++	+++	+++
Vietnam	(600 T units) 295	2,160	→	+++	+++	++ (competitor)
Bangladesh	(420 T units) 954	1,470	→	+++	+	+ (competitor)
Ethiopia	(180 T units) 1,012	740	No data	+++	+++	--- (high altitude drivability, rough road performance, road interference)
Nigeria	(1,630 T units) 183	2,100	→	+++	+++	--- (distance, high altitude drivability, rough road performance, road interference)
Kenya	(1,600 T units) 51	1,460	→	+++	+++	-- (hot restart, air conditioning performance at high outside temperatures, high altitude drivability)
Egypt	(5,830 T units) 22	3,010	→	++	-	- (hot restart and air conditioning performance at high outside temperatures)
Pakistan	(3,730 T units) 65	1,580	→	+++	+++	- (competitor, hot restart and air conditioning performance at high outside temperatures, high altitude drivability)
Saudi Arabia	(7,510 T units) 6.4	20,090	↗	+++	+++	--- (competitor, hot restart, air conditioning performance at high outside temperatures, high altitude drivability)
Colombia	(5,900 T units) 12	5,890	→	+++	+++	--- (high altitude drivability, rough road performance, road interference)
Argentina	(14,110 T units) 4.1	13,030	→	-	-	--- (Distance, altitude drivability, rough road performance, road interference)

Source: JICA Study team based on the materials by MarkLines

\*The above slide is added by JICA Study Team in according with the request by MOI

## Conclusion

### 1. Adaptability to Perspective of Environmental and Safety Regulations

- In terms of environmental regulations, the exhaust gas standard for vehicles manufactured in Indonesia is Euro 4, while Australia and Argentina have standards that are higher than that and require development such as reviewing the fuel system of the catalyst and engine. In addition, Kenya and Egypt have their own emission standards that need to be confirmed. Colombia and Argentina have evapo (fuel evaporation gas) emissions that are not found in Indonesia, and development is needed to review the size of canisters (where fuel evaporation gas is once adsorbed by activated carbon) and add evapo systems (to control adsorption and release of fuel evaporation gas).
- In terms of safety regulations, Australia and Egypt have adopted the United Nations regulations and need to develop safety performance. The development of safety performance is very difficult, as it involves reviewing the body structure and adding protective devices. In Australia, ANCAP (Australasian New Car Assessment Program) is a comparative test of safety performance, and the results are published.
- In terms of regulations for Australia, Argentina, Colombia, and Egypt, Indonesia needs to develop full-scale technologies to comply with the regulations. For Kenya it will need to develop applications depending on the results of exhaust gas tests.

### 2. Adoptability to Market Environment

- The ability to drive on paved roads on flat terrain with the engine warmed up is common throughout the world and rarely causes any problems. However, severe environmental conditions such as extremely low outside temperatures such as -25° C, high outside temperatures such as 40° C, and high altitudes of 3,000m class are unique to each country and require development of applications for those environments. In addition, when there are problems on severe rough roads, it is not easy and difficult to take countermeasures because changing the ground clearance of the vehicle affects the maneuverability and other aspects of the vehicle.
- There is a concern that problems due to harsh environments may occur in exporting countries except Australia. If there is a problem due to rough roads (runnability and road interference), it is necessary to limit the export to models with high vehicle height.

### Materials used

---

- 2020 Data Book of the World, World Country Directories and Latest Statistics (Ninomiya Shoten)
- World Statistics (Ministry of Internal Affairs and Communications)
- WHO Global status report on road safety 2018
- ARC Report Published by the World Economic Information Service
- Information Engine (MarkLines)
- Global Temperature and Precipitation - Travel.Info <http://www.ryoko.info/Temperature/>
- Countries of the World <http://atlas.cdx.jp/nations/nations.htm>
- World Economic Forum 2019 [https://www.theglobaleconomy.com/rankings/roads\\_quality/](https://www.theglobaleconomy.com/rankings/roads_quality/)
- LMC Automotive car sales data





The Framework of Automotive Industry Promotion Plan (from the result of the former project)

**Vision: To become a major player in global automotive production**  
**KPI\*: 2.5 million units of production, including 0.5 million of export & 0.4 million xEV**

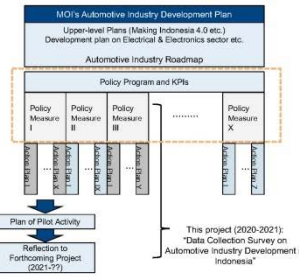
Policy Program	KPI (by-2025)	Policy Measures	Ministry in Charge
Policy implementation	Improve achievement rate of policy KPIs	(0) Make action plan for export and xEV and strengthen implementation capability	<ul style="list-style-type: none"> <li>• Bappenas</li> <li>• M of Industry</li> <li>• Coord Min Econ Affairs</li> <li>• M of Finance</li> <li>• BPSN</li> <li>• Coord Min Marine Affairs</li> <li>• M of Energy Mineral Resources</li> <li>• M of Manpower</li> <li>• M of Public Works</li> <li>• M of Research, Technology and Higher Education</li> <li>• M of Trade</li> <li>• M of Transportation</li> <li>• Central Bank</li> <li>• etc.</li> </ul>
Promote agglomeration of auto parts industry and strengthen cost competitiveness	Development of supporting industries to achieve the increase of local content procurement ratio (Increase number of suppliers*): 1,500->2,000	(1) Attract investment to auto parts industry	
		(2) Raise engineering, quality, and productivity of suppliers	
Enhance product development and engineering capability	R&D** localization ratio: 0% -> 30%	(3) Improve business climate to encourage investment especially for SMEs investment (import license, and visa)	
		(4) Creation of automotive industrial belt in Northern part of Java	
		(5) Factory management and production engineering skills development (ability to improve/ design process, etc)	
		(6) Promotion of R&D investment and transfer of R&D&D capability to local through incentives for R&D&D	
		(7) Collaboration between technology university / polytechnic and auto industry to develop required skills	
		(8) Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation	

\*1: Indonesia government raised these KPI  
\*2: 1500, according to GARIBEC2020 number on par with Thailand which has around 2000 suppliers

Review of the Former Project

The former project (2017-2019), "Survey on Promotion for Globally Competitive Industry in Indonesia" drafted the Policy Program and KPIs of Automotive Industry Roadmap.

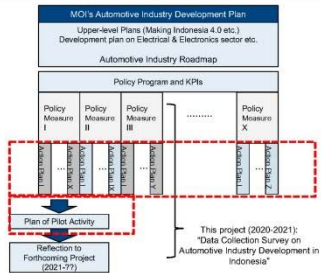
- Three policy programs subtracted in the former JICA project are:
  1. Policy implementation
  2. Promote agglomeration of auto parts industry and strengthen cost competitiveness
  3. Enhance product development and engineering capability
- A total eight policy measures were placed under three policy programs above in the former JICA project.
- It is necessary for the Project to review the Policy Program (incl.KPI) and Policy Measure allowing for new set of economic paradigm of the World after Covid19 turmoil.



Discussion on Action Plan associated to Policy Measure

This project (2020-2021), "Data Collection Survey on Automotive Industry Development in Indonesia" will draft the action plan associated with each Policy Measure of Automotive Industry Roadmap.

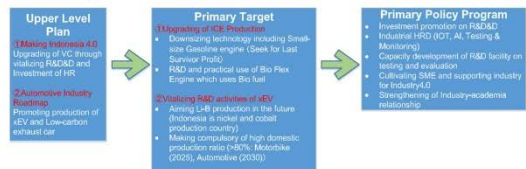
- Eight policy measures were placed under the former JICA project. Associated action plans will be placed to each measure through discussion among stakeholders.
- The detail of each action plan inclusive of responsible agencies, implementing schedule and cost of activity will be prepared in this Project.
- Among the action plans prepared, some are chosen as Pilot Activity. For kick-starting of the entire scheme of Automotive Industry Development Plan, this Project will plan the contents of Pilot Activity, which will be incorporated to forthcoming project financed by JICA (Already requested by GOI).



Important Will and Judgement to be determined by this Project

Three focal agendas will be dealt with in this Project. The first agenda relates to the base of Automotive Industry Roadmap, while the second agenda is for future strategy and the third one is for forthcoming JICA technical assistance to Indonesia.

- Throughout the project term, JICA Consultant will discuss mainly three agendas showing below with GOI and private sector in Indonesia.
  1. Review of major KPIs in Automotive Industry Roadmap after Covid19 turmoil.
  2. Balance of implementation and schedule on ICEV and xEV related programs and measures.
  3. Pilot Activity planned in the next phase.



Source) JICA Study Team Fig. Primary Policy Program on Automotive Industry Development in Indonesia

Important Will and Judgement to be determined by this Project

The second agenda influences to the allocation of budget, human resources and project for the automotive industry development. JICA Study Team will raise the issue to you on the degree of balance poured to ICEV and xEV each year until 2035.

- Throughout the project term, JICA Consultant will discuss mainly three agendas showing below with GOI and private sector in Indonesia.
  1. Review of major KPIs in Automotive Industry Roadmap after Covid19 turmoil.
  2. Balance of implementation and schedule on ICEV and xEV related programs and measures.
  3. Pilot Activity planned in the next phase.

	HORIZON 1 (2021) 3-5 YEARS	HORIZON 2 (2025) 5-10 YEARS	HORIZON 3 (2035) 10-15 YEARS
Primary Initiative	Strengthening local production of ICE vehicles	Start a local production of electric motorcycles	Start a local production of EV vehicles
Main activities	<ul style="list-style-type: none"> <li>• Increasing the capability of producing raw material (steel, chemical)</li> <li>• Increasing productivity of ICE vehicles through technology</li> <li>• Strengthening the capability of the local manufacturing components through strengthening PD and technology transfer</li> </ul>	<ul style="list-style-type: none"> <li>• Create a clear "realization plan" of full-fledged motorcycle, build infrastructure and provide incentive to support electric motorcycles</li> <li>• Create an R&amp;D center for EV component, especially battery and prototyping</li> <li>• Develop domestic production capability of electric motorcycle in all value chain</li> </ul>	<ul style="list-style-type: none"> <li>• Create a clear "realization plan" of full-fledged electric car/bike infrastructure and provide incentive to support electric vehicles</li> <li>• Support improvement of sustainable EV component production</li> <li>• Develop domestic production capability of 4W EV in all value chain</li> </ul>
Focus product	Internal Combustion Engine	Electric Vehicles	Electric Vehicles
	Accelerate the vehicle export, start from the MPV and LCGC	Start to export 2W electric motorcycle to the developing countries	Start to export 4W EV to the developing countries

Important Will and Judgement to be determined by this Project

The third agenda affect to the framework of the forthcoming JICA project. This Project tentatively set the candidate pilot activities with five themes and 10 titles for discussion purposes.

- Throughout the project term, JICA Consultant will discuss mainly three agendas showing below with GOI and private sector in Indonesia.
  1. Review of major KPIs in Automotive Industry Roadmap after Covid19 turmoil.
  2. Balance of implementation and schedule on ICEV and xEV related programs and measures.
  3. Pilot Activity planned in the next phase.

Theme	Contents	Activity Title
HRD	Industrial HRD through industry-academia tie up	<ol style="list-style-type: none"> <li>1. Human resource networking with automotive industry through connecting with higher education system</li> <li>2. Cultivating IOT/IT human resources for Industry4.0</li> <li>3. Cooperation to autoparts experimentation center and cultivating related human resources</li> </ol>

Continued

Theme	Contents	Activity Title
Investment Promotion	Upgrading of Investment Promotion activities	<ol style="list-style-type: none"> <li>1. Development of investment promotion tools viewing CASE situation</li> <li>2. Investment promotion pinpointing specific company</li> </ol>
Fostering Local SMEs	Inhouse Kaizen consulting	1. Implementation of pilot Kaizen consulting
	Preparation Tier2-3 company info	2. Preparation of SME profile information company
	Financial support	3. Support for SME financing program
Policy making/ Infra service	A part of policy review to be conducted in the forthcoming JICA project	<ol style="list-style-type: none"> <li>1. Support of policy making through Global Value Chain (GVC) analysis</li> <li>2. IO analysis linked to Indonesia's infrastructure development policy</li> </ol>

Suggestion to Automotive Industry Promotion Plan from the viewpoint of global trend



Contents to be Discussed

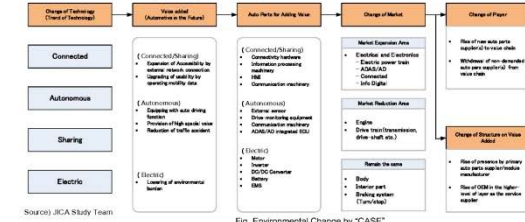
Paradigm shift after Covid-19 turmoil

- Transformation to the New Automotive Industry Model (CASE) and its Market Size
- Prospect of spreading automotive other than internal-combustion engine (ICE)
- Effect of greenhouse gas restriction
- Utilizing the Potentials of Existing Automotive Supply and Value Chains
- Production, Sales and Use of Automobiles Utilizing Next-Generation Technologies (e.g. IoT, AI, and Robotics)
- Automotive Industry Upgrading and Growth in the Local Procurement Ratio
- Expansion of Exports to Neighboring Countries



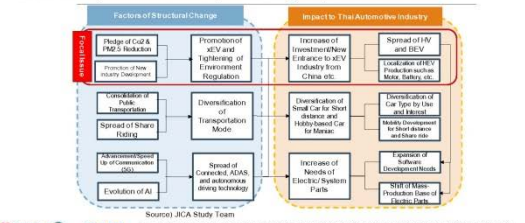
a. Transformation to the New Automotive Industry Model (CASE) and its Market Size  
In the process of "CASE", i) Change of player and ii) Change of structure on value added will be occur. In Indonesia, change of market will be realized around 2028 after Thailand.

iii) Viewing the industry transition in the future, i) Policy making, ii) Investment promotion, iii) Industry HRD, iv) Cultivating of SMEs and v) Related infrastructure development are to be incorporated into automotive industry development plan as policy measures.

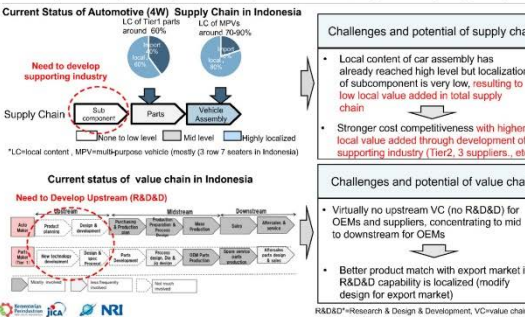


c. Effect of greenhouse gas restriction  
Indonesia needs to proceed R&D for FAME and political adjustment with agricultural sector in terms of palm oil demand / supply for dissemination of domestic bio-diesel.

iii) The spread of xEV, which is thought as effective measure to reduce greenhouse gas will be realized around 2025 in Thailand and 2028 in Indonesia respectively.  
iii) As the first step until then, Thailand start applying B20 to big diesel-engine vehicle from early 2020, and the follower, Indonesia is under experimental stage for practical use.



d. Utilizing the Potentials of Existing Automotive Supply and Value Chains  
Development of supply chain and upstream of value chain (R&D&D) will expand auto export through stronger cost competitiveness and higher design capability



Paradigm shift after Covid-19 turmoil

The economic loss by Covid-19 increases exponentially by the time of convergence. JICA Study Team will propose the timely strategy review allowing for the paradigm shift brought about by this turmoil.

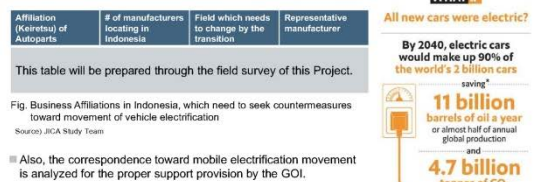
iii) The Automotive industry roadmap should be reviewed in positive and ambitious manner.



Fig. Paradigm shift after Covid-19 turmoil

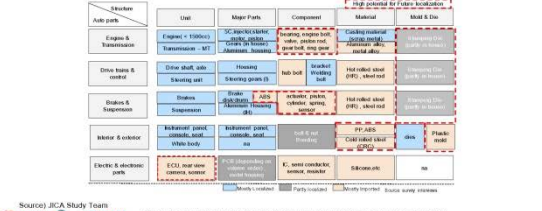
b. Prospect of spreading automotive other than internal-combustion engine (ICE)  
Although technical breakthrough is still questioned on the removal of fossil-fuel vehicle, market needs are boosting this movement.

iii) Indonesia aims to realize the fossil-fuel vehicle ban by 2040, but it needs strong will and energy by the Government because this transaction needs accompanying remarkable loss of employment.  
iii) Specific segments of auto-parts manufacturers in Indonesia needs to cope with this transition. These manufacturers are surveyed and listed in this Study.



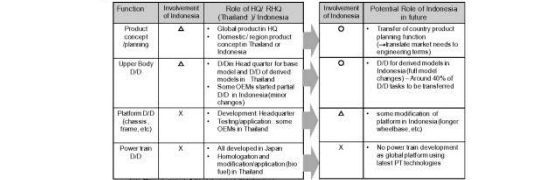
d. Utilizing the Potentials of Existing Automotive Supply and Value Chains  
In the process of xEV advancement, Indonesia should realize full-set supply of auto parts of entire SC, and attract plan/development function of upper side of smile curve on entire VC.

iii) By the advancement of Industry 4.0, the economic value of human labor is reduced and cheap labor may no longer serve as an entry ticket to GVC in the future.  
iii) If Indonesia fails to implement the digitalization of the production process and were to stay within the "trap of a middle-income country," it is possible that the technology linkage with developed countries would be disrupted and the country's status may return to an underdeveloped country.



d. Utilizing the Potentials of Existing Automotive Supply and Value Chains  
The goal of analyzing the value chain is to get the planning portion, the upper portion of the smile curve, and the detailed design portion localized in Indonesia.

iii) These are the core portions of car manufacturing function that were previously performed at the OEM headquarters. In order to realize this, it is necessary to strengthen the R&D&D function in the country.  
iii) The examples of specific measures include i) Consider incentives to attract R&D functions of component manufacturers, ii) Develop R&D&D human resources through industry-academia collaboration especially in the improvement of design ability, and iii) Expand the base pool of human resources through improving the quality of higher education.





e. Production, Sales and Use of Automobiles Utilizing Next-Generation Technologies (e.g. IoT, AI and Robotics)  
Technological innovations brought by Industry 4.0 are already being introduced across all fields from production to sales of automobiles; thus, it is moving in a more capital-intensive direction, and technological innovations will not promote employment generation.

- Improvements in Automobile Production Technology will make the front-end shift of manufacturing process and bring about increase the proportion of automotive electronic parts/components in all parts with the complexity of software.
- As for car sales and use, businesses providing car sharing services will focus on high occupancy rate, that is resulted in one of the factors in the decrease of vehicle sales in the future.
- Indonesia needs to develop HR through Human Resources Development Agency established in 2019 and to initialize the Strategic Innovation Promotion Program (SIP) to enhance industry-academia-government cooperation. Japanese support to this fields will be checked in this Study.

Table. Changes in Automotive Product Development, Manufacturing, Logistics, and Sales Driven by Next-Generation Technologies

Process	Changes Brought by Next-Generation Technologies
Product Planning	• Promoting efficiency
Manufacturing	• Progressing Front-end shift on manufacturing process
Logistics	• Increasing Speed by M2M technology
Sales	• Getting Smaller sales volume
Use	• Spreading Share use

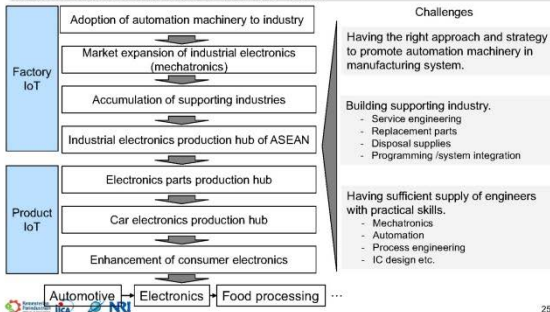
(Source) JICA Study Team



24

e. Production, Sales and Use of Automobiles Utilizing Next-Generation Technologies (e.g. IoT, AI and Robotics)

Industry 4.0 will be a chance for electronics sector to shift from commodity to industrial products and upgrade the value added.



