Republic of Indonesia
Ministry of Industry/
Ministry of National Development Planning Board

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

Final Report

May 2021

Japan International Cooperation Agency (JICA)

Oriental Consultants Global Co., Ltd.
Nomura Research Institute, Ltd.
Nomura Research Institute, Singapore Pte. Ltd.

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Abbreviation

Abbreviation	English/Bahasa Indonesia
AI	Artificial Intelligence
ABS	Anti-lock braking system
ASEAN	Association of South‐East Asian Nations
BAPPENAS	State Ministry of National Development Planning Board
BATAN	National Nuclear Energy Agency of Indonesia
BEV	Battery Electric Vehicle
BKPM	Investment Coordinating Board
BNPB	Indonesian National Board for Disaster Management
BOI	Board of Investment
BPPI	Badan Pelestarian Pusaka Indonesia
BPPT	Badan Pengkajian dan Penerapan Teknologi)
BPSDMI	Badan Pengembangan Sumber Daya Manusia Industri
C/P	Counter Part
CAD	Computer Aided Design
CAFE	Corporate Average Fuel Efficiency
CASE	Connected, Autonomous/Automated, Shared, Electric
CBU	Complete Build Up
CKD	Complete Knock Down
CMMA	Coordinating Ministry for Maritime Affairs and Investments
COVID-19	Corona Virus Disease 2019
CPO	Crude Palm Oil
EBA	European Battery Alliance
ECU	Engine control unit
EPA	Economic Partnership Agreement
EU	European Union
EV	Electric Vehicle
FAME	Fatty Acid Methyl Ester
FCEV	Fuel Cell Electric Vehicle
FCV	Fuel Cell Vehicle
FTA	Free Trade Agreement
GAFA	Google・Amazon・Facebook・Apple
GAIKINDO	The Association of Indonesia Automotive Industries
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D

GIAMM	Association of Automobile and Motor Equipment Industries
GVC	Global Value Chain
HEV	Hybrid Electric Vehicle
HV	Hybrid Vehicle
ICE	Internal Combustion Engine
ICEV	Internal-Combustion Engine Vehicle
I/D	Industrial Dialogue
IKD	Incomplete knock down
ILMATE	Directorate General of Metal, Machinery, Transportation Equipment & Electronic Industries
IMATAP	Directorate of Maritime, Transportation &Defense Equipment Industries
IMF	International Monetary Fund
IMTA	Izin Mempekerjakan Tenaga Kerja Asing
IoI	Indonesia Institute of Automotive Industry
IoT	Internet of Things
ISPO	Indonesian Sustainable Palm Oil
ITB	Institut Teknologi Bandung
ITS	Institut Teknologi Sepuluh Nopember
JABODETABEK	JAkarta、BOgor、DEpok、TAngerang、Bekasi
JETRO	Japan External Trade Organization
JEITA	Japan Electronics and Information Technology Industries Association
KADIN	Indonesian Chamber of Commerce and Industry
KINAS	National Industrial Committee
KPCPEN	National Economic Recovery Committee
KPI	Key Performance Indicator
LCEV	Low Carbon Emission Vehicle
LCGC	Low Cost Green Car
LIPI	Lembaga Ilmu Pengetahuan Indonesia
MaaS	Mobility as a Service
MIDEC	Manufacturing Industry Development Center
MOI	Ministry of Industry
MORTHE	Ministry of Research, Technology and Higher Education
NEV	New Energy Vehicle
OEM	Original Equipment Manufacture
PCB	Policy Coordination Board (echelon 1 level)
PEN	National Economic Recovery Program
PHEV	Plug-in Hybrid Electric Vehicle

PHV	Plug-in Hybrid Vehicle
PIDI	Indonesia Digital Innovation Center
POLMAN	Polytechnic of Manufacturing
PSBB	Pembatasan sosial Berskala Besar
PSO	Subsidized Diesel
R&D&D	Research and Design and Development
RSPO	Roundtable on Sustainable Palm Oil
SC	Supply Chain
SEZ	Special Economic Zone
Sler	Systems Integrator
SME	Small & Medium Sized Enterprise
SMK	Sekolah Menungah Kejuruan
SOE	State-Owned Enterprises
SUV	Sport Utility Vehicle
STMI	Sekolah Tinggi Manajemen Industri
TGI	Thai German Institute
TKDN	Tingkat Komponen Dalam Negeri
UNS	Universitas Sebelas Maret
VC	Value Chain
WG	Working Group (echelon 2 level)
WHO	World Health Organization

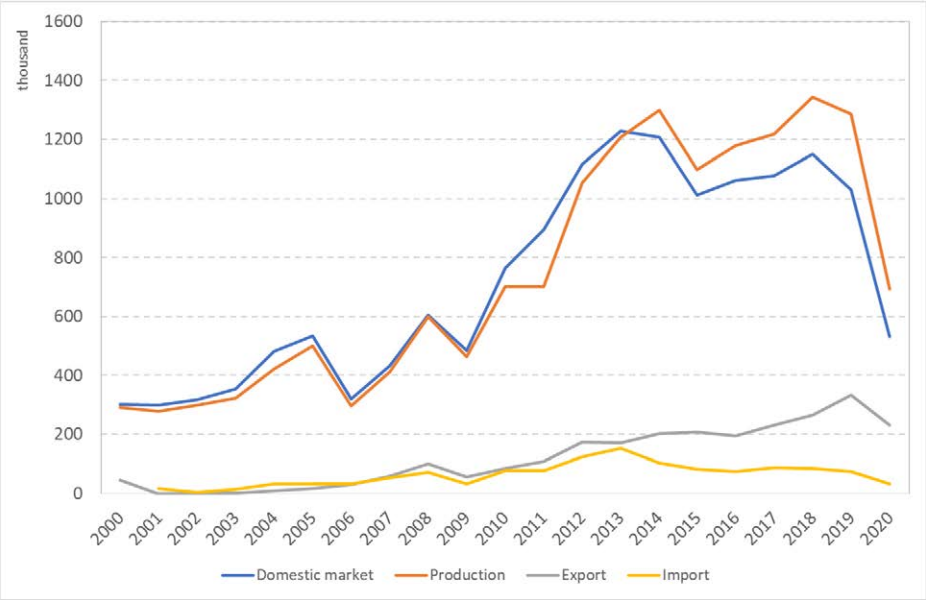
CHAPTER 1. INTRODUCTION

1.1 Project Background and Objectives

1.1.1 Project Background

The economy of Indonesia has been growing steadily since 2005 with a GDP growth rate that has been sustained around 5%. With a growing middle-class income segment among its population of 250 million people, its consumer market has been expanding. Under this economic climate, the Indonesian Government has developed Making Indonesia 4.0 (roadmap for introducing Industry 4.0) for further economic growth. The roadmap specifies five sectors that hold competitive advantages for the country under the fourth industry revolution, namely food and drinks, textile and apparel, automotive, chemicals, and electronics[1]. In order to promote Making Indonesia 4.0, the Indonesian Government plans to set up an inter-ministerial forum comprised of government agencies whose mandates are relevant to industry promotion and will carry out inter-ministerial coordination and cooperation based on the roadmap.

Since 2012 when the auto production in Indonesia reached the 100 million-unit mark, the Indonesian auto industry experienced a temporary setback in 2015 due to overproduction. However, it regained its momentum with the successful implementation of its Compact Car Strategy. Given this, its auto production has seen an upward trend since 2016. (see the graph below).



Source: Prepared by the JICA Expert Team based on data collected from the Association of Indonesia Automotive Industries (GAIKINDO)

Figure 1.1.1 Auto Production and Export Volumes (Unit)

[1] In response to the COVID-19 pandemic, two new sectors, namely medical device industry and pharmaceutical industry, have been added in 2020, resulting in seven priority sectors.

The automotive industry in the Association of Southeast Asian Nations (ASEAN) region is led by Thailand and Indonesia; both countries are considered as the two major supply and value chain hubs. The Philippines and Vietnam have been working to insert themselves in the picture; however, the top two countries are expected to continue leading the market for the time being considering the respective scales of industry agglomeration and market size.

Indonesia has become an important strategic production and sales location for many Japanese auto companies, many of which have already set up their plants in the country. Due to the production competition between the top two countries and fluctuations in global market demands, Indonesia's auto production and export volumes have fluctuated over the years; however, Indonesia has fortified its place in the ASEAN automotive industry alongside Thailand by successfully establishing its global value chain (GVC) in the ASEAN region, which serves a different role from that of Thailand.

In June 2019, The Government of Japan and the Government of Indonesia signed the Framework Document on New Manufacturing Industry Development Center (MIDEC) which is a cooperation initiative on industrial development. In the same year, both governments entered into negotiation to review the cooperation initiative based on the Japan-Indonesia Economic Partnership Agreement (EPA)、and formulate The New Manufacturing Industry Development Center (New MIDEC) as a show of a good will to actualize the cooperation． In New-MIDEC, both governments recognize the automotive industry as one of its target sectors and an important focus of bilateral cooperation support.

In line with Making Indonesia 4.0, the Ministry of Industry plans to formulate a roadmap for promoting the automotive industry and action plans, which cover the period until 2035. For the contents of the roadmap to be practical, reflecting the needs of automotive industry and supporting industries, the elaboration of action plans, including assessment of their feasibilities and impacts, will be needed. In the context of the electric vehicle (EV) industry promotion with focus on xEV or electromotive vehicles, action plans should be developed and implemented under the following areas: research and development, and design (R&D&D) promotion; supporting industries development; industrial human development; export promotion, infrastructure development, and so on. These topics are expected to be discussed in the inter-ministerial forum mentioned above.

1.1.2 Project Objective

The objective of the project is to propose policies and action plans on the automotive industry promotion that will support the implementation of the automotive industry promotion roadmap of the Ministry of Industry. The project also aims to support the operation of the inter-ministerial forum activities; and determine more effective and practical cooperation approaches based on the proposed action plans.

1.2 Project Framework

1.2.1 Counterpart Agency

The direct counterpart agency is Directorate of Maritime, Transportation & Defense Equipment Industries (IMATAP) under the Ministry of Industry. In continuation of the previous JICA project Data Collection Survey on Promotion for Global Competitive Industry, the main partners of this project will be National Development Planning Agency (BAPPENAS) and automotive companies alongside the Ministry of Industry. Also, Directorate General of Metal, Machinery, Transportation Equipment & Electronic Industries, Agency for Human Resources Development under MOI, Agency for Industrial Research and Development and Directorate General of Small, Medium and Multifarious Industry are involved. The project plans to conduct the interview survey to both public and private organizations summarized as follows.

Table 1.2.1 Interview List

Area	Public Organizations	Private Organizations
Automotive and auto parts (10 organizations in total)	Ministry of Industry*, Ministry of National Development Planning/National Development Planning Agency (BAPPENAS), et al	GAIKINDO, Indonesia Automotive Parts & Components Industries Association (GIAMM), Original Equipment Manufacturers (OEM), Japanese auto parts makers, et al.
Electric vehicles (7 organization in total)	Ministry of Industry, Ministry of Energy and Mineral Resources, BAPPENAS, Coordinating Ministry for Maritime and Investment Affairs, et al	Industry associations and their member companies, OEM, et al
Industrial human resources (10 organizations in total)	Ministry of Industry, Ministry of Manpower & Transmigration, Ministry of Research, Technology and Higher Education, et al	Bandung Institute of Technology、polytech, vocational training schools, et al
R&D&D (7 organizations in total)	Ministry of Industry, Ministry of Research, Technology and Higher Education, Indonesia Institute of Sciences (LIPI), National Nuclear Energy Agency (BATAN), et al	Japanese parts makers, University of Indonesia、Bandung Institute of Technology, Sebelas Maret University (UNS), et al
Supporting industry (5 organizations in total)	Ministry of Industry, et al	Mold & Dies Industry Association, other local companies, et al.
Trade and investments (5 organizations in total)	Ministry of Trade, Coordinating Ministry for Maritime and Investment Affairs, Indonesia Investment Coordinating Board (BKPM)**, et al	Indonesia Chamber of Commerce and Industry (KADIN), Chambers of Commerce and Industries from key countries, Japan External Trade Organization (JETRO), et al

*: JICA Study Team plans to interview to Agency for Industrial Research and Development (BPPI), Agency for Industrial Human Resources Development (BPSDMI) and Directorate General of Small, Medium And Multifarious Industry and NewMIDEC

**: As the second term administration of President Joko Widodo upgrade the status of Minister for Maritime Affairs to Ministry of Maritime Affairs and Investments, JICA Study Team plans to interview to Maritime Affairs and Investments in addition to BKPM

Source: JICA Study Team

1.2.2 Overview of Expected Outputs and Activities

The project will conduct information collection/analysis and propose action plans in the fields of the promotion of the R&D&D segment concerning xEV and flexy engines, industrial human development, export promotion, infrastructure development, development of supporting industries for xEV and flexy engine parts, and facilitation of Industry 4.0 for the automotive supply chain development.

1.2.3 Study Period

From April 2020 to April 2021 (13 months)

1.2.4 Project Area Coverage

Indonesia nationwide

1.2.5 Work Process and Implementation Schedule

The project activities will start in March 2020 and be completed in April 2021. It will follow the work process and implementation schedule stipulated in terms of reference (TOR) by JICA. The planned work process is shown in the figure below.

The implementation schedule is based on the methodology, workflow (see Table 1.2.2), and requirements per activity. The schedule also ensures space for flexibility, and each work item is positioned in consideration of how it affects the implementation of other work items. Besides, the survey schedules will be updated in accordance with the circumstances of COVID-19.

1.2.6 Manning Plan

The project activities will be carried out in 16-man months (MM) (see Table 1.2.3). Besides, the survey schedules will be updated in accordance with the circumstances of COVID-19.

Table 1.2.2 Work Process and Implementation Schedule

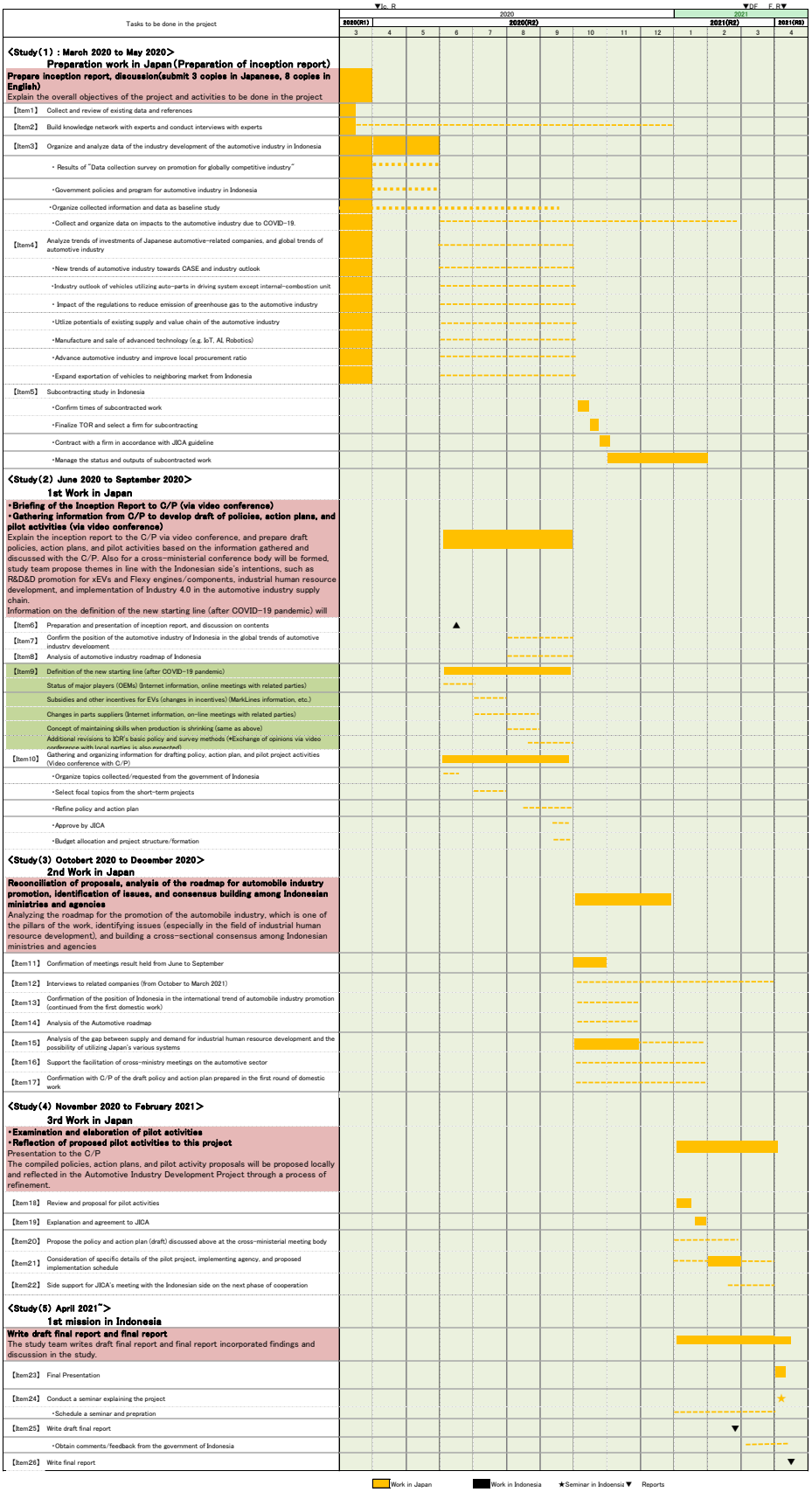


Table 1.2.3 Manning Plan

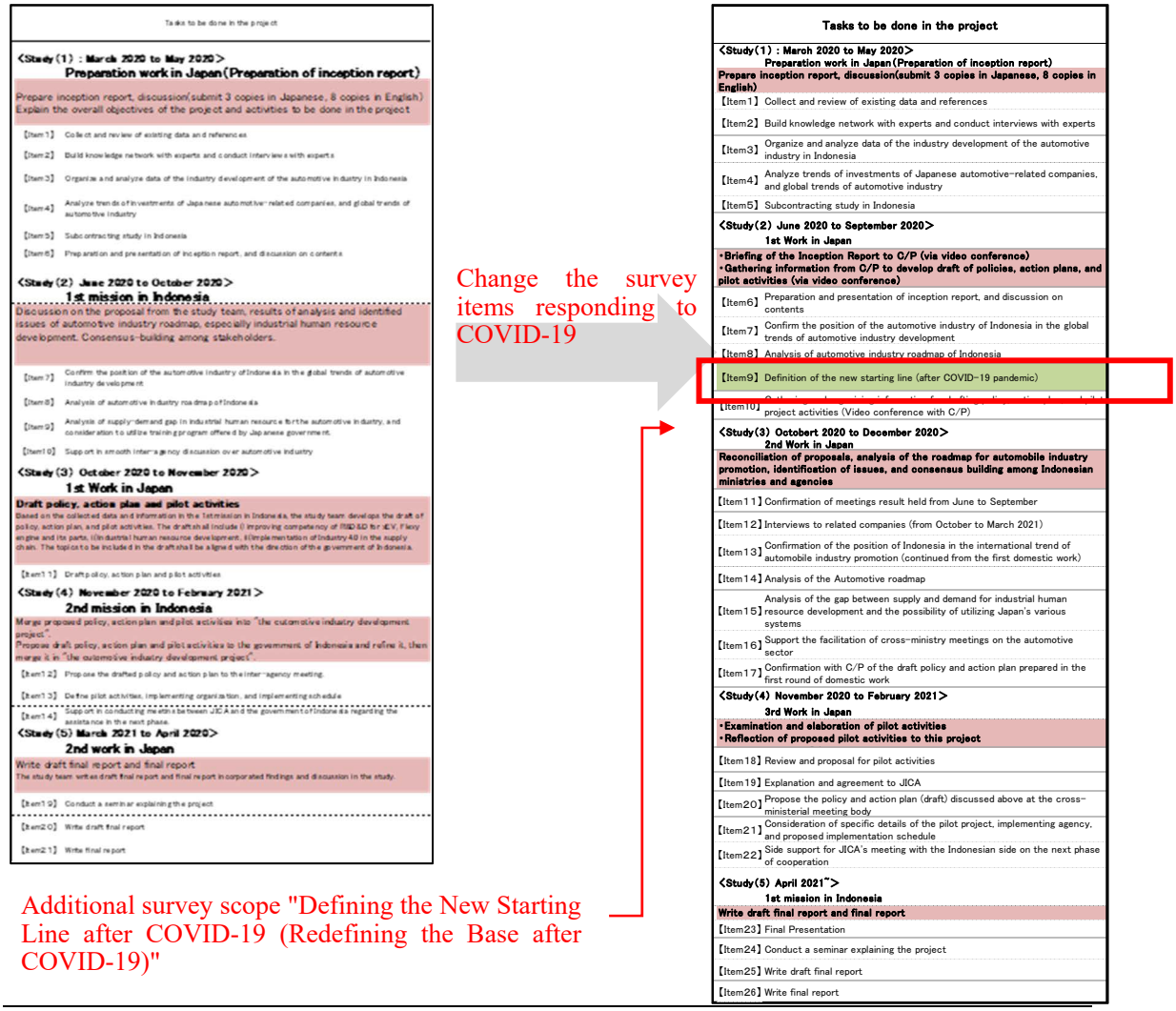
	Role	Name	Company Name	Grade	2020 R1 3	2020 R2 4	2020 R2 5	2020 R2 6	2020 R2 7	2020 R2 8	2020 R2 9	2020 R2 10	2020 R2 11	2020 R2 12	2021 1	2021 2	2021 3	2021 R3 4	Man Month Total Work in ID	Man Month Total Work in JP
Work in Indonesia	Team Leader/Automotive/Auto-related industry	Masashi Takano	Oriental Consultants Global(OCG)	2															0 0.00	
	Sub Leader/Supporting Industry Development 1	Emi Shimada	NRI Singapore	4															0 0.00	
	Industrial Human Resource Development	Shoichiro Hara	Nomura Research Institute(NRI)	3															0 0.00	
	Supporting Industry Development 2	Hiroki Okita	Oriental Consultants Global(OCG)	6			Ramadan												0 0.00	
	R&D&D Enhancement	Hajime Yamamoto	NRI Singapore	3															0 0.00	
	Business Environment/Investment Promotion	Farah Anisa	Nomura Research Institute(NRI)	5															0 0.00	
Work In Japan	Team Leader/Automotive/Auto-related industry	Masashi Takano	Oriental Consultants Global(OCG)	2	12			5	6	8	8 (Additional 6days)	7	6	6	6	5	7	10.4		86.4 4.32
	Sub Leader/Supporting Industry	Emi Shimada	NRI Singapore	4				4	5	5	5 (Additional 4days)		5	5	5	4	5	9.4		52.4 2.62
	Industrial Human Resource Development	Shoichiro Hara	Nomura Research Institute(NRI)	3	12			4	2	3	3 (Additional 3days)	7	6	6	6	5	7	10.4		71.4 3.57
	Supporting Industry Development 2	Hiroki Okita	Oriental Consultants Global(OCG)	6				4	3	3	3 (Additional 3days)	3	5	5	5	4		9.4		44.4 2.22
	R&D&D Enhancement	Hajime Yamamoto	NRI Singapore	3	10			4	4	4	4 (Additional 4days)	5	6	6	6	5		10.4		64.4 3.22
	Business Environment/Investment Promotion	Farah Anisa	Nomura Research Institute(NRI)	5		7		10		8	10		10				5			50 2.50
Reports							▼ Inception Report										▼ DFR	▼ FR	0 18.45	369

■ Work In the Indonesia　□ Work In Japan　▨ Transfer to Domestic Work from Field Work　▥ Additional Domestic Work

1.2.7 Activity Plan and Actual activity

According to the original plan, the activity to analyze the roadmap for the promotion of the automobile industry, identify issues, build consensus among ministries and agencies, and also propose policies, action plans as well as pilot activity plans takes place in Indonesia, resulting in elaborating the "Automobile Industry Development Project". However, due to the COVID-19 pandemic, it turns to became difficult to travel to Indonesia, and JICA Study Team were unable to collect data and have face-to-face discussions with counterparts in Indonesia.

Since the impact of COVID-19 on the automobile industry has become more serious since April 2020. Under these circumstances, additional survey scope "Defining the New Starting Line after COVID-19 (Redefining the Base after COVID-19)," were conducted such as interviewing to Japanese OEMs, parts suppliers, banks, etc., in order to understand the impact of the COVID-19 on the supply chain of the Indonesian automobile industry and the trend of companies investment interest. Also, since JICA have been received the request for developing the export strategies by C/P in several times during the survey period, export potential survey on 10 countries including Australia have been conducted by out sourced company, which was not planned to do in initial phase(see Appendix 5 for details).



CHAPTER 2. SOCIO ECONOMIC CONDITION OF INDONESIA

2.1 Current Status and challenges in Indonesia's Automobile Industry before COVID-19 Pandemic

2.1.1 Current Status of Indonesia's Automobile Industry

The Indonesian automotive market experienced a sharp decline in several times when currency crisis and the fall of the Soeharto regime in 1997, and currency devaluation and fuel price hikes in 2000, resulting in the production stagnant at 400,000 to 600,000 units. Since 2008, with the political and economic stability under the Yudhoyono administration, the impact of the Lehman shock has been limited compared to other countries, and domestic sales have achieved a high growth rate surpassing Thailand to become the top in the ASEAN region in 2011. In the first half of the 2010s, sales continued to grow steadily, reaching a record high of just lower 1.23 million units in 2013. In 2014-2015, vehicle prices and interest rates rose as the rupiah weakened against the backdrop of deteriorating fiscal and trade balances, and sales fell to 1.01 million units in 2015. However, against the backdrop of a recovery in economic growth through the stabilization of exchange and interest rates and full-scale public investment by the government, sales recovered to 1.06 million units in 2016, up 4.8% from the previous year. The market was on a recovery trend from 2017 to 2018, but from 2019 onward, domestic sales was affected by the stricter loan conditions for car loans in response to the rise in non-performing loans. Shrinked nearly 10%. In 2020, under the influence of COVID-19, sales and production decreased by 48% and 46% and 46%, respectively, and fell to the level of 2009-10.

Indonesia's vehicle production has traditionally been mostly target for the domestic market and has been largely linked to fluctuations in the domestic market, as imports of completed vehicles have been suppressed. In 2014, vehicle production nearly reached 1.3 million units, as exports exceeded 200,000 units for the first time, in addition to the expansion of the domestic market. In 2015, exports declined to 1.01 million units, but in 2018 they reached a record 1.34 million units. Since 2014, exports have increased from the previous 100,000 units to 200,000 units in 2014 and 300,000 units in 2019, partly at the urging of the Indonesian government, which is struggling with a worsening balance of trade, and partly because the Toyota Group, which has a large market share, has begun to use Indonesia as an export base for some models such as SUVs. Exports in 2020 were less affected by COVID-19 than in the domestic market, maintaining 230,000 units, which was a supporting factor for production.

Table 2.1.1 Indonesia's automotive market, imports, production, and exports

units

	Domestic market	Production	Export
2005	533,917	500,710	17,805
2006	318,904	296,008	30,974
2007	433,341	411,638	60,267
2008	603,774	600,628	100,982
2009	483,548	464,816	56,669
2010	764,710	702,508	85,796
2011	894,164	702,508	107,932
2012	1,116,230	1,053,270	173,371
2013	1,229,901	1,208,211	170,907
2014	1,208,028	1,298,523	202,273
2015	1,013,291	1,098,780	207,691
2016	1,062,729	1,177,797	194,397
2017	1,077,365	1,217,518	231,169
2018	1,151,291	1,343,714	264,553
2019	1,030,126	1,286,848	332,023
2020	532,014	694,651	232,063

Source: GAIKIDO

The sales share by OEMs shown in the table below, pointing out that the share of Japanese OEMs in 2020 will be 96.7%, still maintaining an overwhelming share. Besides, Chinese, European, and Korean brands account for approximate 1.7% (subtotal of SGMW, Dongfeng and other Chinese brands), approximate 0.9% (subtotal of BMW, Mercedes-Benz, and other European brands), and approximate 0.3% (subtotal of Hyundai and Kia from Others), respectively. Toyota and Daihatsu account for more than 50% of the market share, but from 2017 onward, Mitsubishi's new MPV, the Xpander will rapidly increase sales and market share, and the entry of the Chinese-owned Wuling will be closely watched.

Table 2.1.2 Indonesia's automotive sales share by OEMs

Units

	2015	2016	2017	2018	2019	2020	
							Share
Toyota	333,709	390,646	371,015	352,182	332,492	161,821	32.72%
Daihatsu	161,382	177,649	186,381	202,738	177,284	90,724	18.35%
Honda	153,621	200,097	186,859	162,170	137,339	73,315	14.83%
Suzuki	117,457	93,751	111,660	118,014	100,383	66,130	13.37%
Mitsubishi	60,928	64,402	79,807	142,861	119,011	57,906	11.71%
Nissan	57,332	43,618	24,972	17,318	18,789	11,061	2.24%
Isuzu	13,187	9,898	9,128	10,691	13,159	10,389	2.10%
Wuling (SGMW)	-	-	4,958	17,002	22,343	6,581	1.33%
Fuso	-	-	7,036	7,152	6,623	3,910	0.79%
Mazda	12,543	6,707	3,861	5,657	4,884	2,660	0.54%
BMW	3,419	1,482	2,800	2,360	2,500	1,983	0.40%
Dongfeng	-	-	159	1,222	3,857	1,947	0.39%
Mercedes-Benz	6,627	2,873	3,868	3,859	3,670	1,684	0.34%
Others	34,113	16,628	10,435	8,050	5,810	4,404	0.89%
Grand Total	954,318	1,007,751	1,002,939	1,051,276	948,144	494,515	100.0%

Note: Toyota includes Lexus and Nissan includes Datsun.
Source: Markline data (former GAIKINDO data)

Production trends by OEMs are shown in the table below, with Japanese brands accounting for a 98.1% share, even higher than their share in sales. The production of European manufacturers such as BMW and Mercedes is lower than their sales due to their high CBU imports.

Table 2.1.3 Indonesia's automotive production trends by OEMs

(units)

	2015	2016	2017	2018	2019	2020	
							Share
Toyota	408,783	462,396	552,487	531,573	516,594	288,370	41.78%
Suzuki	136,825	134,887	116,393	124,194	124,658	91,794	13.30%
Daihatsu	183,801	203,385	184,506	201,387	175,489	90,339	13.09%
Mitsubishi	58,901	42,196	61,721	164,107	177,844	80,876	11.72%
Honda	172,378	175,471	181,497	156,592	133,247	71,452	10.35%
Fuso	11,758	9,943	40,404	53,680	43,965	21,208	3.07%
Isuzu	14,319	14,902	17,657	26,051	24,446	18,583	2.69%
Hino	-	3,424	31,665	43,599	32,425	12,653	1.83%
Wuling(SGMW)	-	-	6,149	16,146	24,980	7,353	1.07%
Nissan	86,995	48,425	20,451	15,308	20,806	1,864	0.27%
Mercedes-Benz	3,602	3,284	588	-	418	1,478	0.22%
BMW	2,420	2,711	2,302	3,127	2,337	1,407	0.20%
Hyundai	992	940	508	3,520	3,789	977	0.14%
Others	11,822	1,475	287	4,430	5,850	1,796	0.27%
Grand Total	1,092,596	1,103,439	1,216,615	1,343,714	1,286,848	690,150	100.0%

Note: Nissan includes Datsun.
Source: Compiled by JICA research team from Marklines data

Export trends by OEMs are shown in the table below, with Toyota and Daihatsu accounting for more than 60% of exports. Toyota's main export model is the Fortuner SUV, exporting 6,000 units (2020 results, all subsequent years are the same) and 3,500 units to Saudi Arabia and the Philippines, its main export destinations, respectively. The company also exports 6,000 units of the Yaris compact passenger car to Saudi Arabia. Daihatsu's main export model is the Toyota Avanza produced on an OEM basis, which exports about 8,000 and 5,500 units to Mexico and the Philippines, respectively.

Mitsubishi, in third place, exports mainly the Xpander MPV to Vietnam, the Philippines, and Thailand, while Suzuki exports its Carry Truck and Ertiga MPV to the Philippines and Thailand. Hyundai is exporting its H1 large MPV to Thailand. On the other hand, Wuling who used to export the Amaze, a small SUV under the Chevrolet brand, to Thailand, has stopped exporting to Thailand after 2021 due to GM's withdrawal from Thailand.

As described above, the majority of Indonesia's exports are small MPVs and SUVs, and the majority of exports are to Asia, followed by the Middle East. Shortly, diversification of export products and expansion of export destinations are major challenges to be addressed.

Table 2.1.4 Indonesia's automotive export trends by OEMs

Unit

	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	865	0.4%
Donfeng(DFSK)	170	790	0.3%
Wuling(SGMW)	2,696	611	0.3%
Others	-	-	0.0%
Grand Total	332,023	232,175	100.0%

Source:GAIKIDO data

Import trends by OEMs are shown in the table below, with Japanese manufacturers accounting for more than 90% of imports. Japanese manufacturers import mainly from Thailand and Japan. Among non-Japanese manufacturers, Daimler imports commercial vehicles mainly from Germany.

Table 2.1.5 Indonesia's automotive import trends by OEMs

Unit

	2019	
		Share
Toyota	24,966	33.8%
Daihatsu	1,800	2.4%
Mitsubishi	17,996	24.4%
Suzuki	13,453	18.2%
Mazda	4,884	6.6%
Honda	3,066	4.2%
Daimler (commercial)	1,355	1.8%
GM	1,245	1.7%
Isuzu	996	1.3%
Audi	889	1.2%
Hyundai	855	1.2%
Others	2,371	3.2%
Grand Total	73,876	100.0%

Source:GAIKIDO data

The production capacity in Indonesia is shown in the table below, and has reached approximately 1.9 million units. The utilization rate has been around 60% since before COVID-19, and the resolution of excess production capacity has been a challenge. In addition, as shown in the table below, the locations of factories are concentrated in JABODETABEK (Jakarta, Bogor,

Depok, Tangerang, Bekasi) and dispersion of locations have been a major challenges in recently. The development of the Trans-Jawa Highway and the construction of the new Patimbang Port are expected to contribute more diversifying the industrial bases.

