REPUBLIC OF INDONESIA
MINISTRY OF NATIONAL DEVELOPMENT PLANNING
(BAPPENAS)

REPUBLIC OF INDONESIA
DATA COLLECTION SURVEY
ON PROMOTION FOR
GLOBALLY COMPETITIVE INDUSTRY

FINAL REPORT

MAY 2019

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NOMURA RESEARCH INSTITUTE, LTD.

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Abbreviation	Full name in English
ABS	Anti-lock braking system
ADAS	Advanced driver assistance system
ADB	Asian Development Bank
AEC	ASEAN Economic Community
AFTA	ASEAN Free Trade Area
APPI	Indonesian Electrical Manufacturers Association
APROBI	Biofuel Manufacturer Association of Indonesia
ASEAN	Association of South-East Asian Nations
AUV	Asian Utility Vehicle
MOM	Ministry of Manpower
	Ministry of National Education
BAPPEDA	The Regional Development Planning Agency
BAPPENAS	State Ministry of National Development Planning Board
BEV	Battery Electric Vehicle
BHD	Bio-Hydrogenated Diesel
BKF	Fiscal Policy Agency
BKPM	Investment Coordinating Board
BLK	Job Training Center
BOI	The Board of Investment
BPOM	Food and Medicine Regulatory Agency
BPS	Statistic Indonesia
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CAO	Cabinet Office
CBU	Completed built units
CMEA	Coordinating Ministry for Economic Affairs of the Republic of Indonesia
CNG	Compressed natural gas
CPO	Crude Palm Oil
CV	Commerical vehicle
ECU	Engine control unit
EV	Electric Vehicle
FAME	Fatty Acid Methyl Ester
Gabel	EMC & Indonesia Electronics Producers Association
GAIKINDO	The Association of Indonesia Automotive Industries
GAPMMI	Indonesian Food and Beverage Producers Association
GERD	Gross Expenditure on Research and Development
GHG	Green House Gas
GIAMM	Association of Automobile and Motor Equipment Industries
GOI	Government of Indonesia
GVC	Global Value Chain
HEV	Hybrid Electric Vehicle
HRD	Human Resource Development
I4.0	Making Indonesia 4.0

Abbreviation	Full name in English
IMDIA	Indonesia Mold & Dies Industry Association
ISPO	Indonesian Sustainable Palm Oil
IVO	Industrial Vegetable Oil
JAMA	Japanese Automotive Manufacturer Association
JICA	Japan International Cooperation Agency
JJC	The Jakarta Japan Club
KADIN	Indonesian Chamber of Commerce and Industry
KEIN	The National Economic and Industrial Committee
KINAS	National Industrial Committee
KUR	People's Business Credit
LCEP	Low Carbon Emission Plan
LCEV	Low Carbon Emission Vehicle
LCGC	Low Cost Green Car
LPEM FEB UI	Economic and Social Research – Faculty of Economics and Business, University of Indonesia
MENR	Ministry of Energy and Natural Resources
MG	Monoglyceride
MOA	Ministry of Agriculture
MOEC	Ministry of Education and Culture
MOF	Ministry of Finance
MOI	The Ministry of Industry
MOLINA	Mobil Listrik Nasional
MOMAF	Ministry of Maritime Affairs and Fisheries
MOMT	Ministry of Manpower and Transmigration
MOPW	Ministry of Public Works
MOPWHS	Minister For Public Works and Human Settlements
MORTHE	Ministry of Research, Technology and Higher Education
MOTr	Ministry of Transportation
MOT	Ministry of Trade
MPV	Multi Purpose Vehicle
NIA	National Interest Account
NPL	Non Performing Loan
OEM	Original Equipment Manufacture
PCB	Policy Coordination Board
PFI	Participating Financial Institution
PMU	Project Management Unit
PSO	Subsidized Diesel
R&D	Research and Development
R&D&D	Research and Design and Development
RPJMN	National Medium Term Development Plan
SUN	Government Bond
TKDN	Tingkat Kandungan Dalam Negri
WB	World Bank
WG	Working Group
WTO	World Trade Organization

0. Executive Summary

0.1.Objectives of the Study

The Study is to review current situation of industrial development in Indonesia from comprehensive perspectives, and analyze issues and problems for accelerating further development, and demonstrate a position of Indonesia in international division of industrial labor through Global Value Chain analysis, and clarify promising supply chain process and value chain for further development

Through the result of the points above, design the concept plans for mid-term and long term cooperation program for industrial promotion and agglomeration.

This study conducted in-depth analysis of three major sectors, (i) Transportation machinery, (ii) Electrical and electronic, and (iii) Food processing

0.2.Timeline

The Study comprises of Phase 1 and Phase 2.

- Phase 1: Research and Recommendations (from April 2017 to May 2018)
- Phase 2: Pilot Project (from May 2018 to June 2019)

In Phase 1, results of the Study are shared to Government of Indonesia to receive feedback through 4 times of Industrial Dialogue.

In Phase 2, Study Team supports start of National Industrial Committee (KINAS) which is a new framework to facilitate inter-ministerial policy making. In particular, Study Team prepare various policies to be discussed at Working Group (WG) which is echelon 2 level as well as Policy Coordination Board (OCB) which is echelon 1 level, arrange those meetings, and compile discussed issues into policy brief.

0.3.Overview of Phase 1

(1) Recommendations to 3 sectors

The Study drafted current status & potential and vision in the future. Then policies to achieve those visions are recommended.

Automotive

Potential is to increase local content ratio of upstream in the value chain to be competitive. Specifically, policy to facilitate development (triple helix and human resource development), promotion of suppliers, Java automotive industrial belt (to resolve over congestion of JABODETABEK), and improvement of business environment (such as more favorable regulations

for entrance of foreign SME) are recommended.

Electrical and Electronics

The fourth industrial revolution as well as IOT and trend towards EV would be opportunity for Indonesia. To address such potential, first step is promotion of Factory IOT, developed human resource of IT engineer and setup of special economy zone to attract suppliers. This would pave ways to Product IOT such as electronics parts as a second step.

Food processing

Potential includes expanding export business based on advantage of economies of scale and improving the Value Added of Processed Food. To address the opportunity, business environment (procurement of resources and registration of products), business matching, and coordination with FDI are recommended.

(2) Policy package

Recommendations to the 3 sectors are compiled as policy package which includes; (i) inter-ministerial forum, (ii) local enterprise/SME development, (iii) promotion of R&D&D of local/foreign investment, (iv) human resource upgrade, (v) logistical infrastructure upgrade, and (vi) promotion of export friendly environment.

(3) Key achievements of Phase 1

First, organize Industrial Dialogue 4 times to share the results and recommendations of the study. Minister of BAPPENAS and Minister of MOI provided keynote speeches at 4th Industrial Dialogue (April 17th 2018) where KINAS is confirmed to start.

Second, results of the Study contribute to RPJMN 2020-2024 as valuable inputs to background study

0.4. Overview of Phase 2

(1) Background of Pilot Project to support KINAS

- It is confirmed that KINAS will be established to implement roadmap of Making Indonesia 4.0 (I4.0) under inter-ministerial policy making framework at 4th Industrial Dialogue.
- I4.0 is comprehensive strategy of industrial policy focusing on key 5 sectors (Automotive, electronics, food & beverage, textile & garment, and chemical) and 10 priority issues
- JICA Study Team stay at a project office located at MOI where a local staff/researcher work in full-time to support WG and PCB as project management unit and think tank.

- Study Team prepare 3 policy recommendations to be discussed at KINAS during the pilot project.

(3) Tax incentive for R&D&D and Human Resource Development

- Proposed tax incentive to facilitate R&D&D and human resource development (HRD) in private sectors.
- The tax incentive includes Taxable income deduction (as much as 2 times of costs for HRD and 3 times of costs for R&D&D) and accelerated depreciation (2 times faster than the regular one) for investment aiming at R&D&D and HRD.
- Agreement at PCB led to stage of drafting regulation (such as Presidential instruction).

(4) Finance program for SME in industrial innovation

- It is necessary for the government to support financing investment to raise competitiveness because financial markets of Indonesia is much smaller than neighbor countries and cost of funds is higher.
- Proposed two step loan focusing on medium-sized enterprises in investing for innovation.
- In accordance with result of PCB, the policy is on stage to formulate mode of budgeting before drafting regulations.
-

(5) Development of Biofuel and Ecosystem

- Indonesia is a leading country in developing biodiesel. Besides, Indonesia is enriched with natural resources input to biodiesel, therefore, it is recommend to introduce high technology biofuel and increase weight of bio in fuel.
- Japanese company proposed cooperation in technology and experimental verification.
- After discussion at WG, it is under way to specify policy options in Indonesian Government.

0.5.Further steps

This is to recommend potential approaches to address remaining issues, for Automotive and electrical & electronics sectors in particular, based on results of Phase 1 and achievements of Phase 2

(1) KINAS for more effective policy making and implementation

- Formal establishment of KINAS for I4.0 and involvement of ministries which are not yet participating in pre-KINAS
- Formulate concrete policy measures to upgrade global competitiveness of industries.
- KINAS should be upgraded under the Law of Industry as a basis for continuity, since industrial development takes a long time.

(2) Local enterprise/SME development

- Target SMEs to become good suppliers by applying tax incentive, financial program, business matching, and experts consulting for synergy impacts
- Create list of potential SME supplies in I4.0 for matching between local SMEs and Japanese companies

(3) Promotion of R&D&D investment

- Develop curriculum for "designing" capability by collaboration between business and academics such as tech-universities and polytechnic
- Implement a model case of industry-government-university collaborative in national projects such as x-EV and biofuel technology according to Automotive Roadmap.
- Utilize Innovation Center under development to enhance practical R&D&D.

(4) Human Resource upgrade

- Utilize KINAS for I4.0 to facilitate collaboration between MOI and MORTHE
- Develop curriculum of skills required for I4.0 (especially for electronics, robotics, system engineering) through collaboration with industry

(5) Promotion of Java Automotive Industrial Belt

- Develop industrial estates near Patimban and Kendal Port, especially for the automotive sector, where Zoning system and sub-sector targeting of investment incentive scheme will be effective.
- Model case of industry-government-university collaborative and SME business matching might be coordinated.

(6) Improvement of business/export environment for Indonesia 4.0

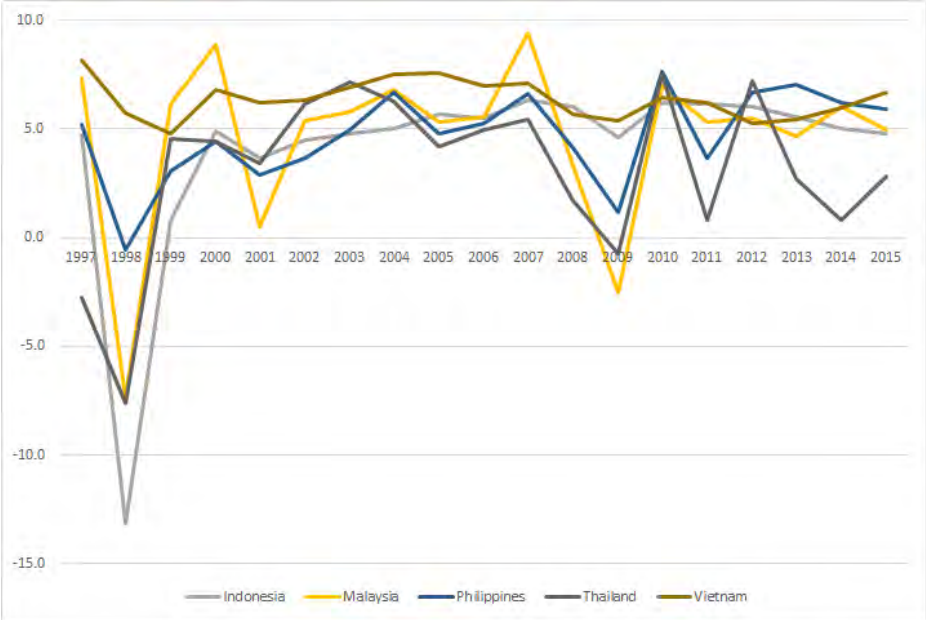
- Promote GVC connected Indonesia 4.0 industry, an industrial complex, especially export processing zone (bonded area) in the vicinity of international ports and airports should be established.
- Policy measures including incentive for investment in Indonesia 4.0 related sector, relaxation of regulation on intermediate goods will be effective.

1. Overview of the study

1.1. Background of the study

Indonesian economy performed well by its stable economic growth since 2005, even over the period of global financial market turmoil around 2008, among neighboring ASEAN countries such as Malaysia, Philippines, Thailand, Vietnam as well as Indonesia. Besides, Indonesia is highlighted by its potential market characterized by large population and growing middle income consumers.

(Unit: YoY %)



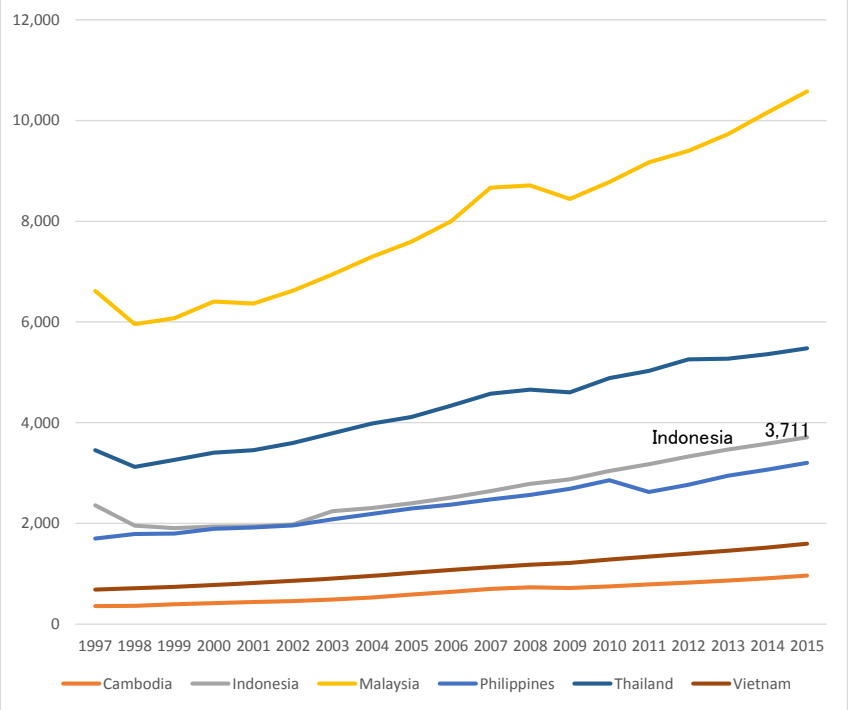
Source: World Development Indicators, World Bank

Figure 1 GDP Growth of ASEAN countries

Government of Indonesia aims to raise per capita income from US$ 3,700 (2015) to US$ 29,000 by 2045 (Vision 2045[1]). To reach high income country level, further economic growth at steady and higher rate is required. Further acceleration of economic growth is required to reach to such target.

[1] President Joko Widodo's statement in March 2017 saying that Indonesia will become the world's fourth largest economy by 2045.