25

f. Automotive Industry Upgrading and Growth in the Local Procurement Ratio

The meaning behind local procurement will shift from domestic procurement to regional procurement, and then to optimal global procurement. Indonesia needs to develop the capacity to produce parts materials domestically and it is ultimate target of automotive industry upgrading.

- The target should be placed on the materials segment given as it is comparatively superior to its counterparts in three countries, and the local companies that belong to Tier 3 or lower.
- The issues to prepare action plan are, i) Nurturing of the material industry with a focus on Tier 2 and Tier 3 companies, ii) Deliberation of investment incentives for the material industry, and iii) Linkage with agricultural policies.

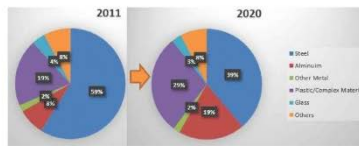


Fig. Average material weight distribution

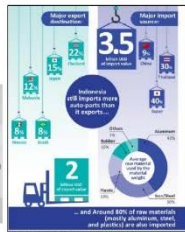


Fig. Indonesia's Auto Parts Trade Balance

26

g. Expansion of Exports to Neighboring Countries

The automotive trade or interdependency between Indonesia and the ASEAN increased nine times for exports, and 18 times for imports in value from 2000 to 2017. About 50% of imported parts are material-type parts.

- In 2017, the scale of Indonesia's auto parts exports was US\$ 6.5 billion, which is much smaller than that of Thailand (US\$ 21.0 billion) but slightly bigger than that of Viet Nam (US\$ 6.1 billion) and the Philippines (US\$ 4.2 billion).

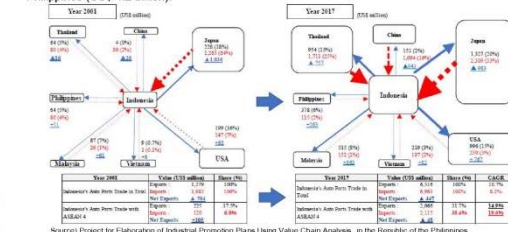


Fig. Structural Change in Indonesia's Auto Parts Trade (2001, 2017)

27

g. Expansion of Exports to Neighboring Countries

The export strategy of automotive should be reviewed allowing for Ex-Corona Situation.

- Viewing from the statistics before corona turmoil shown in the previous slide, it was recommended that Indonesia's export strategy of automotive should target, while upgrading production of ICEV, not only present exporting countries but also additional countries such as Japan, China, and neighboring Pacific countries.
- However this strategy should most probably, be reviewed while analyzing new supply/demand situation of the nations after corona damage.

**The Strategies abstracted from Post-Corona Situation**

- SUV exports to ASEAN countries such as Thailand, Philippines and Vietnam should remain strong.
- The competition on small car exports is fierce. If Indonesia were to expand the exports of this segment, it could introduce environment-friendly cars that can compete in the market.
- The possibility of expanding the exports of public transport vehicles to the Pacific island nations should be explored (about 30,000 can be added).
- The possibility of exporting high-quality cars to Japan and China should be explored.

- A detailed GVC analysis of Indonesia's automotive industry will be covered in the upcoming JICA project, "Automotive Industry Development Project".



28

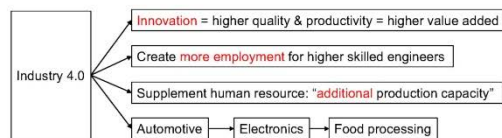
### Suggestion from Former Project on Electric and Electronics Industry

The former project (2017-2019): "Survey on Promotion for Globally Competitive Industry in Indonesia"

Electric and electronics industry 1. Current state and potential

Factory automation (part of Industry 4.0) can increase capacity, quality and productivity of production.

- Industry 4.0 (I4.0) includes innovation for higher quality and productivity allowing manufacturing sector in Indonesia to be globally competitive.
- I4.0 will create employment of higher responsibility and productivity which is appropriate for highly skilled and higher wage employees in JABODETABEK.
- I4.0 may not replace existing employment, as it can supplement human resource, i.e. factory automation will be introduced for additional production capacity.
- In Indonesia, I4.0 can be adopted starting from automotive, diffused to other sectors later on.



30

Electric and electronics industry 2. Vision and policy matrix

Vision: Upgrade quality and productivity of manufacturing by 'Factory IoT' and 'Product IoT' (Indonesian version of Industry 4.0) KPI: To become factory automation production hub (Number 1 in ASEAN)

Policy program	KPI (by 2025)	Proposed policy measures	Ministry in charge
Promotion of facility investments (automation machinery in production for automotive and electronics)	Market size of 7,000 units per year (half of total ASEAN market of 15,000 units)	(1) Development & announcement of roadmap of Indonesian Industry 4.0 (2) Taxation scheme (import duty exemption, accelerated depreciation scheme) and credit guarantee for promoting facility investments	<ul style="list-style-type: none"> <li>- Bappenas</li> <li>- MoI Industry</li> <li>- Coord Min Econ Affairs</li> <li>- MoF Finance</li> <li>- BPPF</li> <li>- MoR Research, Technology and Higher Education</li> <li>- Coord Min Human Dev</li> <li>- Cultural Affairs</li> <li>- Central Bank</li> </ul>
Introduction of new technology and cultivation of supporting industry	Replacement parts, disposable suppliers, other relevant companies: 200 companies (total) Car electronics companies: 50 companies (total)	(3) Local business development through technology exchange/upgrading (incentive, etc)	
Training of IoT engineers; practitioners and researchers who will autonomously develop the sector	Engineers of process engineering and programming: 1500 to 2000 engineers (total) Engineers of IC design, mechatronics etc.: 1500 to 2000 engineers (total)	(4) Foreign direct investment promotion; target sectors will be automation machinery and its parts, components and disposables suppliers, system integrator for factory automation, as well as electronics components for automotive.	
		(5) Introduction and rolling out of practical education and training for IoT at technical universities and polytechnic schools.	
		*Technology exchange include exchange between academia and companies	



31

## 6.2 Meeting on 24<sup>th</sup> August



### Correspondence to Post-Corona Turmoil by the Industry Players in other Countries

Data Collection Survey on Automotive Industry Development  
in the Republic of Indonesia

August 24, 2020

Ministry of Industry (MOI), Republic of Indonesia  
Japan International Cooperation Agency (JICA)  
Oriental Consultants Global  
Nomura Research Institute, Ltd.  
Nomura Research Institute, Singapore Pte. Ltd.

Presentation of Progress on August

The topic and schedule of online discussion  
@13:00 WIB Aug.24 (Mon) 2020

#### ■ Topic of the Presentation

● Correspondence to after Corona Turmoil by the Industry Players in other Countries

#### ■ Sub contents of the Presentation

1. Automotive Industry after Covid-19 focusing ASEAN Region
2. Potential of Business/Market after Covid-19
3. Reference
4. Direction Indonesia Goes
5. Requests for Collaboration with JICA Study



1

### 1. Automotive Industry after Covid-19 focusing ASEAN Region

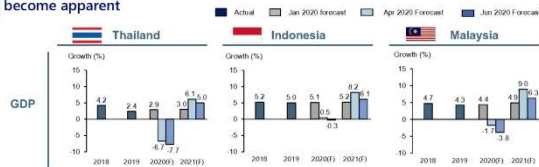
Economic Impact – Macroeconomic snapshot
Current Situation of COVID-19 Indonesia
Impact of COVID-19 on Economy
Support Policy for automotive industry of major ASEAN countries



2

#### Economic impact – Macroeconomic snapshot

Recovery forecasts in Thailand, Indonesia, and Malaysia have been revised downwards for both 2020 and 2021 as more severe impact from COVID-19 become apparent



- Contraction is expected to be the sharpest within ASEAN given comparatively high reliance on exports and international tourist receipts.
- Extension of lockdown reinforced pessimism of slower recovery in June with the economy heading to the sharpest decline since 1997.
- Modest growth was expected in April due partly to comparatively less reliance on global supply chain and government's lockdown.
- However, Indonesia now is seen heading to contraction as sharp rise in COVID-19 cases forced the government to impose lockdown and curb economic activities.
- The economy is expected to shrink for the first time since 2009 due partly to reliance on global supply chain and government's lockdown.
- In June, pessimism over sharper contraction strengthened while strict measures to contain still remain in period ahead.

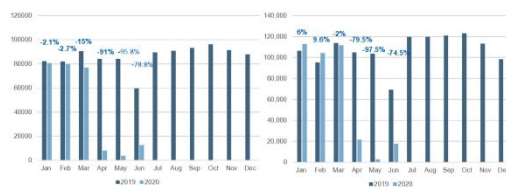


3

#### Current Situation of COVID-19 Indonesia

The effect of lockdown (PSBB) started to impact market from Apr, recording more than 91% drop, the largest drop since Asian Monetary Crisis.

Monthly sales in Indonesia (2019-2020)



4

#### Impact of COVID-19 on Economy

Indonesia automotive market may drop more than 50% in 2020. Slower recovery or "Swoosh shape" recovery may be expected for IND market.

Summary

1. **Impact on sales and production:** the impact on vehicle sales and production has been severe, with an 80-90% drop in vehicle sales and production since the "Massive Social Restrictions" (PSSB) after April 10.
2. **Comparison with ASEAN countries:** compared to other ASEAN countries, Indonesia's auto market and production recovery is expected to be slow, with a decline of over 50% in 2020.
3. **Factors contributing to the delay in recovery of production and sales:** The reasons for the delay in the recovery of sales and production in Indonesia include: (1) the slow response to the corona epidemic, with no signs of an end to the infection; (2) the government's support for the auto industry is lagging behind; and (3) the macroeconomic instability, such as the devaluation of the rupiah exchange rate.
4. **Impact on supply chain:** While major Japanese auto manufacturers are planning to maintain their production capacity in Indonesia, some suppliers and other supporting industries are considering scaling back or withdrawing from production due to increasing demands for capital investment and cost reduction by auto manufacturers after the Corona disaster. The impact on the supply chain is an issue of concern.



5

#### Support Policy for automotive industry of major ASEAN countries

Malaysia and Philippines are active in implementing support measures for local assemblers, while Indonesia still has not announced any substantial measures.

	Thailand	Indonesia	Malaysia	Vietnam	Philippines
<b>Major Responses for economy</b>	• Implementation of the Euro 5 emissions standard is pushed back to 2023 from 2024 (Announced in June) • The Thai government has postponed to implement Gasohol E20 from October 2020 to 2021.	• Coordinating Ministry for Economic Affairs pledged 70 trillion rupiah (about 510 billion yen) in aid as a stimulus package for the auto industry (no concrete measures have been implemented)	• As part of the "Prongkar" economic recovery plan, the sales tax on CKD models has been reduced from 10% to 0% and the sales tax on CBU models from 10% to 5% from June 15 to December 31, 2020.	• From June to December 2020, vehicle registration fees for domestically produced vehicles will be reduced by half. Registration fees for vehicles with new seats or less will be 12% of the vehicle price in Hanoi and 10% in Ho Chi Minh City and Da Nang.	• Department of Trade and Industry continues to impose a preliminary safeguard duty on imported complexity built-up (CBU).
<b>Forecast on Sales and Production</b>	• FTI maintains its forecast for 2020 vehicle production of 1.1 million units, 50% less than the year before (1.6M).	• GARIINDO revised its annual sales forecast downward from 1.1 million units to less than 600,000 units (July)	• The Malaysian Automobile Association (MAA) has revised downward the country's total industry volume (TV) forecast by 33.3% from 600,000 units to 400,000 units in 2020.	• Vietnam Automobile Manufacturers Association (VAMA) report automobile sales were down 12.8% year on year to 24,002 units in June.	• Car sales in June 2020 increased by 25.4% with 15,578 units, a jump from the 4,788 units in May 2020.
<b>COVID-19 quarantine measures</b>	• A state of emergency was declared on March 26, imposed lockdown from April 2, prohibited going out. • Shipping malls and other facilities reopened on June 1, and curfew was lifted up on June 15.	• The large-scale social restrictions (PSBB) was imposed effective on April 10. • PSBB restrictions relaxed from 15 June 2020 (opening economic activities up to 50%)	• Movement Control Order has been issued for all of Malaysia on March 18. • Conditional Movement Control Order was in place from May 4. • Recovery movement control order from June 10.	• All citizens were prohibited from leaving the premises for 15 days from April 15-15. • Relaxed social isolation measures on April 22.	• Since the strict quarantine was imposed in March, the government gradually lifts the quarantine level. • National Capital Region is still under Modified Enhanced Community Quarantine.



### 2. Potential of Business/Market after Covid-19

Potential – New values sought for Automobile

Potential – New Business Dimension

Potential – Comparison with ASEAN countries

Potential – Sign of Recovery in Japan



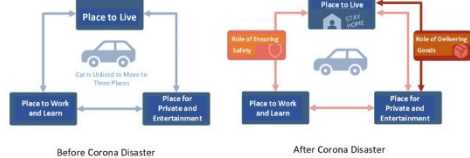
9



Potential - New values sought for Automobile

Role of car: From "Running Parlor" to "Living Room" and turning to "Care House" (Before 2010) (After 2010) (After 2020)

- The Corona disaster has brought into sharp relief, that is the value and appeal of the automobile as more than just a means of transportation.
  - "Ensuring Safety on the Move"
  - "Go to by myself → Goods come to me"
- Uber Eats, for example, which transports restaurant meals home, had a total transaction volume of \$4.88 billion in the first quarter of 2020 (January-March 2020), a 52% increase over the same period last year.

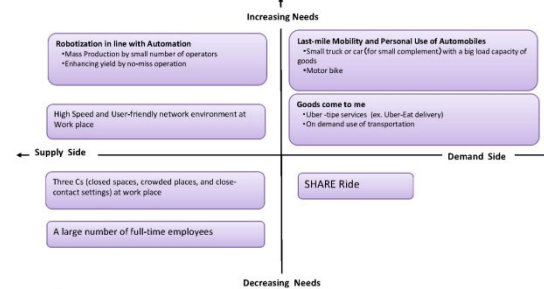


10

Potential - New Business Dimension

Investors are Finding New Potentials in Post-Corona Business

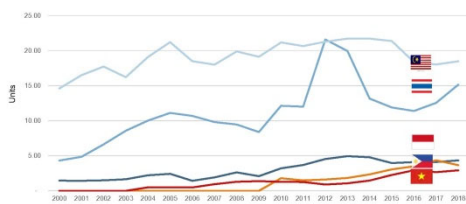
Increasing Needs and Decreasing Needs after Corona Turnoil



11

Potential - Comparison with ASEAN countries

Indonesia domestic vehicle market has potential to grow rapidly as sales by population is still very much low, 5 units per 1000 person, especially outside of Jakarta and West Java, compared to ML and TH which is higher than 10 Units sold by every 1000 persons



Source: Population from ADB and respective country automotive association, Philippines from Marklines



12

Potential -Sign of Recovery in Japan

Japanese OEMs are turning to recovery mode in the second semester 2020 while recognizing an uncertainty of market

- The global demand is on a recovery trend, and the production system is moving back to normal.
- Toyota Motor Corporation is expected to produce the same units in August as it planned for December last year, and Honda and Nissan are planning to return to their normal production systems.
- Suzuki, SUBARU and Matsuda has resumed night operation, which had been suspended since late May, June and July, respectively. All of them are doing normal operation at present.

Company	Global Sales (Jan 2020 to Jun 2020)		Japan (Units)	Japan (%)
	Units	Change (%)		
Toyota	3,771,354 (▲21.2%)	-3,900,805 (▲29.0%)	1,054,669 (▲14.5%)	27.9%
Nissan	1,967,446 (▲16.0%)	2,091,107 (▲13.0%)	107,446 (▲22.7%)	10%
Honda	3,366,667 (▲26.0%)	2,916,026 (▲26.8%)	40,562 (▲21.3%)	12%
Suzuki	1,921,000 (▲27.0%)	1,164,000 (▲38.3%)	313,100 (▲22.3%)	27%
Mitsubishi	375,000 (▲18.1%)	321,000 (▲15.4%)	48,162 (▲16.2%)	15%
Daihatsu	555,225 (▲29.7%)	461,158 (▲17.3%)	251,520 (▲22.4%)	54%
Mazda	189,025 (▲26.1%)	166,383 (▲12.0%)	20,522 (▲17.1%)	12%
Subaru	555,225 (▲29.7%)	461,158 (▲17.3%)	30,520 (▲17.0%)	6%
Matsuda	355,343 (▲11.0%)	37,000 (▲10.4%)	10,440 (▲11.0%)	10%
DAIHATSU	490,333 (▲25.0%)	1,126,169 (▲31.1%)	272,104 (▲21.2%)	60%
Daihatsu	65,027 (▲13.2%)	25,917 (▲13.1%)	11,200 (▲12.4%)	60%
Subaru	385,961 (▲21.5%)	332,733 (▲14.7%)	51,166 (▲23.2%)	14%
Mitsubishi	70,966 (▲17.8%)	87,814 (▲18.0%)	6,061 (▲12.2%)	11%
Mitsubishi	390,000 (▲19.8%)	332,265 (▲15.2%)	37,767 (▲15.2%)	10%
Mitsubishi	65,025 (▲15.0%)	14,519 (▲17.0%)	5,201 (▲16.8%)	12%

▲: Upper: The first semester (Jan-Jun) of 2020. Lower: Achievement in June 2020  
 ■: Figures in parentheses show year-on-year rate (%). Arrows: negative  
 \* Figures of Honda both Global and Canada, Japan is rounded figures.  
 Source: Nissan Kagaku Shiten (Jul. 1, 2020)

- The spread of coronavirus in Japan and abroad has been continuing, and it is uncertain whether demand will recover steadily.



13

3. Reference

Impact of COVID-19 on Automotive Industry - Sales, Production Analysis

Relationship between the Recovery of Economy and Domestic Sales

Scenario of Economic Recovery - New Car Sales of Indonesia

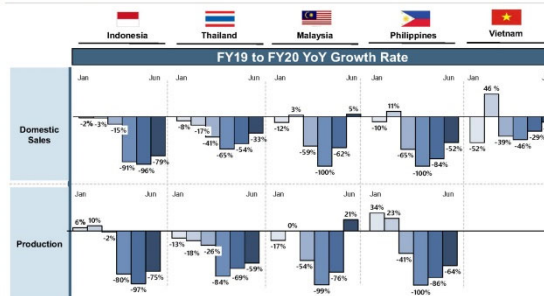
Manner of Economic Recovery



14

Impact of COVID-19 on Automotive Industry - Sales, Production Analysis

There is a growing disparity of recovery from COVID-19 among ASEAN countries; VN showing fastest recovery, while IND and PH are showing slow recovery.

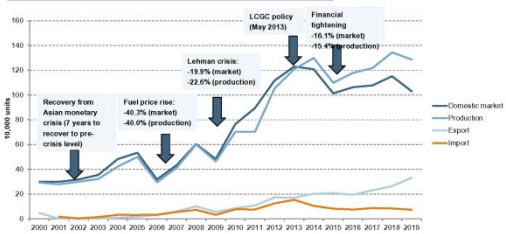


15

Relationship between the Recovery of Economy and Domestic Sales

Indonesia automotive market is susceptible to exterior shocks, but new policy to promote domestic sales such as LCGC, has helped to recover production.