In recent years, there has been a remarkable increase in the number of non-Japanese companies entering the market. This is because Japanese manufacturers have invested in LCGCs in early 2010s, and have excess production capacity, so new investment is not expected by Japanese OEMs. Therefore, Indonesian government has been actively attracting new non-Japanese manufacturers to the country.

For example, Shanghai GM Wuling (SGMW) invested $700 million to establish a vehicle plant in 2015 and began producing MPVs and SUVs such as the Confero in 2017. Dongfeng Motor, another Chinese-owned company, has been producing DFSK-brand SUVs and light trucks at SOKONINDO, a joint venture with a local company, since 2018. In addition, South Korea's Hyundai Motor Company is in the process of establishing a plant with a production capacity of 150,000 units with an investment of 1.5 billion dollars, which is scheduled to start operation at the end of 2021.

Table 2.1.6 Production capacity of major OEMs in Indonesia

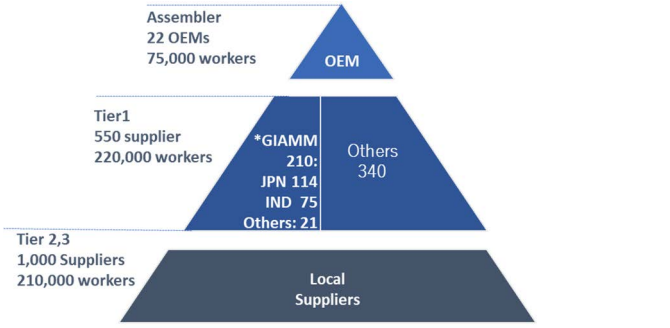
Units

Plant		Production capacity/ annual	Note
		2020	
PT. Toyota Motor Manufacturing Indonesia (TMMIN)	Karawang 1st plant	130,000	
	Karawang 2nd Plant	120,000	
	Total	**250,000**	
PT. Sugity Creatives	Bekasi	6,000	OEM for Toyota trucks
PT. Astra Daihatsu Motor (ADM)	Jakarta	330,000	
	Karawang	200,000	
	Total	**530,000**	
PT. Hino Motors Manufacturing Indonesia (HMMI)	Purwakarta Plant	75,000	
PT. Honda Prospect Motor, Karawang Plant	Karawang	200,000	
PT. Nissan Motor Indonesia (NMI)	Cikampek	0	Plant capacity of 250,000 unit halted production in Feb 2020
PT. Mitsubishi Motors Krama Yudha Indonesia (MMKI)	Bekasi	220,000	
PT Suzuki Indomobil Motor, Cikarang Plant	Cikarang	86,000	Plan to expand to 250,000 in future
PT Suzuki Indomobil Motor, Tambun Plant	Tambun	107,000	Now converted to parts factory
P.T. Isuzu Astra Motor Indonesia (IAMI)	Karawang Plant	52,000	
PT SGMW Motor Indonesia	Bekasi	120,000	
PT. Garuda Mataram Motor (GMM) (indomobil AUDI-VW),	Cikampek Plant	6,000	
PT Daimler Commercial Vehicles Manufacturing Indonesia (DCVMI),	Bogor Plant	25,000	
P.T. Krama Yudha Ratu Motors (KRM: Fuso trucks)	Jakarta	160,000	
PT. Hyundai Indonesia Motor, Bekasi Plant	Bekasi	12,000	
PT. Hyundai Motor Manufacturing Indonesia (HMMI)	Bekasi	150000	Under construction to start production in the end of 2021
PT. Sokonindo Automobile (Donfeng)	Cikanden (Banten)	50,000	
PT. National Assemblers, Jakarta Plant II (Kia , Chery)	Jakarta	30,000	Stopped production
PT. National Assemblers, Jakarta Plant I (Audi, VW., etc)	Jakarta	2,000	Stopped production
PT. Gaya Motor (BMW, Mini, etc)	Jakarta	60,000	
Grand		**1,889,000**	

Source: Compiled by JICA research team from Marklines data

2.1.2 Current status of supply chain

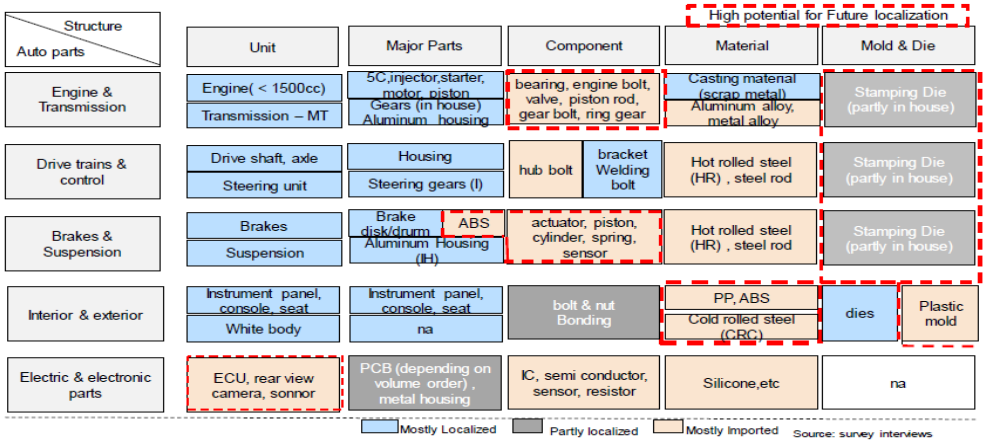
There are 1,550 auto parts suppliers in Indonesia, of which 550 are Tier 1[2]suppliers and 1,000 are Tier 2 suppliers. Of the 210 companies that are members of GIAMM (Indonesian Parts Industry Association), about half are Japanese or joint ventures with Japanese companies. The majority of Tier 2 and 3 companies are local companies, and PIKKO, the Parts Industry Association of Small and Medium Enterprises, which is composed of Tier 2 and 3 suppliers, has 135 member companies.



Source: Compiled by JICA research team from MOI data

Figure 2.1.1 Auto parts supplier structure in Indonesia

The figure below shows an overview of the entire supply chain. The localization of components has progressed to a certain extent, as Tier 1 has been expanded mainly by Japanese companies and Tier 2 has been increased in the number of local manufacturers. Many of the components imported on a component basis at the Tier 1 and Tier 2 levels are centrally produced parts, such as ECUs (electronic components), transmission-related gears, and ABS (anti-lock braking system). On the other hand, little progress has been made in the localization of materials such as steel and plastics.



Source: JICA (2019) Data Collection Survey on Promotion for Globally Competitive Industry in Indonesia

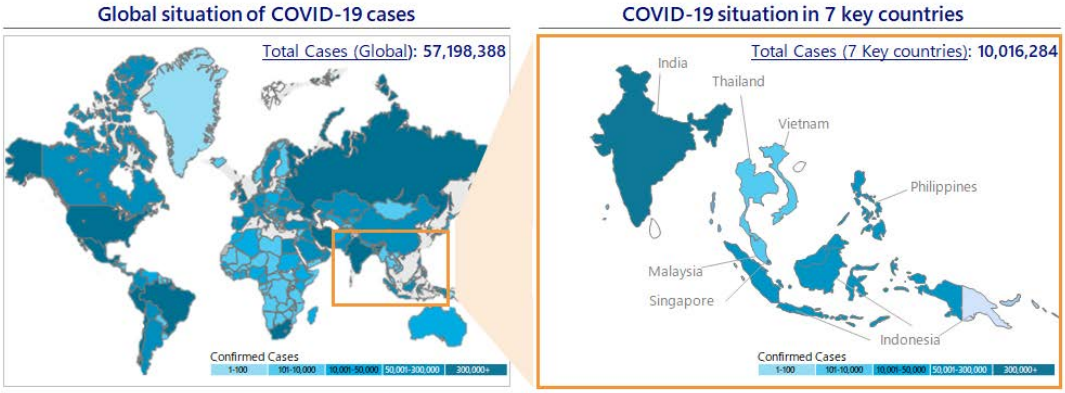
Figure 2.1.2 Procurement Status of Auto Parts in Indonesia

[2] In this report, Tier 1 is referred to primary suppliers who deal directly with manufacturers (OEMs), Tier 2 is referred to suppliers who deliver parts to Tier 1, and Tier 3 is referred to suppliers who deliver to Tier 2.

2.2 Influence of Covid-19 Turmoil

Corona virus disease (Covid-19) pandemic was identified in the late 2019 in China, and since January to February 2020, the world has dwelled with numerous (mis)information regarding the disease. In the first location where the virus was contracted, Wuhan city responded with immediate lockdown in the early 2020. However, even considering not all countries afford to have the same measure, World Health Organization (WHO) was too late in warning countries into activate health precautions.

Early suspected cases in Indonesia were found in February 2020. Although health experts gave warning with modelling data of travelling from and to abroad, the Government of Indonesia had not activated necessary health protocols Covid-19 until, the first death due to Covid-19 was found in Bali on March 11, 2020– the same day as WHO announced Covid-19 as a global pandemic. WHO also demanded each country leader to have stricter health protocols and measures. Soon after, the President appointed the National Disaster Mitigation Agency (BNPB) to contain the Covid-19. However, since the pandemic also widely influence the economic activities, the President appointed the Coordinating Minister of Economy as the Head of Economic Recovery Committee (KPCPEN).



Countries	India	Indonesia	Thailand	Malaysia	Singapore	Philippines	Vietnam
GDP *(Billion USD)*	2,718.7	1,042.1	504.9	358.5	364.1	330.9	245.2
Population *(Millions)*	1,380.0	273.5	69.8	32.4	5.9	109.6	97.3
Total Cases (Active Cases)	9,004,325 (445,107)	483,518 (61,306)	3,888 (86)	51,680 (13,222)	58,139 (59)	413,430 (30,493)	1,304 (127)

Sources: IMF and respective countries' local news, totaled as of November 2020

Figure 2.2.1 Active Cases in 7 Key South and Southeast Asian Countries

Total cases – number of infected cases, removing deaths and recoveries – in seven key countries (India, Indonesia, Thailand, Malaysia, Singapore, Philippines and Vietnam) account for 18.9% of the global cases. As of November 2020, the total cases in Indonesia are 483,518 cases. This figure is more than doubled only in 3 months, totaling over 1 million total cases in January 2021. Indonesian total death is 29,331 and 842,122 recoveries. However, these figures are challenged

since the tracing method in Indonesia is not clear. As of January 2021, Indonesia has 30% positivity rate – much higher than WHO standard for pandemic containment at 3%-5%. Since individuals are sometimes required to have multiple independent testing due to their mobility and testing database is not centralized, reported positivity rate might be higher than actual cases.

In almost one year in pandemic, Indonesia is highly committed in balancing pandemic and economic measures. As most of countries prepare to lockdown, Indonesia reluctantly implemented several relaxed lockdown options. Indonesian most populated province, DKI Jakarta, initiated semi-lockdown measures Large-Scale Social Restriction (PSBB) since March 2020. However, PSBB was slowly implemented in national level and strictly applied in several regional Java cities. However, public places are not restricted as much. As more of industries and office operations are included as an emergency sectors, the public expected continue to work and use public transportations. Offices, hotels, and other indoor activities are expected to have 50%-30% occupancy rate but the enforcement in indoor health protocols remain low. In 2021, PSBB turned to Restriction on Public Activities (PPKM) – of which the implementation is focused in Java Island with most cases.

On the other hand, Indonesian economic responds are more collaborated. In August 2020, the President announced the government would allocate Rp356 trillion (USD24 billion) in 2021 to support the National Economic Recovery (PEN) Program. The budget would be taken from the state budget to induce the economy as a respond to Covid-19 pandemic in six areas: (1) improve healthcare infrastructure, research, laboratory, health insurance, and vaccine (7% of the PEN budget), (2) various social protection programs (31% budget), (3) Ministerial and other government regional agencies to induce tourism, food security, industries, and ICT improvement (38% budget), (4) MSME financing and credit support (14% budget), (5) Corporate funding (4% budget), and (6) Business incentives through several tax alleviations (6%) [3].

2.3 Social Impact of Covid-19

Indonesia with archipelago typology should have minimum exposure to the pandemic effects. However, with the most population resided in Jakarta, activating social distancing (PSBB) automatically shut down economic activities in Jakarta and the satellite cities and recalled Indonesian citizens to go back to different regions/ provinces. Since the border was not monitored well, both from foreign and domestic trips, all provinces are with Covid-19 cases as of May 2020.

The central government is reluctant in enforcing Law of Health Quarantine and consider that restricting movement of people and goods soon after would highly affect unemployment. In effect,

[3] Government of Indonesia Cabinet Secretary. https://setkab.go.id/rapbn-2021-anggaran-pemulihan-ekonomi-rp356-triliun-ada-6-fokus-alokasi/

every province and cities are allowed to have micro-lockdown – an effort to restrict mobilization in the lowest administration unit – depending on the current local active cases.

The government released the pandemic respond with campaign of 3T (testing, tracing, and treatment) and 3M (wear mask, wash hands, keep distance). Public criticized the government effort in testing and tracing, of which after a year the pandemic began, remain low and disorganized. Tracking via mobile application are not utilized as much, and without concerning the individual data privacy.

Overtime, campaign towards 3T and 3M was underheard as the GOI pushing vaccine agenda, in the hope of improving the public confidence in doing normal activities. Indonesian policy to prioritize 18-45 year old adults to receive vaccine rather than the vulnerable old population is frowned upon by the world. Moreover, the public also push the government not to commercialize vaccine and enable the public to opt buying vaccine independently, as the government did with commercialize testing also worsen virus tracing effort in the community.

With the public neglecting social distancing and the government pushing economic stimulus, the active cases in Indonesia continue to rise. Daily cases are hitting highest record everyday and the occupancy rate of hospital in Java island is constantly between 70%-90%. The public is also frustrated over uncertainty restrictions and regulations, misinformation, which leads common behavior to neglect health protocols.

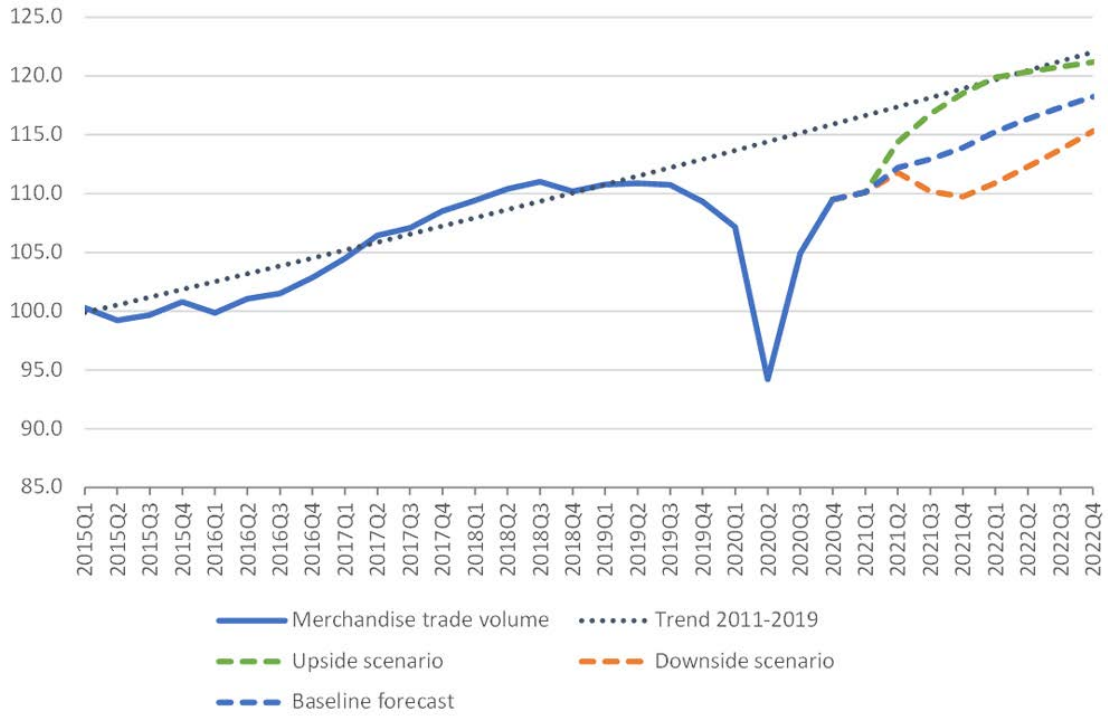
The pandemic is also affecting religious groups who think the God was the ultimate power to give health and death, therefore the government efforts are futile and should not hinder the people to pray and have religious activities in social manners. The government depends on religious figures to enact and persuade people to apply health protocols at the religious houses. As most of Indonesians are devout, some religious figures exploit the pandemic situation to seek political powers. Religious figures remain powerful in enforcing public to obey the health protocols, or even arranging religious mass gathering, disseminating misinformation, and challenging the government method in handling the pandemic.

2.4 Economic Condition After Covid-19 Turmoil

Global economic condition, which has been predicted to slow down in 2020, is expected to experience much sharper decline due to the pandemic. To reduce the spread of the pandemic more widely, most of countries are implementing unprecedented restrictions on trade and social motilities. The economic decline due to this economic shock is predicted to be more severe than the Global Crisis of 2008-2009.

Following the pandemic, the world trade have been drastically shrunk. However, WTO prospected that the world trade have improved quickly as merchandise trade expanded more rapidly than expected in the second half of last year (press release on March 2021). According to

new estimates from the WTO, the volume of world merchandise trade is expected to increase by 8.0% in 2021 after having fallen 5.3% in 2020, continuing its rebound from the pandemic-induced collapse that bottomed out in the second quarter of last year. Even still slow, trade growth is forecasted then grow to 4.0% in 2022, and the effects of the pandemic will continue to be felt as this pace of expansion would still leave trade below its pre-pandemic trend.



Sources: WTO (March 2021). WTO and UNCTAD for trade volume data

Figure 2.4.1 Trade Volume 2015-2022

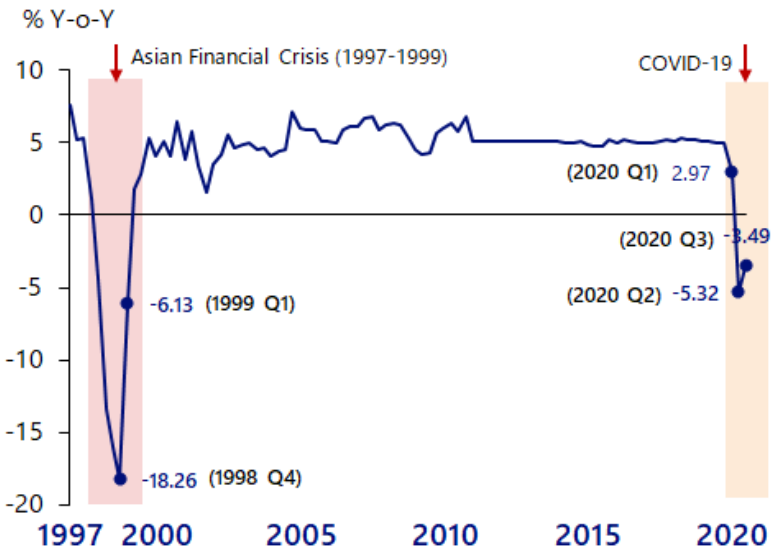
IMF forecasted that GDP growth rate shrank 3.5% in 2020, and is projected to grow 5.5 percent in 2021 and 4.2 percent in 2022. The 2021 forecast is revised up 0.3 percentage point relative to the previous forecast, reflecting stronger-than-expected momentum in the second half of 2020, expectations of a vaccine-powered strengthening of activity later in 2021 and additional policy support in a few large economies. Figure 2.4.2 shows the projection of global GDP growth rate .

(real GDP, annual percent change)	ESTIMATE 2020	PROJECTIONS 2021	2022
World Output	**-3.5**	**5.5**	**4.2**
Advanced Economies	**-4.9**	**4.3**	**3.1**
United States	-3.4	5.1	2.5
Euro Area	-7.2	4.2	3.6
Germany	-5.4	3.5	3.1
France	-9.0	5.5	4.1
Italy	-9.2	3.0	3.6
Spain	-11.1	5.9	4.7
Japan	-5.1	3.1	2.4
United Kingdom	-10.0	4.5	5.0
Canada	-5.5	3.6	4.1
Other Advanced Economies	-2.5	3.6	3.1
Emerging Markets and Developing Economies	**-2.4**	**6.3**	**5.0**
Emerging and Developing Asia	-1.1	8.3	5.9
China	2.3	8.1	5.6
India	-8.0	11.5	6.8
ASEAN-5	-3.7	5.2	6.0
Emerging and Developing Europe	-2.8	4.0	3.9
Russia	-3.6	3.0	3.9
Latin America and the Caribbean	-7.4	4.1	2.9
Brazil	-4.5	3.6	2.6
Mexico	-8.5	4.3	2.5
Middle East and Central Asia	-3.2	3.0	4.2
Saudi Arabia	-3.9	2.6	4.0
Sub-Saharan Africa	-2.6	3.2	3.9
Nigeria	-3.2	1.5	2.5
South Africa	-7.5	2.8	1.4
Memorandum			
Low-Income Developing Countries	-0.8	5.1	5.5

Sources: JICA Study Team based on International Monetary Fund (February 2021)

Figure 2.4.2 Global GDP Growth Rate Projection

Indonesian economic on 2020 experienced Y-o-Y GDP growth dropped from its normal level of 5.0% to 2.97% in Q1 and -5.32% in Q2, -3.49% in Q3, -2.19% in Q4 marking the first contraction since the Asian Financial Crisis. Indonesia plunges into recession for the first time in over two decades as GDP growth in (y-o-y) registered. In Q1 2021, the downward trend has slowed to -0.74%, but the negative growth trend continues. Figure 2.4.3 shows Indonesian quarterly real GDP growth rate.

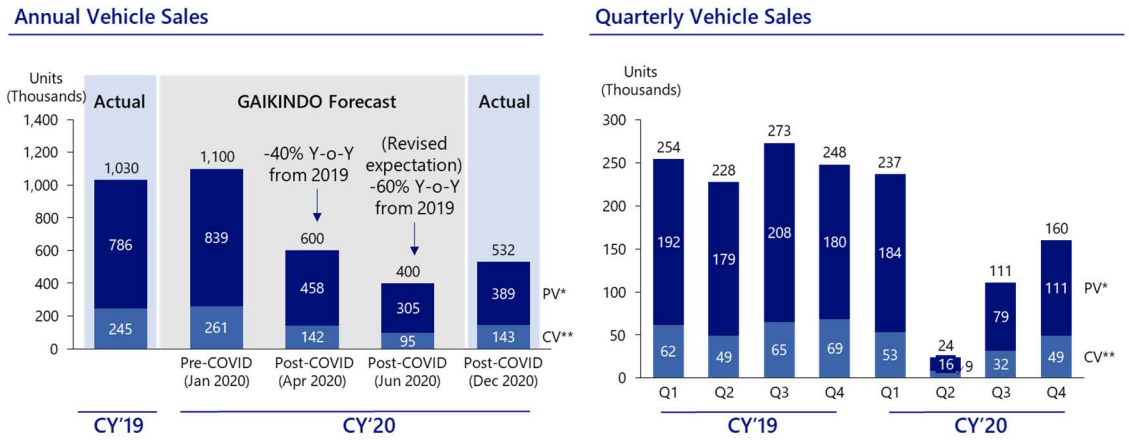


Sources: Prepared by the JICA Team based on data collected from the Bank Indonesia and other published papers

Figure 2.4.3 Indonesian Quarterly Real GDP (% Change on Annual Basis)

The Association of Indonesia Automotive Industries (GAIKINDO) forecasted annual sales in 2020 would reach 1,100,000 units or grow 1% from 2019 sales. However, with Covid-19 turmoil, GAIKINDO released a new target for annual sales to 600,000 units in April 2020 (40% drop from 2019). With the Q2-2020 sales drop to only 24 units, GAIKINDO announced the revised forecast of annual vehicle sales in June 2020 to 400,000 units (60% drop from 2019). With the 2020 forecast would have the same ratio in 2019, the PV sales and CV sales in 2020 are expected to reach around 305,000 and 95,000 units, respectively.

Following Q2 devastating economic plunge, Ministry of Finance in September 2020 released Regulation No. 138/PMK.05/2020 on giving an interest subsidy provision to support the economic recovery, including to obtain housing and motorized vehicles. The MOF Regulation is anticipated to give less bleaker projection on Q4 sales. Averaging GAIKINDO forecast in April and June 2020, the total annual sales in 2020 is projected to reach approximately 500,000 units and Q4 sales need to reach 128,000 units. According to GAIKINDO the annual sales volume for 2020 was revealed to be 530,000 units, as of December 2020. Figure 2.4.4 shows the number of auto sales in Indonesia.



Notes: *PV (Cars, SUV, MPV), **CV (LCV, Trucks, Buses, Pickup, Panel van, Prime mover)
Sources: Prepared by the JICA Team based on data collected from the GAIKINDO, Local Press, Reuters, NRI

Figure 2.4.4 Auto Sales in Indonesia 2019-2020

Governor of Bank Indonesia in the Annual Meeting, December 2020 announced to stay optimistic Indonesian economic recovery would follow IMF expectation with policy response strategy to maintaining health protocols to improve productive sectors, realizing government spending and fiscal stimulus, realizing monetary stimulus and macroprudential policies, increasing supply and demand credits, and implementing MSME financing digitalization.[4]

The key to end the turbulence and rebound the economic downturn, is to end the source of the problem, the pandemic. The government should not only rely on the public to maintain individual health and social distancing, but to serve the public with reliable 3T method while improve health infrastructure and give access to equitable vaccine. With the possibility of Covid-19 mutations and other kinds of pandemic in the future, it is expected that the world and each country have better measures and protocols. Promoting health protocols and "new normal" are imperative to gain public trust and enable societies to be included in economic activities. New normal, of which mostly reducing mobility, requires procedures at most affected sectors, such as tourism, logistics and transportation, sales of foods and essential goods, as well as digital payments are very important to increase consumer confidence and restore people's purchasing power.

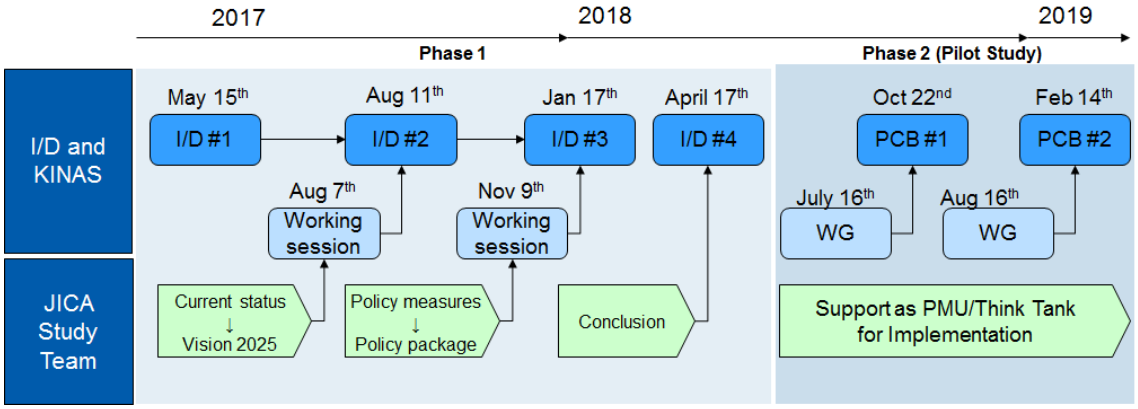
[4] https://www.bi.go.id/en/publikasi/ruang-media/news-release/Pages/sp_229020.aspx

CHAPTER 3. DATA COLLECTION SURVEY ON PROMOTION FOR GLOBALLY COMPETITIVE INDUSTRY (2017-2019)

3.1 Outline of the project

In this section, the JICA project "Data Collection Survey on Promotion for Globally Competitive Industry (2017-2019)" is called "previous project" and its relevance to this project is explained. In the previous project, JICA Study Team conducted analysis of industrial structure and international division of labor analysis (business strategy analysis of related companies including Japanese companies, future industrial promotion) for four industries in Indonesia, namely transportation machinery (automotive), electrical / electronics, and food processing. JICA Study Team clarified the segments that should be strengthened and the factors that hinder development, and proposed a medium- to long-term cooperation program.

- Phase 1: April 2017-May 2018 (Summary of surveys and recommendations)
- Phase 2: May 2018-June 2019 (Implementation of pilot project)



Note: I/D: Industrial Dialogue, WG: Working Group (echelon 2 level), PCB: Policy Coordination Board (echelon 1 level), PMU: Project Management Unit
Source: JICA Study Team

Figure 3.1.1 Time frame of previous project

3.2 Policy on the automobile industry proposed by the previous project

(1) Recommendations to the target sectors

For the three target sectors, JICA Study Team analyzed the current situation and potential, designed the future vision, and proposed the necessary policies to achieve the vision.

- Transportation equipment (automotive)

  It is necessary to raise the local procurement ratio in the upstream, to furnish measures for localization of R&D (industry-academia collaboration, training of engineers, etc.), strengthening of suppliers, Java automotive industry belt (overcome the negative effects of overconcentration of industry in JABODETABEK), the improvement of the business environment (promotion of entry of small and medium-sized enterprises).

- Electrical / electronic

  The study found opportunities in Industry 4.0, IOT, and electrification of automobiles, so proposed to promote factory automation mainly in the automotive industry and strengthen electronic parts, develop human resources such as IT engineers, and accumulate peripheral suppliers by setting bonded processing zones. It was recommended that the product IOT in the electronic field be competitive.

- Food processing

  Its development should match the export potential and future quality improvement needs. For this reason, it was recommended to improve the business environment (raw material procurement, registration procedures, etc.), business matching in each value chain, and promote cooperation with foreign capital.

(2) Recommendation of policy package

The specific policies proposed above are put together as policy packages such as (1) coordination between ministries, (2) promotion of SMEs, (3) promotion of R & D & D and FDI, (4) development of industrial human resources, (5) development of logistics infrastructure, and (6) improvement of export environment.

Table 3.2.1 Remmendations of Policy Packages in the previous project

Policy package	Transportation machinery	Electric & electronics	Food processing
①Inter-ministerial forum	(0) Make action plan for export and xEV and strengthen implementation capability	(1) Development & announcement of roadmap of Indonesian Industry 4.0	(0) Implementation capacity (2)Align policies for improved raw materials
②Local enterprise/SME development	(1) Attract investment to auto parts industry (2) Raise engineering, quality, and productivity of suppliers	(3)Local business development by technology transfer from foreign companies	(4)Collaboration/matching between food processing company and large scale distributers, etc.
③Promotion of R&D&D local and foreign investment	(6) Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D& (8) Support expansion of D&D supporting service such as CAE* and material evaluation	(2)Taxation scheme for promoting facility investment (4)Foreign direct investment promotion	(5)Promote collaboration with foreign entities with advanced technology
④Human resource upgrade	(5) Factory management and production engineering skills development (7) Collaboration between technology university / polytechnics and auto industry	(5)Practical education and training for IOT	
⑤Logistical infrastructure upgrade	(4) Creation of automotive Industrial belt in Northern part of Java		(6)Streamline logistical infrastructure
⑥Promotion of export friendly environment	(3) Improve business climate to encourage investment especially for SMEs and start-ups		(1)Relax restriction on high quality ingredients (3)Enhance efficiency of food standard and halal certificate

Source: JICA Study Team

(3) Implementation of policy dialogue

Through the policy dialogue, the survey results and recommendations were shared. In particular, at the 4th Policy Dialogue (April 17, 2018), JICA Study Team received the attendance and presentations of Ministers BAPPENAS and MOI and contributed to the launch of KINAS (National Industrial Committee) to support in Phase 2. In addition, the results of the survey and analysis in Phase 1 are widely utilized and mentioned in the process of formulating the next five-year plan (RPJMN2020-2024).

Activities of KINAS

Backgrond of conducting a pilot pilot of KINAS

At the 4th Industrial Dialogue (April 17, 2018), direction to establish KINAS and implement policies based on the Roadmap of Making Indonesia 4.0 (I4.0) in collaboration with ministries and agencies was confirmed. The JICA team supported Pre-KINAS as a pilot project on 2018. The project office was set up in Ministry of Industry, and local staff are stationed there acting as a think tank. It acted as the secretariat and think tank of the Echelon 2nd level working group (WG) and the Echelon 1st level Policy Coordination Board (PCB), which was established by the Indonesian side as a ministrial coordination system.

KINAS・Industry 4.0

The target of I4.0 is 5 industries x 10 priority policies. MOI held 30-40 FGDs (Focus Group Discussion) in December in 2018 to discuss Key Initiatives. These were candidates for future WG themes. MOI also discussed the institutionalization of KINAS from December to January, and finally made it a presidential decree focusing on I4.0 (not based on the Industrial Law), and plans to promulgate it under the current administration. During this period, prior to the institutionalization of KINAS, WG and PCB (pre-KINAS) were held on a voluntary participation from respective ministry.

The resources of each ministry are limited, and the WG is held mainly from the policy perspective, excluding the industry perspective. JICA team advised BAPPENAS and MOI on policy themes, giving priority to the approaches such as R&D&D, human resource development, SME support, and export promotion, which were proposed in Phase 1.

Background of adopting the theme: The president ordered strengthening R&D, and MOF drafted a tax incentive and cooperated with BAPPENAS. The theme was also in line with the direction of JICA team.

(4) Tax incentives for R&D&D and industrial human resource development.

Pre-KINAS study status

Based on the following contents agreed by the WG and PCB, MOI and MOF are working on the drafting of concrete ministerial decree. On June 25, 2019, Government Regulation PP 45/2019 Super Tax Deduction on Corporate income tax (PPh) was promulgated, and was subsequently embodied by Ministry of Finance Regulation PMK in 2020.