(Unit: constant 2010 USD)



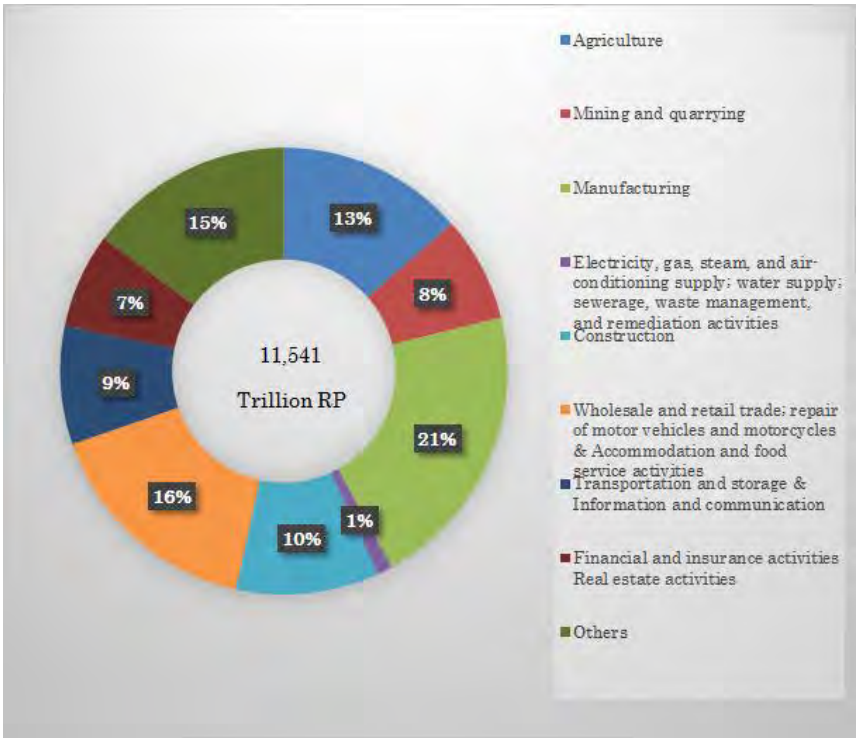
Source: World Development Indicators, World Bank

Figure 2 GNI per capita of ASEAN countries

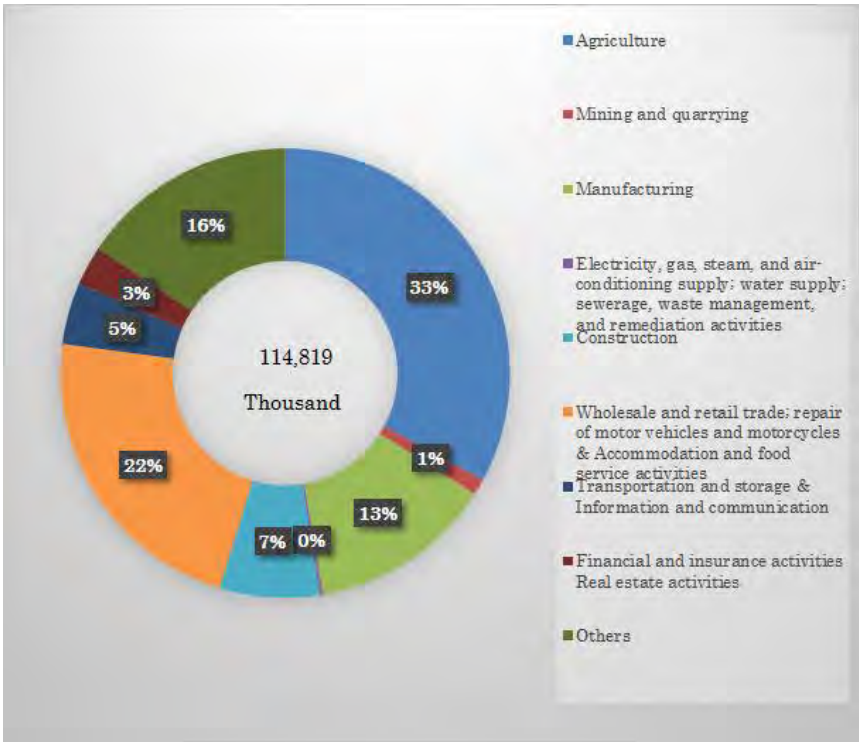
Manufacturing sector shares is 21% of the total GDP and it is the largest weight. It also constitutes 13% in terms of total employment. Share of the manufacturing industry is also projected to increase to 32 percent by 2045 to achieve the target of per capita income of US$ 29,000[2].

[2] Minister of BAPPENAS at 2nd International Conference on Indonesian Economy & Development (ICIED), August 14).

GDP by economic sectors



Employment by economic sectors

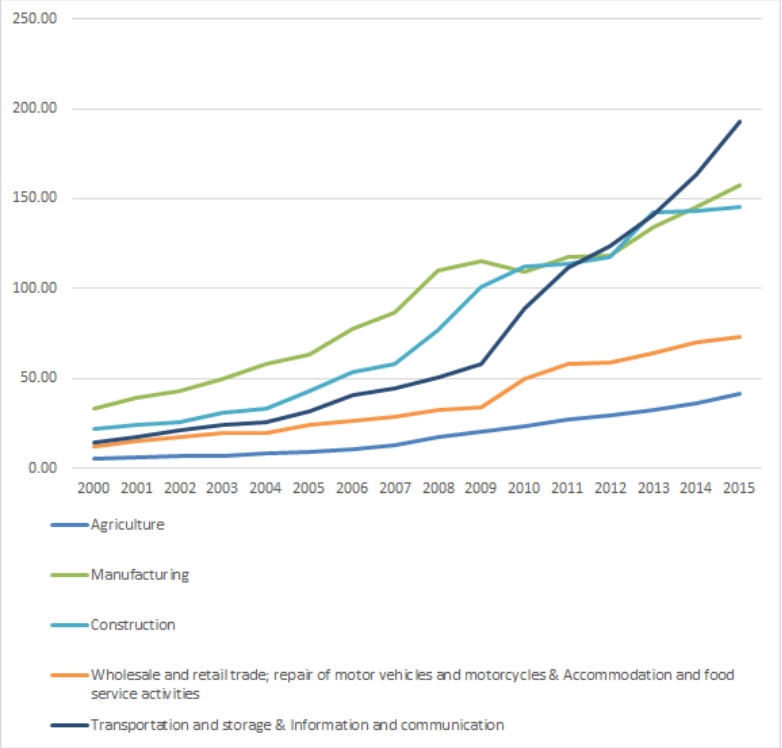


Source: ADB, Key Indicators for Asia and the Pacific 2016

Figure 3 GDP and Employment by Economic Sectors as of 2015

In recent years' trend, however, manufacturing has not performed well. Manufacturing slowed its growing pace in terms of GDP per employee and fell behind Transportation & Communication and Construction.

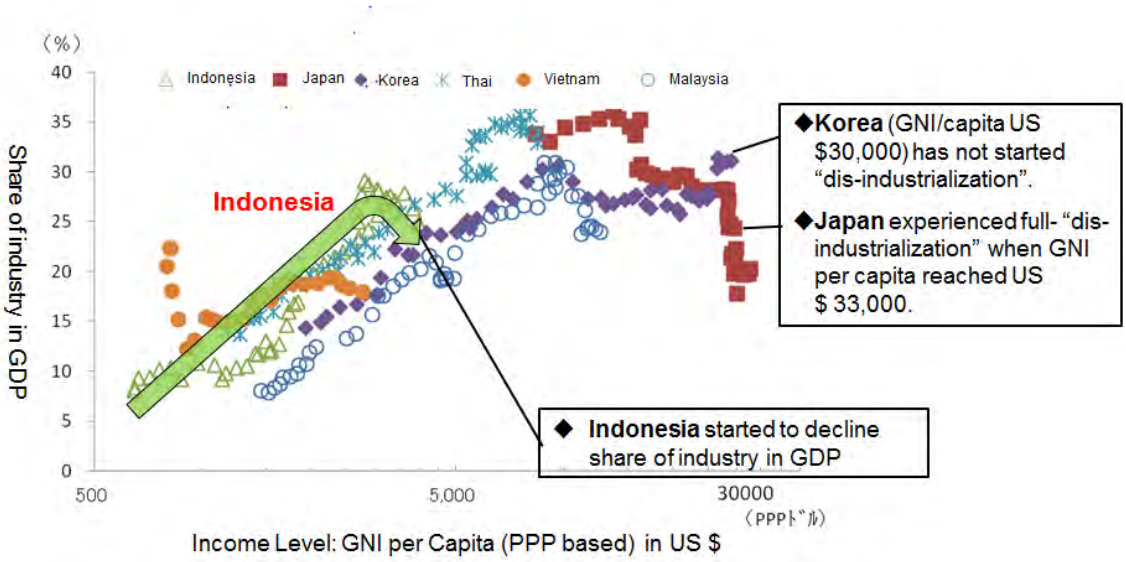
(Unit: million Rp)



Source: ADB, Key Indicators for Asia and the Pacific 2016

Figure 4 GDP per employee by economic sectors

Significance of the slowdown of manufacturing growth is highlighted in comparison with the other Asian countries. Manufacturing share in GDP started to decline in Indonesia before it reaches 5,000 USD of GNI per Capita, which is considered the tipping point for developing countries before embarking into further structural transformation into a more service-based economy. This decline in Indonesia is much earlier than what had happened in Thailand and Malaysia. Further raising concerns of a stagnation in Indonesian income per capita growth.



Source: Tran Van Tho (2015)

Figure 5 Level shift of Share of Industry in GDP as compared with Income Level

For higher manufacturing industry growth, the industry must be restructured towards high value-added and technology-intensive sectors. Looking at global and regional trend, it shall be noted that regional integration and free trade continues to disseminate, highlighted by ASEAN Economic Community (AEC) which started as of December 31 of 2015. This trend may change/restructure location strategy of global enterprises and industrial structure in Southeast Asia region accordingly.

The transformation might influence positively to Indonesia due to prolonged population bonus period of Indonesia which may push up the position of Indonesia as a production location in Asia. However, in order to take advantage of this opportunity, Indonesia must further facilitate industrial competitiveness and productivity.

1.2.Objective of the study

Under the background mentioned above, this study has the following purposes:

(1) Review current situation of industrial development in Indonesia from comprehensive perspectives, and analyze issues and problems for accelerating further development

(2) Demonstrate a position of Indonesia in international division of industrial labor through Global Value Chain analysis, and clarify promising supply chain process and value chain for further development

(3) Through the result of the points above, design the concept plans for mid-term and long term cooperation program for industrial promotion and agglomeration.

(4) Discuss designed concept plans with the Government of Indonesia through Industrial Dialogues, and compile a future cooperation plan

1.3.Target areas

Target area of the study includes all the area in Indonesia, especially industry accumulation areas.

1.4.Target Industry

The Study intends to target three industries of Transportation Machinery, Electrical and Electronic, and Food Processing Industry. These are selected based on several selection criteria, such as GDP share, growth rate, share in export goods, labor absorption capacity, and projected impact to the Indonesian economy going forward.

1.5.Stakeholders of the Study

Stakeholders of the Study at Japanese side include, but not limited to, Japan International Cooperation Agency (JICA), Resource Persons from research institutions and universities, Embassy of Japan, Japan External Trade Organization (JETRO), Business Enterprise and Business Association such as Jakarta Japan Club (JJC).

The Indonesia' main counterpart for the Study is Ministry of National Development Planning (BAPPENAS). Ministry of Industry (MOI) is also a main counterpart during latter part of this Study which is a pilot project (explained later). Other stakeholders of Indonesia include, but not limited to, relevant entities such as Coordinating Ministry of Economic Affairs (CMEA), , Ministry of Trade (MOT), Ministry of Finance (MOF), Ministry of Education and Culture, Investment Coordinating Board (BKPM), Ministry of Public Works and Housing, Ministry of Maritime and Fisheries, Ministry of Agriculture, Ministry of Transportation, Ministry of Research, Technology and Higher Education, Central Bank of Indonesia, and Food and Medicine Regulatory Agency (BPOM). Business Association such as Indonesian Chamber of Commerce and Industry (KADIN), Association of Indonesia Automotive Industries (GAIKINDO), Association of Automobile and Motor Equipment Industries (GIAMM), Indonesian Electrical Manufacturers Association (APPI), and Indonesian Food and Beverage Producers Association (GAPMMI) also participated the discussion in Industrial Dialogue.

1.6.Schedule of the Study

Duration of the Study is May 2017 – June 2019.

1.7.Scope of the Study

The Study comprises of 3 stages after pre-research and Inception Report (IC/R).

In 1st Stage, there are 3 groups of work, such as "Review of target industries", "Review of needs for industrial Human Resource Development", and "Review of JICA's past cooperation" to identify current situation and challenges of industrial promotion. Besides, there is another work, "Collection of data of Indonesian companies", for the preparation of "Empirical analysis on supply chain and production network of Indonesian companies"

In 2nd Stage, the Study will extract promising segment (process and function) based on international division of labor and global value chain analysis. The 2nd Stage also includes Empirical analysis on supply chain and production network of Indonesian companies which is conducted by a Japanese Professor.

In 3rd Stage, the Study will design concept plans for mid-term and long term cooperation program for further industrial development based on findings of the Study and discussion in Industrial Dialogue. The Study will support GOI in implementing proposed policies under inter-ministerial coordination as a Pilot Project. Study Team supports tentative National Industrial Committee as a project management unit and think tank.

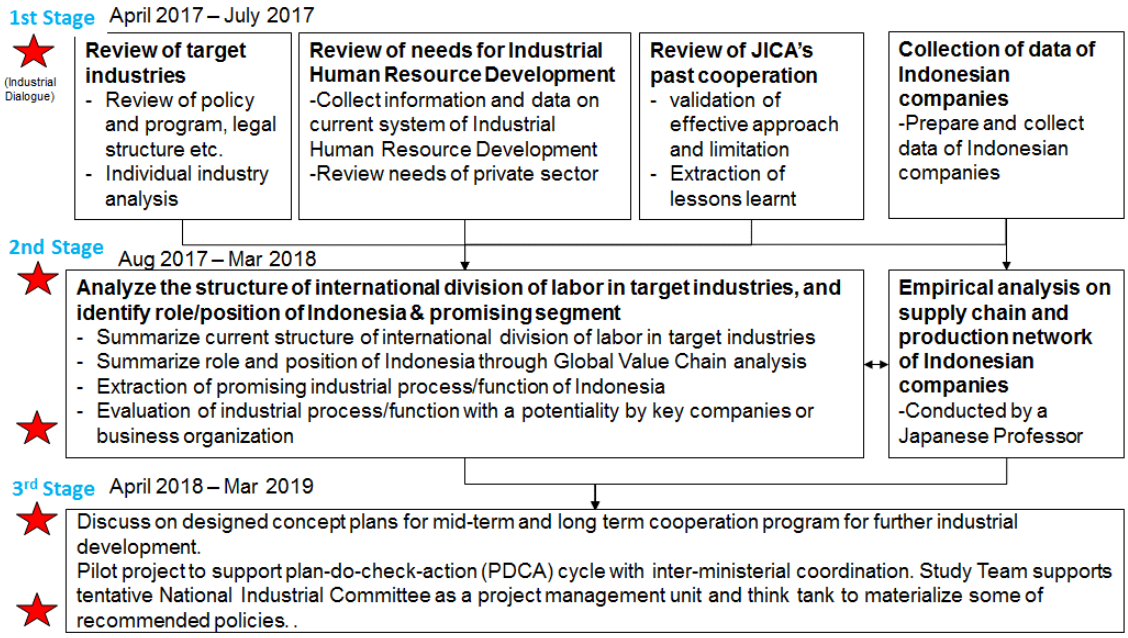


Figure 6 Flow of the Study

1.8.General approach of the study

The study aims at proposing Policy Package related to the selected 3 industries, such as automotive, electrical & electronics, and food processing industries. Towards this goal, the Study implements the following steps.

First, the Study analyzed current status of the 3 industries, including 1) overview of historical development, 2) supply chain and value chain analysis (explained later), 3) current status and future potential of markets, 4) global position of Indonesia in the international division of labor, and 5) industrial policy of Indonesia (in comparison with peer competing countries).

Second, the Study compiles collected data and information to future potential and remaining constraints to materialize such potentials in each of the 3 industries.

Third, the Study proposes future vision towards 2025 of each of the 3 industries, which include target level which represents growth and competitive status of the industries in global supply chain and value chain context, as well as a certain policy scenario to reach to that target level.

Fourth, based on the set target level and constraints identified to achieve the potentials, the Study complied recommended policy measures under policy programs which address the policy scenarios. Current promotional policies/restrictions of Indonesia and comparable policies/regulations observed in the peer countries are also reviewed for developing the policy measures.

Fifth, the Study compiles those policy measures proposed per each of the 3 industries to Policy Packages by functional classification such as Local enterprises/SME development, Promotion of Research, Design and Development, and so on.

Findings and recommendations up to the 2nd steps which proposes the Vision towards 2025 are discussed and confirmed in the 2nd Industrial Dialogue held in August 11th 2017.

Policy Measures and Policy Packages were discussed and confirmed in the 3rd Industrial Dialogue held on January 17th 2018.

Implementation structure and Pilot Project where the Study Team may support inter-ministerial coordination is scheduled to be discussed in the 4th Industrial Dialogue in April 2018.