Production, sales, export, import of Indonesia automotive industry



Source: GAARINDO

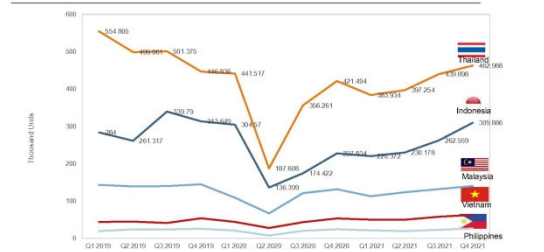


16

Scenario of Economic Recovery - New Car Sales of Indonesia

According to IHS forecast, compared to Lehman crisis the steep is higher and recovery is slower. Thailand and Indonesia expected to recover pre-COVID level by Q4 2021 (but it may be delayed further based on recent trends)

Quarterly LCV production in ASEAN during Covid-19 Crisis



17

**Manner of Economic Recovery**

Before people were discussing about V-shaped or U-shaped recovery.  
But now higher possibility of "Slide shape" due to longer stagnation of market.

Type of recovery (hypothesis)

Recovery period	Type recovery	Recovery period	Major factors of decline	Major factors of recovery
Lehman Crisis	U-Shaped	• 1 year recovery (3 months at the bottom)	• financial crisis • global slowdown of economy.	• Export growth in Emerging market • Expansion of low cost small cars (Eco cars, LCGC)
Covid-19 Crisis	Swoosh Shaped (Nike shape)	• More than 1 year (bottom depends on lockdown and social distancing)	• Pandemic crisis • Shutdown of real economy • Prolongment of crisis due to social distancing and income drop	• Gradual easing of lockdown and social distancing • Recovery of Domestic market comes first. • Recovery of certain market for export (China, etc)

**3. Direction Indonesia Goes**

**Presentation from MOI (Major policy and direction to go)**

**Advice from Remarkable Expert toward Automotive Industry in Indonesia (Rationale)**

- ditto- (Correspondence to Corona Turmoil)

- ditto- (Automotive Industry Roadmap -A-, -B-, -C-, -D-, -E-)

- ditto- (Japan's Support to Indonesia)

Factory relocation from China amid US-China friction. Especially Vietnam is very flexible and getting fish in troubled waters.

**The Framework of Automotive Industry Promotion Plan (from the result of the former project)**

**Vision: To become a major player in global automotive production**

**KPI\*: 2.5 million units of production, including 0.5 million of export & 0.4 million xEV**

Policy Program	KPI (by-2025)	Policy measures	Ministry in Charge
Policy implementation	Improve achievement rate of policy KPIs	(0) Make action plan for export and xEV and strengthen implementation capability	<ul style="list-style-type: none"> <li>• Bappenas</li> <li>• M of Industry</li> <li>• Coord Min Econ Affairs</li> <li>• M of Finance</li> <li>• BPFM</li> <li>• Coord Min Marine Affairs</li> <li>• M of Energy/Mineral Resources</li> <li>• M of Manpower</li> <li>• M of Public Works</li> <li>• M of Research, Technology and Higher Education</li> <li>• M of Trade</li> <li>• M of Transportation</li> <li>• Central Bank</li> <li>• etc</li> </ul>
Promote agglomeration of auto parts industry and strengthen cost competitiveness	Development of supporting industries to achieve the increase of local content procurement ratio (increase number of suppliers**): 1,500→3,000)	(1) Attract investment to auto parts industry	
		(2) Raise engineering, quality, and productivity of suppliers	
Enhance product development and engineering capability	R&D&D** localization ratio: 0% → 30%	(3) Improve business climate to encourage investment especially for SMEs investment (import license, and visa)	
		(4) Creation of automotive industrial belt in Northern part of Java	
		(5) Factory management and production engineering skills development (ability to improve/ design process, etc)	
		(6) Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D	
		(7) Collaboration between technology university / polytechnic and auto industry to develop required skills	
		(8) Support expansion of O&M supporting service such as Computer Aided Engineering and material evaluation	

\*: Indonesia government revised these KPIs.  
\*\*: 1500 according to OAWRENCO, 2000 number on par with Thailand which has around 2000 suppliers.

**Direction Indonesia Goes**

**Advice from Remarkable Experts toward Automotive Industry in Indonesia (Rationale)**

A total eleven (12) Indonesian and Japanese experts/entities who have special expertise or experiences in automotive industry sector in Indonesia were interviewed. Some of them were the industry players of Indonesia at present.

- OEM (6For last)
- Tier1 (2)
- Tier2 (2)
- Financing Agency (1)
- University Professor (1)

Major topics include "Correspondence to Corona Turmoil", "Automotive Industry Roadmap of Indonesia", "Japan's Support to Indonesia's Automotive Industry Promotion" and so on.

The essence of the interviews is summarized to attached Excel Sheet (to be delivered separately with this presentation) for your reference.

Among the suggestions provided by the experts, predominant opinions were subtracted and assorted by topic.

**Direction Indonesia Goes**

**Advice from Remarkable Expert toward Automotive Industry in Indonesia (Correspondence to Corona Turmoil)**

- The production system is **returning to normal from the second half of 2020** based on the production recovery policy of the Japan headquarters.
- **Indonesian government's response is slow** and automotive/auto parts manufacturers are feeling a sense of crisis. A sense of urgency is prevalent as **the movement of Japanese in and out of Indonesia is more severe** than in other countries.
- Companies engaged in Indonesia's auto industry are **demanding government policies (measures to stimulate domestic demand and incentives related to exports)** as soon as possible.
- It is expected that the government should announce not only its short-term policy on corona measures but also its long-term outlook of the industry.

**Direction Indonesia Goes**

**Advice from Remarkable Expert toward Automotive Industry in Indonesia (Automotive Industry Roadmap -A-)**

**A) For the time being, it should focus on the process of transitioning from ICEVs to hybrid vehicles.**

- It should not move rapidly toward EVs, but rather adopt a strategy to support the evolution of ICEVs.
  - Industrial strategy focusing on hybrid vehicle production, consumption and export
  - Technical innovations in Bio-fuel engines in response to the introduction of Euro 4 & 5.
  - Attracting investment in the production of valuable automobile parts that are more difficult to manufacture

**Direction Indonesia Goes**

**Advice from Remarkable Expert toward Automotive Industry in Indonesia (Automotive Industry Roadmap -B-)**

**B) Difficult to establish R&D&D center of excellence**

- Functions are already located in Thailand, and transfer to Indonesia would be difficult in principle.
- As for the MPVs that are unique to Indonesia, there is a possibility that the design of the upper body may be transferred.
- As for the process engineering of ICEVs (especially MPVs), appropriate incentives should be offered to attract them.

**Direction Indonesia Goes**

**Advice from Remarkable Expert toward Automotive Industry in Indonesia (Automotive Industry Roadmap -C-)**

**C) EV battery manufacturing is only viable if it is market oriented**

- It is likely that Indonesia will not be able to create a market under its leadership, and even if it is a raw material production country, China, South Korea and Japan will take the lead in manufacturing. Japanese companies are still unwilling to make a move.
- The basic strategy is based on observation of the Chinese market.





**(Draft) Table of Contents (Final Report)**

※ Table of Contents will be gradually corrected along with the discussion with CPs and JICA, fully equipped with ideas/info of conducted interviews and the result of survey.

**Chapter 5 Action Plan Corresponding to Policy Measures and its Implementation Schedule**

- 5-1 Policy Making
  - 5-1-1 Action Plans on "Export ICEV and xEV and strengthen implementation capability"
  - 5-2 Promote Agglomeration of Auto parts Industry and Strengthen Cost Competitiveness
    - 5-2-1 Action Plans on "Attract investment to auto parts industry"
    - 5-2-2 Action Plans on "Raise engineering, quality, and productivity of suppliers"
    - 5-2-3 Action Plans on "Improve business climate to encourage investment especially for SMEs investment import license, and visa"

5-3 Enhance product development and engineering capability

- 5-3-1 Action Plans on "Promotion of R&D investment and transfer of R&D capability to local through incentives for R&D"
- 5-3-2 Action Plans on "Collaboration between technology university / polytechnic and auto industry to develop required skills"
- 5-3-3 Action Plans on "Support expansion of O&M supporting service such as Computer Aided Engineering and material evaluation"

5-4 Implementation Schedule

**(Draft) Table of Contents (Final Report)**

※ Table of Contents will be gradually corrected along with the discussion with CPs and JICA, fully equipped with ideas/info of conducted interviews and the result of survey.

**Chapter 6 Discussion on Pilot Activity**

- 6-1 Project A
- 6-2 Project B
- 6-3 Project C

**Chapter 7 Suggestion and Remarkable Matters on next JICA Assisted Project namely, "Automotive Industry Development Project in Indonesia"**

- 7-1 GVC Analysis and Capacity Development of MOI
- 7-2 Implementing of Pilot Activity
- 7-3 Japan Training/Third Country Training
- 7-4 Paradigm Change on Automotive Industry



**Request to MOI and BAPPENAS**

■ Appointment Setting

- The government agencies of other ministry always request us a letter of introduction from our counterpart agency. To whom we should contact in MOI to prepare such letter?

■ Provide Information

- Information and comment which were requested by JICA/JICA Study Team should be prepared properly by due date.

■ Regular Meeting (In case JICA Study Team can not go to Indonesia)

- Regular meeting will be held every other month as scheduled. Next meeting will be held on the mid-Oct, 2020, followed by the beg-Dec, 2020, the end-Feb, 2021 and lastly, the beg-Apr. 2021.



**JICA Consultant Team Members**  
Data collection survey on Automotive Industrial Development in Indonesia  
Group E-mail: inda-mobility@jica.go.jp



Team Leader  
Masashi Takano



Assistant Team Leader  
Emi Shimoda



Industrial Human Resources Specialist  
Shoichi Hara



R&D Specialist  
Hajime Yamamoto



Business Environment/Investment Promotion Specialist  
Fajiah Anisa Setyawan



Project Coordinator  
Hiroki Okita

## 6.3 Meeting on 5<sup>th</sup> November



Presentation of Progress as of November 2020

Topic of Presentation @13:00 WIB Nov.5 (Thu) 2020

■ Topic of the Presentation

1. "Where we are" just for confirming present position of the Project
2. List of Action Plan under 9 Policy Measures
3. Kickstarting Pilot Activity (draft)

**Action Plans for Automotive Industry Development and Kickstarting Pilot Activity by JICA**

Data Collection Survey on Automotive Industry Development in the Republic of Indonesia

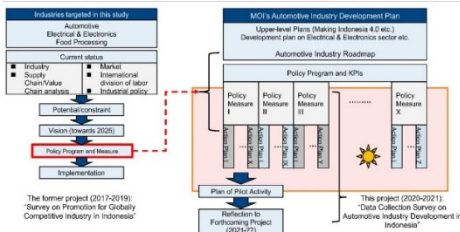
November 5, 2020

Ministry of Industry (MOI), Republic of Indonesia

Japan International Cooperation Agency (JICA)  
Oriental Consultants Global  
Nomura Research Institute, Ltd.  
Nomura Research Institute, Singapore Pte. Ltd.

Where we are?

The study aims at analyzing automotive industry roadmap and supporting related discussion by line agencies. The results will be reflected to JICA's forthcoming technical assistance to Indonesia.



The Framework of Automotive Industry Promotion Plan (from the result of the former project)

Vision: To become a major player in global automotive production  
KPI<sup>1)</sup>: 2.5 million units of production, including 0.5 million of export & 0.4 million xEV

Policy Program	KPI (by 2025)	Policy measures	Ministry in Charge
Policy implementation	Improve achievement rate of policy KPIs.	(0) Make action plan for export and xEV and strengthen implementation capability	<ul style="list-style-type: none"> <li>• Bappenas</li> <li>• MOI</li> <li>• Coordinating Ministry of Economic Affairs</li> <li>• MOI</li> <li>• BPS</li> <li>• Coordinating Ministry of Maritime Affairs</li> <li>• MOI</li> <li>• Ministry of Energy and Mineral Resources</li> <li>• MOI</li> <li>• Ministry of Public Works</li> <li>• MOI</li> <li>• Ministry of Research, Technology and Higher Education</li> <li>• MOI</li> <li>• Ministry of Transportation</li> <li>• MOI</li> <li>• Central Bank</li> <li>• etc.</li> </ul>
Promote agglomeration of auto parts industry and strengthen cost competitiveness	Development of supporting industries to achieve the increase of local content procurement ratio (Increase number of suppliers <sup>2)</sup> : 1,500→2,000)	(1) Attract investment to auto parts industry (2) Raise engineering, quality, and productivity of suppliers (3) Improve business climate to encourage investment especially for SMEs investment import license, and visa (4) Creation of automotive industrial belt in Northern part of Java (5) Factory management and production engineering skills development (ability to improve design process, etc.)	
Enhance product development and engineering capability	R&D/O&M localization ratio: 0%→30%	(6) Promotion of R&D investment and transfer of R&D capability to local through incentives for R&D (7) Collaboration between technology university / polytechnic and auto industry to develop required skills (8) Support expansion of O&M supporting service such as Computer Aided Engineering and material evaluation	

<sup>1)</sup> Indonesian government issued Roadmap  
<sup>2)</sup> 11000 according to GANNOC, 2000 number on par with Thailand which has around 2000 suppliers



2. List of Action Plan under 9 Policy Measures

(0) Action Plans under "Make action plan for export and xEV and strengthen implementation capability"
(1) Action Plans under "Attract investment to auto parts industry"
(2) Action Plans under "Raise engineering, quality and productivity of suppliers"
(3) Action Plans under "Improve business climate to encourage investment especially for SMEs investment (import license and visa)"
(4) Action Plans under "Creation of automotive industrial belt in Northern part of Java"
(5) Action Plans under "Factory management and production engineering skills development (ability to improve design process, etc.)"
(6) Action Plans under "Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D"
(7) Action Plans under "Collaboration between technology university /polytechnic and auto industry to develop required skills"
(8) Action Plans under "Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation"



2. List of Action Plan under 9 Policy Measures

(0) Action Plans under "Make action plan for export and xEV and strengthen implementation capability"

Overall Policy Measures	Specific Measures	Action Plan	Ref
0	Make action plan for export, xEV development and strengthen implementation capability	<p><b>[Research and Framework Development /Policy Formulation]</b></p> <ul style="list-style-type: none"> <li>Policy formulation on PDI and determine KPIs of auto sector</li> <li>EV Strategy Monitoring</li> <li>Measures to increase domestic sales</li> <li>Strategy to attract investment arises by US-China Friction</li> <li>Technology sophistication through establishing R&amp;D Center</li> </ul> <p><b>[Quick Policy Implementation]</b></p> <ul style="list-style-type: none"> <li>IoT supported quicker policy implementation</li> <li>Coordination with other concerned agencies</li> <li>Legalization by the cabinet</li> <li>Announcement by the Government</li> </ul>	<p>Activity 0-1</p> <p>Activity 0-6</p>
<p>(*) Activity 1.1 is to cope with Making Indonesia 4.0 through developing PDI. Activity 1-2 and 1-3 aim to increase domestic sales for post-Covid-19 measures.</p>			



2. List of Action Plan under 9 Policy Measures

(2) Action Plans under "Attract investment to auto parts industry"

Overall	Specific Measures	Action Plan	Ref
2.1	Attract investment to auto parts industry	<p><b>[Investment Promotion of Tier2&amp;3 Companies]</b></p> <ul style="list-style-type: none"> <li>Lowering the minimum capital investment</li> <li>Providing more attractive incentives for SME investment than in neighboring countries</li> </ul> <p><b>[Solve operational challenge caused by BKPM regulations]</b></p> <ul style="list-style-type: none"> <li>Share company information</li> <li>Attraction of FDI for Export Promotion</li> </ul> <p><b>[Expansion of FDI for Export Promotion]</b></p> <ul style="list-style-type: none"> <li>Export strategy by model (exporting Camry and other models to Australia, strengthening development of MPV)</li> <li>Capturing the need for relocation due to US-China Friction</li> </ul> <p><b>[Implementation of Action Plan]</b></p> <ul style="list-style-type: none"> <li>Select target companies for investment</li> <li>Conduct investment attraction seminars</li> <li>Provide incentives on xEV related parts production for export</li> </ul>	<p>Activity 1-1</p> <p>Activity 1-4</p>



2. List of Action Plan under 9 Policy Measures

(2) Action Plans under "Raise engineering, quality and productivity of suppliers"

Overall	Specific Measures	Action Plan	Ref
2.2	Raise engineering, quality, and productivity of suppliers	<p><b>[Incentives for Human Resource Development]</b></p> <ol style="list-style-type: none"> <li>Incentive on R&amp;D promotion</li> <li>Provide technology support on FMS through strengthening of in-ups between higher education and private sector</li> <li>Utilization of PDI for R&amp;D and IPD</li> </ol> <p><b>[Strengthening of FMS skills]</b></p> <ol style="list-style-type: none"> <li>Promotion of capital investment such as automation</li> <li>Grants capital investment incentives</li> </ol> <p><b>[Improvement of Human Resource Management for Foreign Experts (engineers, researchers, and management staff)]</b></p> <ul style="list-style-type: none"> <li>Return of migration management</li> <li>Develop Kaizen leaders</li> <li>Recruitment of Tier 2&amp;3 companies by Japanese Service Volunteer</li> </ul> <p><b>[Preparation of Technology Database for Advanced Tier2 and 3 companies]</b></p> <p>Program (Database, Database, Digital as PDI)</p> <p><b>[Implementation of Action Plan]</b></p> <ol style="list-style-type: none"> <li>Review and improve the contents of board exams on subjects related to auto manufacturing</li> <li>Upgrade books and equipment based on newly updated /developed curriculum to new production technology</li> <li>Study the possibility of lowering logistics costs</li> <li>Study the possibility of lowering materials costs</li> <li>Support business coaching and expansion of local suppliers</li> </ol>	<p>Activity 5-8</p> <p>Activity 2-1</p> <p>Activity 2-8</p>



2. List of Action Plan under 9 Policy Measures

(3) Action Plans under "Improve business climate to encourage investment especially for SMEs investment"

Overall	Specific Measures	Action Plan	Ref
3.1	Improve business climate to encourage investment especially for SME investment, import license, and visa	<p><b>[Lowering the wall toward investment to Indonesia]</b></p> <ul style="list-style-type: none"> <li>Removal from the negative list of industries related to the automotive industry, such as distribution, wholesaling and vocational training</li> </ul> <p><b>[Review of trade barriers]</b></p> <ul style="list-style-type: none"> <li>Proper application of national standard (ex. Application of high-tensile steel)</li> <li>Appropriate safety standard inspections</li> <li>Discontinue import system</li> </ul> <p><b>[Expansion of the Approval System for Green Line Treatment]</b></p> <ul style="list-style-type: none"> <li>Disseminate the merit of Green Line and MTA Line system</li> </ul> <p><b>[Implementation of Action Plan]</b></p> <ol style="list-style-type: none"> <li>Set up "Direct Appeal SIA" on BKPM Website to gather request from related investors</li> <li>Discussion review of Omnibus Law by representative chamber of commerce from abroad</li> <li>Disseminate the status of usage of Green Line and MTA Line in order to expand the approval system of such privilege</li> </ol>	<p>Activity 3-1</p> <p>Activity 3-6</p>



2. List of Action Plan under 9 Policy Measures

(4) Action Plans under "Creation of automotive industrial belt in Northern part of Java"

Overall	Specific Measures	Action Plan	Ref
4.1	Creation of automotive industrial belt in Northern part of Java	<p><b>[Development Direction]</b></p> <ul style="list-style-type: none"> <li>Check progress and monitor the effectiveness of concerned infrastructure projects</li> <li>Highways (from Semarang to Legi, Sukoharjo and Surabaya)</li> <li>Railway Project (Cibon-Semarang)</li> <li>Kendal Industrial Park (abandoned assembly port, assembly plant attraction, imported vehicle center)</li> </ul> <p><b>[Implementation of Action Plan]</b></p> <ul style="list-style-type: none"> <li>Raise awareness about the government's infrastructure development policies</li> <li>Accelerate utilization of Pinrang New Port</li> <li>Improve access road to airports and ports</li> <li>Develop power sources</li> <li>Develop more industrial parks to accommodate new investments</li> </ul>	<p>Activity 4-1</p> <p>Activity 4-6</p>



2. List of Action Plan under 9 Policy Measures

(5) Action Plans under "Factory management and production engineering skills development"