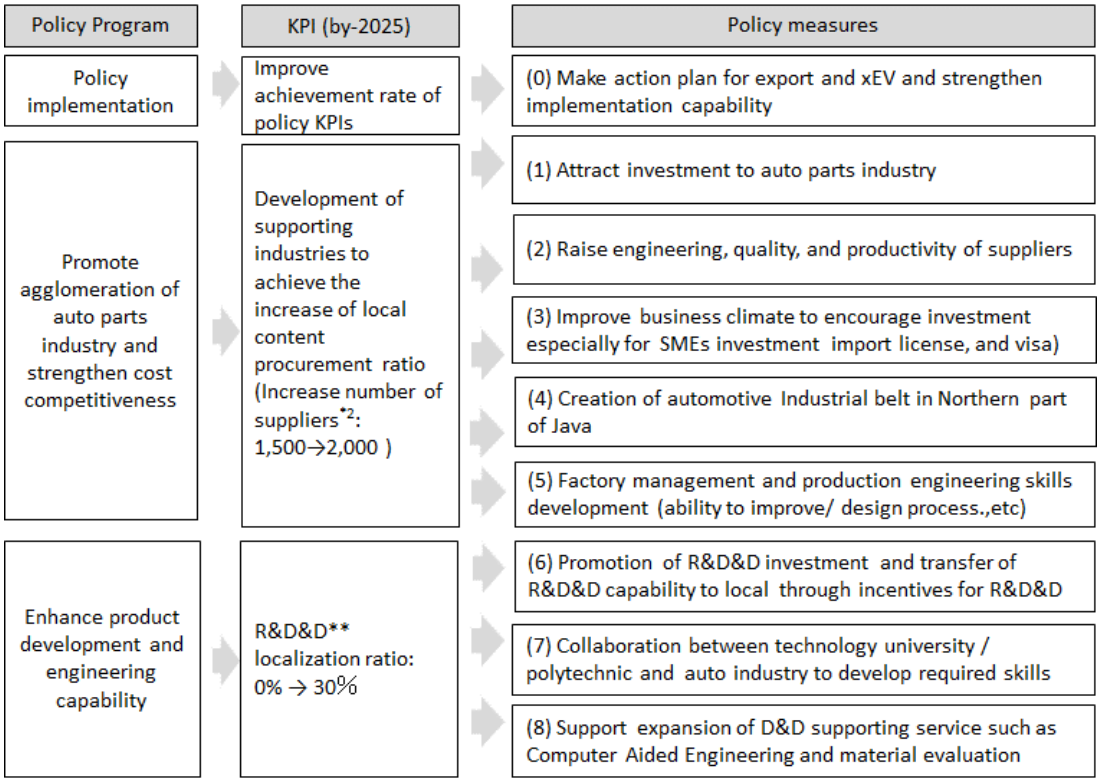
Table 3.2.2 Specific ministerial regulasions considered

Target	Tax deduction
Cost of HRD	• Deduct taxable income by 200% of HRD costs for calculation of corporate income tax for either of the following cases; ➢ Scholarship for public and employees ➢ Vocational training for unemployed ➢ Apprenticeship (working practice and training for unemployed and teacher) ➢ Internship (Working practice for students) • Can be carried forward up to 5 years
Asset acquisition for HRD	• Depreciation by Special Category II (Depreciation 25% for 4 years)
Cost of R&D&D	• Deduct taxable income by 300% of R&D&D costs for calculation of corporate income tax • Collaboration is mandate • Can be carried forward up to 5 years
Asset acquisition for R&D&D	• Depreciation by Special Category II (Depreciation 25% for 4 years)

Note: As a result of PCB discussions, in-house training was excluded from the incentives (because it is a corporate obligation in the first place).
Source: JICA Study Team

(5) Policy making in the automotive industry

In the previous phase, JICA Study Team targeted three industrial fields: automotive, electrical / electronics, and food processing. Here, JICA Study Team will summarize the policy proposals related to the automobile industry, which are closely related to this project. As for the three Policy Programs, KPIs were set by 2025 for each Policy Program. It proposed nine policy measures to achieve KPIs. The whole picture is shown in the figure below.



Source: JICA "Data Collection Survey on Promotion for Globally Competitive Industry (2017-2019)"

Figure 3.2.1 Policy recommendations for the automobile industry in the previous phase

3.3 Lessons from the previous project

Regarding the counterparts of the previous phase, Phase 1 was led by the BAPPENAS Industrial Bureau, and Phase 2 was led by Ministry of Industry Planning Bureau. In the discussion with BAPPENAS, when making a plan, the discussion proceeded with a wide range of related ministries and agencies involved in conducting the project. As a result, it was possible to carry out activities toward the future establishment of a cross-ministerial meeting body called KINAS.

Through discussions with the executives of Ministry of Industry and the directors of internal departments, planning is important, but support for actual project implementation has often been requested. Specific examples include cost support, request for dispatch of experts, and support for installation of various facilities.

In addition, the individual proposals are as follows.

(1) Inter-ministerial coordination (KINAS)

JICA team supported the promulgation of the Presidential Regulations on the meeting organization for the implementation of the I4.0 Roadmap. In response to this, the ministries and agencies that did not participate in pre-KINAS will be involved in discussing and deciding specific policies. As a result, while pre-KINAS was bottom-up, more use of top-down will

increase. In the medium to long term, it is also desirable to install KINAS based on the Industrial Law. In December 2018, the KINAS Executive Order review meetings were held several times, and the following two proposals were considered. At the final meeting on December 27, respecting the intention of Minister of Industry the proposal (2) was chosen unofficially.

Table 3.3.1 President Regulation considered for kINAS

Two plans	(1) President Regulation that embody KINAS stipulated by the Industrial Law (BAPPENAS's original concept)	(2) President Regulation to establish a Steering Committee for the implementation of the I4.0 roadmap
Legal stand	Based on Article 112 (1) / Law No.3/2014	A different organization from KINAS based on Article 112 (1) / Law No.3/2014
Relationship with the I4.0 Roadmap	KINAS has a broader purpose than the roadmap (the same range as the purpose of Artcile 112). For the time being, focus on the I4.0 roadmap and utilize it.	A platform specializing in roadmaps. Regulations including authority of roadmap.
Features	More enforcement for ministries to work under inter-ministerial collaboration. More everlasting platform regardless of its relationship of any particular roadmap.	Usability as a "showcase" of I4.0. Authorization as a regulation including the contents of Roadmap by the government.

Source: JICA Study Team

(2) Promotion of SMEs

In addition to the tax incentives and financial support formulated in Phase 2, it is expected to increase the quantity and quality of local suppliers by combining matching and guidance from outside experts.

Listing and matching of promising SMEs as well as reverse exhibition will be expected. It is also hoped that the matching/ reverse exhibition (exhibition of products by buyers) will expand cooperation with Japanese companies. In particular, it is necessary to promote development of medium-sized enterprises entering the field that can lead I4.0.

(3) Promotion of R&D&D

Although this targets R&D&D, companies need to focus on improving the design ability (drawing ability). It is desirable to clarify the necessary skills in the field and develop a curriculum at the Institute of Technology / Polytech with the cooperation of industry and academia.

It is necessary to disseminate the flow of commercialization of research results through industry-government-academia collaboration. It is expected that cooperation themes will be decided and model cases of cooperation will be implemented, such as promotion of carbon neutral in line with the roadmap of the automobile industry.

In addition, as a concrete utilization method of the Innovation Center, which is being prepared by Ministry of Industry, JICA Study Team will develop services that contribute to the promotion of R&D&D in the field, such as testing and equipment use by external companies, matching and industry-government-academia collaboration.

(4) Industrial human resource development

First, through KINAS, it is expected to promote cooperation between MOI and MORTHE, and cooperation at the government agency level such as BPSDMI. It is necessary to improve the ability required for I4.0, the quantity and quality of engineers in the digital field, etc. It is expected that industry-academia collaboration will develop a curriculum at the Institute of Technology and Polytech.

(5) Automotive industrial belt

Policy measures to support the development of industrial parks in hinterland areas such as Patimbang Port and Kendar Port, zoning, priority sector policies, and utilization of incentives are expected to alleviate the negative effects of congestion caused by excessive concentration of JABODETABEK and to promote the agglomeration of supporting industry companies

In the same area, an innovation center will be set up, a model case for industry-government-academia collaboration will be implemented, and SME matching will be implemented. However, this theme will be excluded from detailed examination in this project.

(6) Business environment improvement (improvement of environment for export promotion)

For example, as an improvement of environment for export promotion, establishment of export processing zones related to I4.0, provision of tax incentives, deregulation of import of intermediate goods for export products (exemption of quotas, shortening of import procedures, etc.) can be considered.

CHAPTER 4. POST COVID-19 AUTOMOTIVE INDUSTRY ROADMAP FOR INDONESIA

4.1 Strategies for the Indonesian Automotive Industry

4.1.1 Global Trend of the Automotive Industry

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

CASE refers to connected, autonomous driving, sharing/service and electrification. CASE is said to bring about once-in-a-century revolution to the automotive industry. All four components of CASE are interconnected and are transforming automobiles into a place of service provision. 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 has been accelerating in order to share technical know-how and gain additional funding for development.

	C	A	S	E
	コネクテッド (Connectivity)	自動運転 (Autonomous drive)	サービス/シェアリング (Sharing/Service)	電動化 (Electrification)
Auto industry trend	• Vehicle data collection and Big Data analysis • V2V/V2X connectivity	• Increase intelligence of car itself • Self-driving vehicles • Expect society with no accidents	• MaaS/ Ride sharing • Shift from "Owner" to "User"	• Electric Vehicles (EV) • Energy storage/Power Grid
Current impact to SEA	• Telecom infrastructure and IT are required to serve this business; still under R&D/ PoC	• Numerous advanced technologies, infrastructure and regulation being studied; under R&D	• Easy market entry for new players; e.g. ride sharing services like Grab and Gojek as SEA local start-ups are successful	• EV and battery business are still new for consumers but tend to gradually expand to SEA market

Source: Presentation material in a seminar "xEV Market Trend in the ASEAN Region," Hamamatsu City, NRI Thailand, October 2019

Figure 4.1.1 Transformation to CASE and Impacts to the South East Asia Market

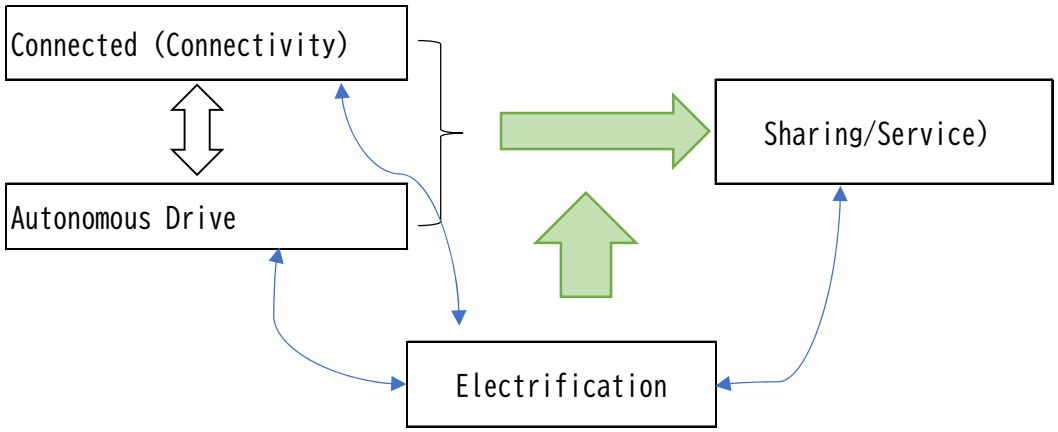
In the future, CASE will unquestionably progress and impact the automotive industry. It will transform an automobile into a place of service provision and the value associated with vehicles will shift from "owning" to "using," forcing auto makers to change their operational structures.

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 (CO2) 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 CO2 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). American IT giants are also 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 is required. This has accelerated the industry-wide company restructurings through alliances and mergers for their survival into the next era.

Given this, CASE will transform the industry structure itself; its market size will exponentially grow especially when MaaS (Mobility as a Service, an advanced stage of CASE) enters in the picture. According to the Japan Electronics and Information Technology Industries Association (JEITA), the market size of one engine control unit (ECU) product that supports the evolution of CASE is expected to expand twofold e.g., from 9.5 trillion yen in 2017 to 17.8 trillion yen in 2030. 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.

(2) Global Trend and Indonesia current status in Relation to CASE

The four components of CASE are interconnected and each component is perceived as a major business opportunity. In western countries, businesses related to connectivity and autonomous driving will lead first, prior to the full-scale rolling out of car sharing and other associated services. As shown in the figure flow, electrification links the components of Connectivity and Autonomous Drive to Sharing/Service.



Source: JICA Study Team

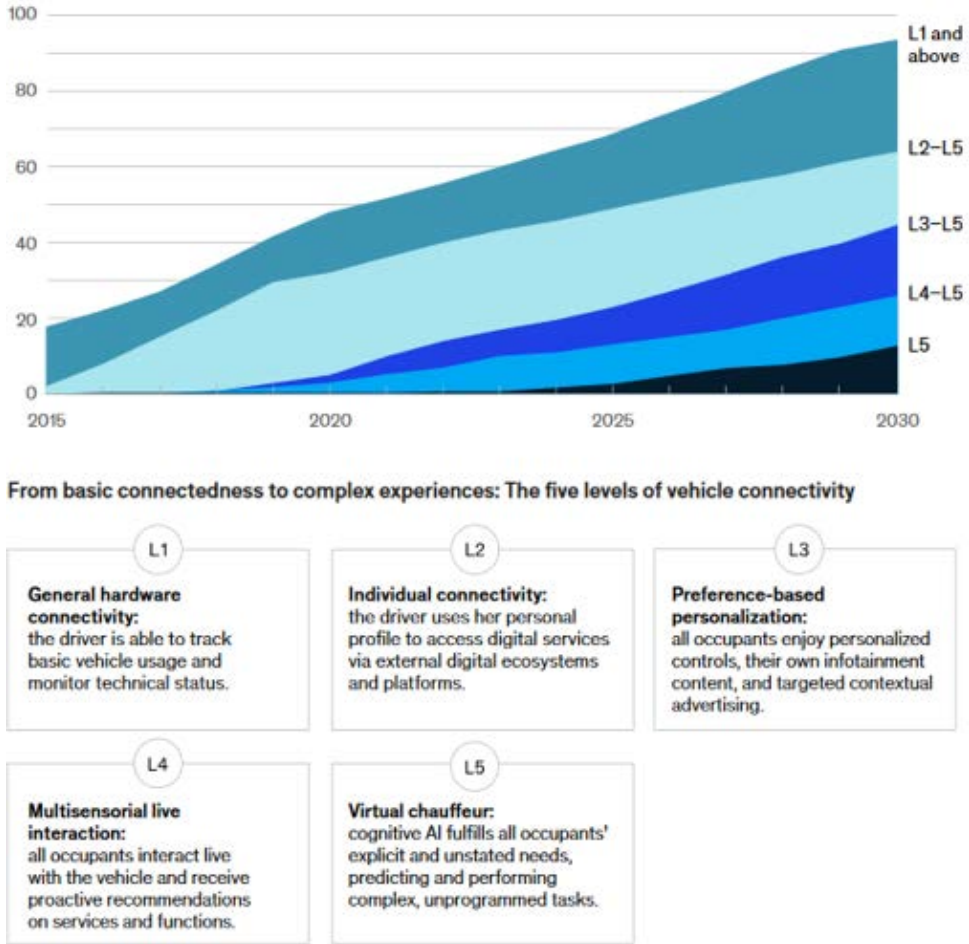
Figure 4.1.2 CASE Business Logics

Meanwhile, in the ASEAN region, the upper stream of the value chain concerning connectivity and autonomous driving, such as technology development or business planning is hardly present. Instead, more political and business moves expecting opportunities to be created by electrification are being made. The section first discusses the global trends of connectivity, autonomous driving, and car sharing and other associated services and then touch upon reginal trends on electrification.

1) Connected

It is viewed that connectivity will not only provide more comforts to drivers but also create a new information platform for companies to invent new values. Conventional automobiles will evolve into telematics connected cars with upgraded functions through interface that provide a wide variety of experiences to drivers and passengers.

As shown in the figure below, there are five levels of vehicle connectivity identified. Each level is associated with the gradual upgrading of functionality that enrich consumer experiences but also the expansion of possibilities related to profit making, cost reduction, safety, and security of passengers.



Source: McKinsey&Co.

Figure 4.1.3 Market Share Forecast by Level of Vehicle Connectivity

The levels reflect the possibilities of connectivity from standardizing data links between a person and automotive hardware at the current stage to providing personalized and live dialogs based on passenger preferences in the future. According to McKinsey, 45% of new cars will reach third-level of connectivity by 2030, creating value between $ 450 billion and $ 750 billion.

Even in Indonesia, connectivity functions made in developed countries are expected to penetrate into its market with a time lag. In other words, after some level of the popularity is achieved in the developed countries and sales prices start to go down, cars equipped with new connectivity functions will be sold in the Indonesian market starting from luxury cars and luxury grades.

The reason for the time lag is because Asian users are more cost sensitive and only a few consumers will pay premium price to obtain connectivity functions. Furthermore, since those in the high-income class are still hiring personal drivers in Indonesia, the need for advanced driving assistance features is deemed to be still low compared to its neighboring countries such as Thailand and Malaysia.

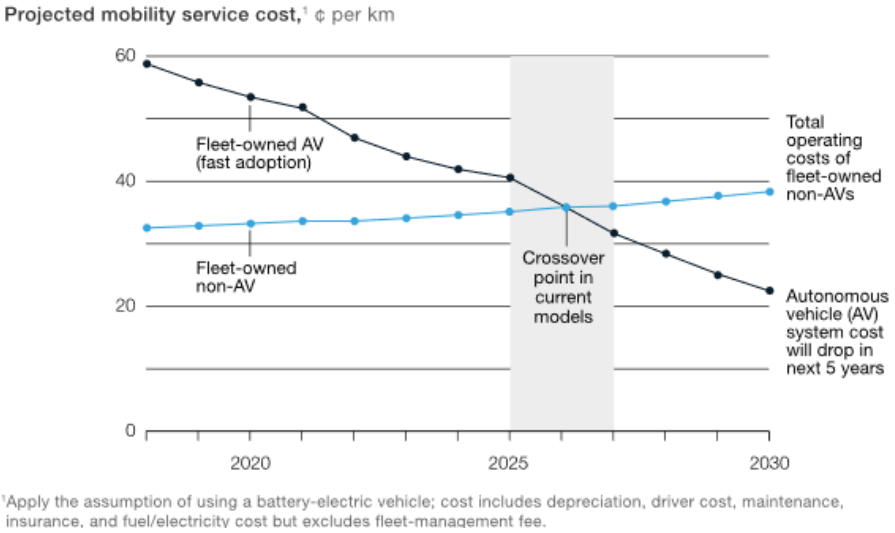
A trend unique to Asia is that it is expected that connectivity functions of automobiles will advance along with the sophistication of smart phone functions via interface functions such as Car Play and Android Auto Smart Phone given the high market permeability of smart phones in the region.

2) Autonomous Driving

From driverless taxis to automated freight trucks, autonomous driving vehicles are expected to change the essence of road driving and, in the process, and make significant changes to the automotive and mobility industries. Autonomous driving has created a business climate filled with opportunities and uncertainties. Under this climate, industry players (component vendors, mobility service providers, etc.) see the autonomous driving market, especially in China, as a major business opportunity.

In Europe, technology, and not regulations, is considered as a factor in preventing the introduction of autonomous vehicles on the road. Because of this thinking, it is estimated that the second half of the 2020s (from 2025 to 2030) will be a crossover point (変曲点) for the adoption of autonomous vehicles and the timing will be greatly influenced by the economic situations of city drivers.

The figure below shows a cost crossover analysis when an electric vehicle equipped with a complete battery is used as a robot taxi. Main cost items include vehicle depreciation, driver costs, maintenance, insurance and fuel expenses. Operating and management costs to run mobility services are not included. The change from manual driving (driving done by humans) to autonomous driving will be done gradually in consideration of safety and regulations.



Source: Chinese Government (Ministry of Transport) & MacKinsey&Co.

Figure 4.1.4 Projected Timeline of Self-Driving Taxi Introduction in the United States

The cost of the entire autonomous driving system (including sensors, computing platforms, and software) is expected to decline rapidly from 2023 onwards as the technology matures to around $8,000 by 2025. The crossover point in the above figure indicates when autonomous driving becomes economically equivalent to manual driving. That is to say, the total running cost per 1 km of an autonomous vehicle is almost the same as that of a conventional driver-equipped vehicle. After this crossover point, the demand for autonomous vehicles is expected to steadily increase depending on the market development.

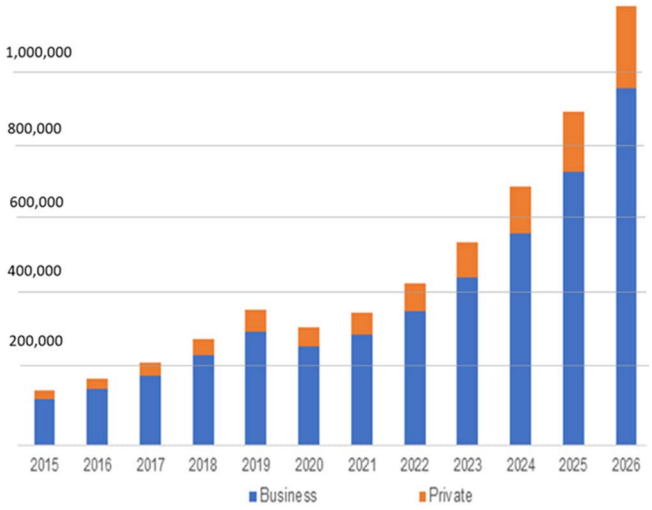
Autonomous driving in Asia is predicted to spread with a greater time lag than connected vehicles. The market permeation of autonomous driving in Asia is currently at the driving support level or Level 2 (i.e., the main driver is a human driver, and the system is merely at the level that supports manual driving). It is at the stage where Level 2 related technologies are introduced for high-end models and advanced grades. At this moment, Level 2+ technologies (i.e., models equipped with two or more driving support functions) have yet been mass-marketed. It will take a considerable time to reach the hands-free driving level or Level 3. The hindering factors that are causing the delay in the roll out of autonomous driving in Asia are: relaxed vehicle safety regulations compared to the advanced markets, delay in setting up a well-covered communication environment such as broadbands, underdeveloped highway infrastructure, greater share of two-wheeled and three-wheeled vehicles on the roads, investment costs for advanced infrastructure (vehicle to infrastructure: V2I), etc. In addition to the high ratio of economically well-off households hiring drivers as mentioned above, the development of road and communication infrastructures in Indonesia are less advanced compared to its neighboring countries such as Thailand and Malaysia. Thus, the challenges in market permeation are still high.

3) Sharing and Other Related Services

Globally, ride-sharing tends to be seen as a niche market or a business idea that its time has yet to come. In the United States, a study has shown that ride share accounts for only about 1% of total mileage (VMT) [5]. As long as humans drive, ride sharing does not make a good financial sense for both providers and users; however, with the advent of autonomous vehicles (AVs), this situation is expected to change. Since, for the ride-sharing service, a much greater share of the profit goes to the drivers and ride-sharing companies only get a small profit share, ride-sharing companies are making large investments to develop AVs given that as the ride sharing business will be more profitable for companies if they do not have to pay for human drivers. In the United States, using their own car is a cheaper option for consumers who drive more than about 3,500 miles (5,600 km) a year than the total cost of ride sharing.

Even under such circumstances, ride sharing business are expanding mainly in urban areas. The share of people who own their personal cars is on decline among high-income earning city dwellers; meanwhile the share of people who use ride share services are on increase among the same group of people. This phenomenon can have a significant impact on car ownership in the future.

The increase in the popularity of electric vehicles is pushed by the rise of mobility companies such as car sharing companies. Currently, one-way car sharing, in which a car is dropped off at a place other than its original pick-up point, is rapidly expanding. This type of service is used for one-way trip to a destination. As such, car sharing will provide travelers with the opportunity to combine various modes of transportation and provide the necessary intermodal connectivity.



Source: JICA Study Team

Figure 4.1.5 Car Sharing Services Forecast for Business Use and Personal Use

[5] Troy Baltic, Russell Hensley, and Jeff Salazar、" Ridesharing and the great urban shift", 2018.

The factor that suppresses the growth of ride sharing is the risk associated in making contacts with other people as shown in the coronavirus pandemic (Covid-19 pandemic). The above ride-sharing boom appears to have seen a downward trend, which can only be temporary as a result of the pandemic. Meanwhile, the popularity of small eco-cars is increasing as a way to avoid coming in contact with other people.

In Indonesia, due to traffic congestion in Jakarta and license plate regulations, the number of ride-sharing service users, such as Gojek and Grab, have increased at an annual rate of 57%. Reaching $ 6 billion in 2019, a six-fold increase from 2015, Indonesia is the largest market for ride sharing in Asia[6]. The market is expected to reach $18 billion in 2025, accounting for about half of ASEAN's total market. Since the pandemic, on one hand, the movement of people has decreased, so the growth of ride sharing is expected to slow down. On the other hand, the delivery services of goods such as food has increased. The shift from "movement of people" to "movement of goods" is expected to increase the need for light commercial vehicles for the last mile logistics or for the final step of the delivery process to the end-user and more advanced motorcycles for home delivery services.

(3) Electrification Tread

1) Policies for Vehicle Electrification in Key Countries

Major European countries, such as Germany, France and the United Kingdom (UK), have announced that they will ban the sale of gasoline and diesel vehicles in accordance with the European Union (EU) Green Deal. From 2030, the sales of gasoline and diesel vehicles will be prohibited in the UK and Germany. Furthermore, from the perspective of reducing CO2 emissions to zero, strict measures will be taken to reduce greenhouse gas emissions, like a policy to ban the sales of plug-in hybrid vehicles. China has announced that it will switch all new vehicle sales to new energy vehicles (NEV) such as electric vehicles (EVs) and hybrid vehicles (HVs) by 2035. It is expected that the sale of gasoline and diesel vehicles will also be banned after 2035. In December 2020, the policy of "achieving zero greenhouse gas emissions by 2050" was also announced in Japan. In the policy, Japan sets the goal of achieving all new car sales to 100% electric vehicles by 2035. Since the ratio of greenhouse gas emissions from the transportation sector, including automobiles, is high in all countries, the shift to EVs is promoted in the passenger cars and commercial vehicles segments, which are expected to significantly reduce greenhouse gas emissions.

[6] https://indonesiaexpat.id/featured/indonesia-dominates-asean-ride-hailing-sector/

Table 4.1.1 Target in EV Policies in Key Countries

Country	Year of implementation	Gasoline/Diesel Vehicle	Plug-in Hybrid Vehicle	Policy/Sales Target
China	2035	Only Hybrid cars are allowed	No restriction on new car sales	• By 2025：10% of new car sales should be next generation cars(PHEV、BEV、FCV) • 2025-2030：sales target of next generation cars is 25% 2030 onwards：sales target of next generation cars is 40-50%
Germany	2030	Banned	Banned	• Increase the number of EVs（PHEV/BEV/FCV）up to 1 million units by 2030. • 2030 onwards: EVs（PHEV/BEV/FCV）target at 7-10 million units. • Ban sales of new gasoline and diesel car in 2030.
France	2040	Banned	Banned	• Ban sales of new gasoline and diesel car in 2040.
UK	2030	Banned	Banned (from 2035)	• Ban sales of ICE and HEV for passenger and van category by 2035
Norway	2025	Banned	Banned	• No new gasoline or diesel car sold, all new car sales should be EV or FCV which are "zero emission" cars.
Ireland	2030	Banned	Banned	• Ban sales of new gasoline and diesel cars by 2030 • Sales target of various electric vehicle by 2030 are : ・Passenger car : 0.84 million units ・Truck and Van : 95,000 units ・Bus: 1,200 units
Canada (Province of British・Columbia and Quebec)	2035	Banned	No restriction	• Ban sales of new gasoline cars in Province of Quebec by 2035. • Ban sales of new gasoline cars and truck in Province of British Columbia by 2040.
US (Only in California State)	2035	Banned	Banned	• Ban sales of new gasoline cars by 2035 in California State. • Sales target of xEVs: • 20205-2030: EVs（PHEV/BEV/FCV）1.5 million units 2030 onwards：EVs(PHEV/BEV/FCV) 5 million unites
Japan	–	–	–	• The government announced to achieve CO2 zero emission by 2050, and to achieve 100% of new car sales with xEV. • Prefecture of Tokyo also announced to achieve 100% of new car sales with xEV.(HV,EV, and FCV)

Source: JICA Study Team

2) Electrification Strategy of Major Automobile Manufacturers

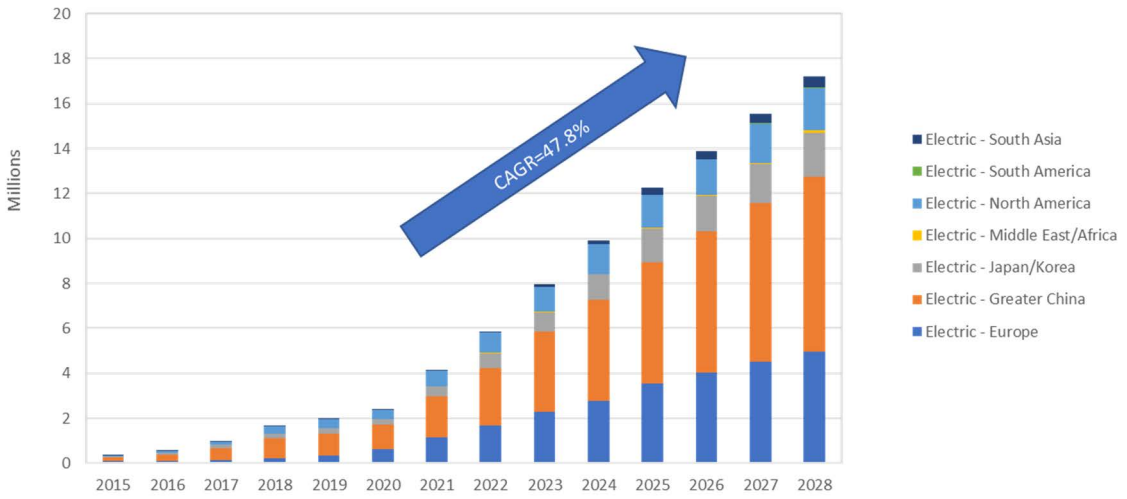
For Indonesia, the biggest focus point in CASE is the future trend of "E: electrification." As a general tendency, executives and engineers who played active roles in shaping the golden era for internal combustion engine (ICE) vehicles are doubtful of the trend on vehicle electrification. Even on the point of the well-to-wheel (WtW) emission[7], many argue that when analyzed in totality, ICE vehicles still have an overall superiority over EVs. Meanwhile, new companies and young engineers have more positive assessments on the trend which include electric vehicles and other x-EVs.

Noting the general dynamic in opinions about electrification of vehicles, it is undeniable that more people have started to believe that the market permeability of EVs will accelerate against the backdrop of changes brought upon by the COVID-19 pandemic, such as the further growth in the popularity of environmental consciousness (decarbonization) propelled by new working styles (e.g., work from home),life style choices and increased interests in new technologies due to digitization. Meanwhile, some view that the pandemic will lead to slowing down of the market permeability of EVs since the purchasing power of the middle-income class will decline and the sales of high-priced EVs will decrease.

[7] WtW refers to total value of energy consumption generated from the extraction of energy source to the running of a car.

Assessing from moves in the global stock market, the former viewpoint (i.e., acceleration of EV market permeation) is more on point. Facilitated by policy trends that are actively promoting decarbonization, environmental, social and governance (ESG) related investments are gaining popularity among environment-related companies. For example, while the growth rate of S&P 500 stock index was about 19% from the start of 2020, that of Tesla stocks was 900% with the market value of the company's equity exceeding $800 billion (about 83 trillion Japanese yen), which was larger than Toyota's market equity value.

The production of electric vehicles (including range extenders) will reach 16 million units with an average growth rate of 47.8%. By 2028, and the electrification ratio will increase from 3% in 2020 to 17% in 2028. In recent years, the EV production increased by 23%, while the overall vehicle production in 2020 fell by about 20% compared to 2019. By region, the growth was particularly high in Europe and China withup to 82% and 68% compared to the last year. On the other hand, the rate of EV acceleration varies from region to region, with Japan and South Korea increasing by 4% and North America by 1%. The sales of EVs are accelerating in Europe against the background of substantial increase in investments by European automakers in EV models since the corporate average fuel economy (CAFE) regulation to decrease CO2 emissions of passenger cars to 95 g / km will be enforced in 2021. China has also been implementing the NEV policy since 2019. Under the policy, penalties will be imposed if auto makers do not achieve a required NEV production ratio; therefore, automakers are producing NEVs centered on EVs and PHEVs. In China, the NEV market is expanding since steep registration fees are imposed on ICE vehicles while government subsidies are given to NEVs. Tesla started local production in China in 2019; in the following year, the global cumulative sales of Tesla reached the company's record high of 500,000 units. Globally, the type of EVs that are popular are high-end models such as Tesla and SUVs; in recent years, EVs that are low-priced city cars are also gaining popularity in China. The "Hongguang Mini EV" developed by SAIC GM Wuling Automobile sold more than 15,000 units in the first 20 days since its launch in July 2020.



Source: IHS Markit

Figure 4.1.6 Trends and Future Forecasts of Global Electric Vehicle Production (2018-2025)

The table below summarizes the moves of auto makers on vehicle electrification. The biggest EV production volume planned by 2018 is the Volkswagen and Renault-Nissan Coalition (including Mitsubishi). Some view that the reason for EU automakers focusing on the expansion of EV production is because the sales of diesel cars became tough after Volkswagen's "Diesel Gate[8]," and they cannot compete with Japanese companies such as Toyota for hybrid vehicles. As for Japanese auto makers, since they have been recording strong sales of hybrid cars and the profitability of the hybrid is higher than that of EVs, the auto makers will continue focusing on hybrid vehicles but, at the same time, expand their EV and fuel cell vehicles (FCVs) markets as a way to deal with strengthening of regulations such as CAFÉ in Europe and similar regulations in China. Chinese auto makers seem to be switching to EVs with the Chinese government's support for NEVs; their move to EVs is also seen as a way to deal with the fierce competitions in the ICE vehicle market with Japanese and European manufacturers. Tesla has gained a strong momentum, aiming to produce one million units by 2022.