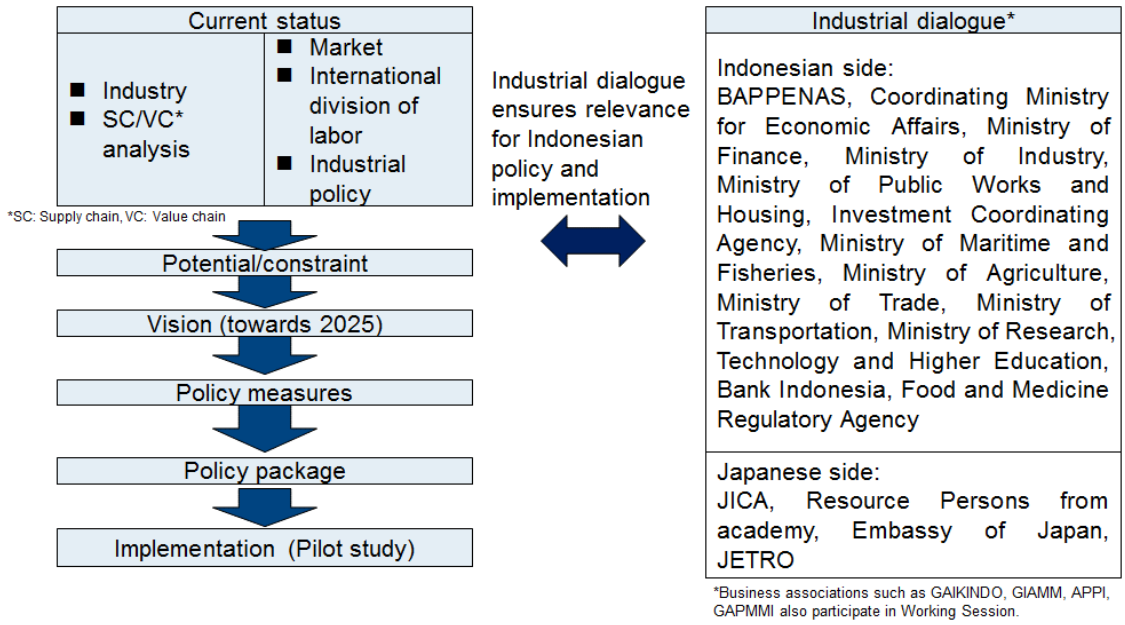


Figure 7 General approach of the Study

1.9.Methodology of Global Value Chain Analysis

1.9.1. Methodology of Global Value Chain (GVC) Analysis

In this Study, “global value chain” (GVC) means each industry’s international division of labor in terms of processes and functions. In this context, GVC analysis adopts the following procedure in general: analyze the trends in each industrial sector and identify the promising supply chain process in the promising sector; and narrow down what value chain is more promising in the process.

In the meantime, “Supply chain” is a chain of materials and parts that are supplied to downstream process of manufacturing. Supporting industry is contributing to various functions of supply chain. “Value chain” is a sequence of value within a company/factory from upstream such as R&D to downstream like sales and services. In summary, GVC analysis in this study will try to identify specific functions of supply chain and value chain that should be focused for further industrial development.

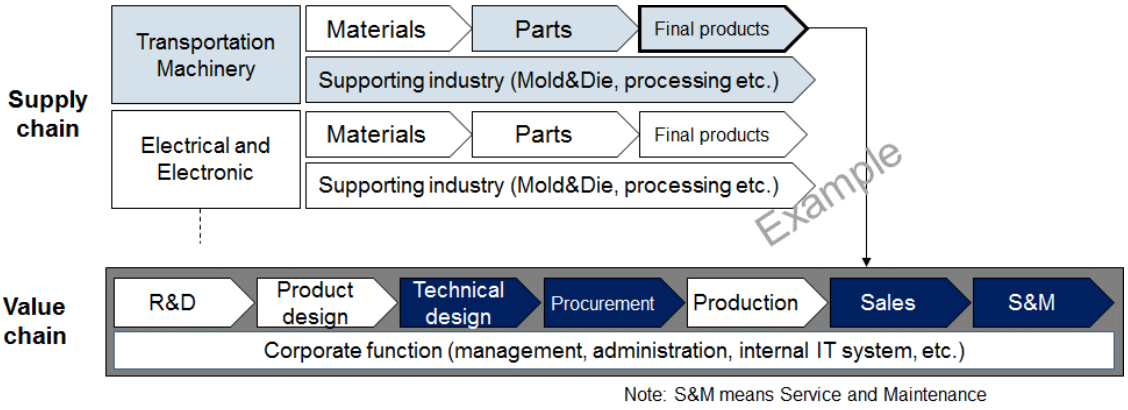


Figure 8 Image of Global Value Chain Analysis

1.9.2. Methodology of supply chain analysis

The study breaks down supply chain by each sub-products in the target industry such as transportation machinery, electrical and electronic, and food industries. The following chart shows an example of such break down.

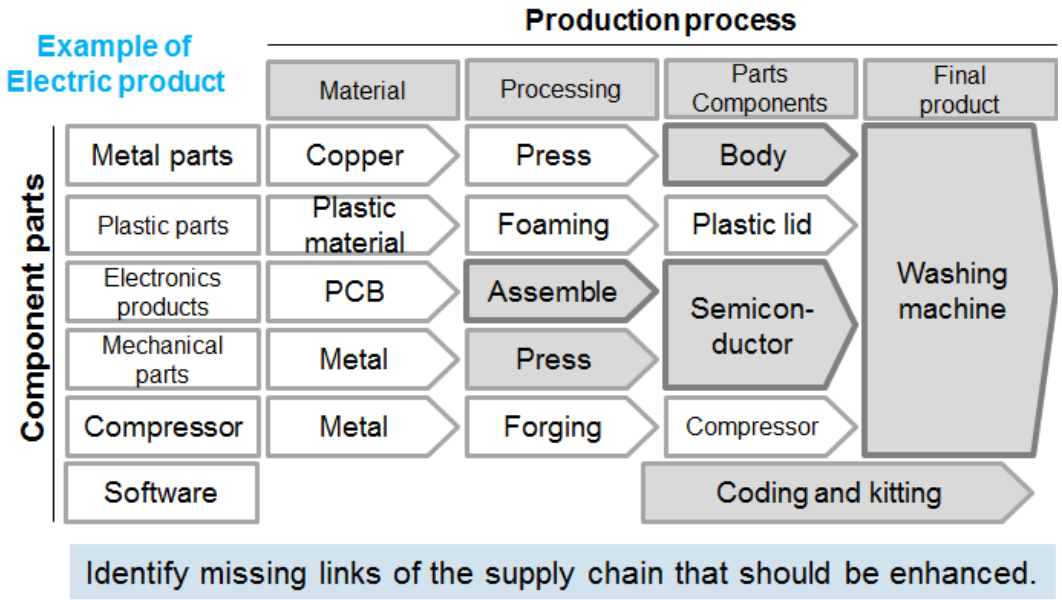


Figure 9 Example of further detailed supply chain

The study tried to specify missing links in the supply chain per categorized parts, items and processes. Initial step to find out such missing link is to pay attention on products that are mainly relying on imports (products that have large trade deficit). Then, among those imported products, the study identified which products/processes can be replaced by domestic production rather than imports, by conducting interview and in-depth discussions with the industry.

1.9.3. Methodology of value chain analysis

Value chain analysis is to try to identify which process has higher potentiality of location in Indonesia. The potentiality depends on availability factors to determine location as shown in the next chart. The location may also depend on strategy of production by global manufacturing enterprises.

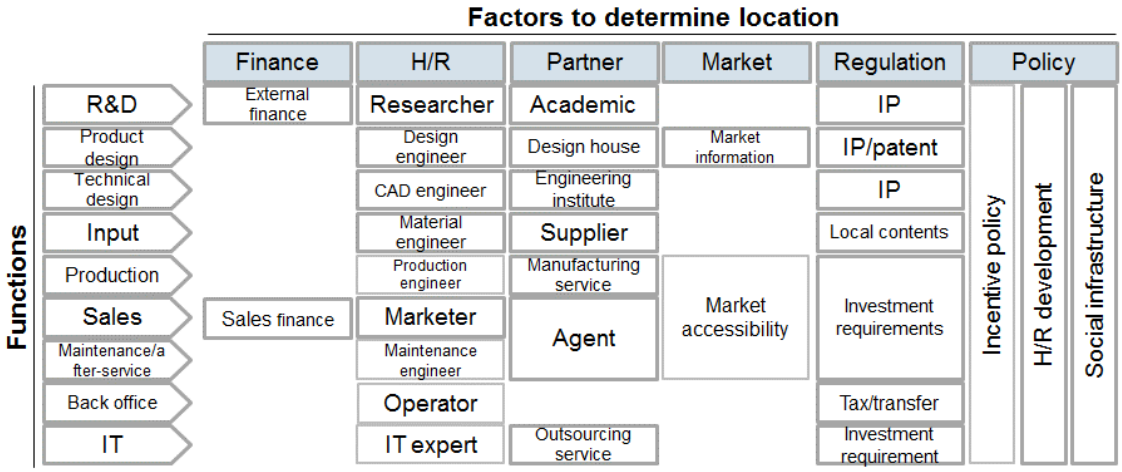


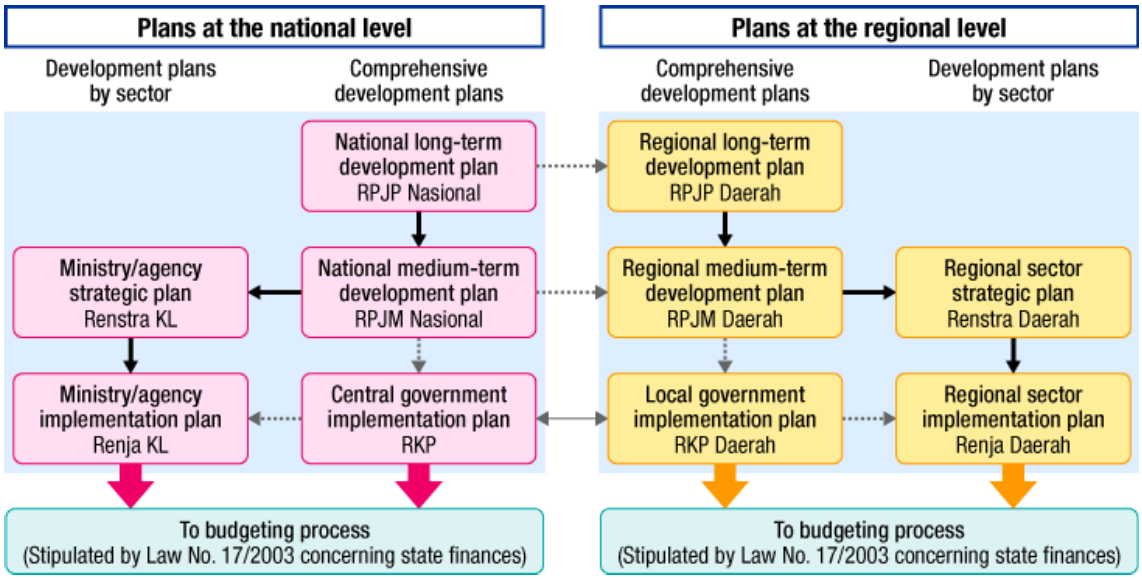
Figure 10 Example of value chain

If the main function of value chain in Indonesia remains only on production with cheap labor force, then the value added in the country will remain low. But if companies located in the country will expand its activity to other functions, such as R&D or design, it will create jobs for highly educated people. The study will try to identify which process has higher potentiality of location in Indonesia through discussion interview with the industry.

2. National Development Planning

2.1.National Development Planning System

By the introduction of direct presidential election, national development planning system has changed from centralized development planning under the President to democratic planning system which requires approval by the People's Consultative Assembly. This is based on the Law on National Development Planning (*Sistem Perencanaan Pembangunan Nasional*) in 2004 and central and local governments prepare various long and medium-term plans (Figure 1). A new President is mandated to prepare a "Medium-Term National Development Plan" for his/her tenure of office.



Source: Ministry of Land, Infrastructure and Transport (Japan) Homepage.

Figure 11 Development Planning System of Indonesia

2.2.Development Plan

Based on the above system, "National Long-Term Development Plan (RPJPN) 2005-2025 was drawn up and it envisaged the Indonesia in 2025 as "a country that is developed and self-reliant, just and democratic, and peaceful and united".

Under the President Joko Widodo and Vice President Jusuf Kalla Administration, BAPPENAS prepared its "Mediem Term National Development Plan (*Rencana Pembangunan Jangka Menengah Nasional: RPJMN*) 2015-2019" in 2014 and succeeded the basic concept of the above long-term development plan. There are nine national development agendas in the RPJMN of which manufacturing sector development is a part of the 6th agenda: Increasing Productivity of the People and Competitiveness in the Global Market.

The RPJMN states the following targets for the industrial sector for the planning period:

- Annual growth rate of the national economy to be reaching 8.0 % by 2019;
- Annual growth rate of the manufacturing sector to be reaching 8.6 % by 2019 and contributes to 21.6% of GDP; and
- New 9,000 middle and large industries and 20,000 small industries to be established.

Table 1 Target Indicators in RPJMN

Year	2014	2015	2016	2017	2018	2019
1. GDP Growth Rate	5.1	5.8	6.6	7.1	7.5	8.0
2. Manufacturing Growth Rate	4.7	6.0	6.9	7.5	8.1	8.6
3. Manufacturing Contribution to GDP	20.7	20.8	21.0	21.1	21.3	21.6
4.Actual GDP Growth Rate	4.98	4.88	5.03	5.07	--	--

Source:

1- 3 : The Indonesian Medium-Term National Development Plan 2015-2019

4 : The Indonesian Central Bureau of Statistics

BAPPENAS prepares the RPJMN which incorporate the technocratic aspects of the development planning and also the vision and mission of the newly elected cabinet of Joko Widodo and Jusuf Kalla. According to the RPJMN, Central Government formulates National Action Plan *'Rencana Kerja Pemerintah' (RKP)* for which each Ministry prepares Ministerial Strategic Plan (RENSTRA KL) and Ministerial Working Plan (RENJA KL).

2.3.Economic Policy Packages

Along with the above Medium-term Development Plan, the GOI issued a series of Economic Policy Packages for quick impact on economy. As of August 2018, sixteen Economic Policy Packages (Table below) have been disclosed and they are mostly related to deregulation on government procedures and tax rate reduction. The Coordinating Ministry of Economic Affairs (CMEA) under the Presidential leadership is dealing with the economic policy package preparing with related ministries and agencies.

Table 2 Economic Policy Packages

No.	Date	Title	Objective	Contents
1	2015/9/9	Encouraging National Industry Competitiveness	Restoring and improving industrial actives, eliminating industrial restrictions that weigh on the consumers and diminishing the burden in regulatory and bureaucracy. Etc.	Reregulation, de-bureaucratization, and fiscal incentives in order to pursue the real sector.
2	2015/9/29	Simplification of investment procedures	Investment promotion	Flexibility in the service of investment for 3 hours within industrial area. Etc.
3	2015/10/7	Investment cost reduction	Investment promotion	1. The price reduction in fuel ammunition, electricity and gas 2. The extension on loan recipients in Kredit Usaha Rakyat (KUR) 3. Simplification of licenses of land in investment activities
4	2015/10/15	Support to domestic business and improvement of labor-welfare	Mitigation of labor problems by creation of job opportunity and improvement of working environment	1. The improvement of labor-welfare policy 2. The low-cost and extensive KUR policies
5	2015/11/2	Tax and interest rate reduction	Development of real estate, banking and infrastructure sectors	1. The cutting on the income tax rates 2. Eliminating double taxation 3. Deregulation in Sharia banking
6	2015/11/6	Deregulation on land development	Industrial promotion on remote areas by SEZ scheme.	1. Allocating the economy in margin areas through the development of Special Economic Zones (SEZ) 2. The easy process of licensing raw materials on medicine imports 3. The provision of the sustainability of water for society in justice
7	2015/12/21	Tax relief	Economic development by tax reduction	1. Tax relief for those who had been worked in labor-intensive industry for 2 years. 2. Easy access to capital makes the land certificates fast
8	2015/12/28	None	Streamlining of public administration	1. One Map Policy 2. Encourage the certainty in business aviation 3. New refinery for energy defense
9	2016/1/27	None	Rural electrification etc.	1. Acceleration of the construction of electricity infrastructure 2. Ensure the stock and price of beef 3. Accelerate the logistic from rural to urban
10	2016/2/12	Foreign Direct Investment deregulation and protection of Micro and SME.	Investment promotion	Revision of Negative Investment List Protection of micro, small and medium enterprises and cooperatives.
11	2016/3/29	None	Promotion of growth industries	1. The development of pharmaceutical industry and medical devices 2. Real estate investment fund 3. Risk control to accelerate the flow of goods at port
12	2016/4/28	Evolution of Indonesia's Ease of Doing Business policy	Improvement of ranking on Ease of Doing Business	Evolution of Indonesia's ease of doing business policy
13	2016/8/23	Low cost housing promotion	Streamlining of public administration related to low cost housing construction.	Reduction of necessary permit from 33 to 11.
14	2016/11/10	Electric commerce Road Map	In 2020, 1,000 technopreneurs will be created and the value business of around US$ 10 billion will be reached.	1. Funding, 2. Tax incentive, 3. Consumer protection, 4. Education and human resource, 5. Tax incentive, 6. Communication infrastructure, and 7. Cyber security.
15	2017/6/15	Logistics	Improvement of logistics sector	1. Transportation insurance 2. Reducing costs for logistic service providers 3. Strengthening the Indonesia National Single Window (INSW) authority 4. Reducing the number of prohibited and restricted goods
16	2017/8/31	Acceleration of business licensing	Deregulation	1.Single submission system: 2.Integrate business licensing services 3.Utilize information technology 4.Enhance cooperation/coordination among government agencies on central and local level Additional (2018/11/16): 1. Expanding 100% FDI in 54 sectors (total 95 sectors), 2. expanding eligible sectors for tax holiday, etc.