Overall	Specific Measures	Action Plan	Ref
5.1	Factory management and production engineering skills development (ability to improve design process)	<p><b>[Expand Automotive Industry Course run by Polytechnical College]</b></p> <ol style="list-style-type: none"> <li>DM and Resource Education</li> <li>Strengthening STMG, POKMAN, ATM etc. and increase engineer graduates from 3,000 to 70,000/year</li> <li>Develop an OJT training plan on processing technologies at Polytechnical College</li> </ol> <p><b>[Quality Upgrading]</b></p> <ul style="list-style-type: none"> <li>Shorten technologies to improve</li> <li>Strengthening Expanding of Industry 4.0 based education</li> <li>Conduct seminars for technology sophistication</li> <li>Support the recruitment of engineer and machinery</li> </ul> <p><b>[FMS based HRD]</b></p> <ul style="list-style-type: none"> <li>Introducing "Learning Factory" and "Teaching Factory"</li> <li>Introduction of FMA education through industry-academic collaboration (supported as a pilot activity)</li> </ul> <p><b>[Implementation of Action Plan]</b></p> <ul style="list-style-type: none"> <li>Forming in 30 Japanese companies to promote digital technology and robotics in manufacturing as required by Making Indonesia 4.0</li> <li>Improving student-level engineering skills</li> <li>Strengthen plant management and manufacturing technologies by proactively utilizing the various ODA's provided by Multi-National and Bilateral Donors</li> <li>Strengthening engineering skills through PDI (leveraging the five pillars of PDI)</li> </ul>	<p>Activity 5-1</p> <p>Activity 5-1</p> <p>Activity 5-1</p>



2. List of Action Plan under 9 Policy Measures

(6) Action Plans under "Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D"

Overall	Specific Measures	Action Plan	Ref
6.1	Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D	<p><b>[Establish R&amp;D&amp;D support system]</b></p> <ol style="list-style-type: none"> <li>Review and expand the existing R&amp;D related incentives</li> <li>Review and expand R&amp;D related incentives by establishing protocol (reg-4)</li> <li>Establish the Sector Project National / SINAS</li> <li>Industry-Academia Tool Box</li> </ol> <p><b>[R&amp;D&amp;D Supporting Policy on the Fuel, Lithium Battery and Upper Body Design of MPV]</b></p> <ul style="list-style-type: none"> <li>Disseminate newly established R&amp;D incentive systems (No.45)</li> <li>Increase incentives for R&amp;D&amp;D</li> <li>Strengthening of exemptions for R&amp;D&amp;D at the registration stage</li> </ul> <p><b>[Improve Immigration Management toward R&amp;D&amp;D Experts]</b></p> <ul style="list-style-type: none"> <li>Encourage communication on Academic Network in order to establish a Project in the Target Fields</li> <li>For example, SATREPS of Japan has dealt with similar theme in Thailand</li> <li>Tea up with overseas universities and support outstanding students to go on an overseas study program</li> </ul> <p><b>[Implementation of Action Plan]</b></p> <ul style="list-style-type: none"> <li>See above action plans on Donors 3, for more information on R&amp;D&amp;D Incentives</li> <li>Assess and improvement activities on the Indonesian side by strengthening up diplomacy and public relations</li> <li>Formulate SATREPS projects related to Bio Fuel and Lithium Battery by utilizing the network of researchers between Indonesia and Japan</li> <li>Technology Sophistication through Establishing R&amp;D Center (Utilization of PDI)</li> </ul>	<p>Activity 6-1</p> <p>Activity 6-4</p>





2. List of Action Plan under 9 Policy Measures

(7) Action Plans under "Collaboration between technology university / polytechnic and auto industry to develop required skills"

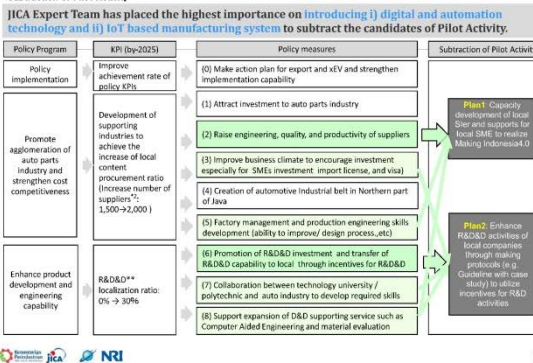
Overall	Specific Measures	Action Plan	Ref
Collaboration between technology university / polytechnic and auto industry to develop required skills	Background This is the most specific of the Making Indonesia 4.0 Goals to create a world-class Learning Factory and Training Factory through the construction of PTD. A key enabler system in the automotive industry for high-quality university students, which has not been common in the past. To apply the concept of industry-university cooperation in technical education, the concept of industry-university cooperation in technical education is introduced with Indonesia 3.5. The priority of establishing a CDE was increased while ensuring collaboration with Datas4.0. An increasing number of courses have been moved from STN to STN in response to the economic changes.	<b>Industry-Academia Joint Program</b> 1. Strengthening collaboration between educational and industry including PKM-MAN Bandung (under the Ministry of Higher Education), STMI (under MOE and STN) (PTSP). Training of PMS skills and human resource development (for Activity 3-2) through the quantity of engineering and modern technology. Increase the number of facilities on automotive-related engineering course at higher educational institutions. <b>Individual ILO</b> 1. Formulate the COE concept, conduct a reference to industry-university collaboration, and provide incentives for donating courses and accepting interns. <b>Strengthening the capacity of testing and certification bodies (e.g. RFTI) on STN</b> 1. Enhancement of evaluation function for new parts and systems such as hardware and new materials related to weight reduction and human resource development. <b>Implementation of Action Plan</b> 1. Discuss the needs of the Pilot activities provided by JICA, and actively promote them with the involvement of university and local educational institutions. 2. Develop a pool of human resources for each educational institution to train manufacturing. 3. Develop a network for companies to work closely with academic/TVET institutions. 4. Create more opportunities for automotive colleges/TVET institutions to learn more about Indonesia auto industry. 5. Facilitate a greater linkage among government agencies in the industrial-academic linkage. Human resource development for machine through the establishment of bonded courses in technical schools (STMI, etc.)	See Activity 5-1, 5-4, 6-2A-3, 6-4

2. List of Action Plan under 9 Policy Measures

(8) Action Plans under "Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation"

Overall	Specific Measures	Action Plan	Ref
Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation	Background There is an expectation on Indonesia side to accumulate Datas4.0 and COE in PDD's "Transparency". Relaxation of restrictions on foreign investment is included in the Omnibus Law. There is an increase in the establishment of venture companies, especially among the mid-level generation.	<b>Enriching D&amp;D Supporting Function</b> 1. Plan for establishing SINAS as a decision-making forum of R&D and innovation activity. 2. Relaxation of restrictions on investment in foreign service companies such as Siers, test and evaluation outsourcing companies and design companies. (Possibly with the enactment of the Omnibus Law.) <b>(Synergizing with PDD Development)</b> 1. Support for entrepreneurship using PDD's "Innovation" function (fostering university-born ventures). 2. Adapting to corporate digitalization and automation using PDD's "Delivery" function. 3. Supporting Corporate SoS assessment through PDD 4.0 Public Mentor Training. 4. Helping companies to improve their certification levels. 5. Industrial human resource development that utilizes the "Capability" function of PDD. 6. Displays of success stories using the PDD "Showcase" function. <b>Implementation of Action Plan</b> 1. Facilitate the project-based learning at the higher education institutes. 2. United procedural and managerial activities to support D&D supporting functions. 3. Coordination with various donor support. 4. Relaxing restrictions on foreign service companies' investments in CAD companies, test and evaluation outsourcing companies, design companies and other foreign service companies in line with PDD's goal. 5. Detailing PDD planning and assigning roles.	See Activity 6-1, 6-2

Subtraction of Pilot Activity



3. Kickstarting Pilot Activity (draft)

- Capacity development of local Sier and supports for local SME to realize Making Indonesia 4.0
    - Collaborate with STMI to organize and implement Matching Hub
  - Enhance R&D&D activities of local companies through making protocols (e.g. Guideline with case study) to utilize incentives for R&D activities
    - Support local companies with conducting R&D&D activities
- ※Other JICA's Project Assistance
- Lexer's support to STMI

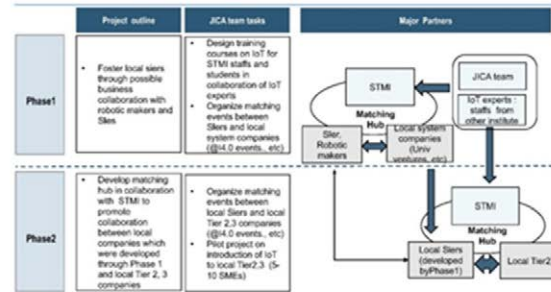
1. Capacity development of local Sier and supports for local SME to implement Making Indonesia 4.0

Implementing Matching Hub for Making Indonesia 4.0

- Objectives
- Accelerate DX (Making Indonesia 4.0) transformation of local Tier 2 and 3 companies of the Automotive Industry.
  - Form a matching scheme/mechanism among major robotic companies with Siers and local companies.
- Implementation Scenario
- The pilot activity is comprised of 2 phases. It supports potential sites (e.g. STMI or industry associations). It aims to conduct business matching between Japanese robotic companies with Siers and local system companies in the phase 1. Then, aims to realize business matching between local Siers and local Tier 2 and 3 companies in the phase 2. (Japanese companies joined in the phase 1 also support activities in the phase 2.)
  - The Indonesia government supports local Tier 2 and 3 companies with their digital transformation or automation through providing financial and administrative assistances.
- Discussion Points
- This activity requires collaboration among related departments/divisions in MOI and industry associations, therefore JICA team would like to request ILMATE to be mainly coordinator and implement the pilot activity.
    - OG ILMATE: Overall responsibility and scale up the hub
    - STMI\* and Association of the Industry: Potential pilot project site(s)
    - \*JICA team already explained the Matching Hub scheme to STMI. STMI showed positive responses to become one of the manufacturers of the matching hub activity.
  - JICA team would like to discuss with OG ILMATE on planning and implementation of this pilot activity.

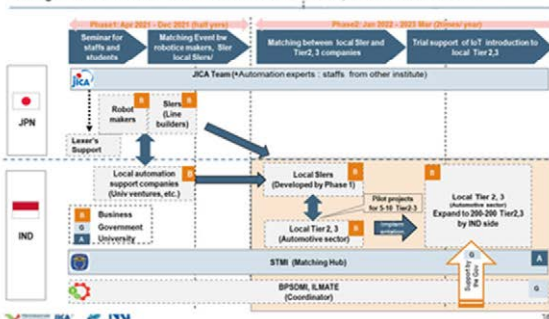
1. Capacity development of local Sier and supports for local SME to implement Making Indonesia 4.0

JICA team will support development of STMI as a matching hub in two phases: 1<sup>st</sup> Phase as matching between robotic makers, Siers and local system companies, 2<sup>nd</sup> Phase as between local Siers Vs Tier 2,3



1. Capacity development of local Sier and supports for local SME to implement Making Indonesia 4.0

JICA team will promote matching between robotic makers, major Siers, local Siers, and Tier 2,3 through collaboration with STMI as main CP and BSPDM, ILMATE as coordinator



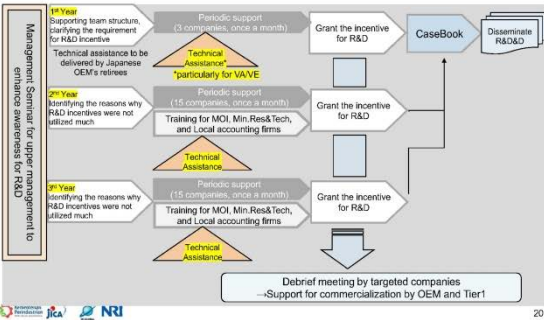
2. Enhance R&D&D activities through making protocols to utilize incentives for R&D activities

Supports for R&D&D activities of local companies

- Objectives
- Improve awareness of R&D activities of the local Tier 1&2 companies.
  - Create protocols (e.g. guideline) of the R&D incentives stated in Regulation 153/2020 for better utilization.
  - Develop knowledge and skills of local officers (e.g. MOI officers, employees of OEM or Tier 1 companies, or local accounting firms) to tap R&D incentives and to disseminate R&D&D activities in local companies.
  - With above mentioned activities, provide recommendations to improve incentive scheme for better utilization.
- Implementation Scenario
- Conduct management seminars for suppliers (Tier 1&2) to improve awareness in the preparation phase. Create protocols to utilize R&D incentives in the phase 1. Develop knowledge and skills of local officers (e.g. MOI officers, employees of OEM or Tier 1 companies, or local accounting firms) to tap R&D incentives in the phase 2.
  - Indonesia Government considers formulating a collaborative team as one or a collaborative system comprise of related stakeholders such as MOF or BPPT to accelerate the usage of R&D incentives and to enhance R&D&D activities in the country.
- Discussion Points
- Level of commitment of MOI in promoting R&D incentives and the role and responsibility of MOI.
    - Clarify rulings of R&D incentives (Regulation 153/2020) such as definitions and criteria of R&D, implementing mechanism or agencies in charge, etc.
  - Identify reasons why R&D incentives were not utilized much. (issues in awareness, application procedures, or lack of collaboration among government agencies to promote the incentives, etc.)
  - Pros, Cons and Intentions of MOI to implement this activity under JICA's Technical Assistance.
  - Clarify if OG of ILMATE can be the local person in MOI for the succeeding project.
  - Opinions of MOI to collaborate with other agencies (e.g. BAPPENAS, BPPT, MOF)

2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

The results of Pilot Activities are expected i) To promote utilization of R&D incentives, ii) To build public services for implementation of R&D outcomes



2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

Proposed items for protocol in 1st year  
The consensus among responsible agencies i.g. MOF and Min. of Res&Tech should be build at the early phase

Items	Items to be confirmed by periodic support
<p>Consistency with the definition of R&amp;D</p> <ul style="list-style-type: none"> <li>Research is an activity conducted by the scientific methodologies to obtain data and information for understanding natural and/or social phenomena, which will prove liability of an assumption and/or hypothesis, and lead the scientific outcomes.</li> <li>Development is an activity to extend the benefits and the capacity of science and technology that has been proven validity and safety for increasing the functions and benefits of science and technology.</li> </ul> <p>R&amp;D criteria to grant incentives i.g. Deductions</p> <ol style="list-style-type: none"> <li>Must be aimed at making new discoveries;</li> <li>Must be based on an original concept or hypothesis;</li> <li>There must be uncertainty in terms of the end results;</li> <li>Must have been planned and budgeted; and</li> <li>Must be aimed at creating an end product that can be freely transferred or traded through the marketplace;</li> </ol>	<ul style="list-style-type: none"> <li>Clarify the projected R&amp;D&amp;D activities by collaborating with MOI, accounting firms, JICA expert and JICA Study Team at the early phase</li> <li>Minutes of meeting with target companies</li> <li>Record of technical assistant by experts</li> <li>Structure organization and operation hours of R&amp;D section</li> <li>Plan for R&amp;D&amp;D, progress, and outcomes</li> <li>Accounting book for R&amp;D&amp;D</li> <li>Confirmation accounting book for excluding the items not to be subjected to grant deductions*</li> </ul>

\* a) production activities at an early stage of commercial production, b) quality control during commercial production, c) repairs the damage that occurred during commercial production phase, d) repair, addition, enhancement or other quality improvement on a routine basis of an existing product, e) adaptation of existing capabilities to special requests or customer requirements as part of a sustainable commercial activity, f) periodic or seasonal design changes on existing products, g) machine design of tools and molds, h) engineering construction and design relating to construction, relocation, rearrangement, or start-up facilities and equipment and, i) marketing research.

2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

Candidate Companies and Consulting Services

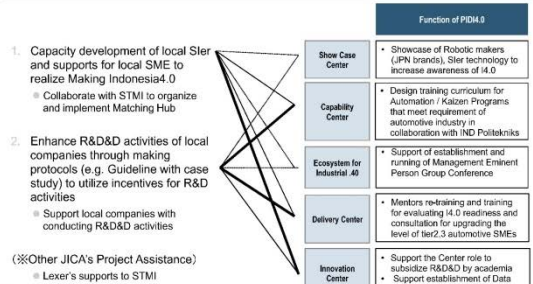
Selection of companies focusing on D&D. Consulting mainly for D&D by collaborating with local expert, lawyer and accounting firms belonging to local OEM and Tier1

- Candidate Companies**
  - Plastic Die cast
  - Aluminum Die Cast
  - Stamped Parts
  - Casting
  - Interior Parts
  - Rubber Processing
  - Aftermarket Parts
- Consulting Services**
  - Enhancing awareness of upper management
  - Reviewing the requirement of R&D&D
  - Extracting R&D&D division (e.g. HR and Expense)
  - Confirming the definition of R&D&D division, job script and operating hours
  - Proposal activities of R&D&D to client (e.g. mold production technology, parts design, testing, obtain a patent, Industry-academia collaboration)
- Gross-Income Deduction by R&D&D**
  - Research and development activities: +100%
  - Domestic patent or PVT: +50%
  - Domestic and overseas patent or PVT: +25%
  - Commercialization stage: +100%
  - Collaboration with government R&D institutions and/or higher-education institutions within Indonesia: +25%
- Focus on Yellow highlighted deduction**
- Costs to be Deducted**
  - Assets except for Depreciation costs for fixed tangible assets, and Supporting costs for fixed tangible assets
  - Goods and/or materials
  - Salaries, honorariums or similar payments which are made to employees, researchers and/or engineers
  - Costs relating to the registration of patents or PVT rights
  - Any compensation provided to other R&D inst., higher-education institutions to carry out R&D activities
- Period Termination**
  - No later than the enforcement date of Regulation 45/2019 (i.e. 28 June 2019)
  - Termination period is not mentioned

\*Peraturan Menteri Keuangan Nomor 153/PMK.010/2020 Tahun 2020

Discussion Material for Nov. 5 meeting

Candidate of Pilot Activities



4. Requests for Collaboration with JICA Study

Work Schedule (need your approval) in Japan until April 2021
(Draft) Table of Contents (Final Report)
Request to MOI and BAPPENAS

Work Schedule (need your approval) in Japan until April 2021

July 2020: Online interview to remarkable persons, companies, and internet survey**
Aug 2020: Progress Report on Post-corona setup to Indonesia CPs (incl. work schedule)
Sept 2020: Online interview to remarkable persons, companies, and internet survey
Oct 2020: Progress Report on Outline of Action Plan and the tips on Pilot Activity
Nov 2020: Online interview to remarkable persons, companies, and internet survey. Intensive discussion on Pilot Activity.
Dec 2020: Progress Report on Details of Pilot Activities

\*\* Online interview and internet survey will continue up to Feb. 2021 on a pace of every other week.

Work Schedule (need your approval) in Japan until April 2021

Jan 2021: Refinement of Action Plan and Correction of Pilot Activity**
Feb 2021: Presentation of DFR to Japan side and Indonesia CPs
Mar 2021: Corresponding to Comments
Apr 2021: Presentation of FR (if necessary) and submission of FR

\*\* Online interview and internet survey will continue up to Feb. 2021 on a pace of every other week.

(Draft) Table of Contents (Final Report)

\*\* Table of Contents will be gradually corrected along with the discussion with CPs and JICA, fully equipped with ideas/info of conducted interviews and the result of survey.

Chapter I Outline of the Project	Chapter IV Automotive Industry Roadmap after Covid-19 Turmoil
1-1 Background and Purpose of the Project	3-1 Change of strategy on Industry Roadmap
1-2 Methodology and Schedule of the Survey	3-2 Movement toward New Normal by Major OEMs
1-3 Achieved and Un-achieved	3-3 Elimination and Consolidation seen in Indonesia (Production, sales, and other services)
<b>Chapter II Socio Economic Condition of Indonesia</b>	3-4 Statistical Change (Production, sales, Export and Import)
2-1 Influence of Covid-19 Turmoil	3-5 Government's Acts for Sales Promotion
2-2 Social impact of Covids-19	3-6 Investment Promotion
2-3 Economic Condition of After Covid-19 Turmoil.	3-7 Maintaining of Skills and Technology (R&D&D strategy)
<b>Chapter III The Input from the Prior Project</b> (*Survey on Promotion for Globally Competitive Industry in Indonesia*(2017-2019))	
4-1 Summary of the Prior Project	
4-2 "Policy and Measures" on Automotive Industry Development proposed by the Prior Project	
4-3 Items of Transmittal from the Prior Project	



(Draft) Table of Contents (Final Report)

\* Table of Contents will be gradually corrected along with the discussion with CPs and JICA, fully equipped with ideas/info of conducted interviews and the result of survey.