[8] This refers to Volkswagen's illegal activities regarding diesel engine control in late 2015. The illegal practice of detecting exhaust gas measurements and activating the test program only when the measurements were taken to pass the test was discovered.

Table 4.1.2 EV Production and Investment Trends of Automobile Manufacturers

OEM	EV production forecast (by 2028)	Main market	Recent movements
Toyota	1,015,307	Japan, US, China, Asia	Announced plan of five years ahead of schedule for electrification of 1 million vehicles (EV, FCV) in 2019. Plans to deploy more than 10 models worldwide by the first half of the 20s.
Volkswagen	2,810,748	Europe, China	Elt has the largest number of EV production plans and is the most active in EV production among existing OEMs, and plans to raise it to 20% by 2025.
Tesla	1,209,551	US, China	Local production will start in China, and about 500,000 units will be sold in 2020. In January 2009, it forecasts that annual sales by 2022 will double from 20 years to over 1 million units. Most active in battery production, such as announcing the construction of a new Gigafactory as a joint venture with Pana.
Daimler	600,564	Europe, China	The company with the highest orientation for in-house battery making among OEMs, paying attention to battery development capabilities.
NIO	171,653	China	With the in-house development of all-solid-state batteries, the world's first EV equipped with all-solid-state batteries will be sold at the end of this year
Nissan - Renault	2,439,487	Europe, China, Japan, Asia	Plan to launch EV under two pillars, E-Power and BEV. Eight models are scheduled to be launched by 2023
GM	1,165,285	US	Turned the wheel to electrification and switched to a brand centered on EVs and connected cars. The company plans to start production of batteries in collaboration with LG Chem and JV.
Hyundai	1,097,171	China, Korea, US	By 2025, the group plans to launch 25 models and sell 1 million units.

Sources: The production forecasts were prepared by the JICA Study Team based on IHS Markit, Nikkei newspaper article "Tesla Sees 1 Million Units a Year, EV Mass Production competition, GM and VW fierce pursuit" (published on January 29, 2021), and other articles

3) Electrification Trends in the ASEAN Region

Electrification of vehicles in the ASEAN region, including Indonesia and Thailand, has just begun. In Thailand, EVs have been sold mainly by Chinese manufacturers and European luxury car manufacturers; the sales volume is less than 3,000 units in 2020 and when excluding Range Extender, the number is only 700-800 units. In Indonesia, Hyundai Motor rolled out two types of EVs to its market in 2020 and sold about 300 units for ride sharing in the public sector and Grab. Hyundai Motor also announced its plan to produce and export EVs in Indonesia in the future; however, details of the plan have not been made clear.

Japanese auto makers, such as Toyota and Honda, which have high market shares in the ASEAN region, will focus on hybrid vehicles for the time being. Availing the investment incentive[9] by the Board of Investment (BOI) of Thailand from March 2018, Toyota started to invest 19 billion baht in order to start producing compact SUVs or the C-HR hybrid model and then gradually expand the models starting with Corolla Artis, Corolla Cross, etc. It is expected that Toyota will make Thailand its production base for internal combustion engine systems on the GA-C platform and HEVs in particular. Meanwhile, Honda also plans to expand its production based in Thailand, centering on HEVs; it already started the local production and sales of City

[9] BOI's investment incentives for 2018 will exempt import tariffs on machinery and equipment for hybrid projects, and will reduce excise taxes to 10% when batteries are assembled.

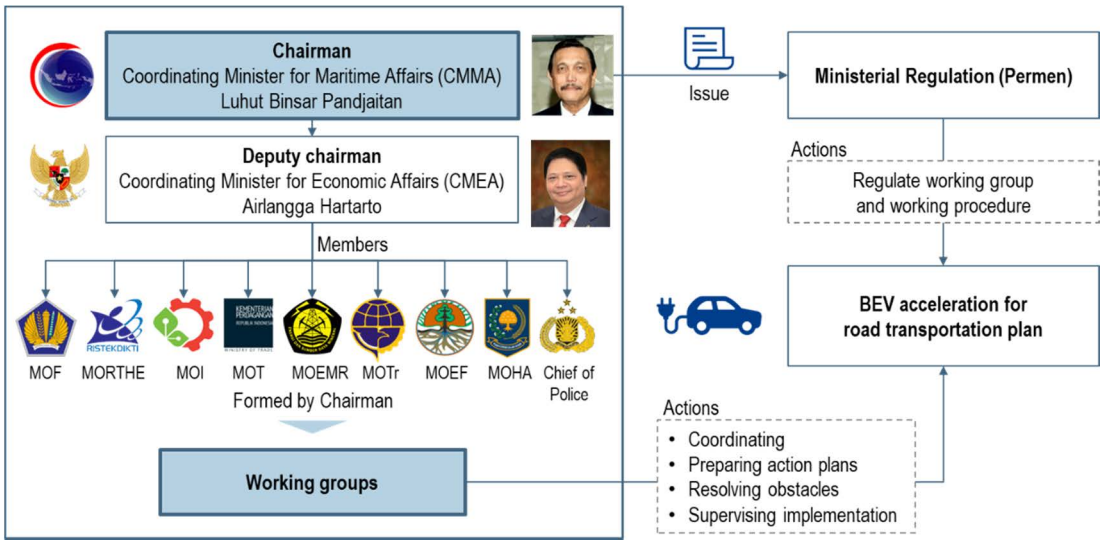
HEV: e in November 2020. Nissan plans to expand its operations centering on e-Power; in the ASEAN region; availing BOI incentives it invested 10 billion baht to start the local production of Kicks and export of the model to Japan.

In the future, there is a concern that the supply of batteries will be insufficient due to the expansion of EV production. In order to secure the materials for batteries, an interest in investing in Indonesia, which is a major nickel-producing country since 2019, is growing, especially among battery manufacturers. In Indonesia, the EV market has yet to start up. However, there is an unusual progress in which investment plans for the production of batteries and their materials are announced one after another.

4.1.2 Current Situation and Issues Surrounding the Indonesian Automotive Industry Roadmap

(1) Acceleration of the Electric Vehicle Production: LCEV Program

With the launching of the "Automotive Roadmap 2035" in 2018, the Ministry of Industry announced a policy to promote the production of electric vehicles (e.g., battery powered electric vehicles [BEVs] and hybrid electric vehicles [HEVs]) and other low carbon emission vehicles (LCEVs) and become the LCEV production base such as BEVs. Following the roadmap, the Presidential Regulation No. 55 of 2019 (issued in August 2019) sets up the nation's plan to promote the development and local production of BEVs. Article 34 of the regulation stipulates the establishment of an inter-ministerial coordination team with the Coordinating Minister of Maritime Affairs (CMMA) as the chairman, the Coordinating Minister for Economic Affairs (CMEA) as the deputy chairman, and ministers of relevant government agencies as its members. CMMA Lufut is the person responsible for leading the "SOE Battery Consortium (state owned battery consortium)" and battery-related investment strategies for domestic production of batteries, which have been gaining attention recently. The Ministry of Industry is mainly in charge of setting the guidelines for calculating the BEV local content ratio and the Ministry of Transport is in charge of setting up the guidelines for BEV certification tests.



Source: JICA Study Team

Figure 4.1.7 Coordination Team for Accelerating BEV in Article 34 of Presidential Regulation No. 55 of 2019

The Presidential Regulation No. 55 of 2019 further stipulates that relevant ministries and agencies establish detailed implementation rules within one year. Following the regulation, relevant ministries and agencies have been working to formulate related rules and regulations and roadmaps to promote EVs. In 2020, a series of BEV-related rules and regulations have been formulated including the Ministerial Regulations No. 27 ("Specifications, Roadmap Development and Calculations of Domestic Component Level Values for Battery-Powered Electric Vehicles") and No. 28 ("Battery Electric Vehicle in Complete Knockdown and Incomplete Knockdown") by the Ministry of Industry, No. 13 ("Provision of Electrical Charging Infrastructure for Battery-Powered Electric Vehicles") by the Ministry of Energy and Mineral Resources, and No. 44 ("Physical Testing of Battery-Powered Electric Motor-Vehicles") by the Ministry of Transport.

In addition, under the banner of *Making Indonesia 4.0*, Government Regulation No. 45[10] of 2019drastic tax cuts on R&D&D and human resource development investment was issued to achieve the advancement in the value chain.

Table 4.1.3 Overview of Indonesian Automotive Policy since 2018

	Contents	Relevant Policies
LCEV (Low Carbon Emission Vehicle)	• Expand the automobile production to four million units and exports 1.5 million units by 2035 • Plan to increase LCEV production ratio	• "Automotive Roadmap 2035" Ministry of Industry (2018) • Ministry of Industry "Making Indonesia 4.0" (March 2017)

[10] JETRO Business Report 26th July 2019

	Contents	Relevant Policies
Promotion Measures and Production Base	from 10% in 2020 to 30% by 2035 • Amendment of the luxury tax (PPN) based on CO2 emissions and fuel consumption (reduction of tax rate on LCEV)	• Government Regulation No. 73 of 2019 (Amended) "Luxury Car Tax"
Electric vehicle (2 wheels and 4 wheels)	• Clarification of for the market roll out of electric vehicles (tax incentives, R&D&D promotion, inter-ministerial policy areas, local content ratio targets). • Calculation method of domestic parts for 2 wheels and 4 or more wheels: battery 35%, assembly 10%, etc. • Definition of CKD and IKD of domestic BEV • Regulations on the installation / operation organization (PLN, etc.) and sales model of charging infrastructure services • BEV certification test regulations	• Presidential Regulation No. 55 of 2019 (PR 55/2019) • Ministerial Regulation No. 27 of 2020 by the Ministry of Industry: Specifications, Roadmap Development and Calculations of Domestic Component Level Values for Battery-Powered Electric Vehicles • Ministerial Regulation No. 28 of 2020 by the Ministry of Industry: "Battery Electric Vehicle in Complete Knockdown and Incomplete Knockdown" • Ministerial Regulation No. 13 of 2020 by the Ministry of Energy and Mineral Resources: Regulations on Charging Infrastructure for BEV • Ministerial Regulation No. 44 of 2020 by the Ministry of Transport: Physical Testing of Battery-Powered Electric Motor-Vehicles
Policies related to advancement of the value chain such as R&D&D	• Significant tax cuts on R&D &D and human resource development investments are granted up to three times the investment amounts, including land and buildings (Super Deductible Tax).	• Government Regulation No. 45 of 2019 • Ministry of Finance Ordinance No. 153 of 2020 (PMK No. 153/2020)

Source: JICA Study Team based on Relevant Regulations of the Indonesian Government

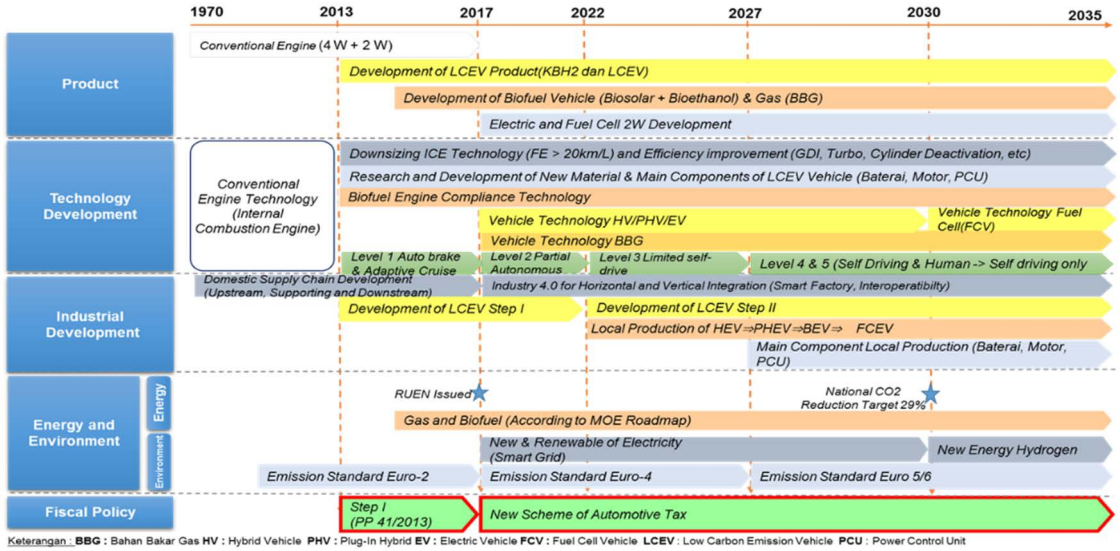
(2) Outline of Indonesian Automotive Industry Roadmap

The Ministerial Regulation No. 27 of 2020 (issued on September, 2020) by the Ministry of Industry officially approves the Automotive Roadmap, and its contents are described in the succeeding sections.

1) Automotive Industry Roadmap

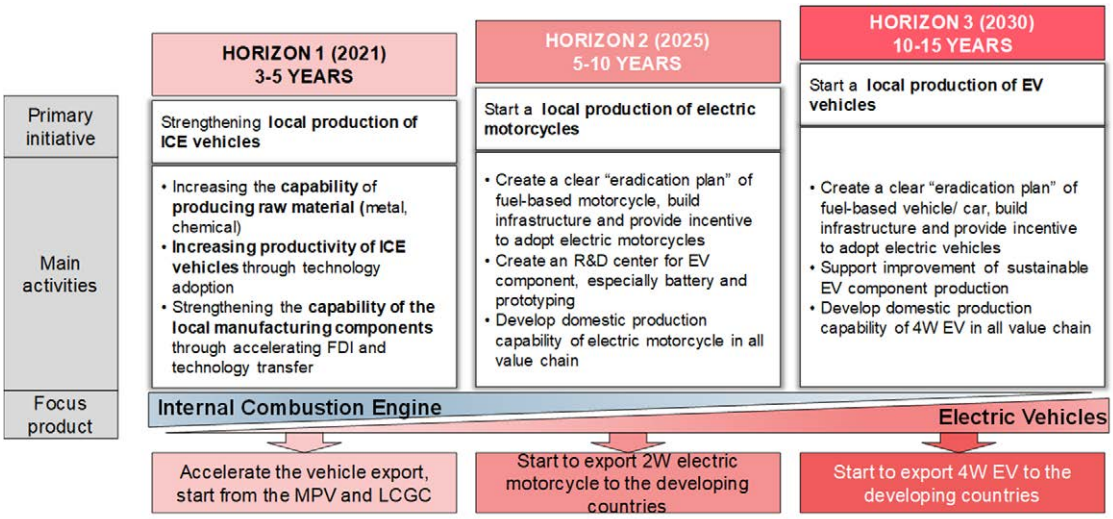
The "Roadmap for the Development of the Automotive Industry" presented by the Ministry of Industry maps out the path for developing LCEV products, technologies, and related industries. LCEV refers to low-carbon emission vehicles in general, including full hybrids, mild hybrids,

PHEVs, BEVs, fuel cell electric vehicles (FCEVs), etc. Full-scale domestic production of LCEVs will begin in 2022; electrification of vehicles will advance in the order of HEVs, PHEVs, BEVs, and reach the FCEV stage by 2035. At the same time, the Indonesian Government will promote the development and popularization of fuel-efficient downsizing engine ICE and biofuel.



Source: Ministry of Industry "Roadmap towards Automotive 4.0"

Figure 4.1.8 Technology Roadmap in Indonesia



Source: Ministry of Industry "Roadmap towards Automotive 4.0"

Figure 4.1.9 Indonesian New Car Roadmap

2) Quantitative Targets for the National Motor Vehicle Industry Development

The Automotive Roadmap draws up the plan to increase the domestic automobile production to four million units by 2035 and exports to 1.5 million units and the LCEV production ratio from 10% in 2020 to 30% by 2035[11].

Table 4.1.4 Indonesian Production / Export / LCEV Ratio Targets

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

Note: LCEV: Low Carbon Emission Vehicle LCGC: Low Cost Green Car
Source: IMATAP, Ministry of Industry (24 Augusts 2020) "The Government Policy on Automotive Policy- Post Covid 19"

In order to facilitate the roll out of LCEVs, the government enacted the Government Ordinance No. 73 of 2019 Amended (PP 73/2019 re.) and revised the new luxury car tax system, which to be take effect on October 16, 2021. The policy aims to promote eco-friendly, fuel-efficient vehicles by setting CO2 emissions and fuel efficiency standards as a base for luxury car tax. In addition, once certified as LCEV program and domestic production standards are met, the value added tax rate (PPN) for PHEV, BEV, FCEV will be 0% zero and 20 to 30% for HEV. The method for calculating the local content rate of BEVs is stipulated in the Ministerial Regulation No. 27 of 2020 by the Ministry of Industry ("Specifications, Roadmap Development and Calculations of Domestic Component Level Values for Battery-Powered Electric Vehicles"), which will be discussed in the next section.

[11] As of today (April 2021), Ministry of Industry have updated table 4.1.4.

Table 4.1.5 Luxury Tax Structure of LCEV (PPn) in Indonesia (to be put into effect in October 2021)

	Category		Fuel Consumption (Km/L)		CO2 (g/Km)	E/G Volume (cc)		
			Gasoline	Diesel		< 1.5	1.5 - 3.0	> 3.0-4.0
LCEV	Passenger Vehicle	(< 10 persons)	>15.5	>17.5	<150	15%		40%
			>11.5 - 15.5	>13.0 - 17.5	150 – 200	20%		50%
			9.3 - 11.5	10.5 - 13.0	>200 – 250	25%		60%
			<9.3	<10.5	>250	40%		70%
		(≥ 10 s.d. 15 persons / Minibus)	>11.6	>13.1	<200	15%		25%
			=<11.6	=< 13.1	>=200	20%		30%
	Commercial	Double Cabin	>15.5	>17.5	<150	10%		20%
			11.6 - 15.5	13.1 - 17.5	150 – 200	12%		25%
			<11.6	<13.1	>200	15%		30%
	Program	KBH2	>=20	>=21.8	<=120	3%		
		Hybrid/Mild Hybrid	>23	>26	<100	2%	8%	20%
			>18.4 - 23	>20 - 26	100 – 125	5%	10%	25%
			>15.5 - 18.4	>17.5 - 20	>125 – 150	8%	12%	30%
		Flexy Engine (E100/B100)	-	-	-	8%		
		PHEV, EV/FC	All type	All type	All type	0%		
Supercar		>4000cc						95%

Note: E/G: Exhaust Gas Volume KBH2: LCGC (Low Cost Green Car)
Source: Ministry of Industry

3) BEV Roadmap (Roadmap of Battery-based Electric Motor Vehicle Industry Development, 2020-2030)

The roadmap for BEVs by the Ministry of Industry is as shown in the figure below. 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.

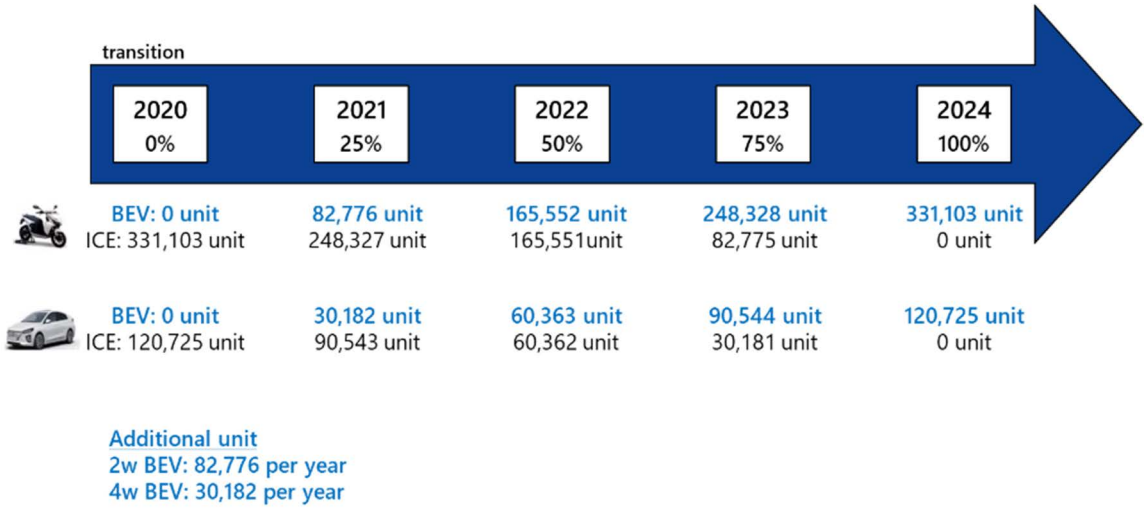
Until 2025, the focus would be formation of local BEV market and BEV industry. Continue short-medium measures are to widen BEV special zones and prepare FTA strategy to export BEV The medium-long measures are to develop BEV raw materials and component industries as well as start production of 2w (CKD, 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.

Source: IMATAP, Ministry of Industry (11 March 2021) "Strategy and Roadmap for BEV Industry"I

Figure 4.1.10 BEV Roadmap Formulated by the Ministry of Industry

As shown in Figure 4.1.2, the EV purchase incentive measure launched in the first phase is the conversion of official cars used by the government and cars used in tourist destinations for ecotourism to BEVs.



Source: Ministry of Industry

Figure 4.1.11 Ministry of Industry's Plan to Convert Official Vehicles etc to BEVs

In addition, the Ministerial Regulation No. 13 of 2020 by the Ministry of Energy and Mineral Resources ("Regulations on Charging Infrastructure for BEVs") stipulates that PT Perusahaan Listrik Negara (PLT, state owned electricity company in Indonesia) shall take the lead in developing charging infrastructure in cooperation with related businesses including the private sector. The PLN's charging infrastructure roadmap states that in order to achieve the government's market roll out of BEVs, $3.7billion, which includes private investments, need to be invested to set up 31,000 charging stations.

4) Roadmaps for Main BEV Component Industries and BEV Charging Industry

The Presidential Regulation No. 55 of 2019 sets the domestic production targets of BEVs as shown in the table below. In order to avail the luxury tax exemption for four-wheel vehicles, BEV makers need to gradually increase domestic production and achieve 35% by 2021, 40% by 2023, and 80% by 2030.

Table 4.1.6 Domestic Production Target of BEVs (Presidential Regulation No. 55 /2019)

<table>
<tr><th rowspan="2">Year</th><th colspan="2">Vehicle Type</th></tr>
<tr><th>2W and 3W</th><th>4W and more</th></tr>
<tr><td>2019</td><td rowspan="5">40%</td><td rowspan="3">35%</td></tr>
<tr><td>2020</td></tr>
<tr><td>2021</td></tr>
<tr><td>2022</td><td rowspan="2">40%</td></tr>
<tr><td>2023</td></tr>
<tr><td>2024</td><td rowspan="2">60%</td><td rowspan="6">60%</td></tr>
<tr><td>2025</td></tr>
<tr><td>2026</td><td rowspan="4">80%</td></tr>
<tr><td>2027</td></tr>
<tr><td>2028</td></tr>
<tr><td>2029</td></tr>
<tr><td>From 2030</td><td>80%</td></tr>
</table>

Source: JICA Study Team based on the Presidential Regulation No. 55/2019

The Ministerial Regulation No. 27 of 2020 by the Ministry of Industry stipulates the local content ratio calculation method, so-called TKDN[12], which is a point system by parts and processes. For example, the battery is 35%, the drive train is 15%, and the assembly is 10%. Up to 20% is allowed if the R&D process is done in Indonesia. In other words, unless the battery that earns the maximum points is domestically produced, it is extremely difficult to achieve the target rate. In interviews conducted to auto makers in Indonesia by the JICA study team, many companies shared that local production of EVs is still premature since batteries cannot yet be procured locally thus it is difficult to achieve the local content ratio target. In the interviews quoted below, companies further requested for changes and clarification of domestic production standards.

- *It is desirable to change to a domestic production schedule that matches the actual conditions of the supply chain. (Car maker A)*
- *We would like the change in the calculation method for domestic production, such as raising assembly points. Also, because the definition of domestic production of batteries is ambiguous, we are still uncertain to what level of domestic production is required. (Car maker B)*

[12] Tingkat Komponen Dalam Negeri (TKDN): it is translated as local content ratio. TKDN is calculated as followed: TKDN = (manufacturing costs – costs of imported raw materials, parts and components) / manufacturing costs

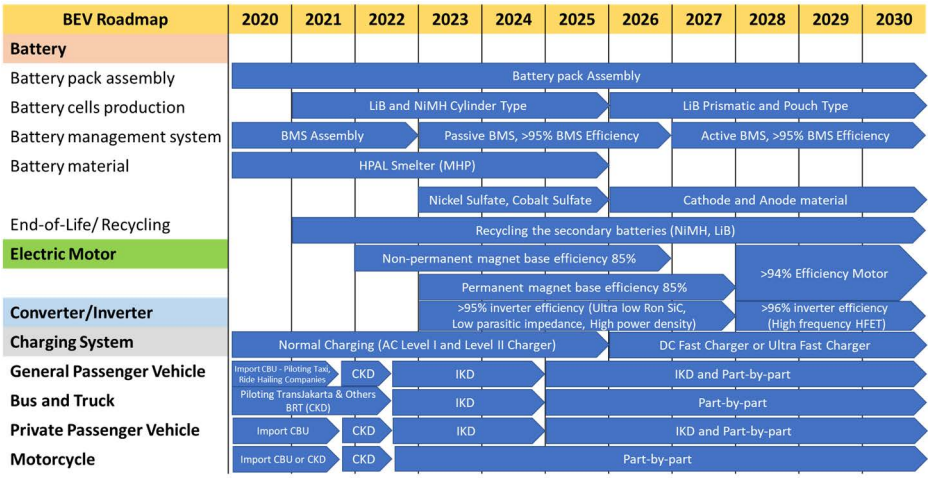
As standards for domestic production of hybrid vehicles are not mentioned in the Ministerial Regulation No. 27, they are being separately formulated by the Association of Indonesia Automotive Industries (GAIKINDO). Under the GAIKINDO's guidelines for domestic production of hybrid vehicles, it is expected that domestic production of batteries or motors and inverters will be required.

Table 4.1.7 Calculation Method for the BEV Domestic Production Rate (Ministerial Regulation No. 27/2020, Ministry of Industry)

Detail Component	Score (%)		Scope of Assessment
	4 Wheel	2/3 Wheel	
Main Component	**55**		a. Direct cost material b. Direct manpower fee c. Non direct cost factory (factory overhead)
Body and Chassis Parts	7		
Battery (BMS, Module and Cell)	35		
Drive Train Parts	13		
Supporting Component	**15**		
Steering System	4		
Suspension	2		
Brake System	4		
Universal Component (Tire, Wheel, Bolt, Nut etc)	5		
Development Component by R&D	**20**		Implement R&D stage
Assembly	**10**		a. Manpower b. Equipment
Total	**100**		

Source: JICA Study Team based on the Ministerial Regulation No. 27/2020, Ministry of Industry

Plans for domestic production of batteries, motors and charging stations are shown in the Automotive Roadmap. In the first phase, production of cylinder-type battery cells, which are mainly used for motorcycles, will start in 2021. In the second phase, production of prism and pouch-type battery cells will be produced after 2026. Production of materials for batteries is targeted to start in 2023.



Source: Automotive Roadmap 2035, Ministry of Industry

Figure 4.1.12 BEV Main Parts and Battery Charging System Industry Roadmap

The government has a policy of giving top priority to the domestic production of positive electrode materials for batteries that use domestically-produced nickel and cobalt. The reason for this is that Indonesia is the world's largest exporter of nickel as of 2019, accounting for 40% of the world's export value (see Table 4.1.8). Eyeing for positive electrode materials to be produced domestically in the future, the Indonesian Government plans to impose the total ban on the export of nickel ore and to require refining of nickel ore to be done domestically from 2020 onwards.

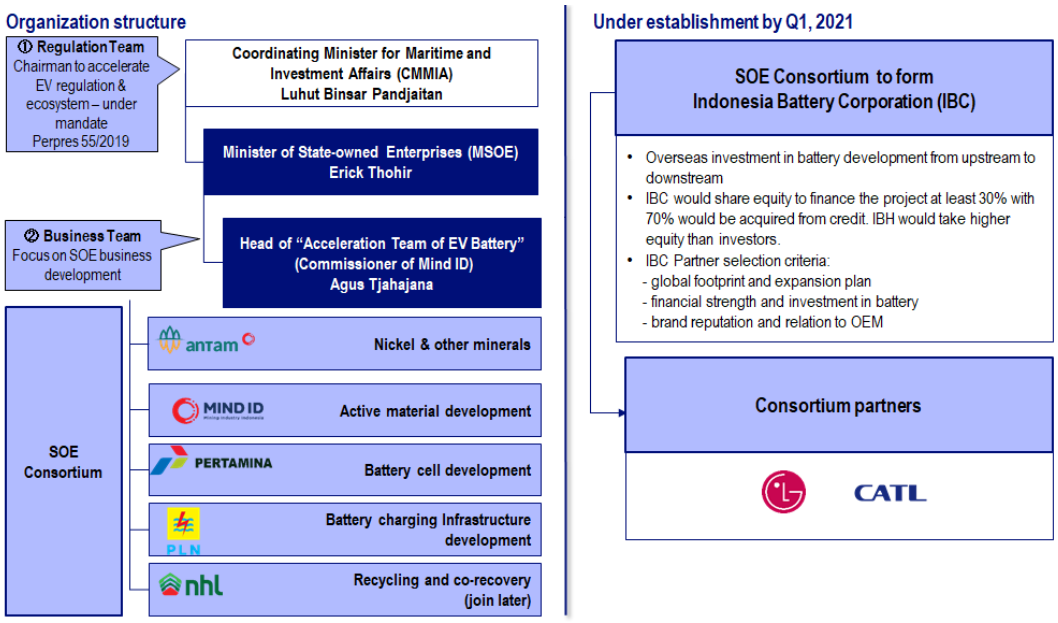
Table 4.1.8 Main Nickel Exporters in the World

	Country: Export Value (2019)
1	Indonesia: US$1.7 billion (37.2% of total nickel exports)
2	Zimbabwe: $737.1 million (16.0%)
3	Philippines: $600.4 million (13.0%)
4	New Caledonia: $480.4 million (10.4%)
5	Australia: $307.5 million (6.7%)
6	Finland: $241.7 million (5.2%)
7	United States: $177.7 million (3.8%)
8	Canada: $163.1 million (3.5%)
9	Ivory Coast: $120.3 million (2.6%)
10	Guatemala: $23.0 million (0.5%)
11	Russia: $19.7 million (0.4%)
12	Zambia: $14.6 million (0.3%)
13	Albania: $6.9 million (0.2%)
14	Belgium: $2.5 million (0.1%)
15	Germany: $2.3 million (0.05%)

Source: http://www.worldstopexports.com/top-nickel-exporters-by-country/

The SOE Battery Consortium (Figure 4.1.13) under the Ministry of State-owned Enterprises is promoting a series of policies for domestic production of batteries from upstream to downstream. Separate from the SOE Battery Consortium, government-affiliated research institutes such as LIPI, BATAN, and BPPT and six university institutions such as UNS, ITB, and ITS formed a “battery consortium” in 2015. The academia-oriented battery consortium has been conducting the research and development of locally produced batteries by designating its members to the sub-research teams of positive electrode material, battery cells, battery management system (BMS), etc. The SOE Battery Consortium is exploring the possibility for commercialization and mass production of locally produced batteries developed by domestic research institutes. At the same time, it is looking into commercialization through partnership with foreign battery makers.

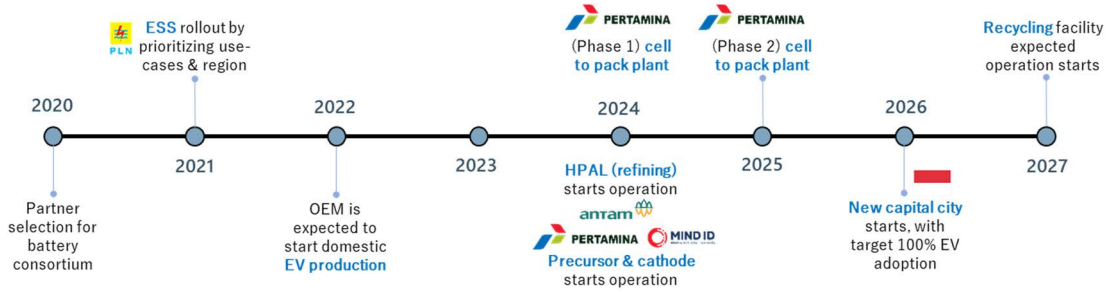
In addition, on March 26, 2021, a holding company, Indonesia Battery Corporation (IBC), was established by four state-owned companies participating in the SOE Battery Consortium, with each company holding a 25% stake. As of the beginning of May 2021, the Company's investment scale has reached $17 billion, and it plans to focus on investments in the upstream battery sector for the next two years.



Source: JICA Study Team based on BKPM materials, etc.

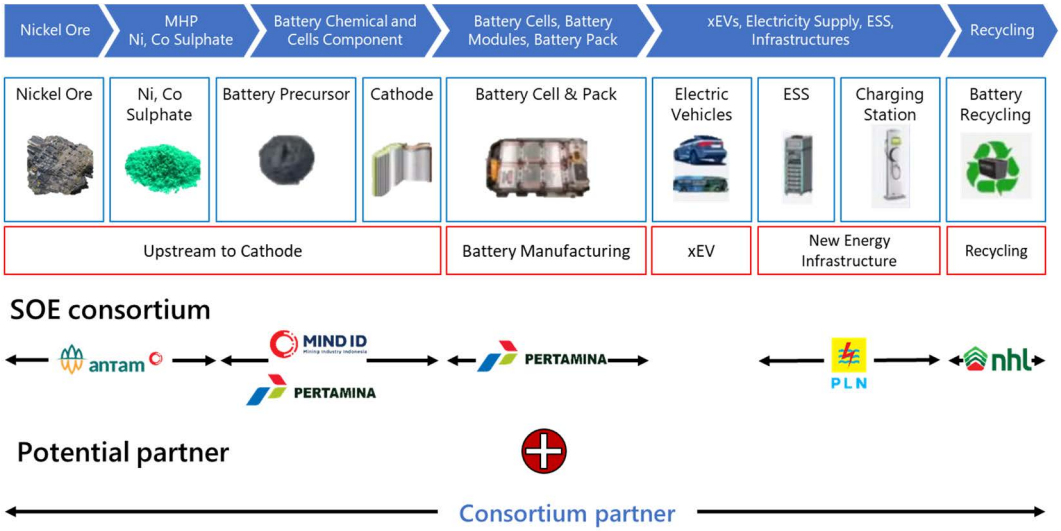
Figure 4.1.13 SOE Battery Consortium

The SOE Battery Consortium plans to invest in battery development by designating segments of the supply chain its members covering from the upper stream segment of raw materials and positive electrode materials, the mid-stream segment of battery cells, and the downstream segment of assembly. Based on the above plan, the CMMA Milestone, which has the jurisdiction over natural resource development and investments, plans to realize domestic production of lithium batteries utilizing domestic natural resources by 2024 (Figure 4.1.14, Figure 4.1.15.)