Note: JICA Survey Team named some titles.
Source: CMEA and News Articles on Jakarta Post etc.

3. Transportation machinery

3.1.Current status of the industry

After the automotive market in Indonesia had experienced a sharp drop due to the currency crisis in 1997 and the collapse of Soeharto regime in 1998, the market continued to decline many times as a result of currency devaluation and the steep rise in fuel prices, and had been floundering around 400 – 600 thousand units per annum since 2000. However, since 2008, both political and economic stability was achieved under Yudhoyono's administration, and this stability positively limited the damage of economic downturn triggered by so called “Lehman Shock”, resulting in a high growth rate of domestic sales which pushed up the market size of Indonesia to exceed that of Thailand in 2011 and became the largest in the region. The domestic sales increased steadily since the first half of 2010s and reached its highest record of 1.23 million units in 2013. Although domestic sales decreased to 1.01 million units in 2015, with the recovery of economic growth resulting from the stabilization of USD-Rupiah rate and interest rates as well as stimulating public investment by the government, the sales recovered to 1.06 million units in 2016, which is 4.8% larger than the previous year.

As the automotive production in Indonesia has traditionally concentrated on the domestic market while the import of completed automobiles has been suppressed, the production has been closely related with the changes in the domestic market. In 2014, in addition to the expansion of domestic market, the export number exceeded 200 thousand units for the first time, resulting in the highest production record of 1.30 million units. Although the production decreased to 1.01 million units in 2015, it recovered to 1.17 million in 2016, which is 7% larger than the previous year.

Since 2014, the export number has increased from 100 thousand to 200 thousand. This is mainly because Toyota group, which held the top market share, expanded production in Indonesia as an export base for some models such as SUV, with support from the government to increase the export value of Indonesian manufacturing products.

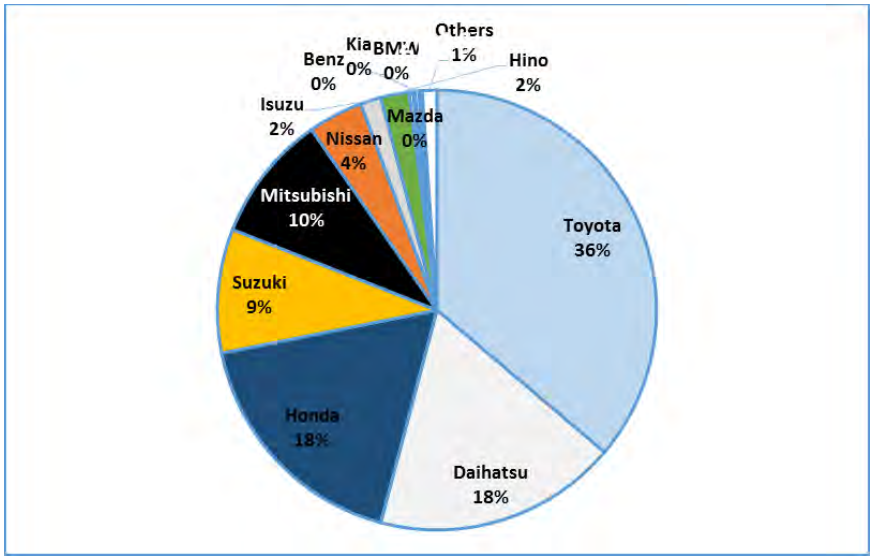
Table 3 Changes in automotive production, import and export, and sales in Indonesia

(Units)

	Sales	Import	Production	Export
2005	533,917	31,760	500,710	17,805
2006	318,904	33,663	296,008	30,974
2007	433,341	55,112	411,638	60,267
2008	603,774	72,646	600,628	100,982
2009	483,548	32,678	464,816	56,669
2010	764,710	76,520	702,508	85,796
2011	894,164	76,173	837,948	107,932
2012	1,116,101	124,835	1,053,270	173,371
2013	1,229,901	154,014	1,208,211	170,907
2014	1,208,028	104,503	1,298,523	202,273
2015	1,013,291	82,306	1,098,780	207,691
2016	1,062,716	75,571	1,177,797	194,397
2017	1,079,534	88,683	1,216,615	231,169

Source: GAIKIDO data

Shown below are domestic sales by category and market share by company.



Source：GAIKIDO data

Figure 12 Changes in automotive production, import and export, and sales in Indonesia

Table 4 Annual production capacity of major automotive companies in Indonesia

ATPM	Parent Company	Production model	Production Capacity	Production Capacity	Investment
PT.ASTRA DAIHATSU MOTOR	Astra	Avanza, Xenia, Rush, Terios Gran Max, Luxio	330,000	530,000	250 million US$ for2nd Factory
PT. TOYOTA ASTRA MOTOR	Toyota	Innova, Fortuner	100,000	250,000	200 US$ for2nd Factory (passenger car)
PT SUZUKI INDOMOBIL MOTOR	Suzuki	APV, SX4,Grand Vitara,	80,000	192,000	300 million US$ for engine and car factory
PT KRAMA YUDHA TIGA BERLIAN MOTORS	FUSO, Mitsubishi Motor	Colt 120SS, L300 Fuso Trucks	70,000	160,000	
PT MITSUBISHI MOTORS KRAMA YUDHA INDONESIA	Mitsubishi Mtotor	Compact SUV, Pajero Sports	240000	240000	New factory to be operational in 2017
PT HONDA PROSPECT MOTOR	Honda	Jazz, Freed	70,000	200,000	
PT NISSAN MOTOR INDONESIA	Nissan motor	Livina Series, Serena, X-Trail	50,000	250,000	270 million US$ for engine and car factory
PT ISUZU ASTRA MOTOR INDONESIA	Isuzu	Panther, Elf, Isuzu Trucks	30,000	100,000	300 million US$ for new factory
PT HINO MOTORS MANUFACTRUING INONDESIA	Hino	Dutro, Hino Trucks/bus, Toyota Dyna	34,000	50,000	
PT MERCEDES BENZ INODONESIA	Benz	Benz C-Class, E-Class, bus	17,000	20,000	
PT. GAYA MOTOR	ASTRA GROUP	BMW, Nissan Diesel	75,000	75,000	
PT. HYUNDAI INDONISIA MOTOR	Hyundai	Avega, H1	23,000	73,000	
NATIONAL ASSMEMBLER	INDOMOBIL GROUP	Kia,Chery, VW	15,000	30,000	
PT.SAIC-GM-WULING INDONESIA	WULING	Baojun 780, Wuling Hongguang		150,000	
Sum			894,000	1,478,000	

Source: GAIKIDO data

3.2. Current status of automotive policy

3.2.1. Past policy review

Indonesia automotive policy is understood in three periods; “Import substitution and localization”, “Trade and industry liberalization”, and “Competitive advantage strategy”.

Indonesian automotive industry has long been protected during the import substitution period, however in this period, the basis of industry has been shaped by development of local automotive assembly makers, majority of which formed a Joint Venture (JV) with local companies, and local Tier 1 suppliers which also formed JV with local companies.

After the economic crisis during the end of Soeharto era and the WTO panel decision that put an end to “National Car Program” on the basis of contravention of Trade-Related Investment Measures (TRIMMs) rules, Indonesia automotive industry policy entered to new stage, which is New Automotive Policy, characterized by trade and industrial liberalization policy. Local content policy was abolished and foreign capital regulation was relaxed, paving way for more competitive

industrial environment. Against the backdrop of regional trade liberalization of AFTA and the said liberalization policy, the Indonesia automotive industry has increased dependence on import from the region, especially from Thailand, which exported CBU (completed built units; mainly small passenger cars) as well as core components. The weak market environment up to 2010 and few initiatives from the government after the failure of "National Car Policy" eroded drive for local investment, leading to weaker industrial competitiveness in the region, especially against Thailand. On the other hand, Thailand, the long term rival of Indonesia, has become the regional hub of the automotive industry through successful launch of "Detroit of Asia Policy" (a policy to promote transfer of automotive production, mainly 1 ton pickups, from Japan and others) in early 2000, and the launch of "Eco Car Policy" (promotion of production of small passenger cars in 2005).

Table 5 History of Indonesian Automotive Policy

	Import substitution and localization **(1969-1993)**	Partial Trade liberalization**(1993- 1998)**	New automotive Policy to comply WTO Rules (1999-2015)
Overview	Import substitution through CBU Import ban and compulsory localization of parts and subcomponents: 40% in 1990s	termination of CBU import ban, while encouraging KD production by tax measures and introducing National Car program	New automotive policy and liberalization of industry and trade to comply with WTO and IMF rescue package after 1998 Economic Crisis
Policies	• the government has introduced CBU import restriction from 1969 and total ban in 1974. • "Deletion Program", compulsory localization of parts for commercial vehicles, was introduced under the ministerial decree of MOI from 1976 t1993,(No.37/M/SK/8/1976:SK307) ; no Program for PC • SK34 was introduced in 1987 to localize sub-components	• CBU import ban terminated In Jun1993 , but introduced high import tariffs/ import VAT(PPN) for CBUs to encourage local KD production: PC CBU 300% VS PC CKD 200% • "Deletion Program" terminated and replaced by "Incentive Policy", by which import tariffs linked to level of localization: component import tariffs 0% for LC>40%	• In 1999, under New Policy, Terminated "Incentive Policy" and "National Car Program" after WTO dispute panel ruled against policies that do not comply with TRIMs • CBU/ KD Import tariffs brought down drastically with no condition of LC • Automotive Industry Roadmap announced in 2010 to become production base for MPV, Light Commercial Truck and environmental friendly vehicle
Market	Market grew over 200,000 in 1980, but stagnated afterwards until 1990 ; 4,448(1970) ,207,804 (1981), 275,000 (1990)	Rapid market expansion from 1992 to 1997 but plummeted in 1998 after the economic crisis; 386,691 (1997), 58,311(1998)	Market recovered from 2000 and reached its peak in 2015 surpassing Thailand 299,558 (2000) →1,291,962 (2014)

3.3.Current Policy Review

Currently, the Indonesia automotive policy is consisted of the following;

National Industrial Policy

In Jun 2015, Government announced National Industrial Development Plan 2015-2035 (RIPIN), which has targeted 10 industries as priority sectors, including transport equipment sector, electronics/ ICT, textile, leather, shoe industry, food industry, etc. Based on RIPIN, medium term industry policy dubbed as National Industry Policy 2015-2019 (KIN), was due to start from 2015, but it did not take effect until 2018. In Feb 2018, President regulation No.2 2018 of National Industry Policy 2015-2019 (KIN) was issued to re-set policy for the remaining years of 2018 and

2019. In KIN, detailed measures for transport equipment sector and other 5 sectors was announced. The focus of the KIN in automotive sector are HRD through training, apprenticeship, and certification, raw material supply development such as steel and petrochemical, and development of technology in collaboration with research and test institutes, and green & sustainable technology development as shown on the table below.

Table 6 National Industrial Policy 2015-2019 (KIN)

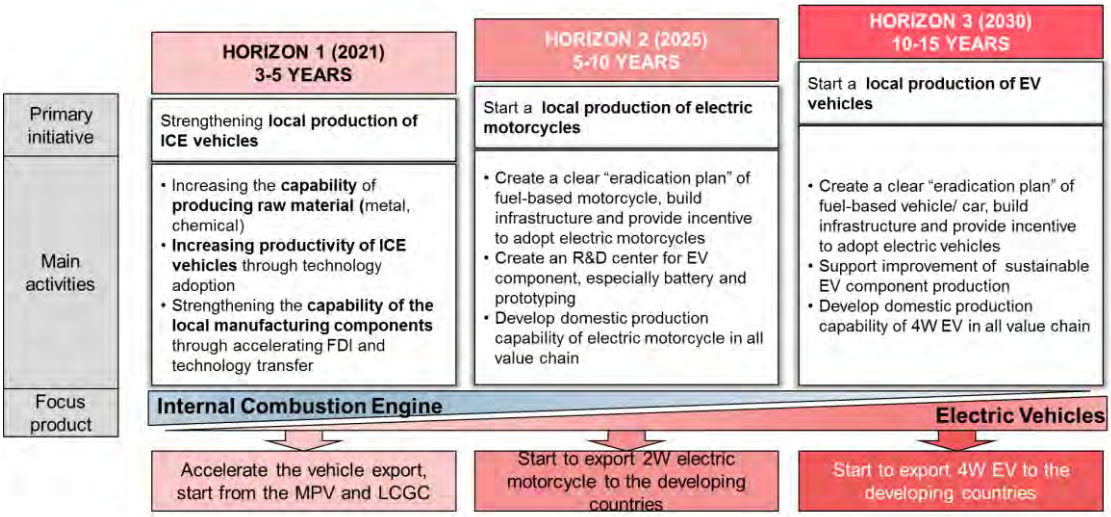
Policies	Details
Industrial Human Resource Development Policy	Develop HRD of priority comptencies such as, designing, casting, machining / fabrication, welding, and mechatronics raining, appreticesihp and certification
Increase utilization, supply and delivery of raw material	Mapping and development of potential supply of raw materials such as steel, other metals, plastic (plastics, rubber, and resins) from within the country to comply with the needs transportation equipment industry.
Industrial Technology Development and utilization	Develop and utilize technology of research laboratory and test institute with the priority on technologies of engine, powertrain, safety, control, communication, GPS, manufacturing, automation, measurement and testing, and materials
Development and utilization of innovation	Development and utilization of innovation of industry by developing Center of Excellence (COE) and strengthening of industry
Standardization	Development of standardization to develop industry
Infrastructure Industry	Integrate transportation equipment policy with national territory development policy
Sustainable industry application	Prepare, apply, and evaluate sustainable industry
Green industry	Prepare, apply, and evaluate green industry

Source: National Industrial Policy 2015-2019 (KIN)

Automotive Industry Roadmap (2018-2035)

Based on the previous National Industrial Policy in 2008, MOI, Indonesia government announced Automotive Industry Roadmap (2010-2025) and aimed to be the production base of MPVs, PC, HEV, CV, as well as design base of MPV s and small passenger cars. The Roadmap stressed upon production expansion of MPV which derived from locally produced AUVs (Asian Utility Vehicle) such as Toyota Kijang, Suzuki Carry, Isuzu Panther, etc. The Raodmap showed target of total production of 2,590,000 units, production for local market, and export, however detailed policy measures to achieve the targets were not announced. Though the official ministry decree has not been finalized yet and still in progress of drafting, the new roadmap (2018-35) was drafted in 2018 based on the new National Industrial Policy 2015-2019 (KIN) and “Making Indonesia 4.0” announced in Mar 2018. The new Roadmap shows basic strategy for the industry to

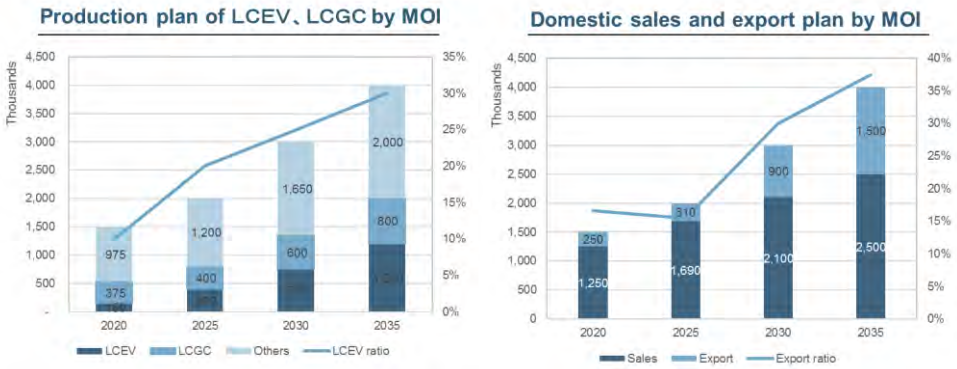
become the hub for ICE (Internal Combustion Engine) as well as for EV. In the initial period of the Roadmap until 2021, Indonesia will pursue industrial upgrading and export base expansion of ICE, while, after the mid period from 2025 onward, Indonesia aims to produce local EVs.