Chapter V Action Plan Corresponding to Policy Measures and its Implementation Schedule

- 5-1 Policy Making
  - 5-1-1 Action Plans on "Export (CEV and xEV and strengthen implementation capability)"
- 5-2 Promote Agglomeration of Auto-parts Industry and Strengthen Cost Competitiveness
  - 5-2-1 Action Plans on "Attract investment to auto parts industry"
  - 5-2-2 Action Plans on "Raise engineering, quality, and productivity of suppliers"
  - 5-2-3 Action Plans on "Improve business climate to encourage investment especially for SMEs investment import license, and visa"

5-3 Enhance product development and engineering capability

- 5-3-1 Action Plans on "Promotion of R&D investment and transfer of R&D capability to local through incentives for R&D"
- 5-3-2 Action Plans on "Collaboration between technology university / polytechnic and auto industry to develop required skills"
- 5-3-3 Action Plans on "Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation"

5-4 Implementation Schedule

(Draft) Table of Contents (Final Report)

\* Table of Contents will be gradually corrected along with the discussion with CPs and JICA, fully equipped with ideas/info of conducted interviews and the result of survey.

Chapter 6 Discussion on Pilot Activity

- 6-1 Project A
- 6-2 Project B
- 6-3 Project C

Chapter 7 Suggestion and Remarkable Matters on next JICA Assisted Project namely, "Automotive Industry Development Project in Indonesia"

- 7-1 GVC Analysis and Capacity Development of MOI
- 7-2 Implementing of Pilot Activity
- 7-3 Japan Training/Third Country Training
- 7-4 Paradigm Change on Automotive Industry



1. Capacity development of local Sier and supports for local SME to implement Making Indonesia4.0

Discussion Points

- This activity requires collaboration among related departments/divisions in MOI and industry associations, therefore JICA team would like to request ILMATE to be mainly coordinate and implement the pilot activity.
  - DG ILMATE: Overall responsibility and scale up the hub
  - STMI\* and Association of the Industry: Potential pilot project site(s)

\*JICA team already explained the Matching Hub scheme to STMI. STMI showed positive responses to become one of the stakeholders of the matching hub activity.
- JICA team would like to discuss with DG ILMATE on planning and implementation of this pilot activity.

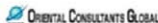
2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

Discussion Points

- Level of commitment of MOI in promoting R&D incentives and the role and responsibility of MOI.
  - Clarify rulings of R&D incentives(Regulation 153/2020) such as definitions and criteria of R&D, implementing mechanism or agencies in charge, etc..
  - Identify reasons why R&D incentives were not utilized much. (issues in awareness, application procedures, or lack of collaboration among government agencies to promote the incentives, etc.)
- Pros, Cons and Intentions of MOI to implement this activity under JICA's Technical Assistance.
- Clarify if DG of ILMATE can be the focal person from MOI for the succeeding project.
- Opinions of MOI to collaborate with other agencies (e.g.BAPPENAS, BPPT, MOF)



## 6.4 Meeting on 2<sup>nd</sup> December



Team Leader  
Masashi Takano



Assistant Team Leader  
Emi Shimoda



Industrial Human Resources  
Shoichiro Hara



R&D  
Hajime Yamamoto



Business Environment  
Investment Promotion  
Fairuh Anisa Setyaningrum



Project Coordinator  
Hiroki Okubo

### Action Plans for Automotive Industry Development and Kickstarting Pilot Activity by JICA

Data Collection Survey on Automotive Industry Development in the Republic of Indonesia

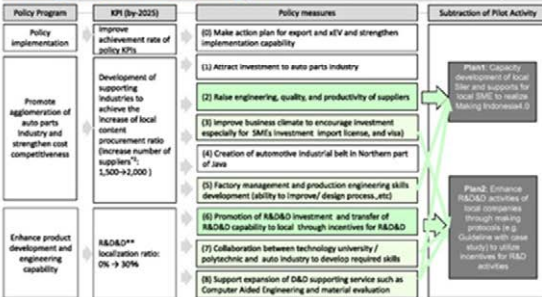
December 2, 2020

Ministry of Industry (MOI), Republic of Indonesia  
Japan International Cooperation Agency (JICA)  
Oriental Consultants Global  
Nomura Research Institute, Ltd.  
Nomura Research Institute, Singapore Pte. Ltd.



Subtraction of Pilot Activity

JICA Expert Team have placed highest importance on introducing (1) digital and automation technology and (2) IoT based manufacturing system to subtract the candidates of Pilot Activity.



3. Kickstarting Pilot Activity (draft)

1. Capacity development of local Sier and supports for local SME to realize Making Indonesia4.0

- Implementing Matching Hub for Making Indonesia4.0

2. Enhance R&D activities of local companies through making protocols (e.g. Guideline with case study) to utilize incentives for R&D activities

- Support local companies with conducting R&D activities

1. Capacity development of local Sier and supports for local SME to implement Making Indonesia 4.0

Implementing Matching Hub for Making Indonesia 4.0

Objectives

- Accelerate DX (Making Indonesia 4.0) transformation of local Tier 2 and 3 companies of the Automotive Industry.
- Form a matching scheme/mechanism among major robotic companies with Siers and local companies

Implementation Scenario

- The pilot activity is comprised of 2 phases, it supports potential sites (e.g. STMI or industry associations). It aims to conduct business matching between Japanese robotic companies with Siers and local system companies in the phase 1, then aims to realize business matching between local Siers and local Tier 2 and 3 companies in the phase 2. (Japanese government supports local Tier 2 and 3 also support activities in the phase 2.)
- The Indonesia government supports local Tier 2 and 3 companies with their digital transformation or automation through providing financial and administrative assistances.

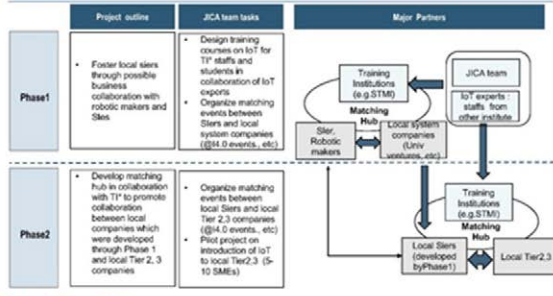
Next Steps

- This activity requires collaboration among related departments/divisions in MOI and industry associations, therefore JICA team would like to request ILMATE to be mainly coordinate and implement the pilot activity.
  - DG ILMATE: Overall responsibility and scale up the hub
  - STMI\* and Association of the Industry: Potential pilot project site(s)
- JICA team already explained the Matching Hub scheme to STMI. STMI showed positive responses to become one of the stakeholders of the matching hub activity.
- JICA team would like to discuss with DG ILMATE on planning and implementation of this pilot activity



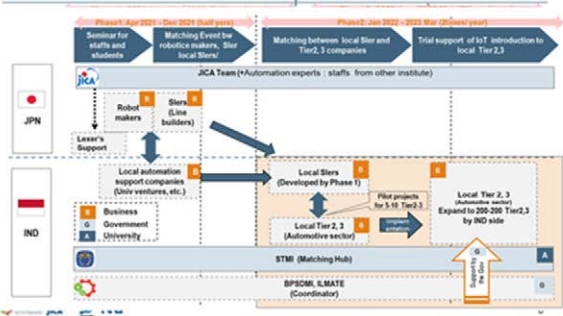
1. Capacity development of local Sier and supports for local SME to implement Making Indonesia 4.0

JICA team will support development of Training Institutions as a matching hub in two phases: 1st Phase as matching between robotic makers, Siers and local system companies, 2nd Phase as between local Siers Vs Tier2,3



1. Capacity development of local Sier and supports for local SME to implement Making Indonesia 4.0

JICA team will promote matching between robotic makers, major Siers, local Siers, and Tier2,3 through collaboration with Training Institutions as main CP and BSPDM, ILMATE as coordinator



2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

Supports for R&D activities of local companies

Objectives

- Improve awareness of R&D activities of the local Tier1&2 companies.
- Create protocols (e.g. guideline) of the R&D incentives stated in Regulation 153/2020 for better utilization.
- Develop knowledge and skills of local officers (e.g. MOI officers, employees of OEM or Tier1 companies, or local accounting firms) to tap R&D incentives and to disseminate R&D activities in local companies.
- With above mentioned activities, provide recommendations to improve incentive scheme for better utilization.

Implementation Scenario

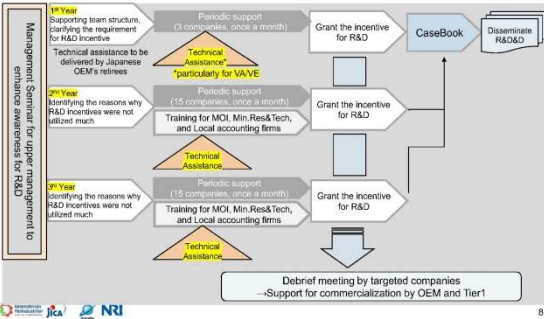
- Conduct management seminars for suppliers (Tier1&2) to improve awareness in the preparation phase. Create protocols to utilize R&D incentives in the phase 1. Develop knowledge and skills of local officers (e.g. MOI officers, employees of OEM or Tier1 companies, or local accounting firms) to tap R&D incentives in the phase 2.
- Indonesia Government considers formulating a collaborative team as one or a collaborative system comprise of related stakeholders such as MOF or BPPT to accelerate the usage of R&D incentives and to enhance R&D activities in the country.

Next Steps

- Level of commitment of MOI in promoting R&D incentives and the role and responsibility of MOI.
  - Clarify rulings of R&D incentives (Regulation 153/2020) such as definitions and criteria of R&D, implementing mechanism or agencies in charge, etc.
  - Identify reasons why R&D incentives were not utilized much. (issues in awareness, application procedures, or lack of collaboration among government agencies to promote the incentives, etc.)
- Pros, Cons and Intentions of MOI to implement this activity under JICA's Technical Assistance.
- Clarify if DG of ILMATE can be the focal person in MOI for the succeeding project.
- Options of MOI to collaborate with other agencies (e.g. BAPPENAS, BPPT, MOF)

2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

The results of Pilot Activities are expected i) To promote utilization of R&D incentives, ii) To build public services for implementation of R&D outcomes



2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

Proposed items for protocol in 1st year

The consensus among responsible agencies i.g. MOF and Min. of Res&Tech should be build at the early phase

Items	Items to be confirmed by periodic support
<p>Consistency with the definition of R&amp;D</p> <ul style="list-style-type: none"> <li>Research is an activity conducted by the scientific methodologies to obtain data and information for understanding natural and/or social phenomena, which will provide liability of an assumption and/or hypothesis, and lead the scientific outcomes.</li> <li>Development is an activity to extend the benefits and the capacity of science and technology that has been proven validity and safety for increasing the functions and benefits of science and technology.</li> </ul>	<ul style="list-style-type: none"> <li>Clarify the projected R&amp;D activities by collaborating with MOI, accounting firms, JICA expert and JICA Study Team at the early phase</li> </ul>
<p>R&amp;D criteria to grant incentives i.g. Deductions</p> <ol style="list-style-type: none"> <li>Must be aimed at making new discoveries;</li> <li>Must be based on an original concept or hypothesis;</li> <li>There must be uncertainty in terms of the end results;</li> <li>Must have been planned and budgeted; and</li> <li>Must be aimed at creating an end product that can be freely transferred or traded through the marketplace.</li> </ol>	<ul style="list-style-type: none"> <li>Minutes of meeting with target companies</li> <li>Record of technical assistant by experts</li> <li>Structure organization and operation hours of R&amp;D section</li> <li>Plan for R&amp;D&amp;D, progress, and outcomes</li> <li>Accounting book for R&amp;D&amp;D</li> <li>Confirmation accounting book for excluding the items not to be subjected to grant deductions*</li> </ul>

\* a) production activities at an early stage of commercial production, b) quality control during commercial production, c) repair the damage that occurred during commercial production phase, d) repair, addition, enrichment or other quality improvement on a routine basis of an existing product, e) adaptation of existing capabilities to special requests or customer requirements, as part of a sustainable commercial activity, f) periodic or seasonal design changes on existing products, g) routine design of tools and molds, h) engineering construction and design relating to construction, relocation, rearrangement, or start-up facilities and equipment and, i) marketing research.

2. Enhance R&D activities through making protocols to utilize incentives for R&D activities

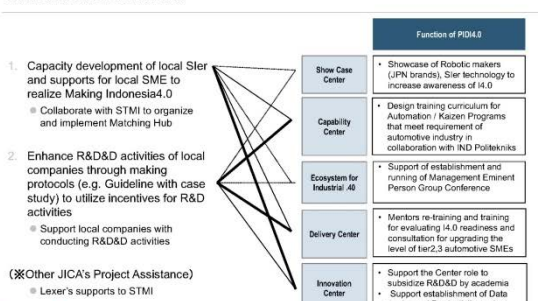
Candidate Companies and Consulting Services

Selection of companies focusing on D&D. Consulting mainly for D&D by collaborating with local expert, lawyer and accounting firms belonging to local OEM and Tier1

- Candidate Companies**
  - Plastic Die cast
  - Aluminum Die Cast
  - Stamped Parts
  - Casting
  - Interior Parts
  - Rubber Processing
  - Aftermarket Parts
- Consulting Services**
  - Enhancing awareness of upper management
  - Reviewing the requirement of R&D&D
  - Extracting R&D&D division (e.g. HR and Expense)
  - Confirming the definition of R&D&D division, job script and operating hours
  - Proposal activities of R&D&D to client (e.g. mold production technology, parts design, testing, obtain a patent, industry-academia collaboration)
- Gross-Income Deduction by R&D&D\***
  - Research and development activities: +100%
  - Domestic patent or PVT: +80%
  - Domestic and overseas patent or PVT: +25%
  - Commercialization stage: +100%
  - Collaboration with government R&D institutions and/or higher-education institutions within Indonesia: +25%
- Focus on Yellow highlighted deduction**
- Costs to be Deducted**
  - Assets except for Depreciation costs for fixed tangible assets, and Supporting costs for fixed tangible assets
  - Goods and/or materials
  - Salaries, honorariums or similar payments which are made to employees, researchers and/or engineers
  - Costs relating to the registration of patents or PVT rights
  - Any compensation provided to other R&D inst., higher-education institutions to carry out R&D activities
- Period/Termination**
  - No later than the enforcement date of Regulation 45/2019 (i.e. 26 June 2019)
  - Termination period is not mentioned

\*Peraturan Menteri Keuangan Nomor 153/PMK/01/2020 Tahun 2020

Candidate of Pilot Activities





## 6.5 Meeting on 3<sup>rd</sup> February



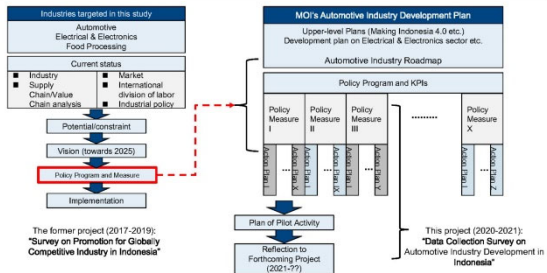
### Data Collection Survey on Automotive Industry development in the Republic of Indonesia Proposal of the scope for the next phase

February 3, 2021

Ministry of Industry (MOI), Republic of Indonesia  
Japan International Cooperation Agency (JICA)  
Oriental Consultants Global  
Nomura Research Institute, Ltd.  
Nomura Research Institute, Singapore Pte. Ltd.

#### I. Overview of this study

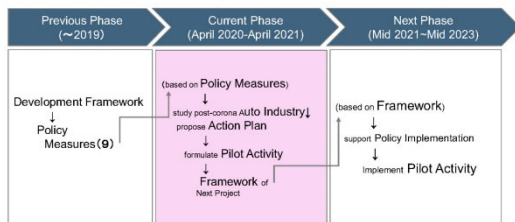
The study aims at analyzing automotive industry roadmap and supporting related discussion by line agencies. The results will be reflected to JICA's forthcoming technical assistance to Indonesia.



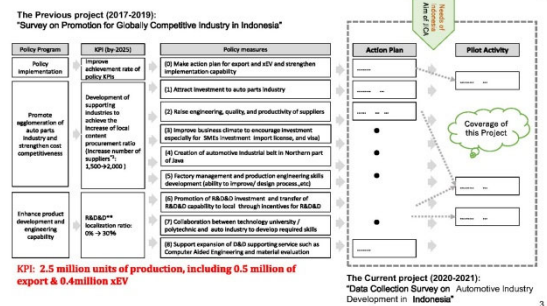
#### The Current Project

In the present phase, the action plans per policy program and pilot activities were suggested, it is expected to be implemented in the next phase.

- In the present phase, the framework of the development plan that is being requested for the next phase is examined. It is also discussed the proposed Pilot activities included in said framework to accelerate the progress of the Roadmap for the automotive industry.
- Current phase conducted a study of the impact of COVID-19 to understand the situation of the automotive industry in Indonesia. The study delivered the actual needs from the companies.



#### The Framework of Automotive Industry Promotion Plan (from the result of the former project) The coverage of the Current Project.



#### "Data Collection Survey on Automotive Industry Development in Indonesia" (2020-2021)

##### Table of Contents (Final Report)

<p><b>Chapter I Outline of the Project</b></p> <p>1-1 Background and Purpose of the Project</p> <p>1-2 Methodology and Schedule of the Survey</p> <p>1-3 Achieved and Un-achieved</p> <p><b>Chapter II Socio Economic Condition of Indonesia</b></p> <p>2-1 Influence of Covid-19 Turnoff</p> <p>2-2 Social Impact of Covid-19</p> <p>2-3 Economic Condition of After Covid-19 Turnoff</p> <p><b>Chapter III The Input from the Prior Project ("Survey on Promotion for Globally Competitive Industry in Indonesia" (2017-2019))</b></p> <p>3-1 Summary of the Prior Project</p> <p>3-2 "Policy and Measures" on Automotive Industry Development proposed by the Prior Project</p> <p>3-3 Items of Transmittal from the Prior Project</p> <p><b>Chapter IV Automotive Industry Roadmap after Covid-19 Turnoff</b></p> <p>4-1 Global trend of change on automotive industry</p> <p>4-2 Movement toward New Normal by Major OEMs</p> <p>4-3 Revision of Automotive Industry Roadmap in Indonesia</p> <p>4-4 Acceleration to EV manufacturing</p> <p>4-5 Export strategy</p> <p>4-6 New skill set of HRD</p> <p>4-7 Government's Acts for Sales Promotion</p> <p>4-8 Maintaining of Skills and Technology (R&amp;D&amp;D strategy)</p>	<p><b>Chapter V Action Plan Corresponding to Policy Measures and its Implementation Schedule</b></p> <p>5-1 Policy Making</p> <p>5-2 Promote Agglomeration of Auto-parts Industry and Strengthen Cost Competitiveness</p> <p>5-2-1 Action Plans on "Attract investment to auto parts industry"</p> <p>5-2-2 Action Plans on "Raise engineering quality and productivity of suppliers"</p> <p>5-2-3 Action Plans on "Improve business climate to encourage investment especially for SMEs investment import license, and visa"</p> <p>5-3 Enhance product development and engineering capability</p> <p>5-3-1 Action Plans on "Promotion of R&amp;D&amp;D investment and transfer of R&amp;D&amp;D capability to local through incentives for R&amp;D&amp;D"</p> <p>5-3-2 Action Plans on "Collaboration between technology university / polytechnic and auto industry to develop required skills"</p> <p>5-3-3 Action Plans on "Support expansion of D&amp;D supporting service such as Computer Aided Engineering and material evaluation"</p> <p>5-4 Implementation Schedule</p> <p><b>Chapter VI Framework of Forthcoming Development Project</b></p> <p>6-1 Framework of Development Project</p> <p>6-1-1 Moving forward to JICA supported Development Project</p> <p>6-1-2 The Framework of Development Project</p> <p>6-2 Plan of Pilot Activities</p> <p>6-2-1 CBU/Auto parts export strategy</p> <p>6-2-2 R&amp;D&amp;D</p> <p>6-2-3 Matching Hub</p>
---	---

#### The result of Interview

##### (0) Initial needs for MOI's next development plan

- Export Promotion of CBU ( for MPVs?, most probably)**
  - There is a vague expectation that Australia may have potential. We are looking forward to the export of MPVs, starting with commercial vehicles, and would like to seek some support from Japan.
- R&D on EV batteries and Biofuel**
  - The development of Biofuel and its application to automobiles will provide a great incentive not only to the automobile industry but also to the agricultural sector in Indonesia. In addition, while China and South Korea are ahead of Japan in the development of EV batteries, MOI would like to make Indonesia the development base for ASEAN if Japan shows some commitments to this theme.
- PIDI support**
  - MOI hopes that Japan's participation in PIDI will bring certainty to the realization of automotive industry Road Map. Furthermore, MOI would like to form a base for human resource development, research and development, and digitalization of the automotive industry.
- Production automation for SMEs**
  - While boosting the progress of Making Indonesia 4.0, MOI hopes to strengthen the parts industry to lower the price of automobiles and ultimately contribute to the export of international competitiveness.
- DIGITAL technology education in polytechnic school**
  - MOI would like to develop industrial human resources who are skilled in digitalization and IoT technology through school education on Lean Manufacturing and FMS, and MOI would like to promote investment by providing the top polytechnic education in ASEAN.