Source: Acceleration Team for the EV Battery Development, Indonesia

Figure 4.1.14 Domestic Battery Production Plan by the SOE Battery Consortium



Source: Acceleration Team for the EV Battery Development, Indonesia

Figure 4.1.15 Milestones for Battery Development and Localization by CMMA

The government is aggressively implementing partner attraction activities through the SOE Battery Consortium. At present, business investment plans with three potential partners are being considered. The site of the first plan is in Morowali Regency, Sulawesi Island located in northeastern part of Indonesia. QMB, which is being funded by Chinese battery maker CATL, invested 70 billion yen to an EV battery raw material factory and started production in January 2019. This is positioned as the first phase of CATL's $ 5.2 billion investment in lithium-ion batteries in the future. The second plan is the investment to an integrated battery production plant that covers the production of positive electrode material to the final assembly of cell packs by South Korea's LG Energy Solutions. The company signed a memorandum of understanding (MOU) with the Indonesian government in December 2020 for the investment worth $9.8 billion. The second plan is regarded as the most promising business plan to be realized, in which EV maker Tesla, which is currently negotiating with the Indonesian government, to plan investment primarily in energy storage systems (ESS) and power packs. As mentioned above, Indonesia is encouraging investments in downstream industries of raw materials by making a good use of its potential stemming from being a nickel and cobalt producing country. It has so far achieved some degree of success.

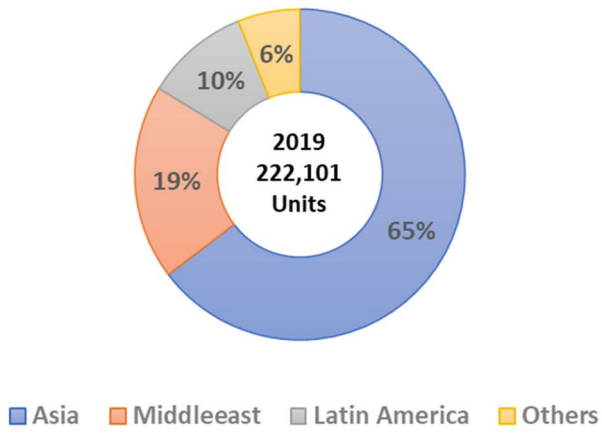
(3) Automobile Export Strategy

The Automotive Roadmap projects that the automobile export volume of Indonesia will triple to 900,000 units by 2030 and quintuple to 1.5 million units by 2035. Indonesia has been experiencing the expansion of exports due to a partial transfer of auto production from Thailand.

According to GAIKINDO statistics, its export volume reached 330,000 units in 2019 up from 210,000 units in 2015. While the volume is on rise, the gap with the government's target remains big.

For export promotion, the Indonesian government has been implementing two policies. The first is the LCEV policy and the new luxury tax (PPn) system, as discussed above. Previously, the tax rate was roughly set based on car types and exhaust volumes; therefore, the tax rate for specific vehicle types such as multi-purpose vehicles (MPVs) was as low as 10% and the rate for sedans as high as 30%. With the new luxury tax, if CO2 emissions are low, the tax rates become lower even for cars like sedans that used to have high tax rates. If this encourages auto makers to produce various vehicle types and models domestically and the mass production of new types or models is achieved, the potential for export expansion will grow.

The second is the expansion of export destinations through FTAs. According to 2019 trade statistics, Indonesia's finished vehicle exports are heavily concentrated in Asia, occupying 65% of its share (see Figure 4.1.16). Within Asia, the Philippines is the top export destination of finished cars from Indonesia with the export volume exceeding 60,000 units. Indonesia is highly dependent on exports to specific countries. The Indonesian government has special focus on Australia, which has a market of 1 million units. With the signing of the Economic Partnership Agreement (EPA) between the two countries in March 2019, exports to Australia are expected to expand. However, Indonesian automakers pointed out that it will be difficult to expand exports into Australia in the short term because of the EURO 5+ emission regulations in Australia (EURO 2 in Indonesia) and the strict safety standards (ANCAP). They also mentioned that the market for MPVs, Indonesia's main export model, is small in Australia, and that SUVs, whose production has recently expanded in Indonesia, might be required larger sizes and displacements in Australia, resulting in different products and segments.



Source: JICA Study Team based on UN Comtrade

Figure 4.1.16 Composition of Indonesian Automobile Export Destinations in 2019

(4) EV strategy

The Indonesian government has laid out its EV strategy through the Automotive Industry Development Roadmap that centers around on the LCEV program and the BEV domestic production policy based on Presidential Regulation No. 55/2019. There are two points that the Indonesia's EV policy sets itself apart from its neighboring countries such as Thailand: the emphasis on accelerating the conversion from internal combustion engines to BEVs and the promotion of domestic production from battery materials and cells. BEV acceleration measures include (1) reduction of tax rates such as luxury tax (PPn), and (2) government EV purchase incentive measures. The former has already been mentioned in the earlier section (1.1.2) , titled "Acceleration of Electric Vehicle Production: LCEV Program".

While the transition from internal combustion engines to BEVs is unavoidable in the long run, Many auto makers, particularly the Japanese companies, still consider that transition should be done gradually in consideration of market acceptance and battery prices. There are four bases for this argument. Firstly, since BEVs that require large batteries are still pricey, the income group that can purchase the products is small, thus the market for BEVs is small. Secondly, infrastructure development such as setting up charging stations require massive investments and takes a long time. Thirdly, Indonesian users prefer cars that can board a large number of people; small city cars that can board only a few people, which have recently been driving EV sales in China do not match the Indonesian market. Fourthly, Indonesia's electric power generation is highly dependent on coal-fired power generation, which emits a large amount of CO2; when analyzed from Well to Wheel (WtW), the reduction in CO2 cannot be expected. In order to realize the Co2 reduction effect of "Well to Wheel", it is indispensable to significantly increase the use of alternative energy.

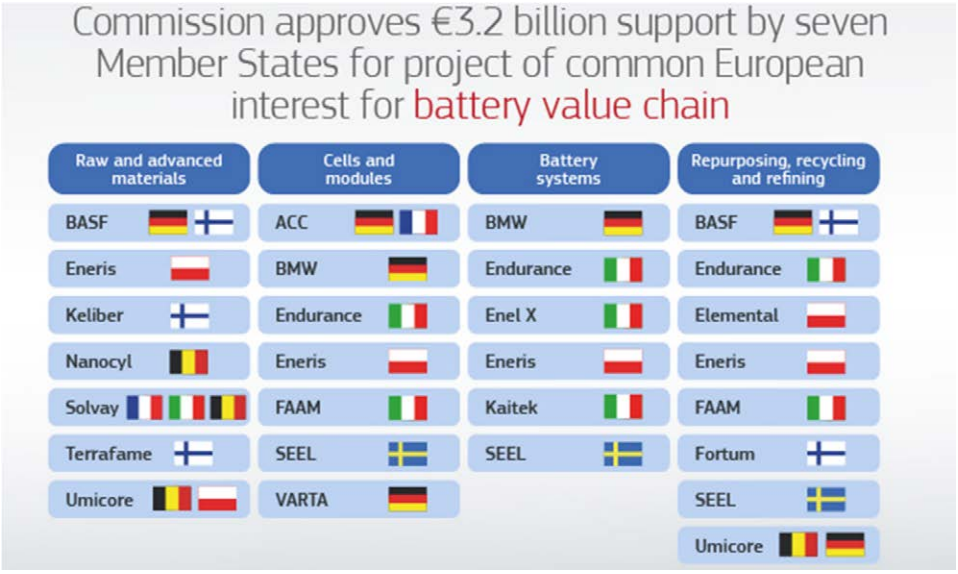
As mentioned above, CMMA aims to realize domestic production of battery materials and cells by 2024. In the interview survey conducted by the JICA study team with automobile maker, there were also the following cautious opinions regarding the possibility of early domestic production of batteries.

- *"On one hand, the materials available in Indonesia are nickel and cobalt, which account for 70% of the positive electrode materials. On the other hand, Indonesia relies heavily on the imports to get graphite and lithium, which are used as negative electrode materials, and many of their intermediate materials. Since battery production is done with a high degree of automation, Indonesia's cheap labor force does not have an advantage. Moreover, raw materials are procured at international prices, therefore, even locally produced, the nickel price does not decrease significantly. For battery production, the economy of scale is the most effective mean to lower the price. At this moment it is presumed that it is cheaper to import batteries because the Indonesian market is still small. "(Indonesian domestic automobile manufacturer)*

- *"Domestic production of batteries will take seven years when you think about the production process of batteries starting from sourcing raw materials. When the postponement of the nickel refining business of Sumitomo and Vale due to the influence of the Covid-19 pandemic is taken into consideration, it is estimated that it will take more than seven years."(Indonesian domestic automobile manufacturer)*

The establishment of the European Battery Alliance (EBA) in Europe and the development of the supply chain for batteries using the framework through public-private partnerships are good references when Indonesia sets out to develop its EV supply chain in Asia in the future. Aiming to develop a complete EV supply chain in Europe, EBA has been working to formulate partnerships in the development of supply chains in each value chain segment with a wide range of stakeholders, including raw material manufacturers, parts manufacturers, and automobile manufacturers. In December 2019, the EU agreed to contribute €3.2 billion for the Important Projects of Common European Interest (IPCEI) project to build up an EV value chain (see Figure 4.1.17). Supporting research and development and technological innovation of batteries, was jointly proposed by seven countries, namely Belgium, Finland, France, Germany, Italy, Poland and Sweden. The project is working to build a system that does not rely too much on the battery supply from South Korean and Chinese companies. Since it is clear that the demand for batteries will increase as electrification progresses in Asia in the future, it will be necessary to build a supply chain that can provide a stable supply of batteries by then. As a country producing nickel—one of the raw materials for batteries—the Indonesian government has been working on the development of a nickel smelter to add value to the industry from a mere ore export to a producer of raw materials for EV batteries and to establish itself as an EV battery manufacturer through foreign capital attraction. That being said, the above-mentioned SOE consortium, however, has only few participating companies at the moment. Thus, it cannot be said that the battery supply chain can be completed in Indonesia at the moment.

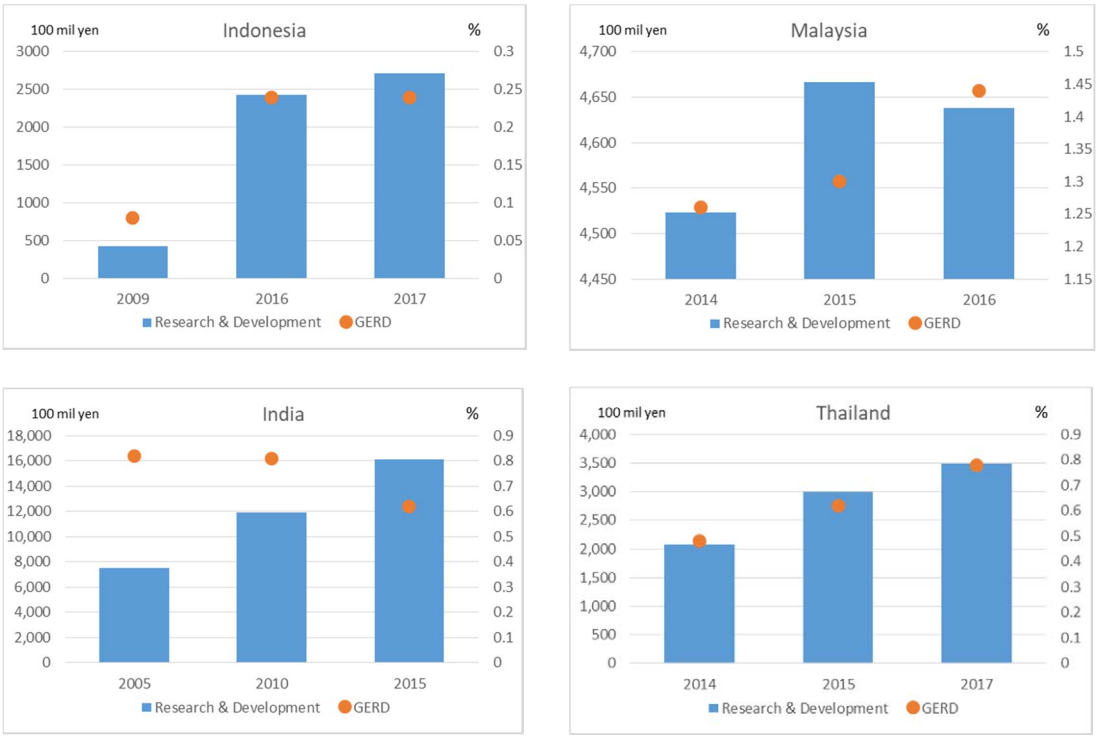
In order for Indonesia to become a hub for EV battery production, it is necessary to build a value chain and supply chain through public-private partnerships. While it may be difficult for a single country to issue a policy such as the one done by EU providing a huge financial support for EV-related R&D, the Indonesian government need not only set investment incentives, but also continue implementing promotion and other related activities under a strong leadership by the government including: building a framework that involves more domestic and foreign private companies; attracting more support from private companies, and improving investment incentives if existing ones have not proven to be effective. Furthermore, the government should also work on building the supply chain in the ASEAN or Asian regions in case the supply chains cannot be built in Indonesia.



Source: European Commission, December 2019

Figure 4.1.17 EU EBA Battery Value Chain

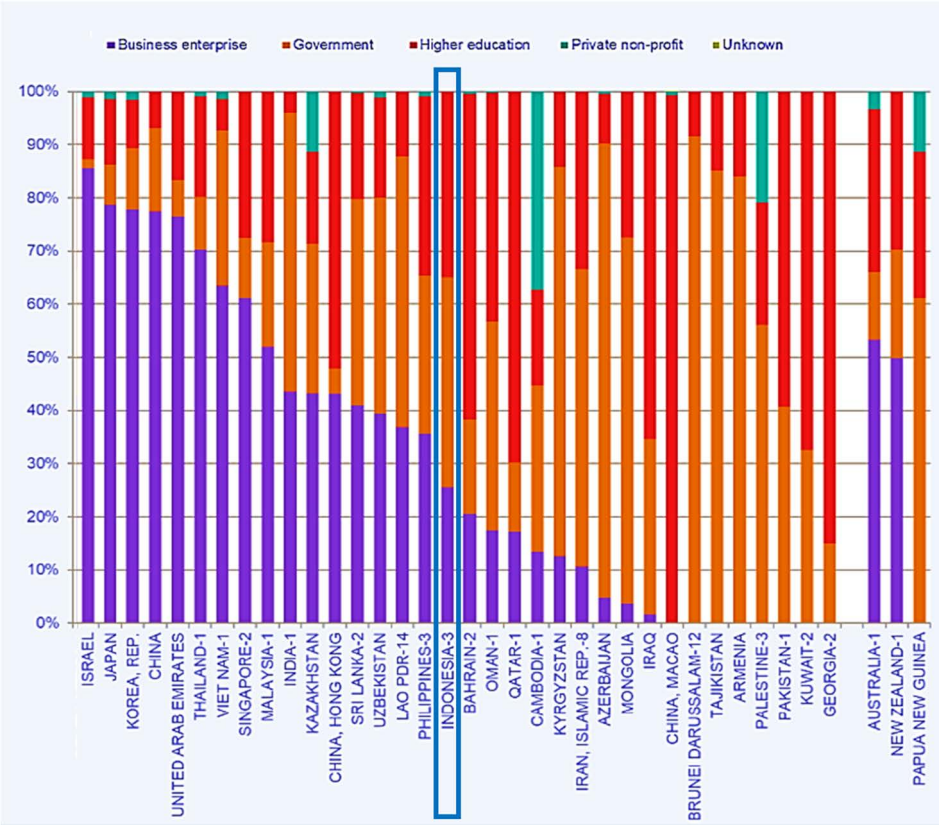
R&D costs for the entire industry in Indonesia are increasing year by year (Figure 4.1.18). The total volume of R&D investments in 2017 has increased to about five times that of 2009. The gross domestic expenditure on R&D (GERD) of Indonesia, however, is still sluggish; the low level of spending stands out when compared with that of Malaysia (1.44% in 2016), India (0.62% in 2015), and Thailand (0.78% in 2017).



Source: JICA Study Team based on the Indicators of Science and Technology, Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2019

Figure 4.1.18 Research Funds and GERD in Asian countries

In addition, compared to other Asian countries, Indonesia tends to have less private R&D investments and more government R&D investments.



Source: UNESCO

Figure 4.1.19 Breakdown of R&D investment in major Asian Countries

The delay in the advancement of R&D in the Indonesian automotive industry is caused by several factors. Firstly, there is a prevalent perception on R&D in Indonesia that it is something that should be carried out freely by private companies, and not backed by government policies. Secondly, graduates from higher education institutions who have obtained an academic foundation to work in product development are being employed in other industries such as finance and IT instead of the automotive industry. Thirdly, the incentive to set up new R&D centers in Indonesia is lower since private companies engaged in global operations already have R&D centers in other Asian countries such as Thailand. The R&D setback issue is more salient among SMEs.

In order to improve this situation and promote R&D related to the automotive industry, the Ministry of Finance promulgated Minister of Finance Regulation No. 153 in 2020, which stipulates tax incentives for R&D. The regulation serves as bylaws of the Government Regulation No. 45 of 2019, which stipulates large-scale tax cuts for human resource development and R&D investments (See more in Table 4.1.9).

Table 4.1.9 Summary of the Ministerial Regulation No. 153 of 2020 by the Ministry of Finance

Target sectors (11 fields)	1)Food, 2)pharmaceuticals/cosmetics/health appliances, 3)textiles/leather/shoes, 4)transportation equipment, 5)information and communication technology, 6)energy, 7)capital goods/parts/auxiliary materials, 8)agricultural industry, 9)metal/other excavations, 10)oil/natural gas/coal-based chemicals, 11)defense and security
Deduction rates	1. When intellectual property rights are acquired through R&D: 50% 2. When intellectual property rights are acquired overseas through R&D: 25% 3. When R&D reaches the commercial stage: 100% 4. When conducting R&D in collaboration with public research institutes and higher education institutions in Indonesia: 25% Taxes are additionally deducted based on the above-mentioned scenarios.
Deductible costs	・ Assets (not including land and buildings; including utilities, fuel and maintenance costs) ・ Goods and materials ・ Personnel costs and honorarium for employees, researchers and engineers ・ Patent or plant-variety protection (PVT) registration fee ・ Compensation costs for R&D institutions or higher education institutions located in Indonesia contracted for R&D by R&D entities
Validity of tax deduction	It covers R&D activities started on or after the date of issuance of Government Regulation No. 45 of 2019. The duration of R&D is not specified.

Source: JICA Study Team, Ministerial Regulation No. 153/2020, Ministry of Finance

Since investments in R&D&D will not proceed without highly-skilled human resources, higher education institutions will be more required to develop R&D&D human resources that meet industry needs. In order to respond to the market that is rapidly changing by the advent of CASE, it is anticipated that the design and development needs of new products and systems will increase worldwide. Therefore, there will be stronger needs for human resources that can not only do traditional product design and development, and new technology development, but also design the total ecosystems by capturing products, environment, and urban infrastructure as a whole as well as human resources who can improve products and *Kaizen* to satisfy the changing market needs and prices (engineering human resources such as so-called VA/VE).

It should be noted that this JICA study added design (D) to be covered in the study along with research (R) and development (D) based on the lesson of the previous project. It is to keep in mind that auto companies with global operations tend to carry out most of the cutting-edge research and development (R&D) activities at research centers located in their headquarters or limited strategic locations overseas. However, there is a growing tendency to conduct the design (D) portion of activities, such as design drawing adjustment/change, design change, mold design, and process design for domestic production, at their overseas production bases or locations closer to main markets. Automobile manufacturers interviewed by the JICA Study Team also confirmed that they do not consider the need to establish new R&D bases in Indonesia but have a stronger need for D (= Design) to support the production base.

(5) Indonesia Digital Innovation Center（PIDI)

In order to accelerate the implementation of Industry 4.0 in Indonesia, MOI is conducting activities including the creation of an index to measure the level of industry readiness for the transformation, called the Indonesia Industry 4.0 Readiness Index (INDI 4.0), and the formation of the Industry Ecosystem 4.0 (SINDI 4.0). To further accelerate the implementation of Industry 4.0 in the country, MOI is building a Digital Innovation Center (PIDI 4.0) with a total budget of 250B Indonesian Rupees (US$178 million) to implement the innovation.

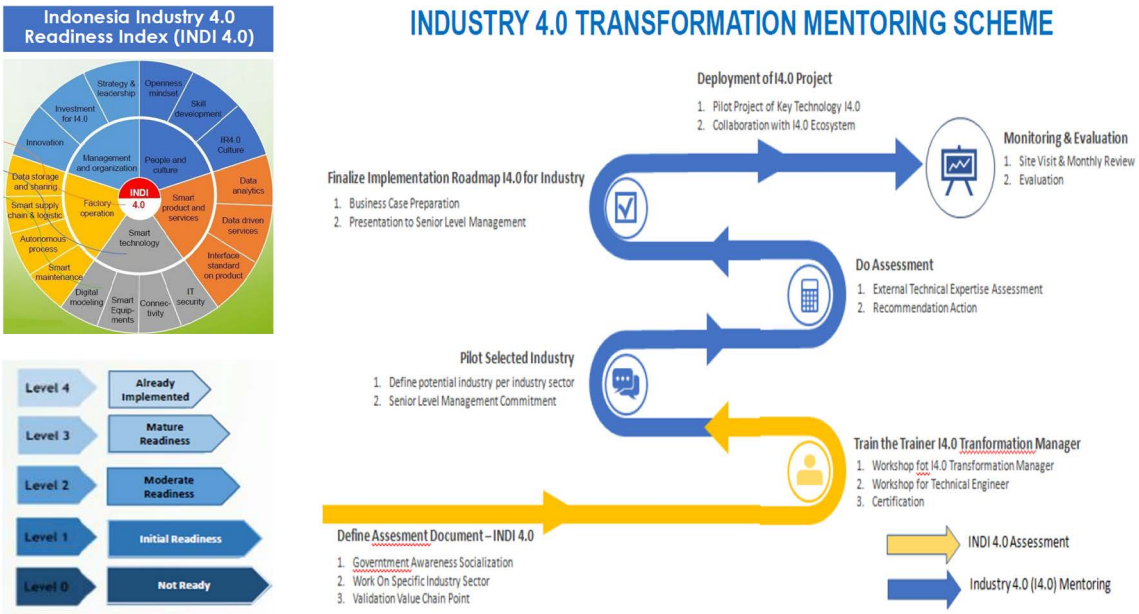
PIDI 4.0 will support the value chain transformation process and generate an ecosystem for Industry 4.0 stakeholders. The 5 functions of PIDI 4.0 will be to serve as technology providers in the implementation of Industry 4.0.

1) INDI4.0 and its KPI

Indonesia's Industry 4.0 Readiness Index, abbreviated as INDI 4.0, is the standard indicator to measure the level of readiness of companies to move into the Industry 4.0 era. INDI 4.0 was introduced by a team from MOI's Industrial Human Resources Development Agency (BPSDMI) and is positioned as a follow-up program to support the Making Indonesia 4.0 program. INDI 4.0 KPIs generally use the following evaluation axes.

INDI4.0 Evaluation Items	Evaluation by INDI4.0
1.People and Culture Entrepreneurship, skill development, open-mindedness 2.Smart Product and Service Standardization in data analysis, data principles, and product development interfaces. 3.Smart Technology IT Security, Connectivity, Smart Equipment、Distal Modeling 4.Factory Operation Data Storage and Sharing, Smart SC/Logistic, Automation, Smart Management 5.Management and Organization Innovation, Investment towards Industry 4.0, Strategy and Leadership	Level 0: Companies are not yet ready to move to Industry 4.0 Level 1: Companies are still in the early stages of readiness Level 2: The company is at the medium level of readiness Level 3: Companies are already at the mature stage of readiness for change. Level 4: The company has implemented some of the concepts of Industry 4.0.

After reviewing and validating the INDI 4.0 achievements, 13 companies were selected to receive the INDI 4.0 award in 2020. The winning companies will be honored with the title of "National Lighthouse Industry4.0” and the companies will be recognized for their leadership in Industry 4.0. According to the Industrial Human Resources Development Agency (BPSDMI), the Lighthouse is a model for the government and a partner in dialogue in implementing Industry 4.0 in Indonesia.



Source: MOI

Figure 4.1.20 INDI 4.0 evaluation axis and the process of company development using this axis at the starting point

2) Overview of PIDI Development and Ancillary Functions

Consistent with the Making Indonesia 4.0 roadmap, the Indonesian Digital Capability Center (IDCC)/Pusat Inovasi Digital Indonesia (PIDI[13]) will be constructed in *Permata Hijau*, south of Jakarta, at a cost of about INR25 billion (US$178 million). The building is expected to be completed in June 2021 and operational in August 2021. PIDI's goal is to assist enterprises in their transformation to digitalization in line with the implementation of the Making Indonesia 4.0 roadmap. PIDI is a one-stop center for Industry 4.0 and is expected to be the window to the world to advance Industry 4.0.

PIDI has five pillars: 1. Showcase, 2. Capability, 3. Ecosystem, 4. Delivery, and 5. Innovation, each with its own objectives. While some of the activities that make up the five pillars are in progress (2. Capability and 3. Ecosystem), others are still in the conceptual stage (5. Innovation). Furthermore, since the PIDI covers six major industries in Indonesia, it is difficult to see the progress of the PIDI concept as a whole.

According to the interview survey on PIDI related to the automotive industry conducted in the Study, there is a high demand for cooperation in the areas of 4. Delivery.

[13] PIDI is intended to serve both the function of developing digital human resources and the function of providing technology for Industry 4.0 in a broader sense.

Table 4.1.10 Current status of PIDI 4.0 features and development needs

	1. Showcase	2.Capability	3. Ecosystem	4.Delivery	5. Innovation
Thoughts and Current Situation	The goal is to raise industry awareness on the importance of implementing Industry 4.0. Using Toyota's Kanban production system as a good example, samples of automated production lines will be show up so that SMEs and others can visit them.	The training center for building expertise in industrial technology, with the aim of upgrading the skills of industrial personnel to realize Industry 4.0. The KPIs are to train 400,000 workers and 4,000 companies, and the basic concept is Digitalization of Production. It is currently planned to collaborate with French companies through the French government, and is in contact with Schneider, Renault, etc.	The goal is to create an ecosystem that connects industry stakeholders. Provide support for entrepreneurs; provide opportunities for SMEs and micro-enterprises to meet customers and expand their business. The Ministry of Industry has already launched an industrial ecosystem called Indonesia Ecosim 4.0 (SINDI 4.0 or Indonesia 4.0) to proactively highlight networking among stakeholders. SINDI 4.0 will be a forum for mutual synergy and collaboration among government, industry, researchers, R&D, technology providers, consultants, and financiers. The number of participating companies is 500-600, with the automotive industry accounting for about half of the 300 or so companies.	Aim to become a delivery center in corporate disital transformation. To train Agents (like SMEs mentors) to be dispatched to SME. Currently, MOI is trying to dispatch 250 Agents trained by McKinsey to SMEs. (Agents are trained in general problem finding and analysis methods, so they are not that specialized and skillful yet.)	Innovation through various trial and intermediary projects in the industrial sector. At this time (August 2020), the content of the project has not been decided, but it is hoped that 40-90 Innovation pilot projects will be realized by 2025.
Indonesia's Needs for Cooperation		MOI has not decided on a specific target industry, but MOI would like to see companies like Schneider participate and support the development of industrial human resources in areas such as the IoT of machinery, sensors, and ICs.	Toyota's Tier 2 and 3 companies are supporting the micro companies under them, and MOI want to promote activities to support such Tier2&3 companies.	From 2006 to 2012, JICA supported the training of diagnosticians with good results, but the target was government employees, so this time MOIwould like to train human resources from the private sector.	

Source: Interviews conducted by JICA Study Team（Aug. 2020）

PIDI will be a research and development activity center under BPSDMI in terms of structure and will support Industry 4.0 applications. The equipment and facilities to be installed in the PIDI are mainly funded by the Indonesian government, but they are also seeking sponsorship from the private sector. However, as mentioned above, it is still difficult to determine the content of the support because the full scope of the PIDI and the strategies for each pillar are still not yet clear.

4.2 Trends in the Automotive Industry since the Start of COVID-19

4.2.1 Moves to the "New Normal" on a Global Scale

(1) Impact on the Supply Chain

The Covid-19 pandemic has affected the entire supply chain, including procurement, production, and sales. In the early days when the virus began to spread from China, it became difficult to procure parts as the logistic network shut down, followed by the halting of production lines due to the shortage of workers as the commute was next to impossible due to the restrictions of movement implemented throughout the ASEAN region. To prevent the spread of virus, factories were temporarily closed, suspending production all together. Alongside the disruption of the supply chains, the world saw the decline in vehicle demands caused by government-imposed restrictions on movement of people and expansion of telecommuting. Production and sales of vehicles have also declined in response to the decline in demand. Depending on countries/regions, the operation of non-essential businesses was prohibited during the lockdown period, forcing auto dealerships and sale stores to close down, which resulted in the loss of sale opportunities and the decrease in the number of cars sold.

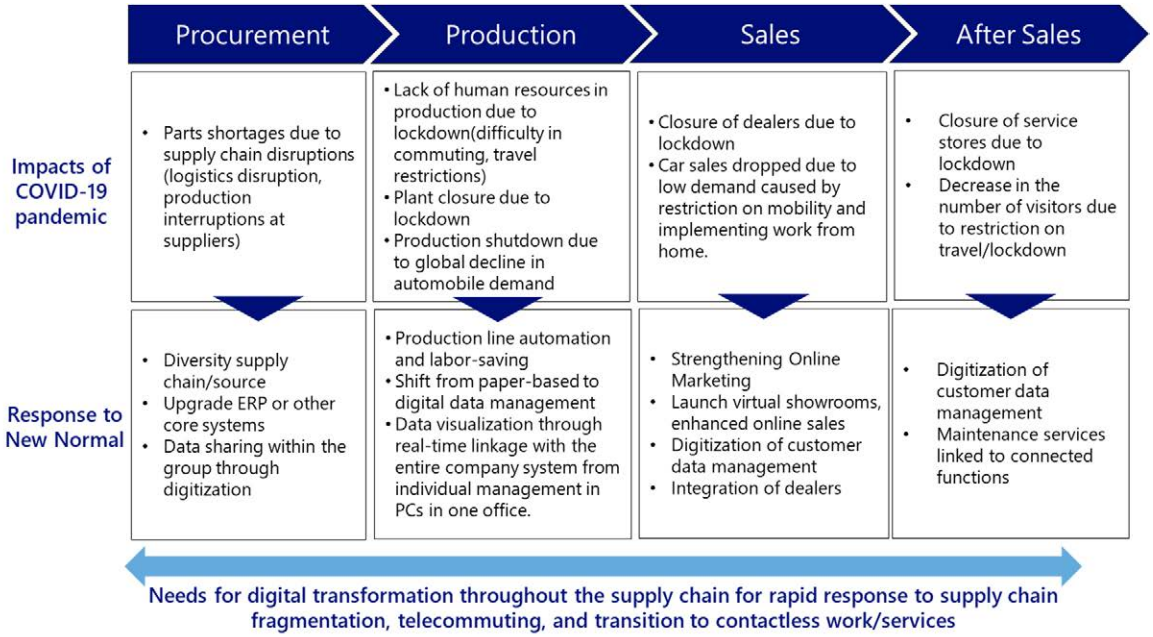
Even before the pandemic due to the influences of trade frictions between the United States and China, there was a growing trend to restructure the supply chains and diversify procurement sources to become less dependent on China. With the experience of the supply chain disruption due to the pandemic, the trend will carry on as the world adjusts to the “new normal”. The key to successful diversification of the supply chain is to digitize the procurement system. It is important not only to achieve the digitalization within the base but also within the supply chain; for example, a group company or a company that is part of the supply chain should be able to share the parts supply status in real time. One of the issues in the manufacturing industry is that the previously introduced core system is old and the specifications cannot support digitalization, so additional investment is required to update the equipment and systems. Even if OEMs have financial resources and can invest, there will be issues such as part suppliers cannot afford to make capital investment to promote digitalization.

In the production process, not only OEMs but also parts suppliers took their own measures such as securing social distance in the production line and measures to prevent droplets. Despite of those measures to respond to the pandemic, companies still have issues, for example, companies are faced with the need to reduce the number of production line technicians and workers due to the decrease in demand; letting go of the human resources who have acquired necessary knowhow from years of training will make it difficult to restart the production operation at a full scale when the demand returns. Due to the sharp drop in demand caused by the Covid-19 pandemic and the uncertainty of market recovery, the adjustment of personnel at production sites requires flexibility. Companies will continue to adopt retrenchment measures through further automation of production lines so that the operation can be done even a small number of people can operate.