Source: MOI "Making Indonesia 4.0"

Figure 13 Automotive Industry Roadmap (2018-2035)

The new Roadmap draft sets target of production of 4 million vehicles by 2035 with export of 1.5 million units, and plans to raise production volume ratio of LCEV (Low Cost Emission Vehicle) such as EVs and hybrids from 10% in 2020 to 30% in 2035.



Note: LCEV (Low Carbon Emission Vehicle), LCGC=Low Cost Green Car
Source: Ministry of Industry, Automotive Industry Roadmap Draft (2018-2035)

Figure 14 Automotive Production Target (2018-2035)

Low Cost Green Car (LCGC) Policy

In order to develop local industry to decrease dependence on import of cars and auto parts, and also to promote more fuel efficient and affordable cars in market, Indonesia government has announced LCGC policy from 2013. The policy promoted local production of 1L class passenger cars through incentives, namely exemption of luxury tax to zero. The policy was effective as it attracted investment from 5 Japanese OEMs with investment value of 3 billion USD. Furthermore,

the policy aimed to attract new investment from major suppliers as the policy required localization of 80% including engine and transmission parts in 5 years after start of production, totaling around 3.5 billion USD. The number of suppliers increased during the period including new Japanese Tier 1 suppliers such as ADVICS and NHK Springs.

Figure 15 Outline of Low Cost Green Car (LCGC) Policy

TKDN (Tingkat Kandungan Dalam Negeri) or Local Content Policy

Indonesia government announced local content/TKDN policy in 2011 to increase local contents to more than 25%. Though TKDN is applied for all types of vehicles, presently, it is strictly applied to LCGC only with a target to increase localization to more than 80%, as LCGC enjoys special tax exemption. However, the local content policy has certain limitation in developing local industry as it only defines localization of final product, but does not refer to local contents of parts and components (refer to the table below). In reality, though localization of mass produced models such as MPVs reached more than 80%, the net local content is much lower as parts and components has large import contents.

Table 7 Outline of TKDN or Local Content

No	Parameter	Cost based on each product			%TKDN
		Local Content	Foreign Content	Total	
1	Direct Materials	1A	1B	1C	1D
2	Direct Process	2A	2B	2C	2D
3	Factory Overhead	3A	3B	3C	3D
	Production Cost	4A	4B	4C	4D

$$\%\,TKDN\ (4D) = \frac{(4C) - (4B)}{(4C)} \times 100\%$$

$$\%\,TKDN\ (4D) = \frac{(4A)}{(4C)} \times 100\%$$

Source: Perindustrian RI No. 16/M-IND/PER/2/2011

Low Carbon Emission Plan (LCEP) and Low Carbon Emission Vehicle (LCEV)

After start of LCGC policy, the government announced LCEP, targeting passenger cars larger than LCGC to promote environmental cars like hybrid cars. However, LCEP never truly took effect, due to lower interests of OEMs compared to LCGC, and due to unclear conditions and limited incentives.

The Indonesian government is now considering LCEV to replace LCEP, which will promote low Co2 emission vehicles such as hybrid, EV, and CNG vehicles. LCEV has not been finalized yet but it sets high Co2 emission standard, no less than 28km/L.

Table 8 Outline of Low Carbon Emission Plan (LCEP) and Low Carbon Emission Vehicle (LCEV)

	LCEP (Low Carbon Emission Program)	LCEV (Low Carbon Emission Vehicle)
Period	Apr 2014	To be announced in 2019
Fuel Economy		Under consideration
Target Vehicle	• Passenger cars • PV、HV、EV、alternative fuel	• Hybrid, PHEV< EV, CNG, Fuel Cell Vehicles , alternative fuel which meet following conditions ➢ Local production ➢ Low Co2 emission (to be defined)
Luxury tax	• Fuel economy 20-28 km/L 25% reduction • Fuel economy ＞28 km/L 50% reduction	Under consideration

EURO4

As reported by the end of March 2017, the Government of Indonesia officially launched a policy to certify the implementation of Euro4 emission standard. The plan came into effect in October 2018 for passenger cars and will be introduced in April 2021 for diesel trucks. The introduction of Euro 4 is expected to facilitate cars exports from Indonesia, as it is in harmonization with international standards.

x-EV policy

In light of high dependence of fossil fuel and increase in net import of oil, DEN (Indonesia National Energy Council) has proposed reduction of dependence on fossil fuel and EV promotion policy with 2 millions of CNG/ LPG, HEV/EV, 2.1 million of electric scooter, and installation of 1,000 quick charging stations by 2025. Also, National EV project, or MOLINA project, was implemented in cooperation with 9 universities in Indonesia, consisting of Institute of Technology Bandung (ITB), Institute of Technology Surabaya (ITS), etc. However, no comprehensive x-EV policy has been announced yet. Clear policy directions of x-EV policy are expected to come out in line with the Automotive Industry Roadmap draft (2018-35), which will be announced by 2019. At least until then, Indonesia x-EV policy will lag behind other major ASEAN countries such as

Thailand and Malaysia, which already announced certain investment and vehicle incentive policies as shown below. On the other hand, as Indonesia government people such as MOI acknowledge that Co2 reduction contribution by EV needs to take into account Well to Wheel comparison, the government is also considering promotion of other x-EV such as mild hybrid, full hybrid, and alternative fuel such as bio fuels.

Product developed by institutions	3W for post office by ITB 	Li-ion battery 10KW by SMU 

Figure 16 MOLINA Project

Table 9 x-EV Policy of Indonesia, Thailand, and Malaysia

	Thai	Malaysia	Indonesia
x-EV related policy	✓ Thailand to promote new product champion and becomes the production hub of Battery EV。 ✓ EEP2015-2035 ✓ Excise tax reduction and BOI incentives (Jul 2017)	✓ Aims to become major e-market in future	✓ Reduce dependence on fossil fuel •Current : 95.9% •Midterm : 82.2% (2025) •Longterm : 71.3% (2050)
Details of policy objectives	✓ Energy intensity to be raised 30% in 20 years (EEP 2015-2035) ✓ EV penetration to reach1.2 million units f by 2019 ✓ Quick charging stations to be installed by 120 locations in 3 years	✓ Aims to reduce Co2 emission 40% by 2020 compared to 2005 ✓ State mobility blue print (2020) •100 k units of BEV and bikes •Quick charging charging stations to be installted in 1250 locations.	✓ Promote Aaternative fuel (gas, electricity etc) ✓ DEN (Indonesian National Energy Council) is currently proposing EV promotion policy to govt • 2 million units of CNG/LPG, HEV/HEV • 2.1 million units of scooter • Quick charging charging stations to be installted in 1000 locations by 2025
xEV market	✓ PHEV=232 units (2016) ✓ HEV=3500 units (2016_	✓ BEV and E blke :1,024 ✓ HEV; around 6K (2015)	-na

Source: based on NRI Study

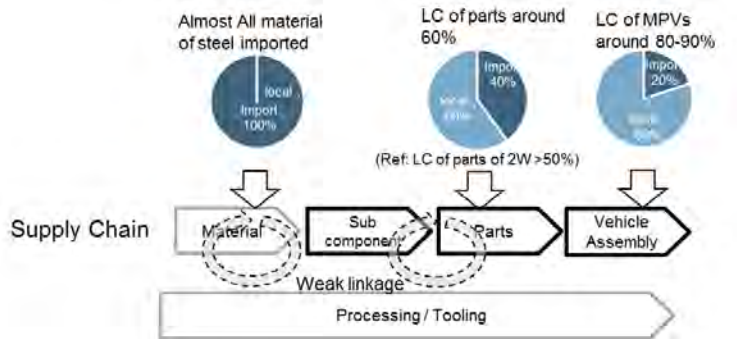
3.4. Supply Chain and Value Chain Analysis and its implication

3.4.1. Supply Chain Analysis and its implication

Findings

Recently, the increase in automotive production in the country has attracted investment in auto parts and the number of automotive suppliers has increased significantly; according to GIAMM (Automotive Part and Components Industry Association of Indonesia), the number of suppliers has increased from 145 in 2010 to 237 in 2016. However, based on the results of supply chain analysis as shown in the figure below, while local content ratio of vehicle is around 70-90% for MPVs, that of subcomponents is as low as 50-60% and raw material import dependence is very high. Trade

balance also shows negative for major auto parts. Therefore the Net Local Content (Total cost of parts / material – Direct/Indirect import of parts/ material) of major models in Indonesia is considered around 50%, whereas that of Thailand has reached around 70%.



Source: based on interviews by JICA team

Figure 17 Current Status of Supply Chain in Indonesia

When considering the trade balance of automotive parts, there is a large import of parts for the production of completed automobiles. In particular, intermediate parts, i.e. components, accounts for a considerable part of the import, making it difficult to identify the main import constituent in many cases.

Table 10 Top 5 Automotive products in trade deficit (2015)

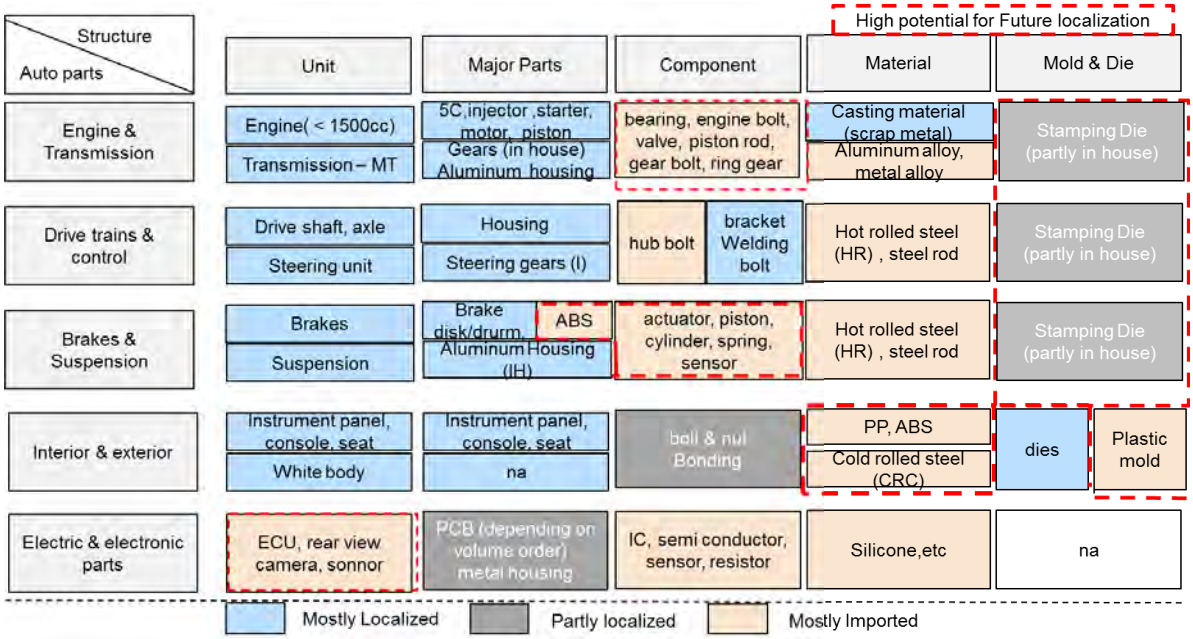
HS Code	Items related to automotive	Trade balance (million US$)
870899	Auto parts	-568
392690	Chassis spring and leaf spring	-309
870421	diesel engine less than 5ton	-228
840991	Gasoline engine for HS87	-188
840991	Rubber air tire	-186

Source: UN Comtrade Data

More detail look by auto parts and structure is shown on figure below; highly localized parts are colored in light blue color, lowly localized parts in pink color, and partially localized in grey color. It can be observed from the Figure below that while unit and major parts are localized, components and materials are still not localized. Major components that are not much localized are precise machining components such as bearing, bolt, gears, piston rods, and electric/electronic components such as actuators, sensors, and ECUs. It is also often mentioned by OEMs that most of advanced safety units and electronic control units depend on imports as Indonesia has limited basis in electronics and advanced control system.

As of raw materials, hot rolled steel (HR), steel rod, major plastic material such as PP and ABS are all imported. Though it is expected that localization of steel will be somewhat improved by the start of production of galvanized alloy (GA) & cold roll coil (CRC) by JFE steel and Krakatau

Nippon Steel Sumikin, localization of other raw material will face more challenges due to large amount of investment needed.



Source: based on interviews by JICA team

Figure 18 Current Status of Supply Chain in Indonesia

JICA survey team has identified ECU, ABS (anti-lock braking system), electric/electronics parts (actuator and sensor) and precision parts as critical parts that have high potential for localization due to increasing demand for higher performance of cars in local market. Also, demand for electric/ electronics parts will significantly increase due to future electrification of powertrain (internal combustion engine replaced by hybrid, plug in hybrid, and electric cars) and introduction of ADAS (advanced driver assistance system) and future proliferation of Connected Car.

Implication

In order to overcome current issue of weak linkage of supply chain and to avoid future loss of industrial competitiveness, it is desirable to first increase more investment incentives for tier 2, 3 to increase their local production, resulting to increase in Net Local Content. As shown from the table below, the number of tier 2 & 3 suppliers are much smaller compared to those in Thailand. Number of suppliers (tier1 to 3) in Indonesia can be increased to more than 2,000 suppliers from current 1,500 suppliers, considering potential increase of vehicle production in Indonesia

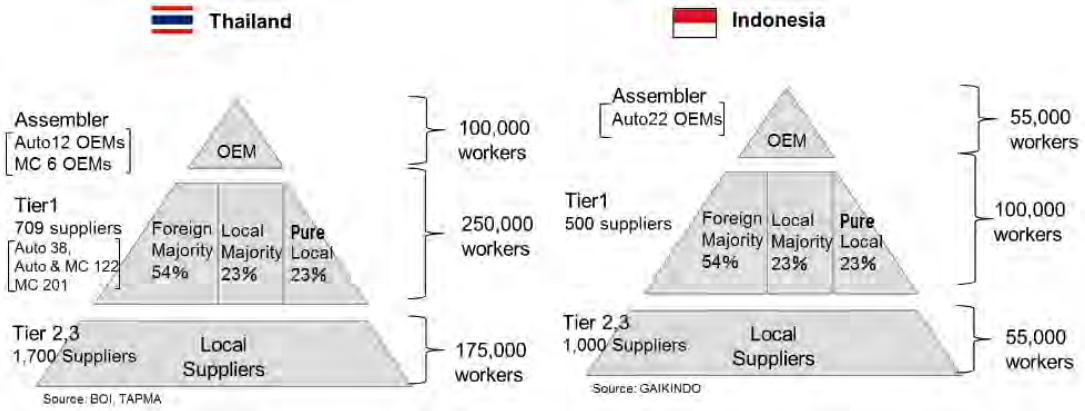


Figure 19 Current Status of Suppliers in Indonesia

3.4.2. Value Chain Analysis and its implication

Findings of upstream value chain analysis

Based on value analysis as shown in Figure below, value chain in Indonesia still has many missing links especially in upstream and also in midstream. Upstream function in Indonesia is almost null as local R&D&D capability is still in very early stage. Despite some OEMs set up some R&D&D facilities, such as Astra Daihatsu, many of them are positioned as satellite office and their main task is still limited to localization of parts with less than 100 persons. A Japanese OEM, who has set up R&D&D facility in Indonesia, mentioned that most of the work is application design of exterior and interior parts for minor changes of models, whereas design work for full model changes are mostly done in Japan. As for suppliers, there is hardly any R&D&D facility in Indonesia, whereas a number of global tier 1 suppliers such as DENSO, Bosch, Toyota Boshoku, NHK Springs, etc. have already set up product engineering and testing facilities in Thailand.

The same can be said for process design capability in midstream in the same figure below. Thailand serves as leading process design / engineering center in the region. For example, Toyota has set up TPS learning center, called Global Production Center (GPC) in Thailand to teach “Kaizen activities” in the region. Many Japanese OEMs also has production preparation team in Thailand to support start of production of new models in the region.