#### The result of Research work

##### (1) Macro trends in the corona disaster

- Corona response and Influence to the automobile industry (domestic consumption is sluggish)**
  - Coronary infection in Indonesia is the most severe among ASEAN countries, and domestic sales of automobiles are extremely sluggish. The procedures for foreigners to enter Indonesia are less convenient than those in Thailand and Malaysia, and production lagged behind, but as of the end of 2020, it has begun to recover.
- Rupiah depreciation**
  - The Indonesian rupiah is under downward pressure due in part to the Corona disaster. The main reason for this is the growing concern in financial markets that the central bank will be used to plug the budget deficit, as the ruling party's move to amend the law to reduce the independence of the central bank has surfaced.
- Meanwhile, growing demand for eco-friendly cars**
  - Due in part to the three Cs, the concept of car sharing, which was on the rise before the Corona, has stagnated, while the importance of traveling in one's own car has been rekindled. However, the popularity of small eco-cars has been on the rise due to declining incomes and the rise of environmental concepts
- "Green" as a keyword in consumer behavior**
  - Increase in the number of environmentally conscious consumers (green consumers) who dare to purchase environmentally friendly products even if they are more expensive than normal products
- Shift to EVs, led by Europe, the U.S. and China**
  - In its "European Green Deal" policy announced in December 2019, the EU announced its intention to lighten CO2 emission standards for automobiles in order to achieve virtually zero CO2 emissions by 2050. In September 2020, China also announced a policy to reduce the manufacture and sale of conventional gasoline vehicles to zero by 2035.

#### The result of Interview survey

##### (2) Present Situation and Needs of Indonesia

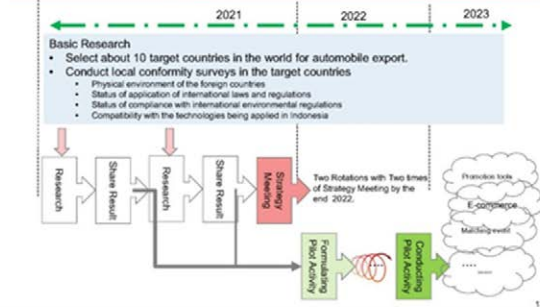
- Automotive Industry Roadmap**
  - No major changes have been made after the Corona disaster. A trigger is needed to kick-start the measures that have been considered.
- Strengthen incentives for R&D&D**
  - New tax incentives in R&D were added in 2020 and the country has developed a legal system to encourage R&D&D.
- SMEs do not have access to various incentives**
  - Despite the government's incentives, the various incentives are distance measures for SMEs. This is due to the lack of exemplary protocols and guidelines and the cumbersome procedures.
- Introduction of digitalization and automated manufacturing technologies with Making Indonesia 4.0 as a guideline**
  - The introduction of automation and digitalization technologies is required as a direction of technological innovation in the automotive industry. In Indonesia, there is a lack of opportunities and facilities to learn these technologies, as well as opportunities for small and medium-sized enterprises to adopt them.
- Strengthening Production Technology Learning at Academia**
  - Curricula related to FMS and lean automation are beginning to be adopted by POLMAN and STMI. On the other hand, there is an overwhelming shortage of experts and tutors to train them, and vocational schools are trying to achieve this with the support of the Ministry of Industry and JICA.

Overall project scope of the next phase (tentative)  
Development Study Project (Supports in Policy Development) + Pilot Activities

- Project Scope of the next phase  
Conduct a study, provide updated informations to relevant government agencies through presentation/seminar and assist MOI with developing policies
- Export Strategy**
    - Study the feasibility of the goal to achieve export target of 1.5 million cars by 2035 in the roadmap.
    - The project will study the following items for (i) Cars and (ii) Motorcycles to be exported from Indonesia: ①Competitiveness, ②Regulations of the target destinations/Environmental, Vehicle safety, Manufacturer responsibilities, ③Export/Import Regulations, ④States/Retail Regulations, ⑤Business Practices, ⑥Trade Insurance, ⑦Government Supports for overseas investments, ⑧Infrastructure of export products.
    - Study economic partnership as a preferred strategy of exporting cars (FTA, Automotive Industry linkage with economic partnership, etc.)
    - (As a pilot activity)** Work with local companies on survey, workshop, seminar, study tour to the 3<sup>rd</sup> countries, or establishing business matching website.
    - Suppliers development for auto-parts suppliers
  - R&D Strategy**
    - R&D Protocol (As a pilot activity)**
    - Survey the challenges/issues on the R&D incentives to identify the reasons why it is not well-utilized through collecting actual practices (model cases).
  - Supplier Development Strategy**
    - Promote investments in electronic auto-parts which are not located in Indonesia, such as sensor, vehicle safety parts (air-lock, air bag, etc.), or other advanced technology.
    - Through matching hub activity, support local companies to realize PIDit 0 or level up INDi4 score. Collaborate with other human resource development program such as Lerner's project. (This activity is different project from Lerner Project.)

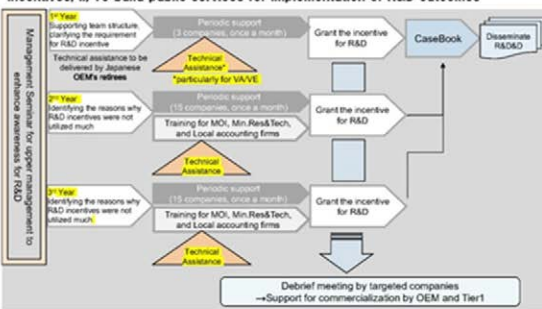
Pilot Activity (Export Strategy)

From a Workshop regularly conducted among MOI, JICA Expert and SME suppliers, the framework of Pilot Activity will be gradually formed and implemented around 2022 afterwards.



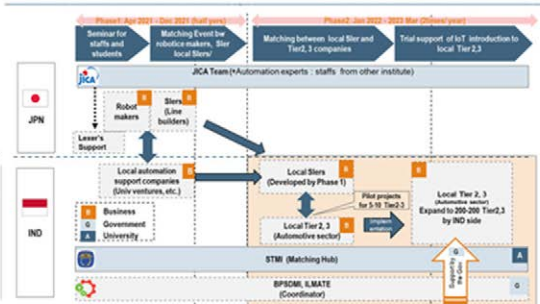
Pilot Activity (R&D Protocol)

The results of Pilot Activities are expected i) To promote utilization of R&D incentives, ii) To build public services for implementation of R&D outcomes



Pilot Activity (Matching Hub)

JICA team will promote matching between robotic makers, Siers, local Siers, and Tier2,3 through collaboration with STMI as main CP and BPSDM, ILMATE as coordinator



(0) Initial needs on MOI's next development plan

MPV/CBU Export	EV Battery R&D for Biofuel	Supports for PIDi	Automation of production lines of SMEs	Education of digital engineering in Polytechnic University
----------------	----------------------------	-------------------	--	--

(1) Macro trends under COVID-19 pandemic

(2) Current Situation and Needs of Indonesia

(3) Perspectives of Japan

Action Plan & Affiliated Activity

Export Strategy

R&D Incentive Utilization Protocol

Matching Hub

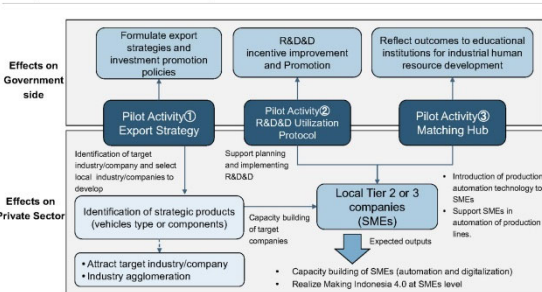
Pilot Activity

Priority of Pilot Activity

3 Pilot Activities are derived based on the action plans to implement corresponding policy measures.

Policy Implementation	KPI (By-2023)	Policy measures	Action Plan and Activity	Extracted Pilot Activity
Promote agglomeration of auto parts industry and strengthen cost competitiveness	Increase local content procurement ratio (Increase number of suppliers*: 1,500-2,000)	(1) Make action plan for export and R&V and strengthen implementation capability	Research and Framework Development, Policy Formulation, Quick Policy Implementation	Export Strategy
		(2) Attract investment to auto parts industry	Investment Promotion of Tier2&3 Companies, Attract FDI for Increasing Export	
Enhance product development and engineering capability	R&D/++ localization ratio: 0% → 30%	(3) Raise engineering, quality, and productivity of suppliers	Incentive for Human Resource Development, Technology Transfer to Local Companies	Matching Hub
		(4) Improve business climate to encourage investment especially for SMEs investment (import license, and vital)	Improvement of Immigration Management for Foreign Experts, Review of trade barriers	
		(5) Factory management and production engineering skill development (ability to improve/design process, etc)	Introduction of FMS through industry-academic collaboration	
		(6) Promotion of R&D investment and transfer of R&D capability to local through incentives for R&D	Establish R&D support system	R&D Protocol
		(7) Collaboration between technology university/polytechnic and auto industry to develop required skills	Industry-Academia Joint Program	
		(8) Support expansion of O&D supporting service such as Computer Aided Engineering and material evaluation	Strengthening the capacity of testing and certification bodies	

Pilot activities will support formulating export strategy and building capacity of local companies in automation and digital transformation.

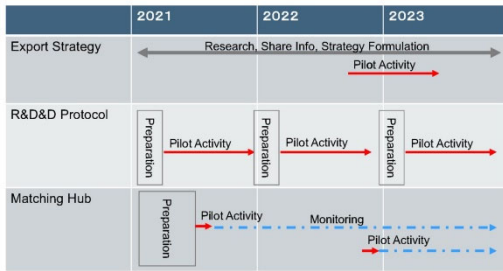


Framework of Next "Development Project"



**Time Frame of Next Phase**

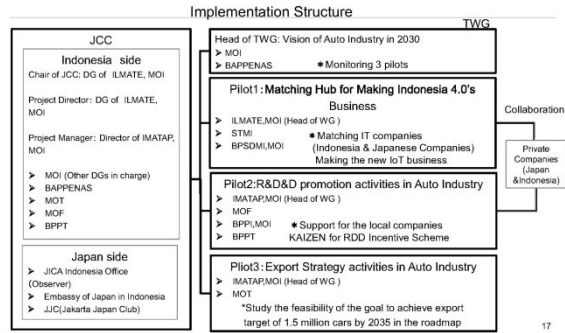
Research, information sharing (seminars and workshops), and strategy development (collaborative work) are activities that will form the basis of the next project



It is quite possible to equalize the availability of experts and the commitment of suppliers.

**Overall project formation of the next phase (tentative)**

Next project will focus to implement 3 themes/pilot activities with ILMATE-MOI and JICA will collaborate to supervise the entire project



**(Reference) MPV export potential of Indonesia**

Currently MPV are sold in limited countries, thus prospective markets for export are few. Philippines and Vietnam have high demand of MPV, Indonesia already export to those countries.

Global MPV Market (2010-2019): Countries with Annual Sales of 10,000 above units

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
India	114,042	122,147	130,252	138,357	146,462	154,567	162,672	170,777	178,882	186,987	5.2%
Japan	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	108,000	0.0%
Philippines	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0.0%
Vietnam	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0.0%

**Appendix Demonstrative Analysis on CBU Export from Indonesia**

**Automotive Export Strategy of Indonesia**

The value of CBU exports and parts exports of Indonesia are both significantly lower than those of Thailand and Turkey. The export ratio is about 10 points lower than that of Thailand and Turkey.

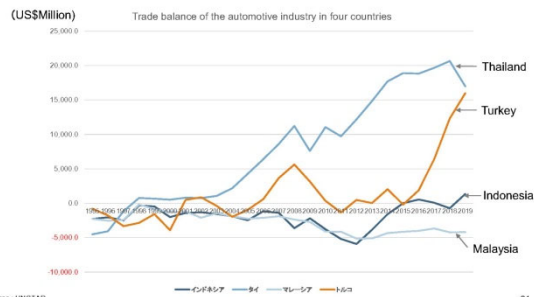
	Indonesia (2019)	Thailand (2019)	Malaysia (2018)	Turkey (2018)
Production (1,000 units)	1,286,848	2,013,710	564,971	1,550,150
Domestic Sales (1,000 units)	1,030,126	1,007,552	598,714	641,541
Export (1,000 units)	332,023	1,054,103	401,444	1,318,869
CBU Export Ratio(%)	25.8%	52.3%	7%	85%
Theoretical number of imports (1,000 units)	73,876	-	-	410,260
CBU Export Amount (Million USD)	6,065	38,643.5	520	21,350
Auto Parts Export Amount (Million USD)	2,050*	21,908	3,025	10,881
Auto Parts Export Ratio (%)	25.3%	36%	85%	34%

\*compiled from Comtrade data (HS8708, HS840734, HS840820, HS851140, HS851290)

Source: UN Comtrade, Marklines

**Automotive Export Strategy of Indonesia**

CBU export is directly linked to the trade balance, although the development of the automotive industry differs from country to country.

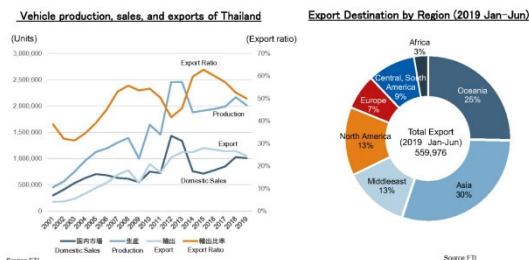


Source: UNCTAD

**(Reference) CBU export of Thailand**

CBU export exceeds 50% out of total vehicle manufactured. Export destination is diversified such as Asia, Oceania, Middle East and South America.

Asia and Oceania account for 55% of exports, other regions such as the Middle East and South America account for 45%, indicating that Thailand is diversifying its destinations.

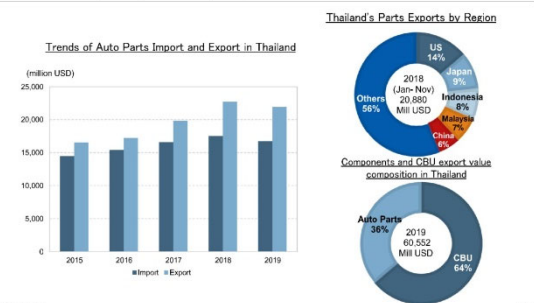


Source: FTI

Source: FTI

**(Reference) Auto Parts Import of Thailand**

Thailand's auto parts exports exceed \$200 billion, and its trade surplus in auto parts has been growing in recent years.



Source: IAPMA, FTI

Source: IAPMA, FTI

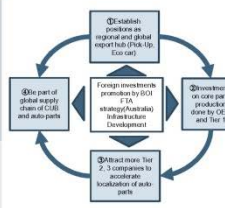
**(Reference) Thailand's policy to promote automobile exports**

Thailand's export policy for CBU and auto-parts was mainly set out in the "Detroit of Asia Initiative" in the early 2000s, with the main pillars of preferential investment policies and FTA promotion policies.

**Investment incentives for export-oriented automotive manufacturing projects**

Requirements of Investment Incentives	Investment Incentives
<b>Cars</b> <ul style="list-style-type: none"> <li>Export automotive manufacturing projects must be packaged with auto-parts manufacturing projects with a total investment amount of at least 10 billion baht (not including land and working capital).</li> </ul>	<ul style="list-style-type: none"> <li>No corporate income tax exemption for companies located in Zone 1 (6 provinces around Bangkok), Zone 2 (12 provinces including Rayong, Chonburi, Phuket, etc.) was granted a 3-year tax exemption, but this has been extended to a maximum of 8 years.</li> <li>Regardless of the zone, duty exemption on machinery imports is granted (50% tax reduction for zones 1 and 2).</li> </ul>
<b>Auto-Parts</b>	<ul style="list-style-type: none"> <li>Companies can locate in Zone 1 while it's limited to Zone 2 and 3 before.</li> <li>3-year corporate tax exemption granted for Zone 1 locations.</li> <li>Import duty exemption for machinery regardless of zone.</li> </ul>

**Thailand's Automotive Policy and development of GVCs**

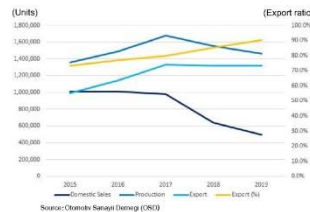


Source: AITRO Bangkok Center, Investment Promotion and Cooperation Division, Nanyang Technological University, AITRO BSCT Report, October 2003.

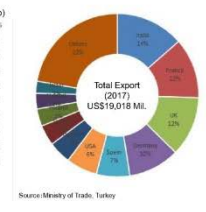
**Turkey's CBU Export**

The annual production volume was 1.55 million units in 2018, of which 1.32 million units or 90% were exported. While the currency weakened, exports are making up for the decline in the domestic market.

**Turkey's automobile production, sales, and exports**



**Turkey's Auto parts Exports by Region**

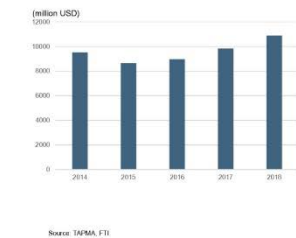


**Turkey's import and export of auto parts**

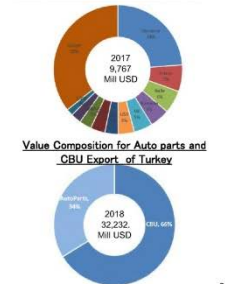
Trade with the EU accounts for nearly 80% of the total. Turkey has fostered TQC in the automotive industry with its proximity to the EU, inheritance of technology through the traditional apprenticeship system, and low labor costs.

The shift in exports is due to the government's initiative to increase the international competitiveness of domestic companies through i) generous support for the manufacture of specific parts and ii) the gradual liberalization of parts imports in a timely manner.