Due to the spread of the Covid-19, restrictions on travels have been imposed around the world, and telecommuting and home schooling have begun, resulting in a sudden drop in the use of automobiles. In addition to the drop in automotive sales, there are also areas where sales cannot be made for several months due to the ban on dealers and other sales outlets, forcing a change in the existing sales structure. OEMs are reinforcing web marketing as a sales channel, for example, by increasing customer acquisition through web advertising. OEMs set up in-house sales data analytics departments or collaborating with companies that are strong in this field. Some OEMs are opening online stores and virtual showrooms to ensure customer safety. In response to the spread of the new coronavirus, the company is strengthening its non-contact sales promotion activities and promoting digitalization. The virtual showroom aims to direct customers to a physical store rather than selling cars directly. The virtual showroom mainly allows customers to check the models for sale, get a quote, and make a reservation for purchase. Some OEMs are trying to stimulate the desire to buy cars by simulating the scene of a real store. Customers who are interested in purchasing a car can virtually see the car's interior equipment without actually

going to the dealership. Some OEMs have also opened virtual stores in Lazada Mall, which is operated by Lazada, an online retailer in Southeast Asia, and sell vouchers for car purchases and genuine auto accessories.

What is common throughout the supply chain is the promotion of digitalization. In particular, in order to avoid the supply chain disruption that was affected by the Covid-19 pandemic. Visualizing information on where, what, how much, and how it is moving by digital tools and solutions is required so that company can monitor the situation in real time. Digitization needs to be promoted more than before Covid-19 pandemic. In addition, digitization can not only realize standardization and efficiency of operations, but can also strengthen the skills of employees with AI. By analyzing and integrating data of human movements, machine positions, and sounds recorded by video cameras and other sensors, the AI can provide training which has been educated by senior employees according to the manual so far even there is no skilled senior employees available.



Source: JICA Study Team based on Interview Surveys and Various Materials

Figure 4.2.1 Impact of the Covid-19 Pandemic to the Supply Chain and Actions Taken

Table 4.2.1 Examples of Digitalization in Sales Corresponding to the New Normal

Company	Case of Digitalization
Toyota Motor	Toyota Motor Philippines Corporation opened a virtual showroom on its official website in June 2020. The website can be viewed in countries with continuous movement restrictions such as the Philippines and Indonesia.
Honda Motor Co., Ltd.	Ensuring customer safety is its top priory, Honda Motor Co., Ltd sets up a virtual showroom that provides more convenient ways to purchase vehicles. Customers can see the vehicle from

Company	Case of Digitalization
	360-degree angles and make reservations for visits and after-sales visits. The service is available in the Philippine and India.
Mitsubishi Motors	At the end of October, Mitsubishi Motors Philippines Corporation (MMPC) opened a website on its official website where customers can make reservations for test drive and store visits, and various inquiries. The site also has a "chatbot" automatic response system installed to respond to questions about products and services.
Nissan Motor Philippines (NPI)	Nissan Motor Philippines (NPI) opened a virtual showroom on its official website in July 2020. It also responds to online inquiries.
Audi	A virtual showroom has been on display in Audi stores even before the Covid-19 pandemic. With the use of virtual reality (VR) technology, customers can check the exterior and interior of the cars that are not in stock.

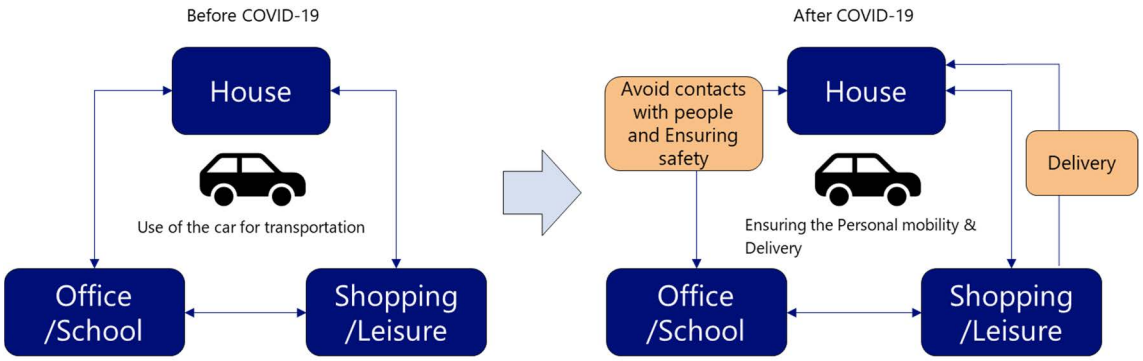
Source: JICA Study Team based on Auto Company Websites

(2) Acceleration of "CASE" and "MaaS"

As mentioned in the previous chapter, "CASE" (connected, autonomous driving, sharing, electrification) and "MaaS (Mobility as a Service)" that provides comfortable movement using information and communication technology have been revolutionized since before the pandemic. In the midst of this trend, the needs for automobiles have changed during the pandemic where the movement of "people and things" was restricted, and the automotive industry has to response it according to changes in demand and the purpose of use of automobiles by users.

It is expected that the transformation of the automotive industry centered on "CASE" will accelerate toward the new normal with the pandemic, but the needs for automobiles due to the Covid-19 pandemic have also changed, and sharing of "CASE" There is a growing tendency to avoid sharing used by the general public, and there is a tendency for it to be reviewed. Instead, the need for "personal mobility services" is increasing, and personal mobility services include not only automobiles but also electric motocycles and automatic delivery robots, and connected, electrification, and automation will evolve together. However, there have been reports of cases where demand for car sharing is increasing among medical professionals who want to refrain from using public transportation to prevent infection, and sharing as a personal mobility service will continue to be a necessary service in the long term. Sharing will be completely replaced by owning personal car, and the acceleration as "CASE" is expected to continue. On the other hand, subscription (flat-rate) services has started in Japan as one of the ways to acquire personal mobility for people who are reluctant to own a car in terms of cost. Toyota's subscription "KINTO" is a typical example of Honda's used car subscription "Monthly Owner". Toyota's "KINTO" received 6 times higher in applications from July to December 2020 compared to the previous year.

Honda's "Monthly Owner" contracts has also become more than doubled with average occupancy rate of 80 to 90%, and is expanding its services nationwide due to rising demand. Japanese car subscriptions might not be applicable to other countries because of different perspective and needs in car ownership per country, but subscription service is one of the ways to meet changing user needs and cultivate car demand in the market.



Sourcr: JICA Study Team based on Mitsubishi Research Institute report

Figure 4.2.2 Changes in Automobile Usage before and after the Covid-19 Pandemic

Promotion of "CASE" and "MaaS" cannot be realized only by the technological capabilities and service provision range of automobile manufacturers, and it is necessary to use infrastructure, technologies and services of different industries, but the automobile manufacturers are aiming for the new normal. Collaboration with different industries is progressing. An industry that can provide a variety of mobility (personal mobility, drones, automatic guided vehicles, etc.) by coordinating with different industries (various services such as communication and energy) from the conventional means of transportation (vehicles) for selling automobiles. It is necessary to transform into a company toward the new normal. As seen in the capital tie-up between Toyota and NTT, cooperation between automobile manufacturers and telecommunications carriers toward the realization of MaaS will continue to accelerate in Japan and overseas. The connected electric scooter developed by Honda Giken Kogyo and used in advance in Japan is a mobility service incorporated into the vehicle and battery management system, and not only the development of the vehicle but also the development of the vehicle and its battery, and the battery management system. This is an example of a car manufacturer leading the way and providing comprehensive mobility services to users.

Since ride sharing such as Grab and Gojek is widespread in Indonesia, CASE "S = Sharing" and its extension MaaS are expected to progress through alliances with ride sharing service companies. For example, in December 2019, Grab and the Coordinating Minister for Maritime and Investments Affairs announced the "Electric Vehicle Ecosystem Roadmap" with the aim of accelerating the adoption of EVs in Indonesia and building a more environmentally friendly

transportation network. As part of this, they are working to expand EV-related services. In November 2020, in collaboration with PLN UID Bali, Bali Transport Bureau, PT Pegadaian, Astra Honda Motor and Panasonic, which are local branches of the state-owned electric power company, Grab has launched 30 electric motorcycles (EM) and 7 public electricity. It has announced that it will launch an automobile battery exchange station and expand its alliance with Honda's motorcycle battery swap service, which is being tested as a pilot prject. Grab has also started EV taxi service at Soekarno Hatta International Airport since December 2019.

Similarly, in March 2019, Grab launched an app Trip Planner that can be used by integrating public transportation services such as MRT and buses with Grab's riding share. As mentioned above, since ride sharing has already expanded in Indonesia, the integration with ride sharing has the potential to launch MaaS faster than in Japan.

(3) Stimulation Measures for Consumer Sentiment as a Response to the Covid-19 Pandemic

In the event of an economic crisis, measures aimed at recovering the automotive industry by stimulating consumer sentiment have been commonly adopted in the past economic crises. This section mainly examines the government's sales promotion measures in the ASEAN region.

One of the typical domestic market support measures is a grace measure for repayment of loans after covid-19 pandemic. Considering the high loan debt of households such as automobiles and housing, it is a common support measure in key ASEAN countries. For example, in Indonesia, car loans have been deferred and postponed until October 2020. The second is aggressive sales promotion measures such as reduction of vehicle registration tax and sales tax. In ASEAN, the automobile-related tax system was reduced in Vietnam and Malaysia, and immediately after that, the market recovery was remarkable in both countries. The third is the postponement of regulations such as environmental regulations that will lead to increased vehicle costs. In Thailand, the introduction of EURO5 and 6 was scheduled to begin in 2021 and 2010, but was postponed for three years.

In parallel with such sales support measures, the rise of domestic protection policies can be seen. For example, the half-price tax exemption for vehicle registration tax announced in Vietnam and Malaysia in June this year is a de facto preferential treatment for domestic assembly manufacturers because it applies only to domestic assembly vehicles. In addition, the Philippines has been considering raising tariffs on finished vehicles from Thailand since last year as a retaliation for raising tariffs on tobacco imports, but there is also a move by a major automobile manufacturer to withdraw from automobile production in February in 2021. The Department of Trade and Industry determines to impose provisional safeguard duties on imported passenger cars and light commercial vehicles from several countries including Indonesia and Thailand, stated on January 2021.

Looking outside of ASEAN, China's sales support measures are remarkable. In April 2020, China announced a plan to implement sales incentives for new energy vehicles (NEV) and used vehicles, including automobiles and electric vehicles (EV). With the aim of stimulating domestic automobile sales affected by the Covid-19 pandemic, delaying the implementation of new gasoline vehicle emission standards and subsidies for purchasing new energy vehicles (NEV) indicated in the policy was extended with the period of two years. As a result, NEV sales, which had fallen in the first half of 2020, recovered in the second half. Responses after the Covid-19 pandemic in ASEAN countries are summarized in the table below.

Table 4.2.2 Government Responses to the Covid-19 Pandemic in Key ASEAN Countries (based on press releases)

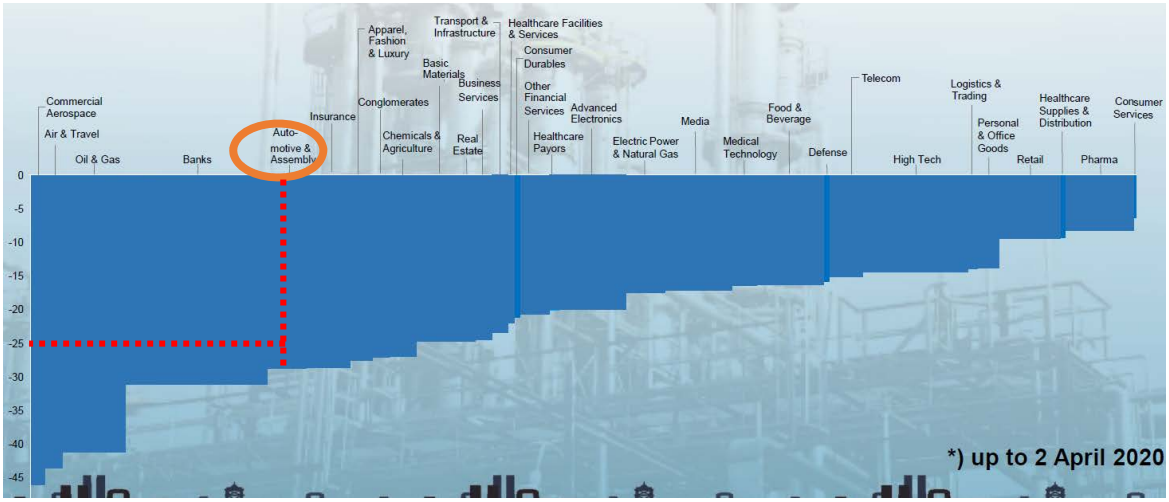
	Thailand	Indonesia	Malaysia	Vietnam	Philippines
Major Responses for economy	• Implementation of the Euro 5 emissions standard is pushed back to 2025 from 2024.(Announced in June)	• MOF release PMK 20/2021 and PMK 31/2021 regarding luxurious tax discount (PPNBM) applying to vehicles with capacity up to 1,500 cc and 2,500 cc with local content minimum 70% and 60% respectively, as much as 100% until Q1, 50% (Q2), and 25% (Q3).	• As part of the "Penjana" 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 nine 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 considers to impose a preliminary safeguard duty on imported completely built-up (CBU).
Forecast on Sales and Production	• FTI maintains its forecast for 2020 vehicle production of 1 million units, 50% less than the year before.(July)	• GAIKINDO projects domestic car sales in 2021 to hit 800,000, lower than last year's wholesale sales of 1.03 million cars.(Nov, 2020)	• the Malaysian Automotive Association (MAA) has revised downward the country's total industry volume (TIV) 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 225.4% with 15,578 units, a jump from the 4,788 units in May 2020..
COVID-19 quarantine measures	• A state of emergency was declared on March 26, imposed lockdown from April 3, prohibited going out. • Shopping 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, 2020. • Starting 2021, PSBB redirected to PPKM – giving local authority to apply restriction as needed, while economy has not shown recovery.	• 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 1-15. • 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.

Source: Prepared by NRI based on Various Press-Releases

4.2.2 Recovery of Indonesian Automotive Industry from the Covid-19 Pandemic

(1) Reconstruction of the Automotive Industry

As of April 2020, announced by MOI, the decline in market capital by industry was about -30% year-on-year, showing a slump along with industries such as the aviation industry, travel industry, and oil and gas. After that, the economy of the automotive industry deteriorated further from May to August 2020, and the number of automobiles produced in Indonesia in 2020 decreased by 46.5% from the previous year.



Source: MOI

Figure 4.2.3 Comparison of Indonesian Market Capital Distribution Volume Compared to the Previous Year

As shown in this figure, there was a large difference in the economic decline caused by COVID-19 among industries. As the automotive industry is becoming more globalized in ASEAN, the decline by industry was affected by the situation in other countries, showing a large decline. Despite the large differences in losses by industry, the Indonesian government has not implemented remedies by industry.

Since the Covid-19 pandemic in 2020, the Indonesian government has not reviewed the "Automotive Industry Development Roadmap". However, as will be described later, the "BEV Roadmap" has been added in response to the BEV Presidential Regulation.

In addition, although not reflected in the automobile roadmap, the current priority of automobile-related policies is the recovery of automobile sales and production, which has been halved due to the Covid-19 pandemic. According to the policy of the Ministry of Industry, the expansion of exports has become an urgent issue along with the recovery of the domestic market in light of the situation where surplus production capacity is becoming constant and serious, and the meeting between ILMATE / IMATAP of the Ministry of Industry and JICA, the ministry officials emphasized the importance of expanding exports.

Table 4.2.3 Economic Measures and Business Supports

Enactment	Responsible Body	Title	Summary
November 2020	Indonesian Government	Government Regulation No. 188 of 2020 by the Ministry of Finance (MoF)	When a corporation designated (or granted a special permit) by the Indonesian government imports a new coronavirus vaccine, its raw materials, and equipment necessary for production, it has introduced tax exemption measures such as tariffs.

July 2020	Indonesian Government	Government Regulation No. 86 of 2020 by MoF	Expanded the scope of the Finance Minister's Regulation No. 44 of 2020, which stipulates tax incentives for prepaid corporate tax, value-added tax, salary withholding tax, etc., and extended the period from April to December 2020 (initially September)
June 2020	Indonesian Government	Government Ordinance No. 29 of 2020	About 30% of the production costs is deducted from taxable income for companies that produce specific sanitary and medical equipment. The full amount of donations is deducted from taxable income for taxpayers who donate. Healthcare professionals are exempt from paying payroll tax (PPh21) on additional compensation earned from services related to the new virus. For taxpayers who rent land, buildings, etc. to the government, the withholding tax on rent will be 0%. All measures are for the period from March 1st (retroactive application) to September 30th.
April 2020	Indonesian Government	Government Regulation No. 44 of 2020 by MoF	This is a revision of the Ministerial Regulation No. 23 of 2020 by the Ministry of Finance dated March 23, which stipulates a special tax cut for half a year. It expanded the target groups of the tax reduction from the manufacturing industry to cover non-manufacturing industries such as wholesale, retail, construction, warehouses, hotels, restaurants, etc. as well as bonded license holders such as bonded factories and warehouses.
March 2020	Indonesian Government	Substitute Government Regulation No. 1 of 2020	The corporate tax, which used to be 25%, has been reduced to 22% from 2020. Implementation is one year ahead of schedule in light of the effects of the coronavirus. In addition, the tax rate will be reduced to 20% in 2022.
March 2020	Indonesian Government	Digitized submission of the Certificate of Origin	Within 30 days of obtaining the registration number of the import declaration, applicants can submit a scanned certificate of origin (two ways) in color, its customs-related documents, and a pledge containing the prescribed items by e-mail or other electronic method. (The condition is to submit original documents within 90 days after import customs clearance
March 2020	Indonesian Government	Government Regulation No. 23 of 2020 by MoF	For half a year from April to September, (1) exemption from tax withholding of income tax for employees with an annual income of 200 million rupiahs (about 1.3 million yen, 1 rupiah: about 0.0065 yen) or lower, (2) exemption of prepaid corporation tax at the time of imports, (3) 30% reduction in monthly prepaid corporate tax, and (4) early refund of VAT overpayment of 5 billion rupiah or less.

Source: JICA Study Team based on information provided by JETRO, etc

In addition to the above policies, the Ministry of Industry will impose a 15-70% luxury tax (PPn) on new car purchases, depending on the maximum number of passenger cars and displacement, with the aim of improving the purchasing power of consumers. On February 2021, Ministry of Finance announced Minister of Finance Regulation No. 20, 2021 to exempt the tax on strabismus when purchasing a new car. The target models were sedans of 1500cc or less, station wagons, and two-wheel drive (4x2) vehicles with a capacity of less than 10 people. All vehicle models require a local procurement rate of 70% or higher. The tax exemption period is until December 2021, with the tax exemption from March to May, 50% tax reduction from June to August, and 25% tax reduction from September to December.

(2) Recommendations from the field for the reconstruction of the automotive industry

The pandemic caused by the new coronavirus caused a loss to human resources and goods, rather than the financial loss seen in the traditional economic crisis. Making Indonesia 4.0 promoted by the Indonesian government has set the primary goal of converting to an industry that has high added value and contributes to export expansion, but labor saving in the production process is even stronger due to the influence of the pandemic. Therefore, the direction of labor-saving production by automating production is inevitable in the future. The following is a summary of the recommendations of the JICA Survey Team based on the needs from the field obtained from the results of the interview survey of this survey.

1) Training of on-site technicians in charge of management and maintenance of automation equipment

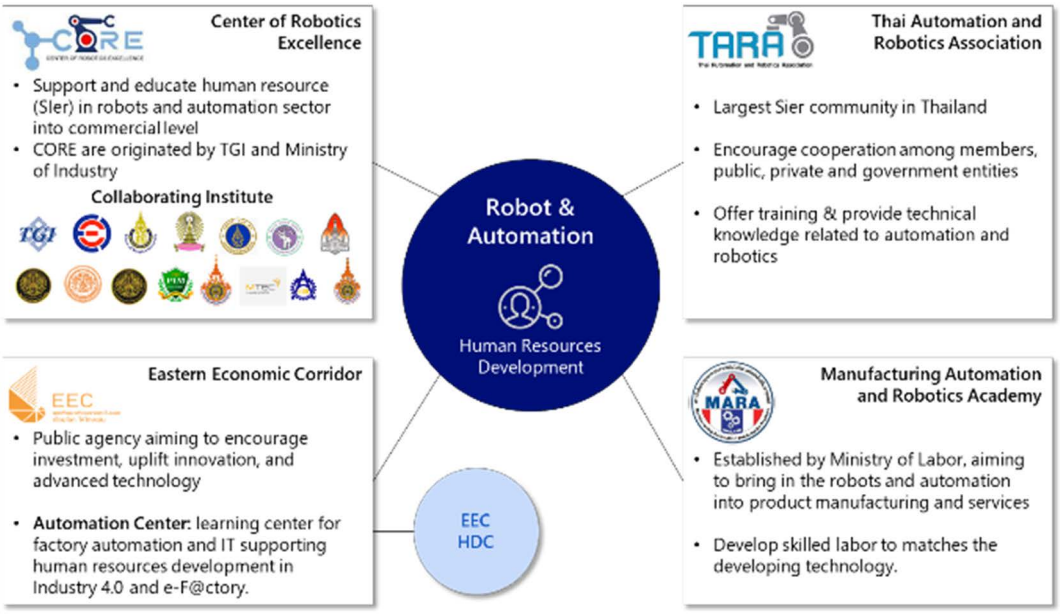
This is mainly handled by technicians of polytech and above, and requires more advanced knowledge and expertise in mechatronics and control. In addition, stricter standard work management, work safety, and quality control skills / knowledge are required. In automation education, the weight of practical training is high, so it is necessary to enhance the practical training and training system at the site of automation lines through learning factories and teaching factories[14]. For automation in the automobile field, it is expected that STMI and POLMAN Bandung, which are strong in the automobile field, will play a central role in formulating curriculums and enhancing training systems in cooperation with the industry.

[14] Learning factory is a production facility for education, training, and research and development related to manufacturing. It can actually produce goods by building a production line consisting of multiple processes, just like an actual factory. By using these facilities, it is possible to acquire more practical knowledge and skills, and to verify new theories and hypotheses. Teaching factory is a production facility where technology and knowledge are exchanged between industry and academia, and where students receive training in actual industrial settings while interacting with corporate personnel. MOI, STMI and POLMAN have needs of training for students, and it would be effective to combine FMS with learning factories and teaching factories to educate students (see 5.2.4 for details).

2) Development of Industrial Sler Human Resources

As automation progresses, it will be important to have a human resource pool of industrial system integrators (Sler) who can handle the design, procurement, and installation of automation automation equipment for the customer's products and processes. More than 200 companies are are members of the Sler Association in Japan (Japan Factory Automation & Robot System Integrator Association), and are working to expand robot applications in cooperation with robot manufacturers. Industrial SIers are limited in Indonesia, and the current situation is that the introduction of new lines of automobile models and parts depends on supporting engineers from from overseas and Slers from overseas. In the future, in order to promote automation in Japan, it it is indispensable to develop industrial Slers. It is desirable to develop Slers human resources in cooperation with robot makers, educational institutions such as universities and polytechnics, and Slers.

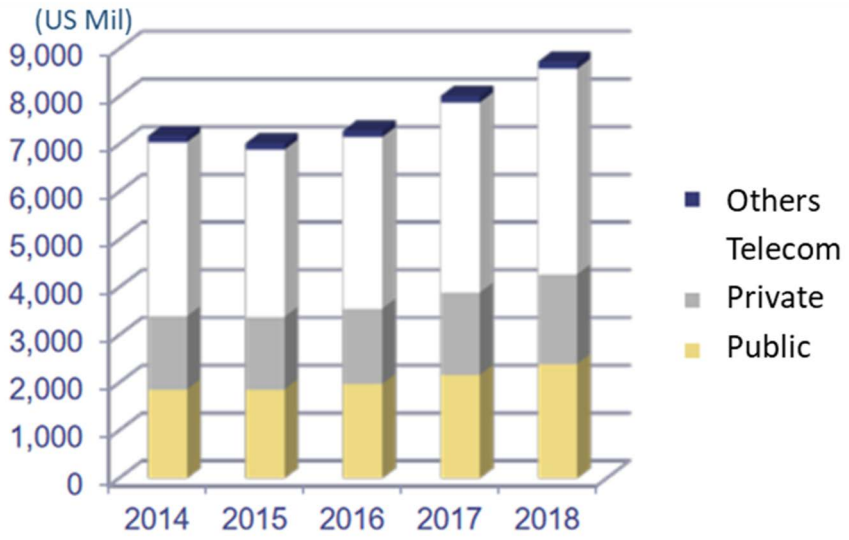
For example, in Thailand, the government-affiliated technical training institution TGI (Thai German Institute) has taken the lead in establishing the Center of Robotic Excellence (CORE), with 16 university institutions and technical intern training institutions participating in 2019. In 2020, 700 system integrator (SI) Warrior (equipment user side) and 300 SI Designer (Slers side) have been trained and a certificate of completion of the course has been issued. In the future, TGI plans to develop a skill test system in cooperation with EEC (East Economic Corridor) and others.



Source: JETRO「Current status and future prospect of Robot industry in Thailand

Figure 4.2.4 Human Resources Developmen in the Fields of Roboting and Automation in Thailand

The ICT market in Indonesia is valued at USD 8.2 billion, with the telecom (electronic communications) market being the largest, followed by the government and enterprise markets. Compared to other ASEAN countries, Indonesia has a relatively high Internet access rate and cell phone penetration rate, and thus the mobile-related market is large.



Source: IT Situation in Indonesia, CICC (Center for International Cooperation in Computerization)

Figure 4.2.5 Trends in the ICT market in Indonesia

Table 4.2.4 Fixed Internet and Mobile Phone Penetration Rates in Major ASEAN Countries (2018)

Country	Fixed Internet and Mobile Phone	Cell phone penetration rate
Indonesia	3.30%	119.80%
Singapore	25.90%	145.70%
Thailand	13.20%	180.20%
Vietnam	13.60%	147.20%
Cambodia	1.00%	119.50%

Source: ITU World Telecommunication/ICT Indicators Database

The major SIers in Indonesia are the world's leading companies such as IBM, Google, Alibaba, Fujitsu, and Hitachi. On the other hand, local SIers include companies that were spun off from the systems departments of conglomerates, but they mainly focus on business systems and rarely provide SI for manufacturing automation.

According to a Japanese robot manufacturer operating company based in Indonesia, there are only a few SIers in the country, and almost no SIers that are capable of introducing equipment mainly using robots. The number of robots installed in Indonesia is 7,000 in terms of the number of units in operation, of which 80-90% are in Japanese companies related to motorcycles and automobiles, and the introduction of these robots has been done mainly by Japanese SIers.

Therefore, it is necessary to develop SIer companies for manufacturing sites such as manufacturing automation as well as to develop human resources.

Table 4.2.5 Indonesia Majot Local Siers

Company	Overview
PT. Multipolar, Tbk	An IT company of the Lippo conglomerate group. A comprehensive IT solutions provider offering consulting, hardware, software, and SI services to the financial, telecommunications, and government sectors.
PT. Metrodata Electronics,Tbk	An IT company in the Metrodata business group, which entered the ICT retail market in 2011. Also involved in cell phone assembly business.
PT.Intikom Berlian Mustika	IT company of the Salim conglomerate group. Provides IT infrastructure systems, software development, and other services to financial and other startups.
PT.Datacom	Major customers include Telekom, Indosat and other major telecom operators. Provides network-related services and cloud computing-related services.
PT. Astra Graphia Tbk	IT company of the Astra conglomerate group, which became a subsidiary of the ICT division as PT Astra Graphia Information Technology (AGIT) in 2011.

Source: IT Situation in Indonesia, CICC (Center for International Cooperation in Computerization)

3) Maintaining Skills and Technology (R&D&D strategy)

*Making Indonesia 4.0 i*ssued by the Ministry of Industry of Indonesia points out that the ratio of research expenses to gross domestic product (GERD) in Indonesia is only 0.1-0.3% on average, which is the same level as China by 2030. It is clearly stated that the target is 2% per GDP. It is also expected that this will promote innovation by local companies and promote R & D led by private companies rather than by the public sector.

It is expected that improving and expanding R & D support measures that will stimulate innovation at various levels in the future will lead to an increase in the R&D&D capabilities of the entire industry, including not only large companies but also small and medium-sized companies.

On the other hand, despite the opportunity for such tax incentives, it cannot be said that local SMEs are fully utilizing them. Concerns about disclosing the financial situation to the Ministry of Finance are thought to be obstacles to the utilization of tax incentives, but the actual situation has not been accurately grasped. The following measures can be considered to promote R & D in Indonesia.

- Factor analysis that SMEs do not utilize tax incentives related to R & D
- Promote understanding of incentives for R & D-related tax incentives for each corporate management
- Establishing a system within each company to obtain tax incentives, preparing application documents, clearing application standards
- Review of reasons for disapproval of incentives and their reflection
- Impact evaluation by obtaining tax incentives

Issues related to R & D in Indonesia and their solutions will be described in detail in Chapter 5, and an action plan will be established to overcome the issues.

(3) Road to Electrification of Vehicles

During the transition period to EV, it is desirable to expand the spread of hybrids that can be expected to reduce CO2 to a certain extent and bioflexes that are close to carbon neutral. Especially in Indonesia, the supply chain of internal combustion engines has been developed through many years of domestic production efforts by automobile manufacturers, so it is possible to suppress the cost increase due to hybridization to some extent.

On the other hand, bioflex has the advantage of being able to utilize natural resources such as Indonesian palm oil, and diesel B30 will be mandatory in 2020, and B40 is scheduled to be introduced this year as well. On the other hand, after 2025, city cars suitable for sprinting are expected to be replaced by EVs, as shown by their success in China. Therefore, it is desirable to select and promote the optimum power train according to the application and size of the vehicle. In addition, in order not to distort the market structure, it is desirable that the selection of power trains should be left to the judgment of the market as much as possible, and the government should keep it within the scope of guidance.

For the domestic production of batteries and the development of their supply chain, the Indonesian government, in consultation with a wide range of stakeholders, devises detailed and feasible domestic production plans for each component and promotes the business on a regular basis. It is desirable to verify and adjust. Immediate domestic production plans, on the contrary, risk making coordination between stakeholders difficult. In addition, since Indonesia alone has size restrictions, it is desirable to form an Asian-sized supply chain in cooperation with neighboring countries such as ASEAN.

(4) Export Expansion Strategy

According to a hearing survey of automobile manufacturers by the JICA survey team, it was suggested that Indonesia should prioritize areas with loose safety standards and exhaust gas regulations (euro regulations) such as Africa in order to expand exports. In developed regions such as Australia, regulations are different from Indonesia, so new parts and functions must be

added or adapted to comply with the regulations, which leads to cost increase with existing models. On the other hand, in emerging countries, these standards are similar to those of Indonesia, and there is a high need for low-cost, multi-seater compact cars such as small MPVs, so they have a high affinity with Indonesian products. In addition, Australia is not geographically far from Indonesia, but its logistics costs are not cheap due to the lack of direct container routes. Therefore, in order to expand exports, while selecting countries with high export potential based on the affinity of export destination regulations and standards and the proximity of the market such as vehicle type composition, FTAs, harmonization of standards, production and export of promising vehicle types. It is desirable to consider measures to strengthen export competition such as promotion. For example, in the early 2000s, Thailand lowered the goods tax rate on double cab pickups and big-up-based SUVs (Passenger Pickup Vehicles: PPVs), leading to increased exports.

The third of export promotion is infrastructure development such as port development for export. This is because Patimbang, the second international port supported by JICA, opened at the end of last year, and it is expected that the capacity of automobile container ships will expand and the infrastructure environment will expand significantly in the future.

4.2.3 Responding to Urgent Needs

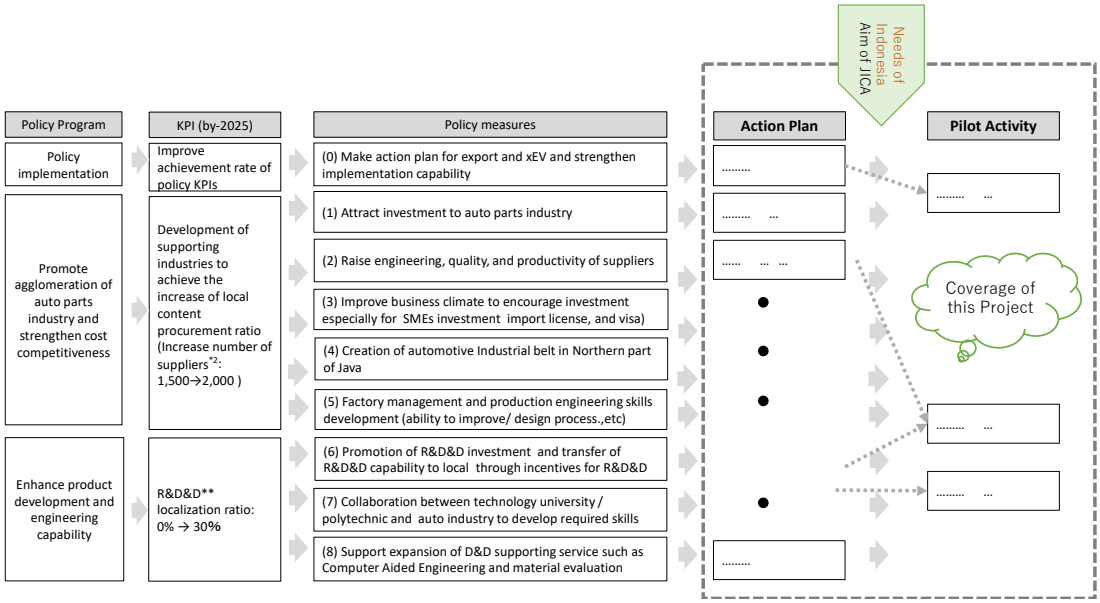
The following are the urgent needs pointed out by many stakeholders in this hearing survey. The action plans that includes these aspects are discussed in the Chapter 5.

- Promotion of domestic demand stimulus measures
- Formulation of export strategy
- Early completion of grand design to get support for PIDI
- Formation of the beginning of digital / IoT human resource development
- Understanding Tier 2-3 participation promotion and donor support limits for R&D&D promotion (Biofuel, EV battery, etc. are difficult)
- Promotion of high added value in the automotive industry through automation of production and IT

CHAPTER 5. ACTION PLANS CORRESPONDING TO POLICY MEASURE AND IMPLENTATION SCHEDULE

The Policy Measures examined in the previous project (as summarized in Chapter 3) 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[15] 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.