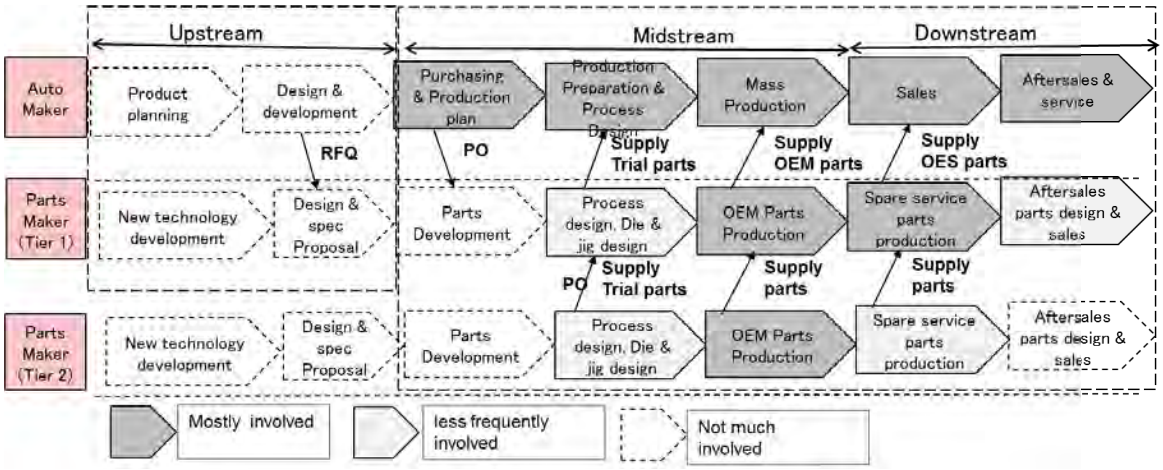


Figure 20 Current status of value chain in Indonesia

Implication

It is expected that with expansion of emerging market, more R&D&D function, especially product planning and body design that need to take into account unique tastes of local users, is expected to be shifted to location closer to the market. As Indonesia's market potential is very large and unique products for Indonesia market such as small MPVs with 7 seaters are developed for the market, Indonesia has potential to become a design hub for MPVs and other light commercial cars. Since Thailand has already localized 30-40% of R&D&D function in Thailand, Indonesia can also start from localization of R&D&D of upper body.

Function	Involvement of Indonesia	Role of HQ/ RHQ (Thailand)/ Indonesia	Involvement of Indonesia	Potential Role of Indonesia in future
Product concept /planning	△	• Global product in HQ • Domestic / region product concept in Thailand or Indonesia	○	• Transfer of country product planning function (→translate market needs to engineering terms)
Upper Body D/D	△	• D/Din Head quarter for base model and D/D of derived models in Thailand • Some OEMs started partial D/D in Indonesia (minor changes)	○	• D/D for derived models in Indonesia (full model changes) – Around 40% of D/D tasks to be transferred
Platform D/D (chassis , frame, etc)	X	• Development: Headquarter • Testing/application : some OEMs in Thailand	△	• some modification of platform in Indonesia (longer wheelbase, etc)
Power train D/D	X	• All developed in Japan • Homologation and modification/application (bio fuel) in Thailand	X	• No power train development as global platform using latest PT technologies

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

Figure 21 Current status of value chain in Indonesia

In order to develop future R&D&D capability, it is recommended to provide R&D&D investment incentives to increase investment. Also, it is also necessary to develop human resource for R&D&D through close cooperation between technical universities and OEMs, as such cooperation will help courses taught at universities more practical and more accommodating to business needs.

Findings of midstream value chain analysis: suppliers

If we highlight on value chain of suppliers including tier1 and tier2 suppliers, development of midstream value chain is critical for increasing competitiveness as shown on Figure 24. Based on JICA survey study, local suppliers are still at the level of C and D in process engineering capability and needs to increase Kaizen and process capability first, then eventually use more automation in future

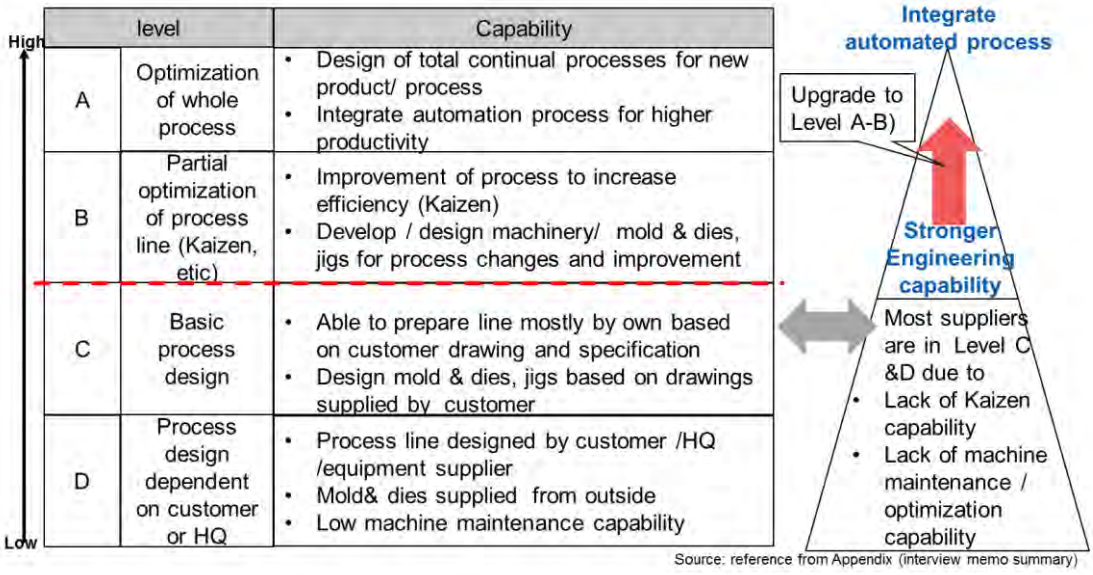


Figure 22 Current Status of Midstream of Value Chain of local suppliers in Indonesia

3.4.3. Spatial supply chain analysis

In addition to the two abovementioned issues, based on the results of spatial value analysis, spatial expansion of the automotive supply chain, most of which is currently aggregated in Jakarta and its vicinity, is critical to overcoming future bottlenecks in development of automotive industry.

Although the automotive industry in Indonesia has seen in a relatively steady growth in the past several years, more than 90 percent of automotive and related industries are located in the JABODETABEK (Greater Jakarta) area. This over-aggregation has resulted in not only steep rises in the land price and minimum wages of major industrial areas, but also severe traffic congestion in such areas. In the long term, difficulty in transportation and logistics would have an adverse effect on the future production growth of the supply chain, making it difficult to achieve the goal of over 2.5 million cars (hypothetical figure). Moreover, vastly increased cost stemming from the surges in

land prices and wages would eventually lead to a grave loss in industrial competitiveness in the international level.

In order to address the current problems in cost and transportation and the long-term risks that will arise from them, the supply chain needs to be developed and expanded spatially. One of the solutions might be to expand industrial development from concentration in Jakarta to be scattered across the Northern part of Java Island from through Surabaya. In addition to the existing supplier agglomeration in JABODETABEK, new agglomerations might be considered to be developed in Tegal, Semarang and Surabaya to form the "Java Automotive Industrial Belt" in the medium- and long-term plans.

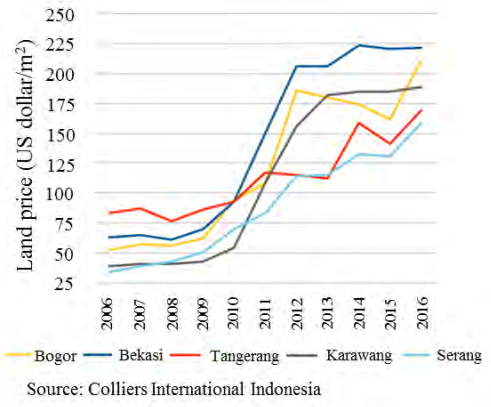


Figure 23 Greater Jakarta industrial land price

Figure 24 Minimum wages in Jakarta, Semarang and Surabaya

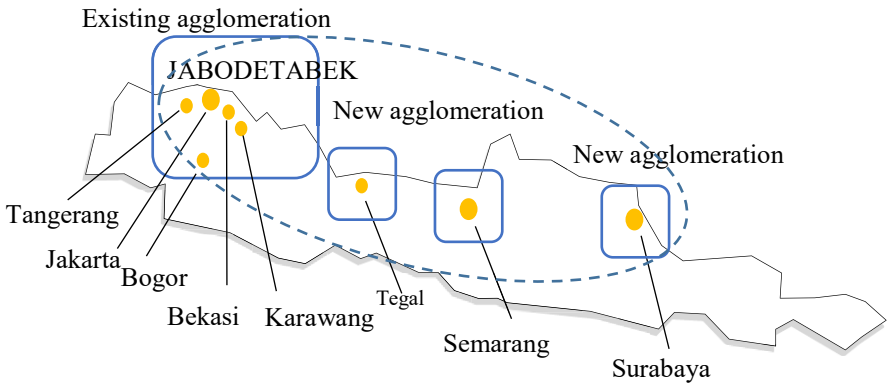
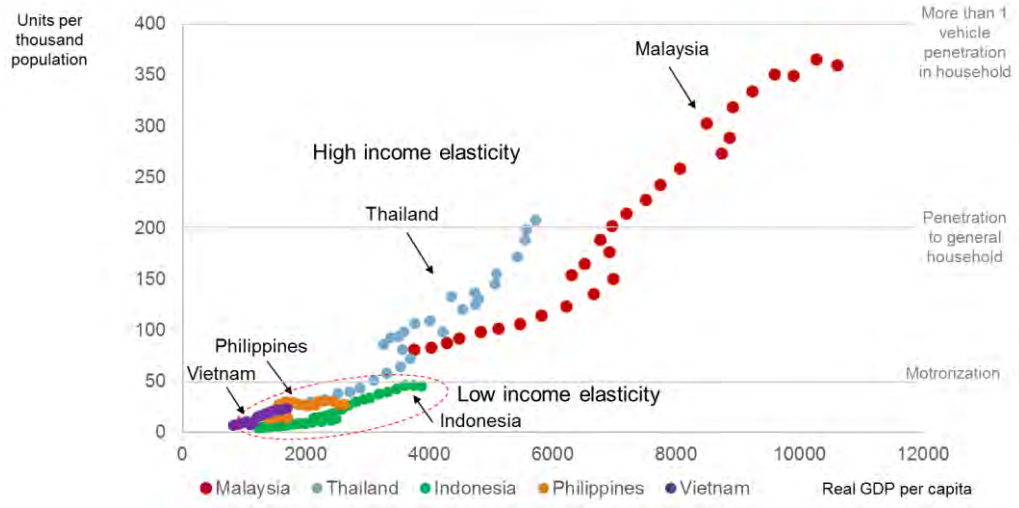


Figure 25 Java Automotive Industrial Belt

3.5. Potential/constraint

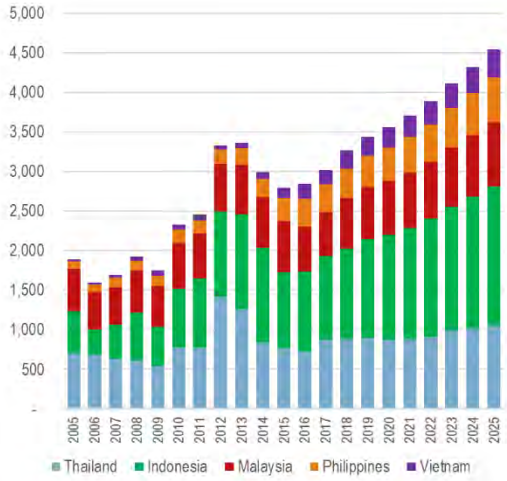
3.5.1. Potential

Indonesia has already reached the Motorization stage as GDP per capita reached close to 4,000 US$ income level. From motorization stage to Penetration to General Household stage, the speed of penetration is expected to accelerate with higher income elasticity as shown on the penetration path of Thailand and Malaysia on the figure below. Therefore, the growth of Indonesian automotive market is expected to accelerate in the next 5- 10 years to reach 2 million units by 2025, if average GDP growth of Indonesia is around 6-7% as high as Thailand and Malaysia at the penetration stage. However, if GDP growth of Indonesia is around 5% or lower, the market is expected to reach around 1.7 million units by 2025. In any of the case, Indonesian automotive market will remain the largest market in ASEAN, increasing the gap with 2nd largest market in ASEAN, Thailand, which will grow modestly to around 1 million units.



Source: NRI based on IMF data, land transport department data of each country

Figure 26 Vehicle Penetration of major ASEAN countries



Source: NRI forecast

Figure 27 Light Vehicle Market forecast of Major ASEAN countries (2005-2025)

Indonesia also has potential to become major production hub of small MPVs and small commercial vehicles, as it has the largest MPV market in Asia Pacific Region including India and Australia.

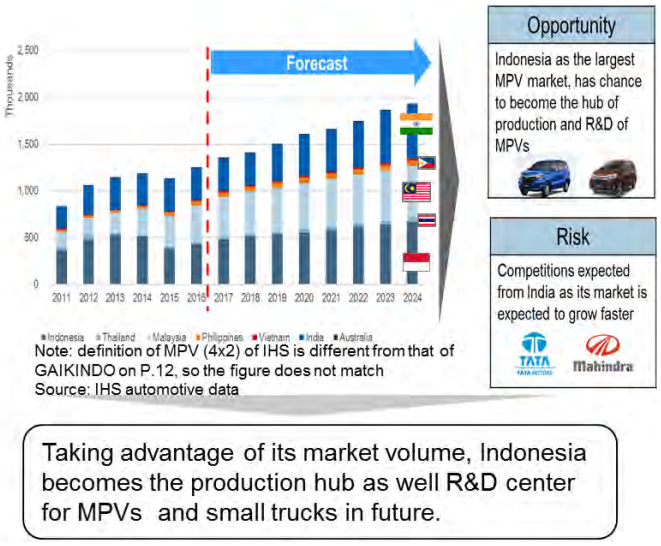
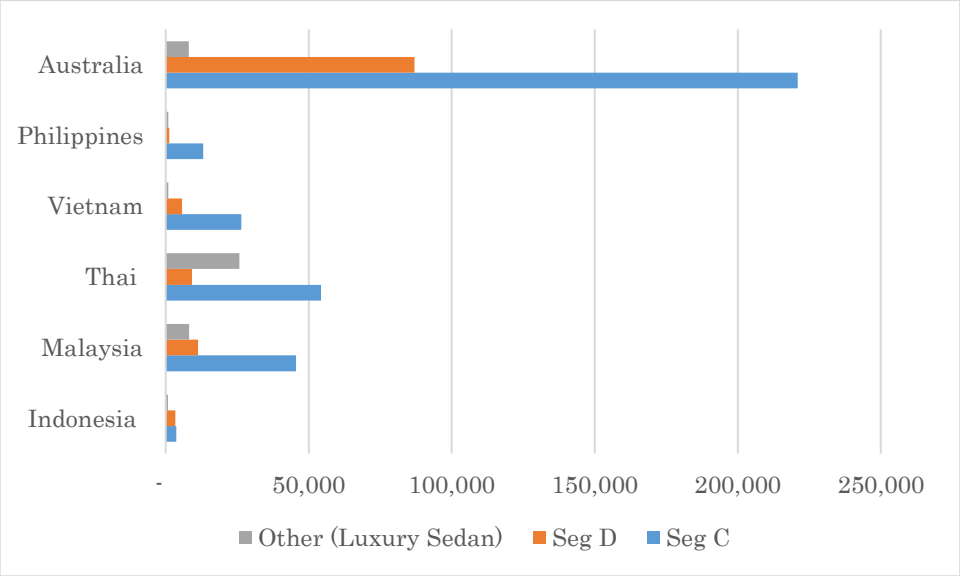


Figure 28 MPV market status and forecast of major ASEAN countries (2011-2024)

However, in order to become export competitive, small MPVs produced in Indonesia may need to be developed to match with global market trends. Firstly, technology of small MPVs produced in Indonesia needs to be upgraded to global standards conforming to more stringent emission standards due to serious environment pollution in emerging market, low CO2 emission standards, and advanced safety standards so that these vehicles can be exported in various market. Secondly,

models produced in Indonesia need to accommodate to tastes of other markets, by refining exterior and interior designs. In this regard, Indonesia can somewhat emulate success of 1 ton pickup in Thailand, which has refined 1 ton pickup model to more passenger car-like design with more advanced features and thus has become the largest production hub of 1 ton pickup in the world.