**Turkey's Import and Export of Auto Parts**



**Turkey's Auto parts Exports by Region**

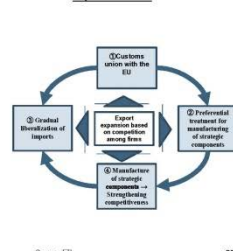


Source: TAPMA, FTI

**Incentives for export-oriented automotive manufacturing projects**

- The Customs Union signed with the EU in 1995.
- The government needed to lend tariffs on goods and services passing through the customs union with the EU on the same basis, and for this purpose, it was necessary to set up a system in which goods and services could be evaluated based on uniform quality standards (this is compliance with the same international standards and conventions).
- The export-oriented growth strategy of the 1980s had two pillars<sup>1)</sup>. The first pillar was to provide subsidies to domestic producers to steer them towards selling in international markets. In other words, without increasing exports, it was impossible to control the balance of trade. The second pillar was the gradual liberalization of imports, which included easing quantitative restrictions and lowering tariffs.
- <sup>1)</sup> Theoretically, as domestic producers begin to face competition from imports, they will be forced to increase productivity and upgrade their products to survive.
- Since the abolition of the import license system in 1996, imports have been free in principle, and no special incentives have been granted for the export of auto parts.
- As for investment incentives<sup>2)</sup>, there are a variety of exemptions, which can be combined according to the type of business, region, and sector. By so doing a sound environment has been created to promote free competition, improve QCD, and enhance the international competitiveness of the parts industry.
- <sup>2)</sup> The priority investment incentives offered include: 10% and corporate duty exemption, social security assistance, corporate tax exemption, and free land allocation. Incentives will be granted on a case-by-case basis to ensure that overall costs and price controls will not affect the incentives that eventually are eligible to receive.

**Policy Implementation to Enhance Turkey's Export Potential**



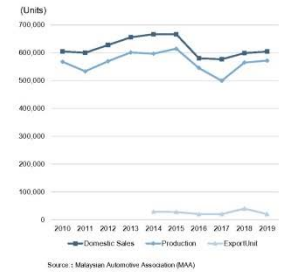
説明：「プラットフォームセンター 投資環境改善策 適用 図説」(EITO BSCTレポート) 2004年6月編

Source: FTI

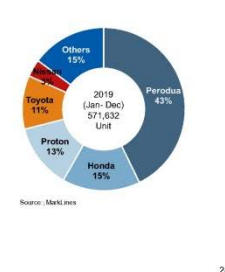
**(Reference) Malaysia's CBU exports**

Export unit rate in Malaysia is quite low for the scale of domestic sales. Malaysia's automotive industry largely relying on domestic OEM has targeted domestic market

**Domestic Sales, Production and Export Unit in Malaysia**



**Major Automotive OEM in Malaysia**

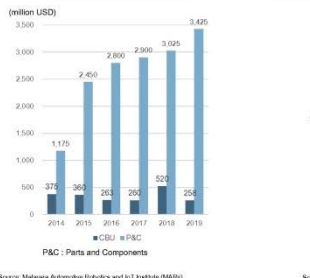


Source: Malaysian Automotive Association (MAA)

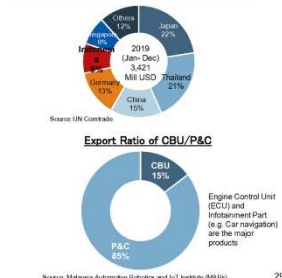
**Reference) Comparison of CBU/P&C export of Malaysia**

P&C is more exported than CBU as the production of E&E part has been promoted

**CBU/P&C Export in Malaysia**



**Destination Country for P&C Export from Malaysia**



Source: UN Comtrade

Source: Malaysian Automotive Robotics and IoT Institute (MARi)

**(Reference) Malaysia Automotive Export Policy**

P&C export has been actively promoted by The National Automotive Policy (NAP)

**(Reference) Malaysia Automotive Export Policy**

The ambition targets for P&C export were set in NAP2020, which is supported by tax deduction policy and other related policies

**The National Automotive Policy (NAP)**

**THE NATIONAL AUTOMOTIVE VISION**

- SUPPLY CHAIN INTEGRATION**  
Malaysia as the hub for:
  - Exports of vehicles;
  - Exports of components and spare parts;
  - Automotive R&D;
  - Technology development related to automotive and mobility; and
  - Vehicle and component testing.
- LOCAL MANUFACTURING**  
Enhance local manufacturing of vehicles and components as well as promotion of remanufacturing
- ENGINEERING CAPABILITIES**  
Enhance local manufacturing of vehicles and components as well as promotion of remanufacturing
- LATEST TECHNOLOGY TREND**  
Adopt and adapt the latest technology trend through application of IR4.0 technologies
- SUSTAINABLE DEVELOPMENT**  
Sustainable development of the automotive industry through application of environmental friendly products and processes which aims to reduce carbon emission etc.



**Target of NAP2020**

Item	NAP2014 (by 2020)	Actual Value 2019	NAP2020 (by 2025)
Export CBU	250,000 units	RM 2.09 billion	RM 12.3 billion
Export P&C	RM 10 billion	RM 12.1 billion	RM 26.3 billion
Export Remanufactured P&C	RM 7 billion	RM 0.52 billion	RM 10 billion

**TAX Incentives for export**

Eligibility	Tax Reliefs
Manufacturers of motor vehicles, components or parts which export these manufactured goods provided the export sales of the products attained at least 30% value added	Tax exemption of statutory income (restricted to 70% in a year of assessment) equivalent to: (a) 30% of the value of increased exports (attained at least 30% value added); or (b) 50% of the value of increased exports (attained at least 50% value added)

Source: Income Tax (Exemption) Order 2011

30

31





"Data Collection Survey on Automotive Industry Development in Indonesia" (2020-2021)

Table of Contents (Draft Final Report) (2/2)

<p><b>CHAPTER 5. Action plans corresponding to policy measure and implantation schedule</b></p> <p>5.1 Export, xEV development and strengthen implementation capability</p> <p>5.2 Promote Agglomeration of Auto-parts Industry and Strengthen Cost Competitiveness</p> <p>5.2.1 Action Plans on "Attract investment to auto parts industry"</p> <p>5.2.2 Raise engineering quality, and productivity of suppliers</p> <p>5.2.3 Improve Business Climate to Encourage Investment especially for SMEs Investment, Import license, and Visa</p> <p>5.2.4 Factory management and production engineering skills development (ability to improve design process, etc)</p> <p>5.3 Enhance Product Development and Engineering Capability</p> <p>5.3.1 Promotion of R&amp;D investment and transfer of R&amp;D capability to local through incentives for R&amp;D&amp;D</p>	<p>5.3.2 Collaboration between technology university (polytechnic and auto industry to develop required skills</p> <p>5.3.3 Support expansion of R&amp;D&amp;D supporting service such as Computer Aided Engineering and material evaluation</p> <p>5.4 Implementation Schedule</p> <p><b>CHAPTER 6. Framework of Development Projects</b></p> <p>6.1 Overview</p> <p>6.1.1 Development Project Ideas for by the JICA Project</p> <p>6.1.2 Pilot Activity Planning</p> <p>6.1.3 Ripple Effects of Pilot Projects</p> <p><b>Appendix</b></p> <p>Appendix 1. Summary of Inception Report</p> <p>Appendix 2. Road Map for Development of Automotive Industry 2019-2025</p> <p>Appendix 3. Summary of Interview Result</p> <p>Appendix 4. Action Plans and Key Activities</p> <p>Appendix 5. Export Potential Survey</p> <p>Appendix 6. Meeting Materials for MOI</p>
--	---

Automotive Industry after COVID-19 Turmoil

Current status and challenges of the Indonesian automobile industry before the Covid-19 pandemic

In 2020, sales and production fell by 48% and 46%, respectively, to 2009-10 levels, due to COVID-19. The drop in exports was only 30%, became a stopper to the industrial slump.

- Toyota and Daihatsu are accounting for more than 60% of exports (see below table).
- Since 2014, exports have increased from 100T units to 200T units in 2017 and 300T units in 2019, when the Indonesian government has struggled with a worsening trade balance. Meanwhile, the Toyota Group, having a high market share, has begun to use Indonesia as an export hub.

Table 2.1.1 Indonesia's automotive market, imports, production, and exports

Year	Domestic market	Production	Export
2009	533,917	500,710	17,805
2010	518,524	296,028	30,976
2011	435,341	411,028	69,267
2012	603,774	600,028	100,982
2013	485,548	464,816	56,669
2014	765,732	702,508	85,796
2015	895,165	702,508	107,982
2016	1,116,230	1,053,270	173,171
2017	1,229,904	1,208,211	170,907
2018	1,208,028	1,208,523	200,273
2019	1,013,281	1,088,780	207,681
2020	1,062,729	1,177,797	394,397
2021	1,077,365	1,217,538	211,169
2022	1,151,291	1,454,717	264,553
2023	1,030,126	1,286,848	322,023
2024	542,071	699,061	242,061

Source: GAIKINDO

Table 2.1.4 Indonesia's automotive export trends by OEMs 2019-2020

	2019	2020	Share
Toyota	89,205	53,728	23.1%
Daihatsu	123,227	91,472	39.4%
Mitsubishi	64,714	40,589	17.5%
Suzuki	39,613	37,400	16.1%
Honda	6,847	5,970	2.6%
Hyundai	3,241	750	0.3%
Hino	2,310	605	0.2%
Dodge(FSC)	170	790	0.3%
Wuling(SGMW)	2,696	611	0.3%
Others	-	-	0.0%
Grand Total	332,023	232,175	100.0%

Source: GAIKINDO

Current status and challenges of the Indonesian automobile industry before the Covid-19 pandemic

Increasing the local procurement rate and reducing manufacturing costs will greatly contribute to export promotion.

- As the number of local manufacturers is increasing, localization of components has progressed to a certain extent; most of the components that are imported on a component basis at the Tier 1 and Tier 2 level are those that are manufactured centrally, such as Electronic Control Units (ECUs), transmission-related gears, and Antilock Brake System (ABS).
- The localization of materials such as steel and plastics has made little progress.

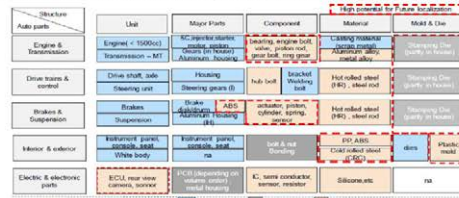


Figure 18 Current Status of Supply Chain in Indonesia

Global Trends in the Automotive Industry

The movement of CASE is progressing faster than initially anticipated. Both technology and regulation have been challenging in adopting autonomous vehicles

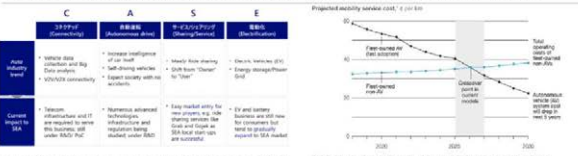


Figure 4.1.4 Transformation to CASE and Impacts to South East Asia Market

- In ASEAN Region, manufacturing of EV and service/sharing are the major concern among CASE.
- It is estimated that 2025-30 will be the inflection point for the adoption of autonomous vehicles, but the duration will largely depend on the economics of drivers at the city level.
- In Indonesia, the adoption of autonomous vehicles is expected to be slower than Thailand and Malaysia due to the high percentage of drivers employed, the slower development of road, and the poorer communication infrastructure.

Reference: Front-loaded New Normals

Honda launched the new "Legend", the world's first car equipped with Level 3 automated driving functions on March 5, 2021.



Legend Hybrid EX • Honda SENSING Elite  
No one but Toyota can easily follow suit

Car Price in Japan : ¥11,000,000 (Rp.1,470million)  
Limited production of 100 units for lease



Global Trends in the Automotive Industry

The COVID-19 turmoil has led to a global decline in demand, production and sales of automotive due to restrictions on travel and the expansion of teleworking.

Global trends after Corona pandemic

- There will be a growing trend toward desinicalization and diversification of the supply chain.
- Digitization will be developed not only within bases, but within whole supply chain.



Figure 4.2.1 Impact of the Covid-19 Pandemic to the Supply Chain and Actions Taken

Global Trends in the Automotive Industry

Stimulating Consumer Confidence as a Response to Covid-19 Infections: Stimulating consumer demand is being used aiming for a recovery from economic crisis.

Table 4.2.2 Government Responses to the Covid-19 Pandemic in Key ASEAN Countries (based on press releases)

	Thailand	Indonesia	Malaysia	Vietnam	Philippines	
<b>Major Responses for economy</b>	Implementation of the Basic 5 stimulus package in June 2020	MOT release PKM 2020 and PKM 2021 regarding Motor Vehicle tax discount (PPh) applying to vehicles with capacity up to 1,500 cc and 2,000 cc with local content minimum 70% and 60% respectively, as much as 100% and 25-50% (Q2) and 25% (Q3)	As part of the "Pergerakan ekonomi recovery plan" the sales tax on Q2 goods has been reduced from 5% to 0% and the sales tax on Q3 goods from 5% to 0% from June 15 to December 31, 2020	From June to December 2020, vehicle registration fees for domestically produced vehicles will be reduced by half. Registration fees for vehicles with new seats or seats will be 15% of the vehicle price in Ha Noi and 10% in Ho Chi Minh City and Da Nang	Department of Trade and Industry continues to impose a temporary softening duty on imported components built-up (CBU)	
<b>Forecast on Sales and Production</b>	ETI maintains its forecast for 2020 vehicle production of 1 million units, 50% less than the year before (1.9M)	GAIKINDO projects domestic car sales in 2020 to be 800,000 units, 50% less than last year's annual sales of 1.3 million cars (Nov. 2020)	The Malaysian Automotive Association (MAA) has revised downward the country's top automotive volume (TV) forecast by 33.3% from 600,000 units to 400,000 units in 2020	Vietnam Automotive Manufacturers Association (VAMA) report automotive sales were down 12.8% year on year to 24,000 units in June	Car sales in June 2020 increased by 226.5% with 18,578 units, a jump from the 4,768 units in May 2020.	
<b>COVID-19 quarantine measures</b>	A state of emergency was declared on March 16, important lockdown from April 5, prohibited going out	Shipping malls and other facilities reopened on June 1, and curfew was lifted up on June 15	The largest-scale social restriction, PSBB was imposed effective on April 10, 2020. Starting 2021, PSBB reduced to PPKM, giving local authority to apply restrictions as needed, while economy has not shown recovery	Movement Control Order has been issued for all of Malaysia on March 16. Conditional Movement Control Order was in place from May 4. Recovery movement control order from June 10.	All citizens were prohibited from leaving the premises for 15 days from April 1-15. Released social condition measures on April 22	Since the strict quarantine was imposed in March, the government gradually lifts the quarantine level. National Capital Region is still under Modified Enhanced Community Quarantine.

Source: Prepared by NRI based on Various Press-Releasees

Global Trends in the Automotive Industry

Global Trends vs. Indonesia's Automotive Industry (Summary, Table 4.1.3, Main Report)

Global Trends (neighboring countries)	Indonesia's Automotive Industry
<ul style="list-style-type: none"> <li>Progress of CASE (faster than expected)                             <ul style="list-style-type: none"> <li>Shift from "movement of humans" to "movement of goods"</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>"C" and "A" are undeveloped, "S" is rapidly increasing mainly for ridesharing (e.g. GOJEK, Grab), and "E" has great potential for assembly and export.</li> </ul>
<ul style="list-style-type: none"> <li>Acceleration of EV production                             <ul style="list-style-type: none"> <li>Production of EVs will increase by 23% in 2020, while the overall production of automobiles will decline by about 20% year-on-year. Europe and China will lead the way.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>"Automobile Roadmap for 2035" announced a policy to encourage the production of EVs and other low-carbon emission vehicles.</li> <li>"Presidential Regulation No. 55/2019" clarified to develop domestic production of BEVs and established a Coordination Team for the promotion.</li> <li>In 2020, Hyundai started selling two types of EVs, and announced to produce EVs in Indonesia and export them.</li> </ul>
<ul style="list-style-type: none"> <li>Green-oriented buyers                             <ul style="list-style-type: none"> <li>Increasing environmental awareness</li> <li>Preference of owning smaller vehicles due to non-contact orientation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The regulations other than those mentioned above for the Automotive Industry Roadmap and Making Indonesia 4.0 are being prepared</li> </ul>

Table 4.1.3 Overview of Indonesia's Automotive Policy after 2018

Indonesian Direction on Automotive Industry

Direction of automotive industry development

MOI Regulation No. 27/2020 (issued in September 2020) released the renewal of "Automotive Roadmap"

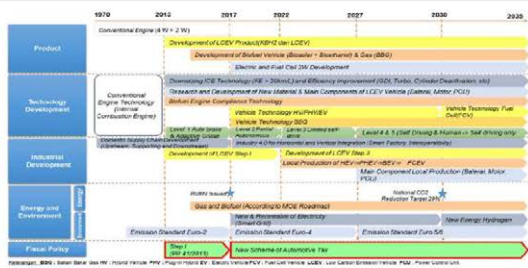


Figure 4.1.8 Technology Roadmap in Indonesia

Direction of automotive industry development

Prioritization towards creation of demand and supply side should be accelerated to satisfy targets of local EV production

- Indonesia will prioritize the formation of local demand market
  - The short-medium term measures include pilot projects, government procurement, BEV special zones, and BEV education. Another strategy is to apply (non) fiscal incentive and accelerate charging station
- Until 2025, the focus would be formation of local BEV market and BEV industry
  - Continue short-medium measures are to widen BEV special zones and prepare FTA strategy to export BEV
  - The medium-long measures are to develop BEV raw materials and component industries as well as start production of 2w (CKD, part-by-part), 4w (CKD, IKD, part-by-part), and charging station
- Until 2030, the focus would be to develop BEV core technology (battery)
  - The battery technology aims to develop (non) Li-B battery and 2nd generation, improve Battery Management System efficiency, Battery end of life, to increase localization of battery raw materials, and develop (non)permanent-based E-motorcycle. Investment provisions for developing battery is under discussion.



Figure 4.1.10 BEV Roadmap Formulated by the Ministry of Industry

Direction of automotive industry development

Without manufacturing EV battery locally, it is difficult to fulfill the condition of "Luxury Tax=0%", - the minimum condition to expand local EV market.

- To encourage the widespread adoption of LCEVs, the government has enacted the "Revision of Decree 2018/73" to revise the new automobile luxury tax system, which will take effect in October 2021.
- The Luxury tax rate on PHEVs, BEVs, and FCEVs will be reduced to 0% if they meet the nationalization criteria.
- However, there is a high hurdle of "domestic production of batteries" to obtain this benefit, and it is thought to be almost impossible to realize.

Table 4.1.6 Domestic Production Target of BEVs (Presidential Regulation No. 55/2019)

Year	2W and 3W	4W and more
2019		
2020		35%
2021	40%	
2022		40%
2023		60%
2024	60%	
2025		60%
2026		60%
2027	30%	
2028		30%
2029		30%
From 2030		80%

Source: JICA Study Team based on the Presidential Regulation No. 55/2019

Table 4.1.7 Calculation Method for the BEV Domestic Production Rate (Ministerial Regulation No. 27/2020, Ministry of Industry)

Category	Item	Value	Notes
Main Component	Body and chassis parts	79	
	Electric Motor, Inverter and Gear	29	
	Drive Train Parts	13	
Supporting Component	Control System	4	Direct cost material
	Wiring System	2	Direct material fee
	Central Computer	4	Non-direct cost factory (battery overhead)
	Other Parts, Tools, etc.	5	
Development Component by R&D	A. Research	30	Implement R&D stage
	B. Equipment	10	
Assembly	A. Material	10	
	B. Equipment	10	
Total		100	

Source: JICA Study Team based on the Ministerial Regulation No. 27/2020, Ministry of Industry

Direction of automotive industry development

Indonesia's Gross Domestic Expenditure on R&D (GERD) is still low at 0.24%. Developing VA/VE engineers in the R&D field will be necessary with the advancement of CASE.

- As CASE progresses, there will be increasing needs for ecosystem design that takes a total view of products, the environment, and urban infrastructure, as well as needs for human resources who can make product improvements and Kaizen (VA/VE engineering personnel).