Source：JICA Study Team

Figure 5.0.1 Role of this Project（the area surrounded by the dotted line）

[15] Activities are the elements of "an action" that require special attention in implementing the Action Plan. In many cases, it is difficult to calculate the organization in charge and the cost at this stage, so it should be understood as tentative. In particular, many expenses 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 for the procurement of specific equipment and services that can be estimated at this stage are excluded. However, for Major Expenses, the names of necessary costs were listed as much as possible. For the contents of the activities associated with the two action plans, please refer to Chapter 4 of the Appendix.

The following sections provide background and overview of Action Plan and Activity in the order of measures (0) to (8). The details of action plans and activities are summarized in Chapter 4 of Appendix.

5.1 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 prompt services from the Government.

Table 5.1.1 Policy Measures and Action Plan on "Policy Implementation"

Table 0		
Policy Measures		**Action Plan**
0 Make action plan for export and xEV development and strengthen implementation capability		**[Research and Framework Development /Policy Formulation]** ・Policy formulation on PIDI and determine KPIs of auto sector ・CBU/Auto Parts export strategy ・xEV and EV Battery development strategy ・Measures to increase domestic sales ・Strategy to attract investment arises by US-China Friction ・Technology sophistication through establishing R&D Center
		[Quick Policy Implementation] ・IoT supported quicker policy implementation ・Coordination with other concerned agencies ・Legalization by the cabinet ・Announcement by the Government

As for the two action plans, many of the themes are cross-ministerial, and their realization depends on the initiative of the MOI. In particular, the functions of MOI are weak for those involving R&D (e.g., budget securing and monitoring) so that it is necessary to establish a successful experience through bilateral ODA, etc., and to ensure the system by continuing this experience.

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.

5.2 Promote Agglomeration of Auto-parts Industry and Strengthen Cost Competitiveness

5.2.1 Action Plans on "Attract investment to auto parts industry"

The policy measure of "Attract investment to auto parts industry" presents 5 action plans. 1) "Investment Promotion of Tier2&3 Companies" proposes to provide more attractive incentives for investment promotion than in other ASEAN countries; 2) "Lowering the Minimum Capital Investment" proposes to reduce the minimum capital investment, which has been a barrier for foreign companies to enter the Indonesian market, and examples from other countries; 3) "File and share company information contacted" proposes to how to share and utilize information on companies interested in investing in Indonesia; 4) "Attract FDI for increasing Export" proposes to export strategies for each automobile model and measures for establishing SEZs; and 5) "Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.2.1 Policy Measures and Action Plan on "Attract Investment to Auto parts Industry"

Table 1		
Policy Measures		**Action Plan**
1 Attract investment to auto parts industry Background ・Support industries have not been able to accumulate. ・It has always been pointed out that the minimum investment (fixed assets excluding land and buildings & working capital for 3 months) is 10 billion rupiah (about 100 million yen), which is too high and the burden is too great.		**[Investment Promotion of Tier2&3 Companies]** ・Providing more attractive incentives for SME investment than in neighboring countries ・Capturing the need for relocation due to US-China friction(see Activity 07) **[Lowering the Minimum Capital Investment]** ・Monitor the voices from Tier2&3 tenants which have an interest to invest to Indonesia. ・Study the cases of neighboring countries (ASEAN countries as well as the other competitors which is attracting investment) **[File and share company information contacted]** ・Share company information which are interested in investment to Indonesia **[Attract FDI for increasing Export]** ・Establish export strategy by model (ex. exporting MPV and other models to target countries) ・Strengthen development of MPV for export ・Accelerate developing SEZ and attract Tier2&3 companies to increase export of auto parts. ・Capturing the need for relocation due to US-China friction (see Activity 07 and Activity 1-1) **[Implementation of Action Plan]** ・Select target companies for investment ・Conduct investment attraction seminars ・Provide incentives on xEV related parts production for export

Especially, as for the second action plan regarding "Lowering the Minimum Capital Requirement", the minimum capital required for the establishment of a foreign company is 10 billion rupiah in Indonesia, 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.

The Omnibus Law, which was signed into effect by the President on November 2, 2020, is aimed at attracting investment to create jobs, and amends 79 related laws in 11 areas, including labor (minimum wage, retirement benefits, unemployment compensation) and investment. Of the 11 areas to be amended, the seven areas that are most relevant to business activities are business licensing, investment requirements, labor, small and medium-sized enterprises, business convenience, land expropriation, and economic zones. The amendments are expected to improve the business environment in Indonesia by eliminating overlaps and inconsistencies among laws and regulations, which had been the problem in the past, and by including positive changes such as a clear list of investment priorities that will provide financial incentives for foreign capital, improved procedures for obtaining investment permits and licenses, and the elimination of the need for user permits when using foreign labor.

With regard to the five action plans, it is necessary to conduct activities in parallel with the development of the legal system in order to promote the attraction of Tier 2 & 3 companies, which are hesitant to enter the market, especially due to the minimum capital barrier. Since cooperation with BKPM will be particularly important, it will be effective to form a joint task force to promote the Action Plan.

Furthermore, with regard to the third item in the Action Plan, "File and share company information contacted" it would be very fruitful if it were possible to match Japanese companies that have excellent technology but have to give up their business due to lack of successors and labor force in Japan. In this sense, the activities of the Indonesian Embassy in Tokyo and other Indonesian investment promotion organizations in Japan are expected to bear fruit.

Table 5.2.2 Key current laws and regulations for SEZ development

	Investment Promotion	SEZ Development	Inccome Tax/Incentive
Basic Law	Investment Promotion Law No.25/2007	SEZ Law No.39/2009	Decree related to Income Tax No.7/1983 and No.36/2008
Decree related to the Basic Law	(1) Presidential Decree No. 76/2007 on Restricted Areas/Industries and Restricted Areas/Industries with Conditions (2) Presidential Decree No. 36/2010 on the list of investment areas	(1) Presidential Decree No. 8/2010 on the implementation of SEZ (2) Presidential Decree No. 8/2010 on the National Council for the Implementation of SEZ (3) Presidential Decree No. 33/2010 on the National and Regional Councils implementing the SEZ (4) Decree No.2/2011 on SEZ implementation	(1) Decree No. 1/2007 on Income Tax Incentives (2) Decree No.62/2008 on the amendment of Decree No.1./2007 (3) Decree No. 94/2010 on the calculation of non-taxable income and income tax payments (4) Ministerial Ordinance No.130/PMK.011/2011 on Corporate Income Tax Reduction by Ministry of Finance
Government Agency in charge	BKPM	EKON	MOF

Source: JICA

In the fourth action plan, "Attract FDI for increasing Export", JICA Study Team would like to focus on SEZ development around the metropolitan area. In other countries, SEZ development is very active, but for some reasons, in Indonesia, SEZs are located in regional areas. The development of SEZs in the vicinity of the metropolitan area should enable many jobs to be created and taxes to be collected from the companies located there.

5.2.2 Raise engineering quality, and productivity of suppliers

The policy measure of "Raise engineering, quality, and productivity of suppliers" presents 5 action plans. 1) "Incentives for Human Resource Development" proposes to tax deduction for R&D&D; 2) "Technology Transfer to Local Companies" proposes tax incentives for joint ventures based on technology transfer; 3) "Enhancing Kaizen Activity" proposes guidance by senior Japanese volunteers; 4) "Preparation of Technology Database for Advanced Tier2 and 3 companies" Prepare Technology Database and display at PIDI; and 5) "Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.2.3 Policy Measures and Action Plan on "Raise Engineering, Quality, and Productivity of Suppliers"

Table 2		
Policy Measures		**Action Plan**
2 **Raise engineering, quality, and productivity of suppliers**		**[Incentives for Human Resource Development]** ・ Incentives on R&D&D promotions

Background ・ The introduction of high-dimensional engineering adapted to the Digital Transformation (DX) is required. ・ Most of R&D(&D) functions are concentrated in Thailand, jeopardizing Indonesia's position as the next generation production hub. ・ PIDI will be built in Jakarta to promote the realization of Making Indonesia 4.0 and to showcase it at home and abroad.		・ (e.g., the tax reduction effect of raising the amount of expenses recorded according to conditions) ・ Relaxation of capital and minimum capital requirements ・ Utilization of PPDI for R&D&D and HRD
		[Technology Transfer to Local Companies] ・ Promotion of capital investment such as automation ・ Tax incentives for companies entering into joint ventures on the premise of technology transfer to local companies, etc.
		[Enhancing Kaizen Activity] ・ Develop Kaizen leaders ・ Kaizen consultation to Tier 2&3 companies by Japanese Senior Volunteer
		[Preparation of Technology Database for Advanced Tier2 and 3 companies] ・ Prepare Technology Database and display at PIDI
		[Implementation of Action Plan] ・ Review and improve the contents of board exams on subjects related to auto manufacturing ・ Upgrade tools and equipment based on newly updated / developed curriculums to new production technology ・ Study the possibility of lowering logistics costs ・ Study the possibility of lowering materials costs ・ Support business matching and expansion of local suppliers

** 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).

Major action plans in the above table will be explained below. 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
    - 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)
    - 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)

As for the five action plans, many of them require long-term routine work compared to other areas, and the role of the division in charge among the specific departments of MOI should be clarified. On the other hand, there are likely to be many cases where specific Tier 2&3 companies are the common target of many action plans, and horizontal cooperation among the departments in charge will be necessary.

BOX

1. 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 5.2.4 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) Minimum capital for foreign invested companies 2.5 billion rupiah (about 21 million yen)	Obtaining work permits for foreigners: For each foreigner: 2 million-baht (about 7 million yen) capital per foreigner is required.
Minimum Capital Investment	Total investment exceeding 10 billion rupiah (about 85 million yen) excluding land and buildings	Investment amount restrictions under the Companies Act None
Interview result	Minimum capital requirement (including minimum investment amount) is a hurdle for Japanese	No restrictions on minimum capital and minimum investment, making it easier to enter the market

	companies that have not yet entered the Indonesian market. (from Japanese companies that have not yet entered Indonesia)	(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.

2. 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.
- ✓ However, R&D has not taken root in Indonesian local companies due to the lack of high-level industrial human resources, immature R&D-related policies, and a competent R&D department within the MOI.
- ✓ In addition, the comparative advantage of being able to produce at low labor cost is being lost due to the annual increase in the minimum labor wage for workers.
- ✓ To begin with, existing internal combustion engine and vehicle development functions for the ASEAN region are concentrated in Thailand, and automakers are reluctant to establish additional facilities in Indonesia.
- ✓ Rather, in interviews with R&D&D-related executives from automakers, it was

pointed out that there is potential for R&D&D in Indonesia, as development for CASE, which will be popular in ASEAN in the future, will require incorporating more regional characteristics and open innovation with new regional partners

- ✓ 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.

3. 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 5.2.5 Examples of Local Business Growth in Thailand

Company	Influence by Japanese Company
Thai Summit Group(TSG)	✓ Rapid expansion in the production of parts for Japanese automobiles by actively introducing Japanese technology ✓ In 2009, the company acquired Ogihara, which manufactures molds for automobile bodies.
Siam Motors Group	✓ 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.
Somboon Advance Technology(SAT)	✓ Expanding business through Japanese business with major customers such as Mitsubishi Motors, Isuzu, Toyota and Honda. ✓ In order to incorporate Japanese technology, the company has established many joint ventures such as Nisshinbo Somboon Automotive, Yamada Somboon, and Tsuchiyoshi Somboon.

Source: JICA Study Team

5.2.3 Improve Business Climate to Encourage Investment especially for SMEs Investment, Import license, and Visa

The policy measure of "Improve business climate to encourage investment especially for SMEs investment, import license, and visa" presents 5 action plans. 1) "Improvement of Immigration Management for Foreign Experts" proposes to ease the requirements and procedures for obtaining working visas; 2) "Review of trade barriers" proposes to review of the tariff system in accordance with international standards; 3) "Expansion of the Approval System for Green Line Treatment" proposes the dissemination of Green Line standards; and 4)"Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.2.6 Policy Measures and Action Plan on "Improve Business Climate to Encourage Investment especially for SMEs Investment, Import license, and Visa"

Table 3		
Policy Measures		**Action Plan**
3 **Improve business climate to encourage investment especially for SMEs investment, import license, and visa**		**[Improvement of Immigration Management for Foreign Experts (engineers, researchers, and management staff)]** ・ 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) ・ Relaxation of visa requirements ・ Other adjustment
Background The following issues have become apparent; ・ 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. ・ Non-processing certificates are strictly required for transshipment at the time of importation. ・ Bribery is rampant in customs. ※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. 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.		**[Review of trade barriers]** ・ Proper application of national standard (ex. Application of high-tensile steel) ・ Appropriate safety standard inspections ・ Proper operation in customs **[Expansion of the Approval System for Green Line Treatment]** ・ Disseminate the status of usage of Green Line and MITA Line in order to expand the approval system of such privilege. **[Implementation of Action Plan]** ・ Set up "Direct Appeal Site" on BKPM Website to gather request from related investors. ・ Discussion/review of Omnibus Law by representative chamber of commerce from abroad ・ Rental factory for small sized investors ・ Establish a collaborative working group and Support the collaborative working group's activities ・ Regular review of safety/environmental standard

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.

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 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.

Simplification of the procedure for obtaining a working visa

It takes a long time for the supervisory authorities (SKK Migas and MIGAS) 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 5.2.7 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. (4) Submission of a written pledge to transfer knowledge and skills to Indonesian employees. (5) 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). (6) Enrollment in insurance of Indonesian insurance company	(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.
Policy toward Industrial Human Resources	✓ 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. ✓ The IMTA is valid for a maximum of one (1) year, which may be extended depending on the RPTKA. <u>Requirements for IMTA application</u> (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	✓ 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; (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 ✓ 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.

Source: JICA Study Team

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;

Regarding the four action plans, urgent business inefficiencies identified by investors in the automotive industry should be corrected. Although many of the issues related to these measures are outside the MOI's jurisdiction, the MOI should increase its sensitivity to information on tenants' business, such as the Omnibus Act, and create a system that can address the day-to-day issues of tenants through the establishment of a direct appeal site.

5.2.4 Factory management and production engineering skills development (ability to improve/ design process, etc)

The policy measure of "Factory management and production engineering skills development (ability to improve/ design process.,etc)" presents 4 action plans. 1) "Expand Automotive Industry Course run by Polytechnical College" proposes to review the curriculum and special classes; 2) "Quality Upgrading" identify technologies that need to be improved and holding seminars; 3) "FMS based HRD" introduce the Learning Factory and Teaching Factory for human resource development rooted in automated technology; and 4)"Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.2.8 Policy Measures and Action Plan on "Factory management and production engineering skills development"

Table 5		
Policy Measures		**Action Plan**
7. Factory management and production engineering skills development (ability to improve/ design process.,etc)		**[Expand Automotive Industry Course run by Polytechnical College]** 1 D4 and Recurrent Education
Background ・Making Indonesia 4.0 does not see a way to incorporate digitalization and automation technologies. ・In the implementation of Making Indonesia 4.0, there is a shortage of human resources that can handle digitalization and robotization. ・Implementation of Making Indonesia 4.0 (linkage between this domain and the functions of PIDI) through the construction of PIDI is expected. ・In cooperation with PIDI, German and French companies are already preparing to go.		・Strengthening STMI, POLMAN, ATMI etc. and increase engineer graduates from 5,000 to 20,000/year 2 Develop an OJT training plan on processing technologies at Polytechnical College 3 Provide training and seminars on in-demand processing skills identified
		Quality Upgrading] ・Shortlist technologies to improve ・Strengthening/Expanding of Industry 4.0 based education (Upgrade the level of teachers) ・Conduct seminars for technology sophistication ・Support the procurement of equipment and machinery
		[FMS based HRD] ・Functionalizing "Learning Factory" and "Teaching Factory". ・Introduction of FMS through industry-academic collaboration (supported by a pilot activity "Matching Hub")
		[Implementation of Action Plan] ・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") ・Provide training and seminars on in-demand processing skills identified ✓ Improving student-level engineering skills ✓ Strengthen plant management and manufacturing technologies by proactively utilizing the various ODAs provided by Multi-National and Bilateral Donors. ・Strengthening engineering skills through PIDI (leveraging the five pillars of PIDI)

With regard to the four action plans, a particular issue is that the manufacturing technology of SME factories is lagging behind (few opportunities to be exposed to automation and other technologies, and no engineers to give advice). As the kick-start for the entire project, it would be effective to conduct pilot activities to create an opportunity to expand the action plans.

1. 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.

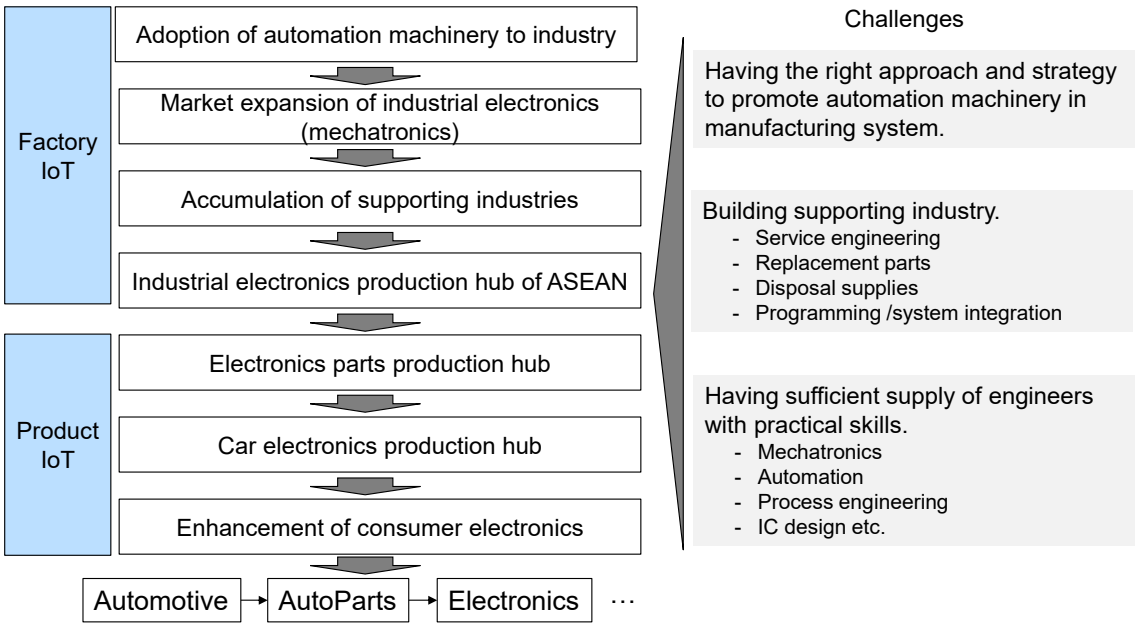
Box. Interview with a Japanese Company

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 JICA Study Team should not think that they are the same.

2. 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 5.2.1 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[16] 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.

3. Human Resource Development rooted in automation technology

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 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[17].

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.

4. Implementation of Action Plan

This training need is high at MOI and other vocational schools such as STMI and POLMAN. 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.

[16] 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.

[17] 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.

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 Chapter 6 of the main report.

5.3 Enhance Product Development and Engineering Capability

5.3.1 Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D

The policy measure of "Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D" presents 5 action plans. 1) "Establish R&D&D support system" review R&D-related incentives; 2) "Push R&D&D Implementation Policy on Bio Fuel, Lithium Battery and Upper Body Design of MPV" reviews policy and budget distribution; 3) "Improve Immigration Management toward R&D&D Experts" mentioned above in 5.2.3; 4) "Encourage communication on Academic Network in order to establish a Project in the Target Fields" proposes the promotion of academic collaboration with overseas research institutes including Japan; and 5)"Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.3.1 Policy Measures and Action Plan on "Factory management and production engineering skills development"

Table 6		
Policy Measures		**Action Plan**
6. Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D		**Establish R&D&D support system]** ・ Review and expand the existing R&D related incentives ・ Review and expand R&D related incentives by establishing protocol (supported by a pilot activity "R&D&D protocol")
Background ・ Incentive policy on R&D&D (No. 45), which was enacted into a law last year, is under-recognized and under-utilized. ・ R&D&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.		**[Push R&D&D Implementation Policy on Bio Fuel, Lithium Battery and Upper Body Design of MPV]** ・ Strengthen institutional tie-up with advanced OEMs, research institute, and academe. ・ Allocate necessary budget for R&D&D ・ Industry-Academia Tie-Up ・ Examine a probability on establishing the System Inovasi Nasional：SINAS
		[Improve Immigration Management toward R&D&D Experts]
		[Encourage communication on Academic Network in order to establish a Project in the Target Fields] ・ For example, SATREPS of Japan has dealt with similar theme in Thailand ・ Tie up with oversea universities and support outstanding students to go on an overseas study program
		[Implementation of Action Plan] ・ See above action plans on Domain 2-3, for more information on R&D&D Incentive,. ・ Awareness and improvement activities on the Indonesian side by strengthening top diplomacy and public relations ・ Formulate SATREPS projects related to Bio Fuel and Lithium Battery by utilizing the network of

		researchers between Indonesia and Japan. ・ Technology Sophistication through Establishing R&D Center (Utilization of PIDI)

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.

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. A benefit system other than such simple tax exemption/reduction should also be considered.

While 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.

5.3.2 Collaboration between technology university /polytechnic and auto industry to develop required skills

The policy measure of "Collaboration between technology university /polytechnic and auto industry to develop required skills" presents 2 action plans. 1) "Industry-Academia Joint Program" proposes to promote the collaboration between academic institutions, including polytechnics, and industry; and 5)"Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.3.2 Policy Measures and Action Plan on "Collaboration between technology university /polytechnic and auto industry to develop required skills"

Table 7		
Policy Measures		**Action Plan**
7. Collaboration between technology university /polytechnic and auto industry to develop required skills		**[Industry-Academia Joint Program]** ・ Strengthening collaboration between polytechnic and industry, including POLMAN Bandung (under the Ministry of Higher Education), STMI (under MOI) and ATMI (private)
Background ・ This is the main agenda of the Making Industry 4.0. ・ Enable to expect to create Learning Factory and Teaching Factory through the construction of PIDI, . ・ Adopt an internship system in the automotive industry for 4th year university students, which has not been common in the past. ・ To apply the concept of industry-university cooperation to improve the technology of factory management and engineering through		・ Training of 5,000 design personnel per year (currently about 0: OJT in the design department after employment) ・ Training of FMS skills and human resource development (See Activity 2-2) ・ Strengthen the capability of engineering on modern technology. ・ Increase the number of faculties on automotive related engineering course at higher educational institutions.
		・ Create more opportunities for universities/colleges/TVET institutions to learn

the cooperation with Domain 2-5. ・ The possibility of establishing a COE was increased while ensuring collaboration with Domain2-5. ・ An increasing number of countries have been steered from ICEVs to xEVs in response to the corona disaster.		more about Indonesia auto industry. ・ Formulate the COE concept, create a syllabus for industry-university collaboration, and provide incentives for donating courses and accepting interns. ・ Functionalize “Learning Factory” and “Teaching Factory” in the training of academe. **[Implementation of Action Plan]** ・ Conduct endowed lecture at STMI: Business efficiency technology (FMS, etc.)" (for students). ・ Develop a pool of human resources that can teach educational institution in auto manufacturing. ・ Develop incentives for companies to work closely with academia/TVET institutions. ・ Facilitate a greater linkage among government agencies for the industrial-academe linkage ・ Human resources development for students through the establishment of donated courses at technical schools (STMI, etc.)

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 5.3.3 Government Policy on Industry-Academia Tie-up and Its Precedents

Government Policy	Example of Industry-Academia Tie-up in Indonesia
・ SMK Initiative (Ministry of Education and Culture) ✓ The goal is to establish 1,650 more advanced SMK schools by 2020. ✓ As of 2015, 90 schools have been established. ・ SMK revitalization strategy (implemented by the SMK Education Committee) ✓ 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. ・ Polytechnic Program (Ministry of Industry) ✓ The Ministry of Industry and Trade (MOIT)	・ Indonesia Institute of Automotive Industry (IOI) ✓ 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. ・ Establishment of SMK in the industrial park ✓ In 2012, Marubeni Corporation and Argo Manunggal, a local conglomerate, established SMK "Mitra Industry MM2100" in MM2100 Industrial Park. ✓ The vision is to "connect industry and education," focusing not only on knowledge and skills, but also on attitude and stance. ✓ The school has been designated as a model school by the Ministry of Education and Culture, and has attracted considerable attention in Japan. ・ Establishment of educational courses at SMK ✓ Isuzu Astra Motor Indonesia established the

is working with automobile manufacturers to improve the curriculum to match the needs of the automobile industry. ・Link and Match Program (Ministry of Industry) ✓ Participation of industry in vocational education and training at SMK to develop human resources that match the needs of industry ・Establishment of polytechnics in industrial parks and special economic zones	"Isuzu Education Program" at SMK in Medan, North Sumatra, to teach the latest diesel technology. ✓ Isuzu Astra Motor Indonesia has established a similar educational course at SMK in Medan, North Sumatra.

Source: JICA Study Team

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 this Domain）.

The SMK Initiative was launched in 2014 by the Ministry of Education and Culture in response to the needs of companies to improve the skills of Indonesian high school graduates, such as: "It is difficult to attract engineers, and even high school graduates lack knowledge in electrical and mechanical fields. The program is funded by the Ministry of Education and aims to establish 1,650 more advanced SMK schools.

The "Polytechnic Program" was created in collaboration with various automobile manufacturers to solve the problems of the polytechnics under the Ministry of Industry, which were mainly classroom-based and did not teach practical skills, had few teachers from industry, and lacked machinery and equipment. In order to solve these problems, the MOI, since 2015, has been working with various automobile manufacturers to improve the curriculum to fit the needs of the automobile industry, revise the curriculum from a classroom-based curriculum to one that emphasizes practical skills, expand the facilities of polytechnics, dispatch teachers to automobile manufacturers for internships (experience in production), and invite lecturers from automobile manufacturers.

The "Link and Match Program" is a program where students from SMK and polytechnic schools receive vocational training as internship students at actual production sites of companies, giving them the opportunity to learn both classroom lectures and practical work at the company. This program not only fosters human resources who can be immediately effective after joining a company, but also has the effect of securing employment opportunities after graduation.

The industry-academia collaboration that the automotive industry expects is not just for securing excellent human resources. European and U.S. OEMs sometimes order basic research after signing confidentiality agreements with research institutions (universities and research centers). In addition, they often order the same research from multiple research institutes in the

same country and compare the results to choose the best one. There are also many cases of joint research and patent acquisition with research institutions that have excellent researchers.

Such cases are still rare in Indonesia. In addition to strengthen R&D capabilities as suggested in 5-3-3 above in higher education institutions and research facilities, the government should take the initiative in creating opportunities for joint research with academic institutions.

5.3.3 Support expansion of R&D&D[18] supporting service such as Computer Aided Engineering and material evaluation

The policy measure of "Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation" presents 4 action plans. 1) "Strengthening the capacity of testing and certification bodies (e.g. R4T) on xEV" proposes to the evaluation system of light weighting and new materials; 2)"Fostering D&D Supporting Function and System" consider to establish SINAS and deduction of investment restrictions on foreign companies; 3) Synergizing with PIDI Development promotes D&D in coordination with the five pillars of PIDI; and 4)"Implementation of Action Plan" proposes to specific methods to implement the above action plans were discussed.

Table 5.3.4 Policy Measures and Action Plan on "Support expansion of R&D&D supporting service such as Computer Aided Engineering and material evaluation"

Table 8		
Policy Measures		**Action Plan**
8. Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation		**[Strengthening the capacity of testing and certification bodies (e.g. R4T) on xEV]** ・Enhancement of evaluation functions for new parts and systems such as batteries and new materials related to weight reduction and human resource development
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 the millennial generation.		**[Fostering D&D Supporting Function and System]** ・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.)
		[Synergizing with PIDI Development] ・Support for entrepreneurship using PIDI's "Innovation" function (fostering university-born ventures) ・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 ・Industrial human resource development that utilizes the "Capability" function of PIDI ・Displays of success stories using the PIDI "Showcase" function
		[Implementation of Action Plan]

[18] The importance of D (=Design) among R (=Research) & D (=Development) & D (=Design) was explained (see 4.1.2 Current Status and Issues Surrounding Indonesia's Automotive Industry Roadmap (4) EV Strategy).

		・Facilitate the project-based learning at the higher education institutes ・Unified procedural and managerial activities to support D&D supporting functions ・Coordination with various donor support ・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 ・Detailing PIDI planning and assigning roles

R&D&D, as explained previously, is not recognized as an urgent issue while the effects of the corona disaster remain. 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 JICA Study Team are not interested in R&D&D projects which are offered from the Government."(GAIKINDO)

Four action plans have been proposed, but research activities are not efficient because there is no centralized organization to manage R&D. In addition, there are areas where companies are reluctant to collaborate on R&D activities, and the Government of Indonesia has little choice but to steadily train young researchers.

In other words, the action plan on R&D is agreed in general, but its details are yet to be agreed. As have been shown so far, the success or failure of R&D&D support projects depends on one's clear understanding between the parts that should be implemented by the private sector and the parts 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 5.3.5 Percentage of joint applications filed of patent 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

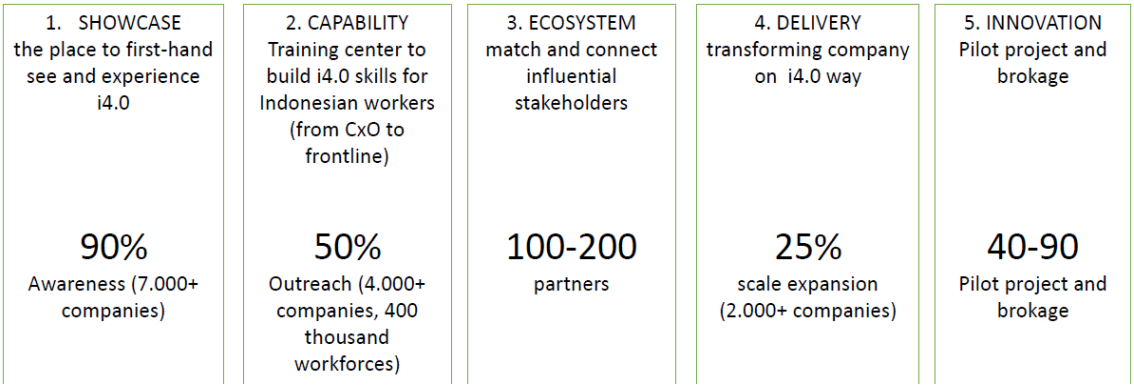
Source:" Empirical Study on R&D Activities of Major Automobile Manufacturers : Technological Domains, Series, and Industrial Clusters", Kansei Gakuin University,2018

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&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 can 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.

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.



Source: MOI

Figure 5.3.1 PIDI's 5 functions and performed target

The Government of Indonesia (GOI) is exploring the possibility of collaborating the function between "5. Innovation" and Teaching Factory, and further,of forming a Center of Excellence (COE) for cross-sectoral R&D that is not limited to the automotive industry. In this regard, the idea of the FabLab[19], which is being led by the Massachusetts Institute of Technology (MIT),

[19] FabLab is a workshop equipped with a variety of machine tools such as 3D printers and cutting machines with the goal of creating "almost anything". Fab labs exist all over the world and are freely available to citizens. FabLab's vision is a society in

seems to be in line with this concept, and it is proposed that the action should be conformed to the movement of forming a COE of FabLab in Indonesia.

5.4 Implementation Schedule

This section presents the implementation schedule for the action plans proposed in this Chapter 5.

Each action plan needs to be implemented by the relevant ministries and agencies, including the Ministry of Industry, and is expected to be implemented in the following four timeframes, based on the urgency, policy effectiveness, and ease of implementation.

SS: Super Short Term within 1-2 years from 2021
S: Short Term within 3 years from 2021
M: Mid Term within 5 years from 2021
L: Long Term 5 years and over from 2021

The individual details of each project are shown in Chapter 4 of Appendix. The details of the project are described so that the urgency, policy effects, and ease of approach can be understood.

which individuals are able to create "things" on their own according to their own needs and desires, which they call the "Industrial (Re)revolution. The word "fab" is a combination of the two words "fabrication" and "fabulous".