Policy to develop new export models other than MPVs and small cars and trucks, shall be considered as well with aim to expand export market. For example, Indonesia market of C segment and D segment of passenger cars, which are mostly comprised of sedans like Toyota Carolla Altis, Honda Civic, Toyota Camry, and Honda Accord, is starkly small compared to other markets in the region due to higher luxury tax for sedans compared to other segments: 30% for sedans versus 10% for MPVs with engine displacement of 1500cc or less. For example, Australia, one of the largest potential export markets in the region, has more than 300,000 units in C-Segment car and D-Segment car combined, while market of small cars and MPVs are 100,000 units and 15,000 units respectively. Provided that the models produced in Indonesia be exported to major markets, some special tax incentives may be considered for specific segments that can be exported from Indonesia.



Source: Regional sales data compiled by NRI

Figure 29 Market of C and D segments in the region

3.5.2. Challenges from spread of x-EVs

Despite its potential, Indonesia automotive industry may face major constraints. **Firstly, the effect of future electrification of powertrain or x-EVs, which will put Indonesia at disadvantage.** Electrification of powertrain will proceed sooner or later in following steps as shown on figure below due to stricter global Co2 emission regulations. It may be difficult for Indonesia to export x-EVs as the infrastructure of electronics/ electric industry is weak. Also, Indonesia cannot

enjoy economy of scale as market condition of Indonesia is still somewhat premature for the spread of x-EVs due to higher cost compared to conventional powertrain, and due to limited purchasing power of households to replace current conventional powertrain by x-EVs. Government will also may find it difficult to allocate enough budget for infrastructure development of charging stations and electric supply grids in the initial phase of x-EV penetration, let alone to provide direct subsidies for purchase of x-EVs.

It is therefore preferable for Indonesia to introduce realistic and long-term x-EVs policy to gradually build up infrastructure and eco-systems that can accelerate spread of x-EVs based on long term point of view, once the cost of x-EVs comes down to a level comparable to conventional powertrain. For example, Indonesia may need well aligned investment policy and vehicle luxury tax policy to gradually localize major parts corresponding to the development steps of x-EVs as mentioned on the figure below; luxury tax will be lowered for x-EVs at early stage of each step with requirement for certain localization.

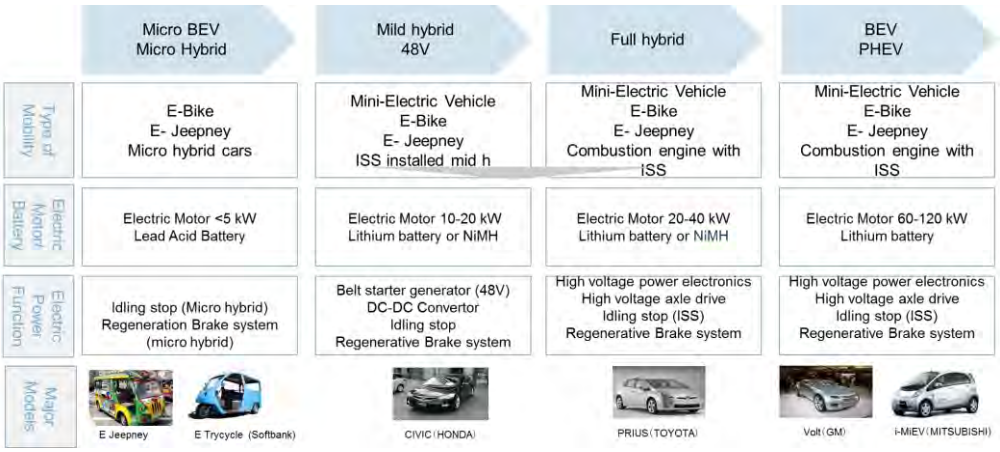


Figure 30 Future steps of x-EVs Penetration

Indonesia may also further explore on using bio-fuels or alternative fuels, such as bio diesel, ethanol, and natural gas to replace gasoline, as the country has large stock of natural resources to be used for fuel. It will facilitate Indonesia to reduce dependence on gasoline during the transition period of switching from conventional powertrain to x-EVs.

3.5.3. Challenges from Competitions from region and outside of region

Secondly, Indonesia may face challenges of competitions in the region as well as outside of the region like China and India, as free trade agreement such as AEC and ASEAN -China Free Trade Agreement will take full effect in coming years. China may build up huge excess production capacity of cars in future, which will trigger export drive to neighboring countries, as it happened

with other manufacturing products like steel. Development of Indian automotive industry is also spectacular in recent years as the domestic market expands, which may be threat to Indonesia due to its strong cost competitiveness and recent export promotion policy. In order to cope with challenges from neighboring countries, Indonesia needs to strengthen cost competitiveness through development of supply chain. As mentioned in supply chain analysis, Indonesia needs to improve Net Local Content through localization of components and parts in order to be cost competitive.

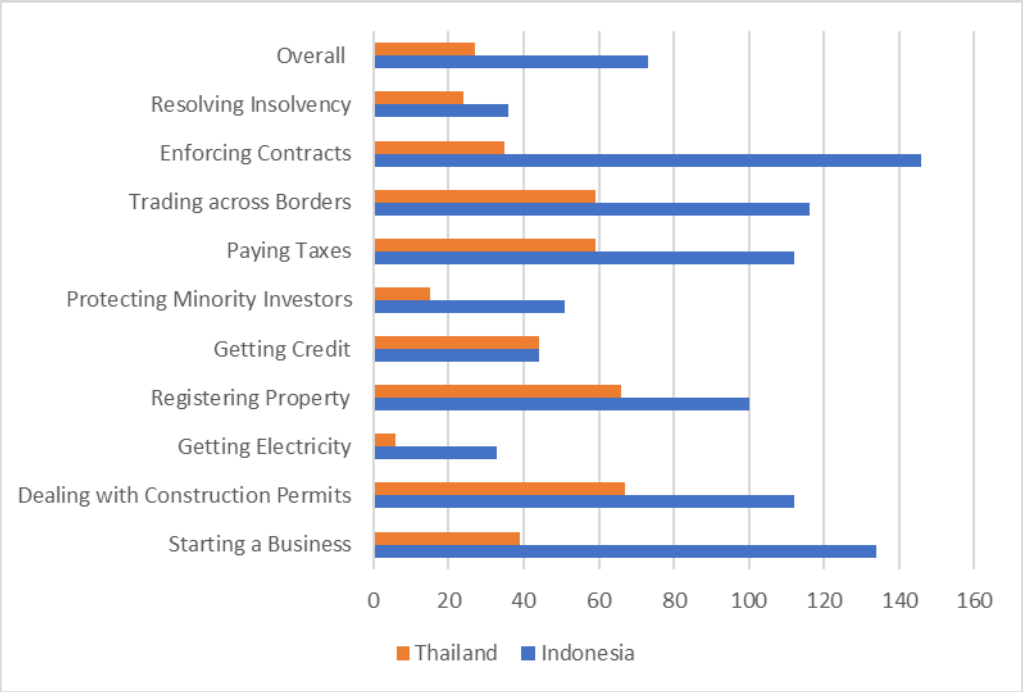
Figure 31 Potential threat from China and India

3.5.4. Challenges from competitions for attracting investment in technology areas and upstream value chain activities

Thirdly, Indonesia's investment policy has not been very successful in attracting investments especially in high technology sectors like car electronics or highly specialized processing at the level of Tier2 and Tier 3 suppliers, compared to countries like Thailand. Moreover, Indonesia lags behind furthermore for attracting investment in upstream value chain activities such as R&D&D as many OEMs have chosen Thailand as regional R&D&D hub for automotive industry. This is partly due to regulatory factors in Indonesia, which do not offer much incentives for investment in small scale but highly specialized technology or for investment in areas as R&D&D.

As shown in the figure below, Indonesia is ranked 73 among 190 economies in the Ease of Doing Business, according to 2019 World Bank annual ratings, and lags behind major countries in the region, such as Thailand at 27 and Malaysia at 15.

If compared with Thailand as shown in the figure below, Indonesia lags notably in "Starting new business" and "Enforcing contracts". It may be particularly difficult for smaller companies to invest in such investment environment due to limited resources to overcome these hurdles.



Source: World Bank "Ease of Doing Business 2019"

Figure 32 Ease of Doing Business of Indonesia and Thailand (2019)

Looking more closely at investment policy as shown below, it can be said that Thailand investment policy is more sector specific and activity based, while Indonesia investment target is broad and is focused on attracting large-investment. Notably, Thailand offers "Merit based incentives", additional incentives on top of the activity based incentives if investor contributes in enhancing competitiveness, such as R&D&D. In contrast, Indonesia offers fairly limited incentives for R&D&D.

Also, immigration policy may need to align with investment policy through relaxation of visa requirement for certain category in order to facilitate technology transfer by skilled experts to local people.

	Indonesia	Thailand
Minimum investment/ capital	• Minimum investment 10 billion Rupiah (100, 000 USD) • Minimum capital: 2500 million Rupiah	• Minimum paid up capital 2milion baht (60,000 USD) per one foreign employee
Investment priority sectors	• 70 priority sectors: export oriented industry (automotive, electronics., etc.), import substitution (component., etc), labor intensive (food & beverages., etc)	• 107 sectors are able to apply for BOI incentives
Tax Incentives for priority sector	• Corporate income tax : 25% • Tax allowance of 5% per year: 30% of the total investment charged for 6 years • Tax exemption of Importation of capital goods for 2 years, Accelerated depreciation, etc • 5-15 years of Tax holiday for Pioneer industry with new investment 1 trillion Rupiah for (5 industries such as upstream metal industry, industrial machinery)	• Corporate income tax : 20% • Tax holiday of 3-8 years for activity based incentives (A1-A4 Group: 8 years for A1, 3 years for A4) + merit base incentives • Extended tax holiday to 13 years for Target Core Technology (Nano, digital .,etc) , enabling services (R&D., etc) during Jan- Dec 2017 • Investment in East Economic Corridor: additional tax allowance of 50% for 5 years
Incentives for R&D and technology upgrades	• Cost incurred by R&D will be tax deductible as expenses amortized based on general provision	• BOI merit base incentive; projects investing on technology and workforce development will be eligible to include the investment value for CIT exemption from up to 100% to 200%, R&D 300% • Import tariffs exemptions for R&D related facilities and protctype., etc

Source: BKPM and BOI

Figure 33 Investment policy in comparison with Thailand

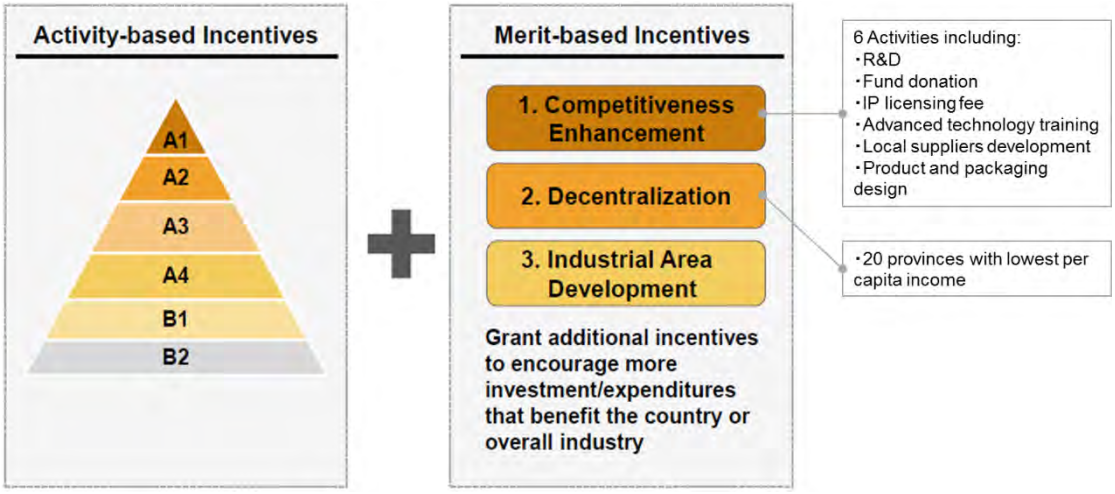


Figure 34 Incentives for investment promotion in Thailand

3.6.Future vision 2025 and challenges

3.6.1. Becoming Export Hub of MPVs, Small Cars, and Trucks for Emerging Market

Vision：To become a major player in global automotive production

KPI: 2.5 million units of production, including 0.5 million of export and 0.4 million of xEV

As mentioned before, Indonesia potential domestic market is 2 million under strong GDP growth scenario. If export is expanded around double of the current status to 500,000 units, total production will reach 2.5 million units by 2025, overpassing current production level of Thailand, the no.1 leader in the region in terms of vehicle production.

In order to achieve the goal to become a major player in global automotive production, Indonesia shall maximize its potentials, while minimizing challenges/ issues that limit achievement of potentials. Firstly, taking advantage of its large domestic market**, Indonesia has potential to become export hub of MPVs and small cars and truck for emerging market.** In other words, Indonesia can increase export through pursuing global niche strategy, focusing on certain product / segment of the industry as adopted by Thailand during its "Detroit of Asia policy" in early 2000s; Thailand has focused investment and export effort for 1 ton pickup and has become the largest export hub of 1 ton pickup.

Recently, Indonesia government has set target of producing 0.4 million of xEVs by 2025. Prospect of achieving this goal will depend on three major factors: development of infrastructure of changing stations, purchase incentives for vehicle users, and development of supply chain of key components such as battery, motor, and power control unit. Developing these factors will need well-coordinated policy among ministries and strong support from private sectors.

There are a number of challenges/ issues to achieve its potential, arising from weak supply chain (small number of local suppliers compared to Thailand and lack of suppliers with specific/high technologies as explained in 2.4.1) missing value chain (lack of local suppliers capability in engineering, quality and productivity as explained in 2.4.2), mismatch of human resource (lack of factory management and engineering as will be explained in human resource in 6.), infrastructure bottleneck (overconcentration of industry in JABODETABEK as explained in 2.4.3), and lack of investment confidence (less ease of doing business as explained in 2.5.4) as shown on the figure below. In order to realize its potential, policy program needs to be crafted to promote agglomeration of auto parts industry and strengthen cost competitiveness with higher net local content (value excluding all imported parts / total cost of goods), while at the same time addressing major challenges /issues mentioned earlier.

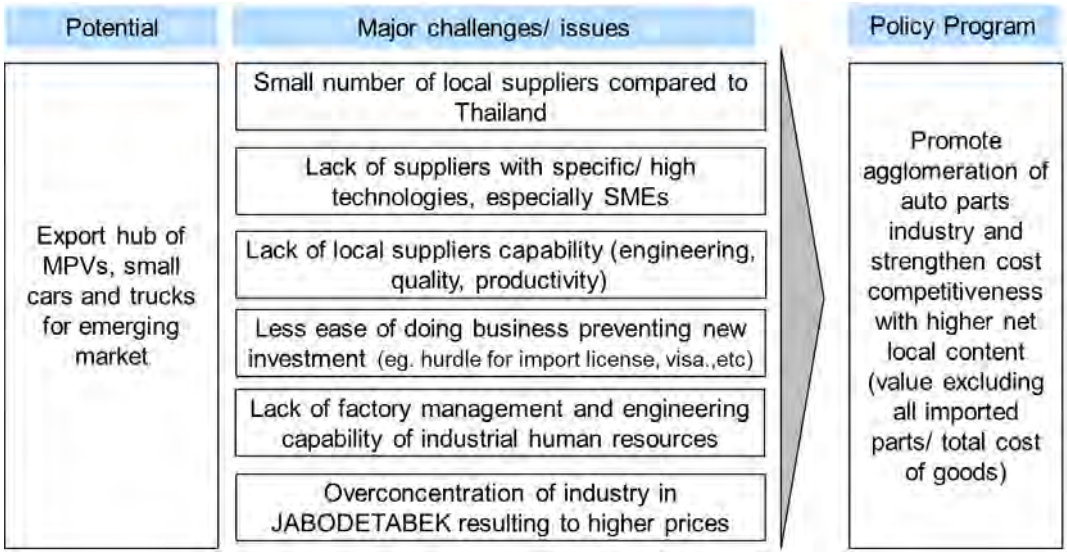


Figure 35 Major challenges/issues of Indonesia becoming export hub

3.6.2. Becoming R&D&D hub of MPVs, Small Cars and Trucks

Indonesia also has potential to become R&D&D hub of MPVs, small cars and trucks, and in future Indonesian version of x-EV & Bio-Fuel Vehicles. Higher R&D&D capability will make it easier for the product to timely respond to local market requirement or quality issues and to adjust specification for local legislations. For example, Toyota set up an R&D&D facility in Thailand to cover not only domestic market but also major export destinations like ASEAN and South Asia. There are a number of challenges/ issues to achieve its potential, arising from regional competitions (Thailand as regional R&D&D hub), resources constraints (lack of R&D&D engineers and unmet skills of technical university graduates), and lack of collaboration or support within related sectors (lack of collaboration between universities and business sector, and lack of R&D&D support services) as shown on the figure below. In order to realize its potential, policy program needs to be crafted to enhance product development and engineering capability