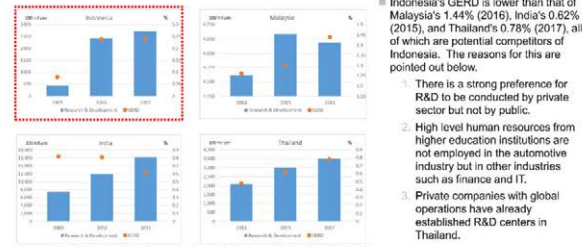
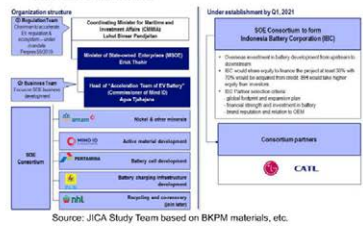


Figure 4.1.18 Research Funds and GERD in Asian countries

Direction of automotive industry development

Indonesia will start aiming a full-scale linkage between low material processing and manufacturing for EV battery, a Key EV Technology

- Battery Consortium and EV Consortium, which were supervised by (the previous) MORTHE and part of national research flagship programs (PRN), consisted of government research institutes and six universities to conduct research on EV.
- The Coordinating Ministry for Maritime and Investments Affairs (CMMIA) orchestrate a general plan to produce local LiB using domestic natural resources by 2024. CMMIA also promoting and harmonizing EV related policies across the administration



Source: JICA Study Team based on BKPM materials, etc.

Figure 4.1.13 SOE Battery Consortium

- The Ministry of SOE is focusing on business side and currently forming Indonesia Battery Corporation (IBC) to the "Battery Consortium" to domestically produced batteries while sharing the responsibility for cathode materials, battery cells, and BMS.
- Investment agreements for battery production are currently underway with two entities:
  - Korea LG Energy Solutions: US\$9.8B
  - Contemporary Amperex Technology Co., Ltd (CATL): US\$5.2B

Direction of automotive industry development

The "Automotive Roadmap" aims to increase automobile exports to 900,000 units (a threefold increase) by 2030 and 1.5 million units (a fivefold increase) by 2035.

- Indonesia's exports have been on the rise in recent years, partly due to the partial transfer of production from Thailand.
- According to GAIKINDO statistics, exports reached 330,000 units in 2019, up from 210,000 units in 2015. However, the gap with the policy target is still large.
- In terms of EV batteries, the SOE consortium has only a few participating companies, and the supply chain is not yet complete domestically, so it is far from being ready for export.

Table 4.1.4 Indonesian Production / Export / LCEV Ratio Targets

ITEM	2020	2025	2030	2035	
MOTOR VEHICLE	Production	1,500,000	2,000,000	3,000,000	4,000,000
	Export	10	20	25	30
	Percentage (Export/Production)	0.67%	1.00%	0.83%	0.75%
	Ratio (Export/Production)	0.001	0.002	0.002	0.002
MOTOR CYCLE	Production	7,500,000	8,800,000	9,800,000	10,750,000
	Export	250,000	330,000	400,000	450,000
	Percentage (Export/Production)	3.33%	3.75%	4.08%	4.19%
	Ratio (Export/Production)	0.033	0.038	0.041	0.042

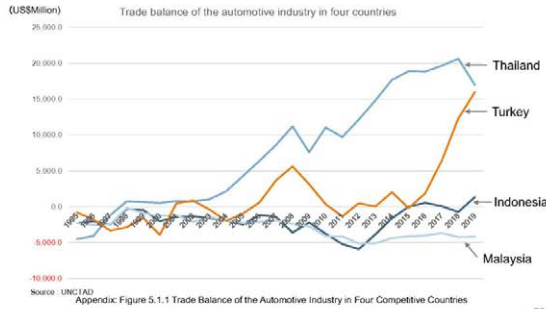
Note: LCEV: Low Carbon Emission Vehicle  
Source: MOI Regulation No. 27/2020  
LCGC: Low Cost Green Car

- In order to promote exports, the government is implementing two policies:
  - LCEV policy and new luxury tax (PPN) system
  - Expanding export destinations through FTAs
- Indonesia's auto industry is moving into the black, and the strategy for the next 4-5 years is particularly important if the country wants to be a LeapFrog (next slide).



Reference: Indonesia needs more Export Promotion

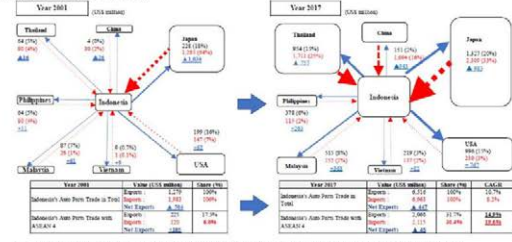
CBU export is directly linked to the trade balance, although the development of the automotive industry differs from country to country,



Reference: Indonesia needs to reduce parts import and increase car exports for bettering of trade balance.

About 50% of imported parts are material-type parts.

In 2017, the scale of Indonesia's auto parts exports was US\$ 6.5 billion, which is much smaller than that of Thailand (US\$ 21.0 billion) but slightly bigger than that of Viet Nam (US\$ 6.1 billion) and the Philippines (US\$ 4.2 billion).



(Reference) MPV export potential of Indonesia

Currently MPV are sold in limited countries, thus prospective markets for export are few. Philippines and Vietnam have high demand of MPV. Indonesia already export to those countries.

Global MPV Market (2010-2019): Countries with Annual Sales of 10,000 above units

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
China	13,000	13,717	14,500	15,283	16,066	16,849	17,632	18,415	19,198	20,000	10.1%
India	10,000	10,500	11,000	11,500	12,000	12,500	13,000	13,500	14,000	14,500	8.5%
USA	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0.0%
Indonesia	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0.0%

Source: BIS

(Reference) MPV export potential of Indonesia

SUV segment is the highest growing segment in the global automotive market at CAGR 15%. Indonesia is 16<sup>th</sup> largest market and Australia and Saudi Arabia can be potential export market.

Global SUV Market (2010-2019): Countries with Annual Sales of 10,000 above units

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CAGR
China	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000	1,700,000	1,800,000	1,900,000	15.0%
USA	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	0.0%
Indonesia	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	0.0%

Source: BIS

Preliminary analysis on Auto Export from Indonesia (Appendix 5)

Country	Number of people per car	Per capita GDP (US\$)	Sales growth	Safety regulation	Environmental regulation	Market environment adaptability/development
Australia (18,310 T units)	1.7	51,360	→	Advanced US regulations for frontal offset, pretensioner, pedestrian protection, ESC and fuel tank ABS standards	Euro 6 exhaust gas regulations, smoke regulations, fuel efficiency regulations.	No particular development concerns
Philippines (4,990 T units)	162	3,660	→	Not adopted US regulations	None	Need to check for rough road performance and road interference
Vietnam (800 T units)	295	1,470	→	Not adopted US regulations	Frontal offset regulations, fuel consumption test	Need to check for high altitude suitability, rough road performance and road interference
Bangladesh (420 T units)	954	1,470	→	Not adopted US regulations	Category required for gasoline vehicles and special regulations for smoke regulation	Need to check for rough road performance and road interference
Ethiopia (190 T units)	1,012	740	No data	Not adopted US regulations	Frontal offset regulations, fuel consumption test	Need to check for high altitude suitability, rough road performance and road interference
Nigeria (1,630 T units)	183	2,100	→	Not adopted US regulations	None	High altitude suitability, rough road performance, road interference
Kenya (1,600 T units)	51	1,460	→	Not adopted US regulations	Category required for gasoline vehicles and special regulations for smoke regulation	Need to check for rough road performance and road interference
Egypt (5,830 T units)	22	3,910	→	Advanced US regulations, frontal offset, pedestrian protection, ESC standards	Exhaust gas regulation, special regulation values for gasoline and diesel vehicles, Emission regulation	Need to check for rough road performance and road interference
Pakistan (3,730 T units)	65	1,500	→	Advanced US regulations, frontal offset, pedestrian protection, ESC standards	Frontal offset regulations, fuel consumption test	Need to check for high altitude suitability, rough road performance and road interference
Saudi Arabia (7,510 T units)	6.4	20,990	→	Not adopted US regulations	Frontal offset regulations, fuel consumption test	Need to check for high altitude suitability, rough road performance and road interference
Colombia (5,900 T units)	12	5,990	→	Not adopted US regulations	Frontal offset regulations, fuel consumption test	Need to check for high altitude suitability, rough road performance and road interference
Argentina (14,110 T units)	4.1	13,030	→	Not adopted US regulations	Euro 6 for all car type. Smoke regulations, Emission regulation	Need to check for high altitude suitability, rough road performance and road interference

Source: BIS

Preliminary analysis on Auto Export from Indonesia (Appendix 5)

Country	Number of people per car	Per capita GDP (US\$)	Sales growth	Safety regulation	Environmental regulation	Market environment adaptability/development
Australia (18,310 T units)	1.7	51,360	→	→	→	→ (engine power)
Philippines (4,990 T units)	162	3,660	→	→	→	→
Vietnam (800 T units)	295	1,470	→	→	→	→ (computer)
Bangladesh (420 T units)	954	1,470	→	→	→	→ (computer)
Ethiopia (190 T units)	1,012	740	No data	→	→	→ (High altitude suitability, rough road performance, road interference)
Nigeria (1,630 T units)	183	2,100	→	→	→	→ (High altitude suitability, rough road performance, road interference)
Kenya (1,600 T units)	51	1,460	→	→	→	→ (Fuel system, air conditioning performance of high altitude temperatures, high altitude suitability)
Egypt (5,830 T units)	22	3,910	→	→	→	→ (Fuel system and air conditioning performance of high altitude temperatures)
Pakistan (3,730 T units)	65	1,500	→	→	→	→ (Computer, fuel system and air conditioning performance of high altitude temperatures, high altitude suitability)
Saudi Arabia (7,510 T units)	6.4	20,990	→	→	→	→ (Computer, fuel system, air conditioning performance of high altitude temperatures, high altitude suitability)
Colombia (5,900 T units)	12	5,990	→	→	→	→ (High altitude suitability, rough road performance, road interference)
Argentina (14,110 T units)	4.1	13,030	→	→	→	→ (Distance, altitude suitability, rough road performance, road interference)

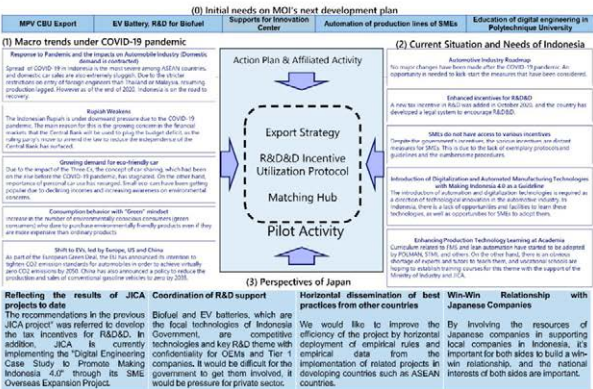
Source: BIS

Reference: Automotive Export Strategy of Indonesia

The value of CBU exports and parts exports of Indonesia are both significantly lower than those of Thailand and Turkey.

	Indonesia (2019)	Thailand (2019)	Malaysia (2018)	Turkey (2018)
Production (1,000 units)	1,286,848	2,013,710	564,971	1,550,150
Domestic Sales (1,000 units)	1,030,126	1,007,552	598,714	641,541
Export (1,000 units)	332,023	1,054,103	401,444	1,318,869
CBU Export Ratio(%)	25.8%	52.3%	7%	85%
Theoretical number of imports (1,000 units)	73,876	-	-	410,260
CBU Export Amount (Million USD)	6,065	38,643.5	520	21,350
Auto Parts Export Amount (Million USD)	2,050*	21,908	3,025	10,881
Auto Parts Export Ratio(%)	25.3%	36%	85%	34%

\*compiled from Comtrade data (HS8708, HS840734, HS840820, HS851140, HS851290)  
Source: UN Comtrade, Marklines

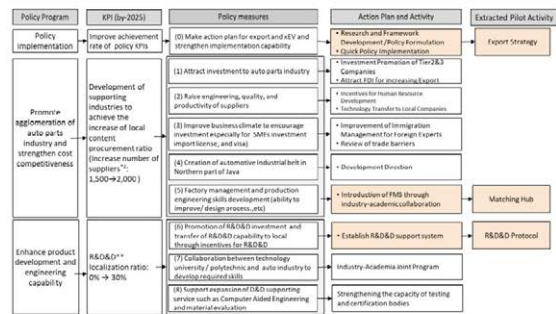




Action Plan and Pilot Activity

Recommendation on Pilot Activities

3 Pilot Activities are derived based on the action plans to implement corresponding policy measures.



1. Export Strategy

The Pilot Activity 1 : CBU/Auto Parts export Strategy. JICA should work with local companies on survey, workshop, seminar, study tour to the 3rd countries, or establishing business matching website.

Table 5.4.1 Implementation Schedule of Action Plan

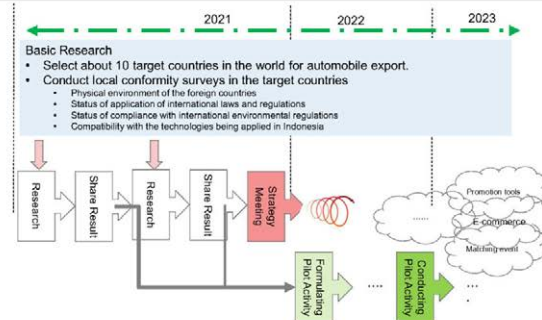
Policy/Sy stem/ Program	Policy Measures	Action Plan & Activity Detail	Schedule(SS/S/M/L)				
			SS	S	M	L	
Policy implementation	(0) Make action plan for export and eEV and strengthen implementation capability	0-1 Policy Formulation					
		0-2 CBU/Auto Parts export strategy					
		0-3 xEV and EV Battery industry development Strategy					
		0-4 Release of EV Battery Production Plan					
		0-5 Measures to increase domestic sales					
		0-6 Technology sophistication through establishing R&D Center					
		0-7 Strategy to attract investment arises by US-China Friction					
		0-8 Quick Policy Implementation					

- The Pilot Activity should study the following items for i) Cars and ii) Motorcycles to be exported from Indonesia. ①Competitiveness, ②Regulations of the target destinations(Environmental, Vehicle safety, Manufacturer responsibilities), ③Export/Import Regulations, ④Sales/Retail Regulations, ⑤Business Practices, ⑥Trade Insurance, ⑦Government Supports for oversea investments, ⑧Preference/selection of export products.

37

1. Pilot Activity (Export Strategy)

From a Workshop regularly conducted among MOI, JICA Expert and SME suppliers, the framework of Pilot Activity will be gradually formed and implemented around 2022 afterwards.



38

2. Matching Hub

The Pilot Activity 2 : Matching Hub, Cultivating local Slers and promoting manufacturing automation of Tier 2-3 companies would strengthen Indonesia's car export competitiveness.

Table 5.4.1 Implementation Schedule of Action Plan

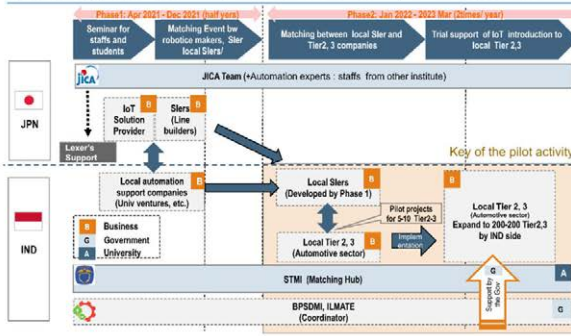
Policy/Sy stem/ Program	Policy Measures	Action Plan & Activity Detail	Schedule(SS/S/M/L)				
			SS	S	M	L	
(5) Factory management and production engineering skills development (ability to improve/ design process, etc)	5-1 Expand Automotive Industry Course run by Polytechnical College D4 and Recurrent Education (Utilize and strengthen SMK/Polytechnic Program) 5-2 Develop an OJT training plan on processing technologies at Polytechnical College 5-3 Quality Upgrading 5-3 Choose necessary technology and implement education both at academe and at businesses 5-4 FMS based Human Resource Development 5-4 Develop a training plan based on the needs on processing technologies and flexible manufacturing system (FMS) 5-5 Introduction of FMS through industry-academic collaboration (supported as a pilot activity "Matching Hub") 5-6 Implementation of Action Plan 5-6 Provide training and seminars on in-demand processing skills identified						

- Through matching hub activity, support local companies to realize PIDIA.0 or level up INDIA.0 score. The Pilot Activity will collaborate with other human resource development program such as Lexer's project. (This activity is different project from Lexer Project.)

39

2. Pilot Activity (Matching Hub)

The Pilot Activity will promote matching between robotic makers, major Slers, local Slers, and Tier 2-3 through collaboration with STMI as main CP and BSPDMI, ILMATE as coordinator



3. R&D Incentive Utilization Protocol

The Pilot Activity 3 : R&D Protocol, Developing protocol for Tier2-3 companies and breaking into ASEAN's R&D hub especially focusing on D&D (Development & Design)

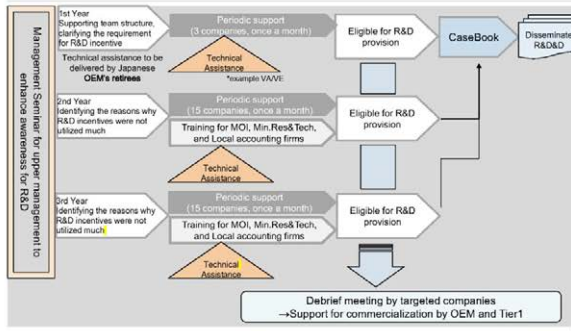
Table 5.4.1 Implementation Schedule of Action Plan

Policy/Sy stem/ Program	Policy Measures	Action Plan & Activity Detail	Schedule(SS/S/M/L)				
			SS	S	M	L	
Enhance product development and Engineering capability	(6) Promotion of R&D investment and transfer of R&D capability to local through incentives for R&D	6-1 Review and expand R&D related incentives by establishing protocol (No.45)					
		6-2 Push R&D Implementation Policy on Bio Fuel, Lithium Battery and others 6-2 Strengthen institutional tie-up with advanced OEMs, research institute, and academe					
		6-3 Establish the Sistem Inovasi Nasional : SINAS					

- Survey the challenges/issues on the R&D incentives to identify the reasons why it is not well utilized through collecting actual practices.
- The Pilot Activity demonstrates the process of obtaining tax incentives on R&D and summarizes as a protocol (shown as "Casebook" in the next slide). Make entrench the R&D activities among Tier 2-3 companies and create innovative operations.
- JICA will provide the technical assistance for the recipient companies during the R&D activity.

41

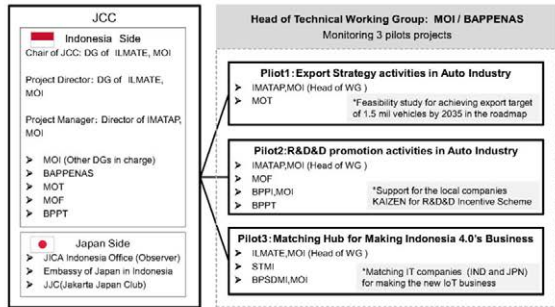
The results of Pilot Activities are expected i) To promote utilization of R&D incentives, ii) To build public services for implementation of R&D outcomes



42

Tentative CPs for the next phase implementation

Next project will focus to implement 3 themes/pilot activities with ILMATE-MOI and JICA will collaborate to supervise the entire project



43

Effects of Pilot Activities

Pilot activities will support formulating export strategy and building capacity of local companies in automation and digital transformation.

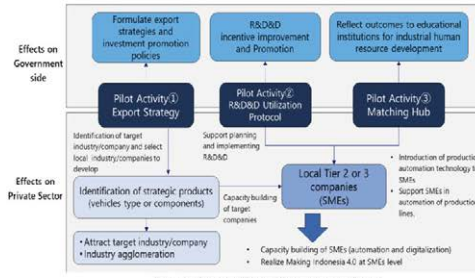


Figure 6.1.5 Image of Ripple Effects in the Next Phase

44