Table 5.4.1 Implementation Schedule of ActionPlan

Policy/System/ 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 xEV and strengthen implementation capability	Research and Framework Development and Policy Formulation					
		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	■	■		
		Quick Policy Implementation					
		0-8	Quick Policy Implementation		■	■	■
Promote agglomeration of auto parts industry and Strengthen cost competitiveness	(1) Attract investment to auto parts industry	Investment Promotion of Tier2&3 Companies					
		1-1	Providing more attractive incentives for SME investment than in neighboring countries		■	■	■
			Capturing the need for relocation due to US China friction		■	■	■
		Lowering the minimum capital investment					
		1-2	Monitor the voices from Tier2&3 tenants which have an interest to invest to Indonesia.	2022 - 2023			
			Study the cases of neighboring countries (ASEAN countries as well as the other competitors which is attracting investment)				
		File and share company information contacted					
		1-3	Share company information which are interested in investment to Indonesia	As Required			
		Attraction of FDI Export Promotion					
		1-4	Establish export strategy by model (ex. exporting MPV and other models to target countries)	■	■		
			Strengthen development of MPV for export	■	■		
			Accelerate developing Industrial zone and attract Tier2&3 companies to increase export of auto parts.	■	■		
			Capturing the need for relocation due to US China friction (see Activity 07 and Activity 11)	■	■		
		Implementation of Action Plan					
		1-5	Select target companies for investment	■	■	■	■
		1-6	Conduct investment attraction seminars	As Required			
		1-7	Provide incentives on xEV related parts production for export			■	■
	(2) Raise engineering, quality, and productivity of suppliers	Incentives for Human Resource Development					
		2-1	Incentivize to R&D&D promotions			■	■
			Relaxation of capital and minimum capital requirements			■	■
			Utilization of PIDI for R&D&D and HRD			■	■
		Technology transfer to local companies					
		2-2	Tax incentives for companies entering into joint ventures on the premise of technology transfer to local companies, etc.			■	■
			Promotion of capital investment such as automation			■	■
			Granting capital investment incentives (As related to Activity 2-1 above)			■	■
		Enhancing Kaizen Activity					
		2-3	Develop Kaizen leaders	■	■	■	■
			Kaizen consultation to Tier 2&3 companies by Japanese Senior Volunteer	■	■	■	■
		Preparation of Technology Database for Advanced Tier2 and 3 companies					
		2-4	Prepare Technology Database and display at PIDI			■	■
		Implementation of Action Plan					
		2-5	Review and improve the contents of board exams on subjects related to auto manufacturing			■	■
		2-6	Upgrade tools and equipment based on newly updated / developed curriculums to new production technology	2022 - 2023			
		2-7	Study the possibility of lowering logistics costs			■	■

		2-8	Study the possibility of lowering materials costs				
		2-9	Support business matching and expansion of local suppliers(Conducting Matching Hub)				
	(3) Improve business climate to encourage investment especially for SMEs investment import license, and visa)	Improvement of Immigration Management for Foreign Experts					
		3-1	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)				
		3-2	Relaxation of visa requirements				
		3-3	Other adjustment				
		Review of Trade Barriers					
		3-4	Proper application of national standard (ex. Application of high-tensile steel)				
			Appropriate safety standard inspections				
			Proper operation in customs				
		Expansion of the Approval System for Green Line Treatment					
		3-5	Disseminate the merit of Green Line and MITA Line system.				
		Implementation of Action Plan					
		3-6	Set up "Direct Appeal Site" on BKPM Website to gather request from related investors.	As Required			
			Discussion/review of Omnibus Law by representative chamber of commerce from abroad	As Required			
		3-7	Rental factory for small sized investors	As Required			
		3-8	Establish a collaborative working group and Support the collaborative working group's activities				
		3-9	Regular review of safety/environmental standard				
	(5) Factory management and production engineering skills development (ability to improve/ design process.,etc)	Expand Automotive Industry Course run by Polytechnical College					
		5-1	D4 and Recurrent Education (Utilize and strengthen SMK/Polytechnic Program)				
		5-2	Develop an OJT training plan on processing technologies at Polytechnical College				
		Quality Upgrading					
		5-3	Choose necessary technology and implement education both at academe and at businesses				
		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")				
		Implementation of Action Plan					
		5-6	Provide training and seminars on in-demand processing skills identified				
Enhance product development and Engineering capability	(6) Promotion of R&D&D investment and transfer of R&D&D capability to local through incentives for R&D&D	Establishing the Support System					
		6-1	Review and expand R&D related incentives by establishing protocol (No.45)				
		Push R&D&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				
	(7) Collaboration between technology university /polytechnic and auto industry to develop	Industry Academia Joint Program					
		7-1	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)				
		7-2	Create more opportunities for universities/colleges/TVET institutions to learn more about Indonesia auto industry	2021 - 2022			
		7-3	Formulate the COE concept, create a syllabus for industry-university collaboration, and provide incentives for donating courses and accepting interns.				

	required skills	7-4	Functionalize “Learning Factory” and “Teaching Factory” in the training of academe (refer to Activity 7-3, and Activity 5-4)				
		7-8	Facilitate a greater linkage among government agencies for the industrial-academe linkage				
		Implementation of Action Plan					
		7-5	Conduct endowed lecture at STMI: Business efficiency technology (FMS, etc.)" (for students)				
		7-6	Develop a pool of human resources that can teach educational institution in auto manufacturing.				
		7-7	Develop incentives for companies to work closely with academia/TVET institutions				
	(8) Support expansion of D&D supporting service such as Computer Aided Engineering and material evaluation	Strengthening the capacity of testing and certification bodies (e.g. R4T) on xEV					
		8-1	Enhancement of evaluation functions for new parts and systems such as batteries and new materials related to weight reduction and human resource development				
		Fostering D&D Supporting Function					
		8-2	Plan for establishing SINAS as a decision-making forum of R&D and Innovation activity				
		8-3	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.)				
		Synergizing with PIDI Development					
		8-4	Determine the function of PIDI’s 5 Pillars and Create Grand Design of Each Pillar				
		Implementation of Action Plan					
		8-5	Facilitate the project-based learning at the higher education institutes				
		8-6	Unified procedural and managerial activities to support D&D supporting functions				

CHAPTER 6. FRAMEWORK OF DEVELOPMENT PROJECTS

6.1 Overview

6.1.1 Development Project Ideas for by the JICA Project

In Chapter 5, a total of 31 action plans extracted from a total of 9 fields and 57 action plans associated with them were examined. In Chapter 6, activities that will kickstart various policy measures to enhance the international competitiveness of the Indonesian automotive industry are selected from these action plans. Positioning the activities as pilot projects, a framework for implementing the succeeding JICA project (hereinafter the Development Plan), which already has been requested by the Indonesian Government, is drawn out.

(1) Process for Selecting Pilot Projects

In the brainstorming process of the Development Plan, the following items have been considered through a series of discussions between Indonesian and Japanese stakeholders in this JICA study. The first item for consideration was the initial needs of the Indonesian side regarding the Development Project. While a request to the Japanese government has already been issued for the Development Plan, it was agreed that its content will gradually be solidified after collecting information and confirming needs in this study.

When the initial needs of the Indonesian side were confirmed at the initial stage of this study, IMATAP (Director of Maritime Industry, Transportation and Defense Equipment) identified key themes for the automotive industry roadmap: (1) CBU export of multi-purpose vehicles (MPVs), (2) R&D on EV battery and biofuel, (3) PIDI support, (4) automation in the production process in SMEs, and (5) digital technology education in polytech institutes. The Indonesian government aims to achieve exports of 1.5 million units by 2035; however, it still lacks sufficient action plans and programs to achieve the objectives. When targeting the increase in exports of finished vehicles or Completely Built Units (CBUs), it is necessary to consider the regulations and market trends of neighboring countries. Support for export strategy formulation was selected as one of the pilot projects since it is deemed necessary to prepare all-encompassing export strategies, including exports of competitive electronic components.

The JICA Study Team studied the global trend of the automotive industry and response situations in Indonesia during the Covid-19 pandemic and reported it to the Indonesian side in September 2020. Key items confirmed in the study were (1) decline in domestic consumption, (2)

currency depreciation in middle-income countries, (3) sudden increase in popularity for private cars amid heightened awareness toward keeping non-contact with others, (4) environment-conscious consumption behaviors with "going green", and (5) shift to EVs especially in Europe, the United States, and China.

In this study, the JICA Study Team confirmed with the Indonesian side that the automotive industry promotion roadmap, which maps out paths of the industry development until 2035, has no major changes[20] and fiscal incentives to R&D&D activities were strengthened. While the strengthening of R&D&D incentives, which was proposed in the previous JICA project *(Information Collection and Confirmation Survey on Possibilities and Issues Concerning Promotion of Globally Competitive Industries in Indonesia.*), is a noteworthy step forward, Indonesian SMEs find it difficult to avail the incentives based on interviews with automotive companies. Therefore, R&D&D incentive protocol formulation was selected as a pilot project to promote the utilization of the incentives. The activity will cover issues faced by companies regarding the fiscal incentive system, success cases/stories of incentive utilizations, and recommendations for improvement of the incentive system.

In interviews with educational institutions, it was confirmed that the need for digital education is increasing in higher education institutions such as Polytech in order to meet the future industrial human resource needs. Indonesia is promoting PIDI and INDI 4.0 to facilitate digital transformation among local companies with the view that the improvements in parts production capacity and productivity of local companies are needed to form the basis for the expansion of the auto exports. Despite the country's efforts, some issues faced by the industry came to light: although the idea of *Making Indonesia 4.0* is widely understood and appreciated among SMEs, there is no one way to show how to take a step to realize the vision; the fiscal support for adopting the system integrator (a.k.a Sler), which plays a part in the digitization of the production process and automation, is not sufficiently available. The PIDI and INDI4.0 scoring systems under Making Indonesia 4.0 set targets too high for local companies achieve and the steps to reach them are difficult to understand. In addition, there is a strong need to support local companies, especially Tiers 2 and 3 small and medium-sized enterprises. As a measure to support the digitalization of local companies, the implementation of *Matching Hub* was selected as a pilot project[21].

The above-mentioned concerns were consolidated as reference for pilot project ideas. Meanwhile, the Japanese side in charge of assistance to Indonesia holds the following views: (1)

[20] President Joko Widodo has proposed that EV conversion should be implemented ahead of the current schedule and be realized by 2030.

[21] Since SMEs in Indonesia are faced with various challenges, they are requiring holistic support. However, since the main focus of this study is "supporting for SMEs to promote the realization of Indonesia 4.0," matching Hubs were selected based on the experience accumulated by JICA so far.

Outputs of the previous JICA project and the lessons learned from other JICA projects should ideally be integrated into the development plan, (2) R&D support measures should be considered with utmost cautions in order to avoid putting a strain on the private sector, (3) An increase in business efficiency though horizontal roll out of successful operations in neighboring ASEAN countries (especially Thailand) should be encouraged, and (4) Japanese companies should be involved in the development process to build win-win relationships with Indonesian companies.

(2) Selection of Pilot Projects

The pilot projects were selected by reflecting the results of the interview survey, statistical/case analysis, and series of regularly conducted virtual discussions from Indonesian and Japanese sides in the midst of the pandemic. In the end, the following three activities were selected as pilot project candidates.

(Selected pilot project ideas)

1. Export strategy (for CBU and auto parts)
2. R&D&D demonstration / expansion support for SMEs (R&D&D protocol)
3. Production automation support for SMEs (MatchingHub)

Unlike the experimental nature of Activities 2 and 3, Activity 1 is more of a research type activity. Noting the differences, Activity 1 should also evolve into demonstration type activity in the latter half of the next project by involving relevant stakeholders, holding regularly scheduled participatory discussions, and gradually encompassing an experimental element to the activity. Eventually, as shown in the next section, one pilot project should be recommended from each of the three areas of the "Policy Program[22]" proposed in the predecessor project.

It should be noted that a pilot project in the R&D&D field concerning xEV and biofuel remains an unresolved issue at the moment. While expectations from the Indonesian side are still high, it is difficult to obtain the cooperation of Japanese companies because the R&D&D target can be an internationally competitive technology whose right can be held by related companies in the future. Therefore, it was excluded from the pilot projects and the subsequent development plan. Nevertheless, basic data and information collection regarding xEV might be carried out in the subsequent development plan for supporting xEV policy making if necessary.

[22] "Policy Implementation", "Promote agglomeration of auto parts industry and strengthen cost competitiveness", "Enhance product development and engineering capability" of 3 domains

(0) Initial needs on MOI's next development plan

MPV CBU Export	EV Battery, R&D for Biofuel	Supports for Innovation Center	Automation of production lines of SMEs	Education of digital engineering in Polytechnique University

(1) Macro trends under COVID-19 pandemic

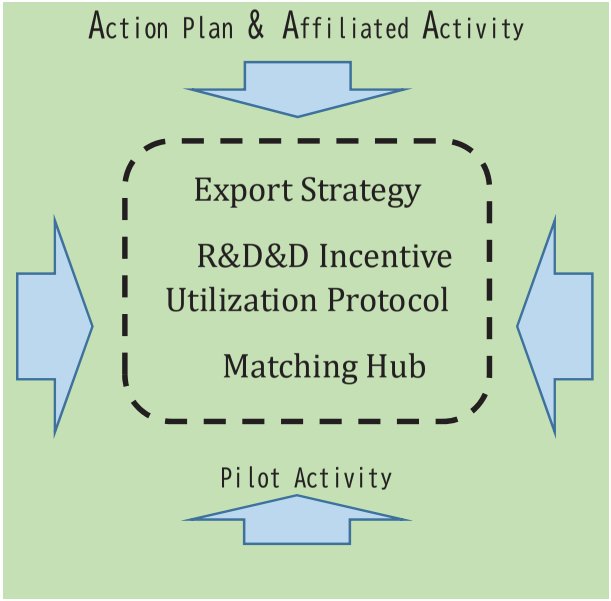
Response to Pandemic and the impacts on Automobile Industry (Domestic demand is contracted)
Spread of COVID-19 in Indonesia is the most severe among ASEAN countries, and domestic car sales are also extremely sluggish. Due to the stricter restrictions on entry of foreign engineers than Thailand or Malaysia, resuming production lagged. However as of the end of 2020, Indonesia is on the road to recovery.

Rupiah Weakens
The Indonesian Rupiah is under downward pressure due to the COVID-19 pandemic. The main reason for this is the growing concern in the 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.

Growing demand for eco-friendly car
Due to the impact of the Three Cs, the concept of car sharing, which had been on the rise before the COVID-19 pandemic, has stagnated. On the other hand, importance of personal car use has resurged. Small eco-cars have been getting popular due to declining incomes and increasing awareness on environmental concerns.

Consumption behavior with "Green" mindset
Increase in the number of environmentally conscious consumers (green consumers) who dare to purchase environmentally friendly products even if they are more expensive than ordinary products

Shift to EVs, led by Europe, US and China
As part of the European Green Deal, the EU has announced its intention to tighten CO2 emission standards for automobiles in order to achieve virtually zero CO2 emissions by 2050. China has also announced a policy to reduce the production and sales of conventional gasoline vehicles to zero by 2035.



(2) Current Situation and Needs of Indonesia

Automotive Industry Roadmap
No major changes have been made after the COVID-19 pandemic. An opportunity is needed to kick-start the measures that have been considered.

Enhanced incentives for R&D&D
A new tax incentive in R&D was added in October 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 distant 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 SMEs to adopt them.

Enhancing Production Technology Learning at Academia
Curriculum related to FMS and lean automation have started to be adopted by POLMAN, STMI, and others. On the other hand, there is an obvious shortage of experts and tutors to teach them, and vocational schools are hoping to establish training courses for this theme with the support of the Ministry of Industry and JICA.

(3) Perspectives of Japan

Reflecting the results of JICA projects to date	Coordination of R&D support	Horizontal dissemination of best practices from other countries	Win-Win Relationship with Japanese Companies
The recommendations in the previous JICA project* was referred to develop the tax incentives for R&D&D. In addition, JICA is currently implementing the "Digital Engineering Case Study to Promote Making Indonesia 4.0" through its SME Overseas Expansion Project.	Biofuel and EV batteries, which are the focal technologies of Indonesia Government, are competitive technologies and key R&D theme with confidentiality for OEMs and Tier 1 companies. It would be difficult for the government to get them involved, it would be pressure for private sector.	JICA Study Team would like to improve the efficiency of the project by horizontal deployment of empirical rules and empirical data from the implementation of related projects in developing countries such as ASEAN countries.	By involving the resources of Japanese companies in supporting local companies in Indonesia, it's important for both sides to build a win-win relationship, and the national interests of both sides are important.

Figure 6.1.1 Framework Formulation Process for the Development Pan and Pilot Projects in the Next Phase

6.1.2 Pilot Activity Planning

This section describes three pilot projects planned to be implemented in the next project.

(1) Export Strategy

Indonesia has set a target of exporting 900,000 CBUs by 2030 and 1.5 million in 2035. Specific policy measures, however, have not been clarified. It is also necessary to consider the exports not only of CBUs but also related industries such as automobile parts..

Therefore, the next JICA project will tackle the case study of export strategies in other countries, the formulation of specific policy measures for export promotion, and the implementation of some of the measures toward achieving the target.

1) Strategic Development

The first step is to develop an export strategy. For this purpose, the project will look into actions to be taken for selected possible candidates of export destinations and export items (CBUs/ parts, passenger cars / commercial vehicles / two-wheeled vehicles, etc.). Furthermore, strategic policy measures that should be implemented for achieving the export target will be considered while referring to case studies in other countries. Target export destinations and export items will be selected by looking into the regions where the automobile markets are expected to expand due to the projected population and economic growth, and the suitability of items produced in Indonesia (vehicle types, parts, etc.). For selected countries, relevant regulations (environment/safety, manufacturer responsibility, etc), automobile-related import system, sales system, business customs, trade insurance system, and the relationship between the target country government and the Indonesian government will be examined.

For policy development, the case study on past export promotion policies implemented by countries that have aggressively promoted exports of CBUs and auto parts will be conducted.

At present, Thailand, Turkey, and Malaysia are considered as candidates for policy case analysis. The project will develop the export strategy for Indonesia through the analysis of target countries, target products, and policies implemented in countries that have succeeded in becoming key players in auto exports. Future discussions on policy measures to strengthen competitiveness are strategies concerning free trade agreements (FTAs) in the automotive field (foreign policy), export seminars for companies as a measure to strengthen the domestic automotive industry, and KAIZEN programs for automobile parts companies to strengthen competitiveness.

Since the ultimate target for export promotion is the increase in net export value, the export promotion strategy should include both the domestic localization (TKDN) of parts /material as shown in the KPI in Figure 4.2.1 as well as export expansion, which are like heads and tails of a coin. In addition, the improvement of the localization rate (TKDN) will lead to the export competitiveness of finished vehicles and parts. Therefore, this pilot project will also aim to grasp

the current state of the localization rate at the component/ material level and to consider measures to improve the state.

2) Implementation of Export Promotion Projects

The Indonesian government and JICA will jointly implement the policy measures formulated in response to strategic planning. The FTA strategy, export seminars for domestic companies, and KAIZEN programs that are currently considered as possible measures. Among these, policy measures other than the FTA strategy-the measure which is deemed problematic to be supported by a foreign aid organization-will be test run starting from program planning. The details of the program will be discussed in the next project together with strategy planning.

Table 6.1.1 Project Ideas for the Automotive Export Strategy

Timing	Formulation of the Export Strategy (2021)	Implementation of Export Strategy Project (2022-2023)
Project Details	**1) Selection of target countries and products for exports** ・ Destinations: Middle East, Africa, Australia, etc ・ Products: CBUs of MPVs; aftermarket parts, medium-sized 2-wheelers, etc. **2) Case study of successful export countries** ・ Study tour of the countries ・ Analysis of policies and their impacts **3) Export strategies** ・ FTA strategies ・ Export seminar for domestic companies ・ KAIZEN programs ・ Others	1) Export seminars for domestic companies ・ Seminars on target destinations for exports ・ Seminars on export strategy plan development for companies ・ Seminar for utilizing FTAs (Certificate of Origin, etc) ・ Others 2) KAIZEN Program ・ Private technical instructions by Japanese experts ・ Incentive system to promote the introduction of equipment for quality improvement, etc 3) Others ・ Other strategies formulated

Source: JICA Study Team

(2) R&D&D Verification

There have been cases of large companies and foreign companies engaged in R&D&D in Indonesia; however most local SMEs are engaged in production and it is extremely rare to find local SMEs engaged in R&D&D. In order for the R&D&D incentive system promulgated in 2020 to be used appropriately and effectively by local companies, it is necessary to support SMEs to start engaging in R&D&D activities and improve the accessibility of the incentive system.

With the need to strengthen support for Tiers 2 and 3 SMEs engaged in R&D&D activities, the incentive protocol for facilitation of SMEs to avail the incentives will be developed in the first project year, and the promotion of R&D&D activities through capacity development of local human resources (i.e., employees in the Ministry of Industry, OEM& Tier 1 companies, and local accounting offices) from the second project year onwards.

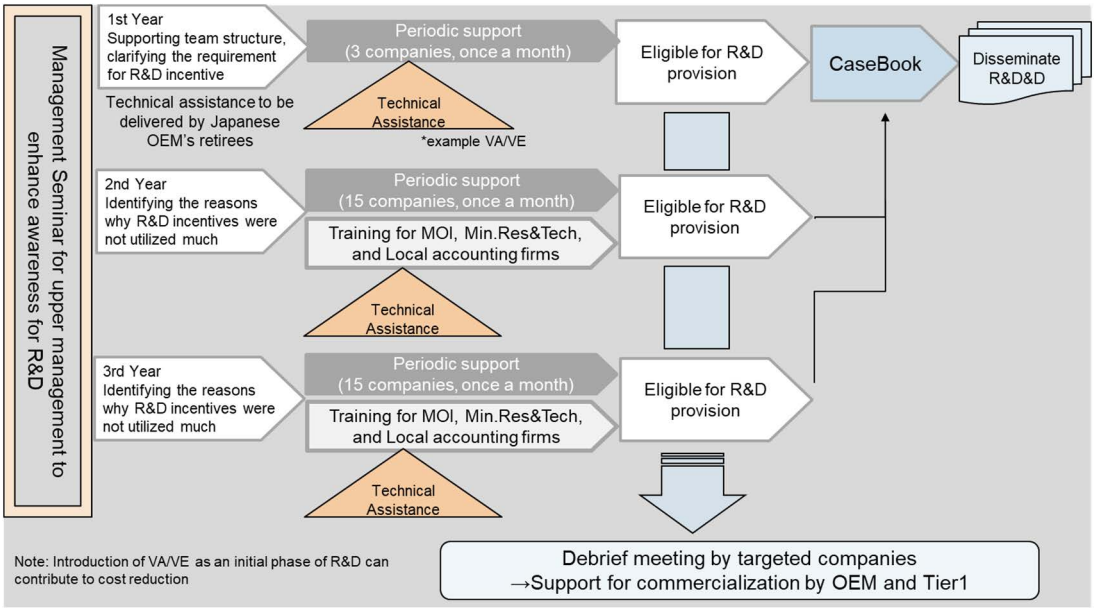
In the first project year, management seminars will be conducted as a preparatory work for activities to improve the awareness (Awareness) of Supplier (Tier 1 & 2).

More specifically, seminars on the R&D&D incentive system will be conducted for SMEs to promote the incentive system and to introduce next-generation technologies and examples of initiatives by SMEs in the ASEAN region. The seminars will showcase success stories of SMEs that are motivated to implement R&D activities in the ASEAN region through a Third Country Study tour, trainings in Japan, and discussions on methods used by successful SMEs to produce what outputs. Similar seminars that are intended to raise awareness in top management will be held as introduction segments to activities in the second and third project years.

As mentioned, the protocol for R&D&D incentive acquisition will be drawn out in the first year. In order to promote R&D&D (especially D&D) activities, the project will clarify the procedures and requirements for availing R&D incentives and set the protocol while providing necessary technical guidance to companies.

In the initial stage of the project, around three Tier 2 companies from different fields will be selected for once-a-month on-site guidance or consultation; in this process, the transfer of the skills for acquiring incentives will be provided to the MOI staff and local tax accountants who will join monthly visits to the companies. The results of on-site guidance (CaseBook) will be disseminated through debriefing sessions and various publications; this will be done in concurrence with the promotion of R&D&D activities through capacity development of local human resources (i.e., employees in the Ministry of Industry, OEM& Tier 1 companies, and local accounting offices).

In the second year, results obtained from the first year from MOI staff (about 3 people) and local tax accountants (2-3 people) will support R&D activities of 15 companies, which will serve as the training of trainers (TOT). In the third year, the MOI staff will take the initiative for implementing the activity and the JICA Expert Team will play a supporting role in consultations conducted by the trained human resources.



Source: JICA Study Team

Figure 6.1.2 Schematic Diagram of R&D&D Verification Activities

Table 6.1.2 Checklist Items for Developing Protocals to Avail R&D&D Incentives

Items to check	Indicators to check during on-site visits
1. Company's activity is aligned with R&D definition ・ Research is the collection of data and information, the proving and rejecting of conjectures and hypotheses, and the drawing of scientific conclusions in order to understand phenomena and society based on the scientific method. ・ Development is the activity of enhancing the benefits and provenance of science and technology that have already been proven to be accurate and safe, in order to improve the function and benefits of science and technology.	Statement of R&D activities to be discussed between the MOI, local accountants, JICA expert team and the private company during the stage of consultation.
2. Identify criteria for awarding incentives. a Aiming to discover new things. b Must be based on a unique concept or hypothesis c Final deliverables are uncertain d Have a plan and a budget. e The goal is to create what can be freely distributed and traded in the marketplace.	Whether the following items from a. to e. are processed as accounting expense categories**. ・ Minutes of regular meetings with the company in question. ・ Records of consultations by technical experts ・ R&D team formation and monthly time management book ・ R & D & D business plan and progress management evidence ・ Monthly related account book

**Expenses not included in R&D accounting

a. Production activities during the initial stages of commercial goods, b. Quality control of output, including routine testing, c. Repair of products for damage, d. Routine repair, addition of features, or other quality improvements to existing products, e. Adaptation of existing features of products to special or customer requirements as part of sustained commercial operations, f. Routine design changes of existing products, g. Routine design changes of equipment and molds, h. Construction, relocation, or start-up of facilities and equipment, i. Marketing studies f. Routine redesign of existing products, g. Routine redesign of equipment and molds, h. Construction, relocation, relocation, or start-up of facilities or equipment, i. Marketing

Source: JICA Study Team base of Various Documetaions

(3) Matching Hub

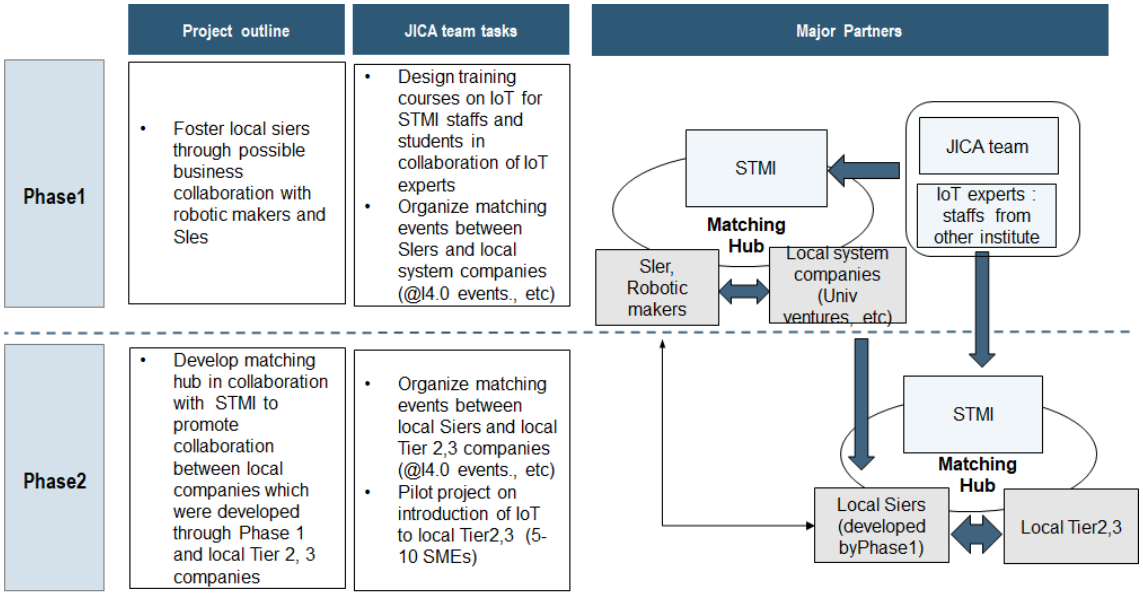
This pilot project aims to accelerate the digitization of local Tier 2 & 3 companies.

It aims to match Japanese robotic and system integrator companies with local system companies and works on setting up the production system such as auto parts companies with JICA's support. Local system companies will acquire know-how and experiences from on-the-job training (OJT).

If the pilot project is implemented successfully, it will lead to stronger partnerships between Japanese and Indonesian companies. To accelerate this activity, the project will assist the Indonesian government in establishing a new incentive system and improving its capacity development system.

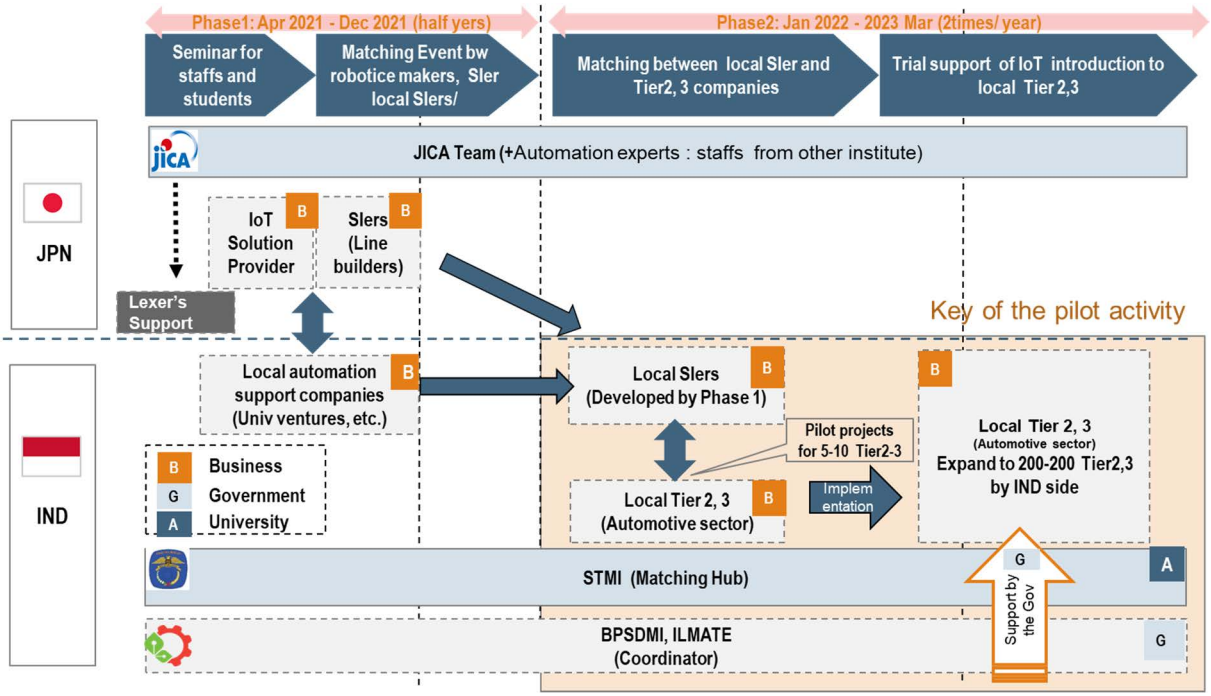
The specific ideas of the project are as follows:

- Provide support to Polytech STMI in two phases that lasts one year each
- In Phase 1, business matching between Japanese IoT solution provider and system integrator companies and local system companies are made.
- In Phase 2, business matching between local
- In Phase 2, matching of local system integrator companies and Tiers 2 and 3 companies (Japanese companies provide the support to the whole system set ups).
- The Indonesian government will support SMEs' efforts by providing institutional and financial support for digitization and automation implemented by matched Tier 2 & 3 companies.
- At this moment, it is envisioned that STMI under MOI will act as a matching hub. Specific arrangements have to be reviewed in the future.



Source: JICA Study Team

Figure 6.1.3 Operational Structure Image of the Matching Hub Project



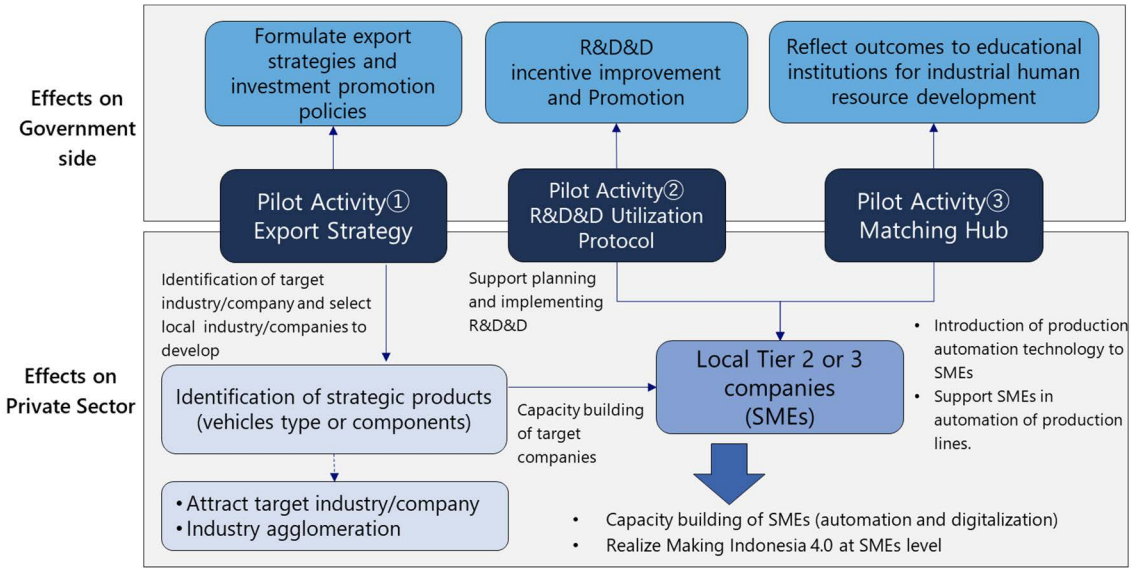
Source: JICA Study Team

Figure 6.1.4 Tentative Timeline of Setting Up a Maching Hub

6.1.3 Ripple Effects of Pilot Projects

The objective of all the proposed pilot projects is to have the activity outputs reflected in the Indonesian automotive industry promotion policy. To this end, the activities cover the elements of not only production expansion but also R&D&D and human resources development through measures such as: the development of an export strategy that aims at increased participation by the Indonesian automotive industry in the global supply chain, the improvements in the R&D&D incentive utilization for facilitating the capacity development of domestic companies that support the global chain integration, and the development of human resources necessary for supporting the digitization of production sites. While the promotion of R&D&D activities and digitization need to be addressed in order for the Indonesian automotive industry to be included in the global supply chain, it is not difficult to imagine many private companies do not know how to tackle these issues. Therefore, it is important to fully appreciate the issues and needs felt by R&D&D incentive users and the current situation and issues at production sites concerning digitalization and reflect the user needs in relevant policies. As ripple effects to the private sector, it is possible to directly support the capacity development of SMEs by designing pilot activities that involve SMEs.

If the pilot projects achieve its targets, it can give a great stimulus to the three areas of the Policy Program, which are the overarching concepts in the previous JICA project. In particular, it will fully function as a stimulus measure for SME promotion.



Source: JICA Study Team

Figure 6.1.5 Image of Ripple Effects in the Next Phase