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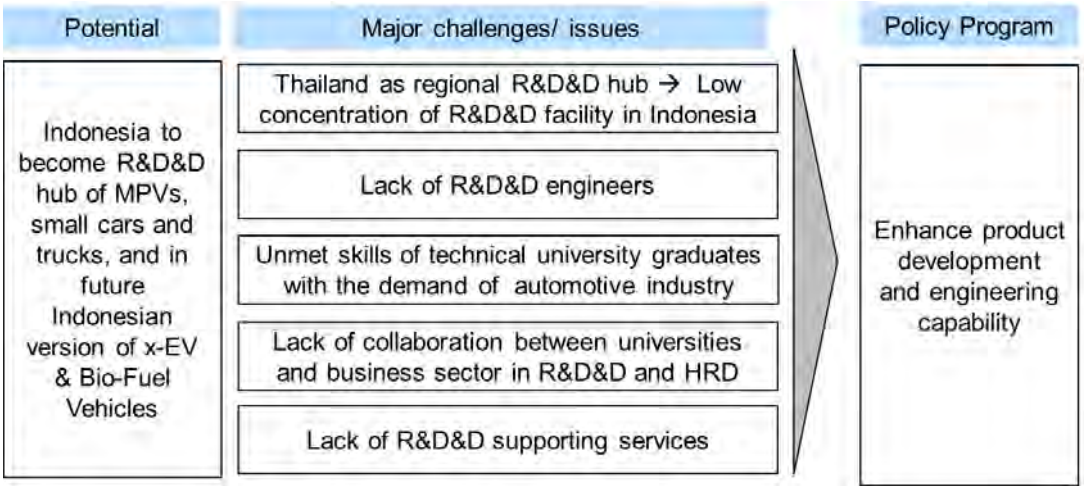
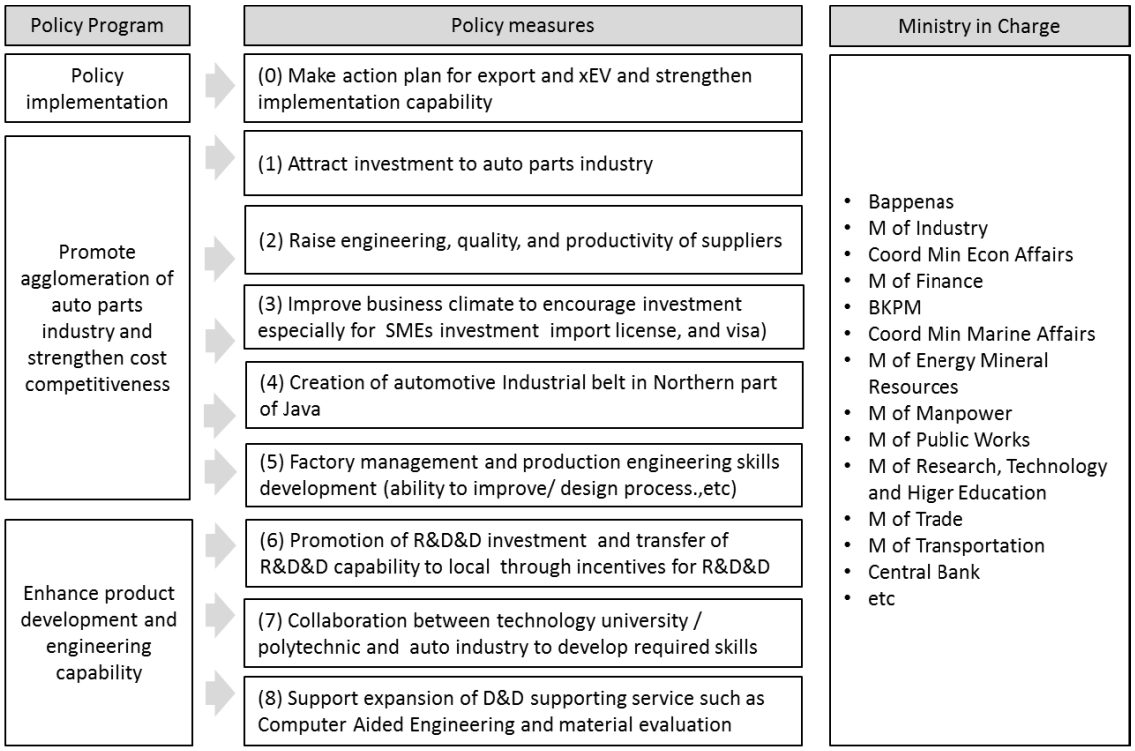


Figure 36 Major challenges/issues of Indonesia becoming R&D&D hub

3.7. Policy scenario

Policy scenario to realize the Future Vision 2025 is summarized as three major policy programs: 1. policy implementation, 2. Promote agglomeration of auto parts industry and strengthen cost competitiveness, and 3. Enhance product development and engineering capability.



*1: Indonesia government issued these KPI.
*2: 1500 : according to GAIKINDO, 2000: number on par with Thailand which has around 2000 suppliers

Figure 37 Policy Implementation and its Policy Measures

3.7.1. Policy Implementation

Policy scenario for the first policy program can be summarized as follows.

(0) Make action plan and strengthen implementation capability

Objective/ KPI

Make action plan which will involve commitment of relevant government agencies and also in line with future development of automotive industry.

Short term policy actions

- Set up a National Industrial Committee which includes a working group for "Automotive Industry'.

Long term policy actions

- Follow up major policies and revise the policy accordingly; conduct PDCA

3.7.2. Promote agglomeration of auto parts industry and strengthen cost competitiveness

Policy scenario for the second policy program can be summarized as follows.

Policy Program: Promote agglomeration of auto parts industry and strengthen cost competitiveness
KPI: Increase numbers of suppliers from 1,500 – 2,000

In order to achieve the policy program to promote agglomeration of auto parts industry and strengthen cost competitiveness, five policy measures are proposed.

(1) Attract investment to auto parts industry

Objective/ KPI

Expand local supplier base to 2000 in order to increase more sourcing for components / material and promote further localization at sub-components and material level, which will lead to stronger export competitiveness of cars/ trucks and auto parts.

Short term policy actions

- Foreign investment promotion for specific target industry / technology (high precision parts, forging, etc.) by offering wide range of investment incentives such as: tax incentives such as tax allowance and tax holiday, foreign workers incentives and relaxation on initial investment value requirement, etc.;
- Make data base of companies and organize supplier exhibitions (exhibition to display parts that need to be localized in order to match customers and suppliers inside the country); and

- Make lists of local companies seeking partner and organize matching events for local and foreign companies (especially SMEs) to bring in technology, market network, and financial access.

Long term policy actions

- Continuous implementation of investment promotion for targeted industry according to the needs;
- Continuous deployment of exhibitions to regions to spread the supplier base outside of JABODETABEK; and
- Set up SME Support/Endowment Fund to upgrade existing facility, change from other industry, and encourage startups to enter new automotive technologies (connected, etc.)

(2) Raise engineering, quality, and productivity of suppliers

Objective/KPI

strengthen local supplier base by improving the engineering level of suppliers from subcontract level or Level C,D to self-dependent level to or A,B level as shown on Figure 11) in order to increase export competitiveness of cars/ trucks and auto part

Short term policy actions

- Support schemes to promote new equipment introduction for improving quality and productivity fund

Long term policy actions

- Support increasing quality level and productivity of suppliers though human source training of factory line manager and supervisor level by industry experts on ‘lean production”, “quality management”, “production preparation” and “specific process”
- Indonesia may refer to cooperation between government and private sector in Thailand to raise human resources under Automotive Human Resource Development Program (AHRDP) 2006-2011 by JICA and Japanese automotive sector and Automotive Human Resource Development Institute Program (AHRDIP) 2012-2017 by JETRO and Japanese automotive sector, which in total raised 1300 trainers and trainees.

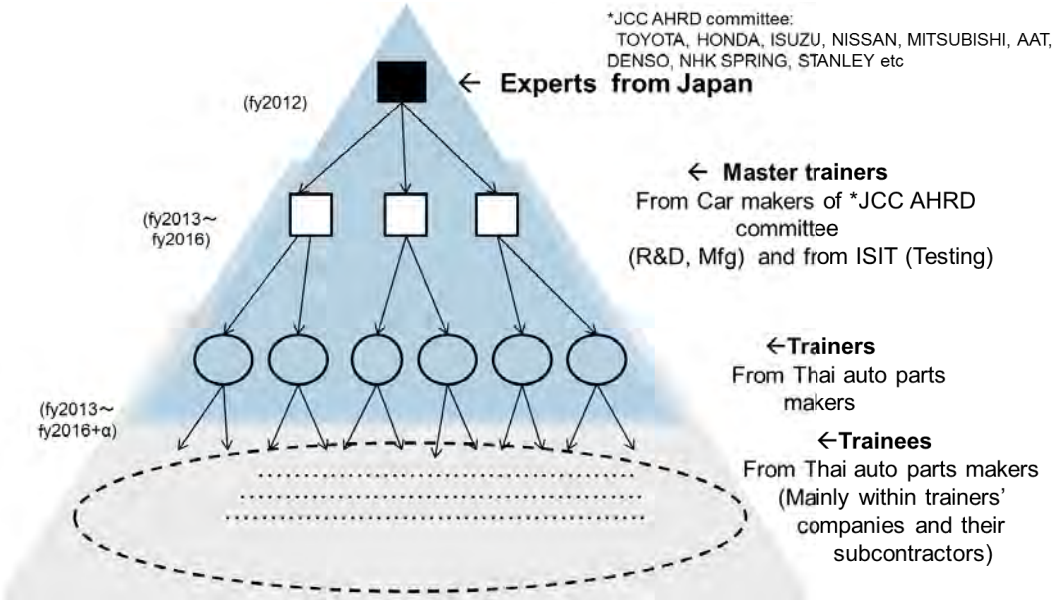


Figure 38 Trainers' Training Program under AHRDIP

(3) Improve business climate to encourage investment

Objective / KPI

Eliminate trade barrier (TB) & non trade barriers (NTB) to prepare for entry to global supply chain.

Short term policy actions

- Improve procedures for imports and reduce import barriers for common components such as steel wire, bolt & nuts for final process and assembly, which require strict SNI (National Standard of Indonesia), despite no local product available that can meet specification requirement of automotive manufacturers.

Long term policy actions

- monitor status and expand the target list for ease of doing business

(4) Creation of Java Automotive Industrial Belt (KPI: create 5 new agglomerations*)

Objective

Disperse overconcentration of automotive industry in JABODETABEK and raise competitiveness through utilizing cheaper labor and lower land costs.

Short term policy actions

- Development of infrastructure in coordination with automotive agglomerations such as Tegal-Cirebon, Ceper, Semarang, and Surabaya

- Develop automotive related companies (SMEs) in the existing agglomerations of automotive and machinery processing industry such as Tegal-Cirebon, Semarang, and Surabaya..

Long term policy actions

- Create new automotive industry agglomerations which are connected to new Patimbang port under development and Semarang port under expansion: Subang near Patimbang port and Kendal near Semarang port through attraction of new investment and development of local industry.

*Notes5 (new agglomerations): Subang (near New Patimbang Port), Tegal-Cirebon, Ceper, Semarang, Surabaya

(5) Industrial human resource development -factory engineers with high production site management capability

Objective/KPI

Increase the skill level and the number of factory engineers from 5,000 to 15,000 who can respond to current and future higher technical and managerial requirements.

Short term policy actions

- Make base plan for improving Polytechnic course (curriculum, budget, professors) to include factory management courses and other necessary courses are shown below.

Table 11 Image of Training Course in Politechnic D4

	Technical Competencies	General Competencies	Managerial Competencies
Training course in Politec D4	• Education aligned with new processing technology (robotics, automation) • Focus of 3 skills type ✓ Operational Skill ✓ Setting Skill ✓ Maintenance Skill (preventative maintenance)	• Attitude about industrial work and Leadership (Discipline, Leadership, Team work, Critical thinking)	• Skill to manage manufacturing system to achieve major industrial key indicators (QCD) in Lean manner • Skill to use appropriate industrial management tool in working environment (5S, 5 Why, etc…) • Skill to use appropriate cost control tool (calculation of cost, defects,etc)

- Designation of model schools and initial trial implementation.

Long term policy actions

- Full implementation of the new courses to new and existing Polytechnic

3.7.3. Product development and technology development and its Policy Measures

Policy Program：Enhance product development and engineering capability
KPI: R&D&D localization ratio to increase from 0% to 30%

Three policy measures are recommend to achieve policy program for product development and technology development.

(6) Promotion of R&D&D Investment and transfer of R&D&D capability to local through incentives for R&D&D

Objective/KPI

Attract foreign investment from OEMS and parts makers to strengthen value chain by increasing number of R&D&D facilities from 0 to 70 [OEM20, parts 50])

Short term policy actions

- To offer R&D&D investment incentives (duty exemption, tax reduction, tax incentives for trainees of local staffs in Japan) on par with Thailand which has succeeded in attracting R&D&D investment.
- To ease visa grant for experts related to R&D&D in order to facilitate knowledge and skill transfer from parent company to local R&D&D facility.

Long term policy actions

- Continue incentives and lead to even higher value chain through development of collaboration between industry and universities in advanced technology such as xEV, alternative fuel, connected, raw material development.
- Enhancement of innovation capability in universities, government institutes, and local companies including start-ups that can participate in innovation of leading global automotive companies is prerequisite for achieving the long term policy actions.

(7) Collaboration between tehnology university/poliytechnic and auto industry to developrequired skills

Objective/KPI

Develop HR required for development of R&D&D and increase the number of R&D&D engineers to 5,000 persons.

Short term policy actions

- Show strong commitment and concrete plan from the side of government and universities to raise a large number of engineers (at least 5,000) with knowledge and skills sets required by automotive sector.
- Start from creating practical D&D courses stressing on CAD/ CAM skills, CAE, and failure analysis, as D&D will come first before R(research): Planning and curriculum design for technology universities to offer more practical courses; and
- Promote collaboration between private sector and technical universities in order to accommodate skills and knowledge required in automotive sector: teaching staffs from private sectors sent to universities and to collaborate in improving curriculum more suited for requirement of industry.

Long term policy actions

- Continue collaboration between private sector and universities and develop it to higher level such as technology innovation in new areas involving R of R&D&D.
- Develop Center of Excellence (CoE) in order to attract global companies to collaborate with universities in R, and raise research level to be the" Best CoE in the region" for certain research filed.
- Research field in CoEs must be carefully selected and coordinated to follow global technological trends and to meet requirement of global companies.

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

Objective/KPI

- Increase bottom base of supporting industry related to R&D&D from almost zero to 50 new companies in order to facilitate R&D&D activities

Short term policy actions

- Relax regulations for D&D support service as foreign investment is still restricted to below 50% as it is regarded as service sector and promote investment in D&D support services by relaxing rules for maximum foreign capital ratio

Long term policy actions

- Continue relaxation of regulations such as relaxing visa for foreign engineers with high skills, if the skilled labor force is not sufficient.

4. Electrical and electronics industry

4.1.Current status of E&E industry

4.1.1. Overview of the sector

Electric and Electronics (E&E) industry can be categorized into two major sub-sectors, namely, consumer electronics (Business to Consumers; B to C) and industrial electronics (Business to Business; B to B). B to C type of business includes home appliances such as refrigerator and washing machine, smart phone and personal computer and its peripheral devices and others. B to B type of business includes electronics parts, industrial machines (factory automation machinery), power generator and others.

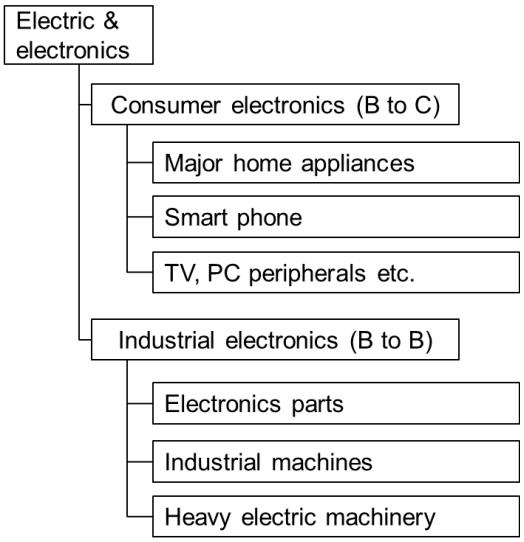


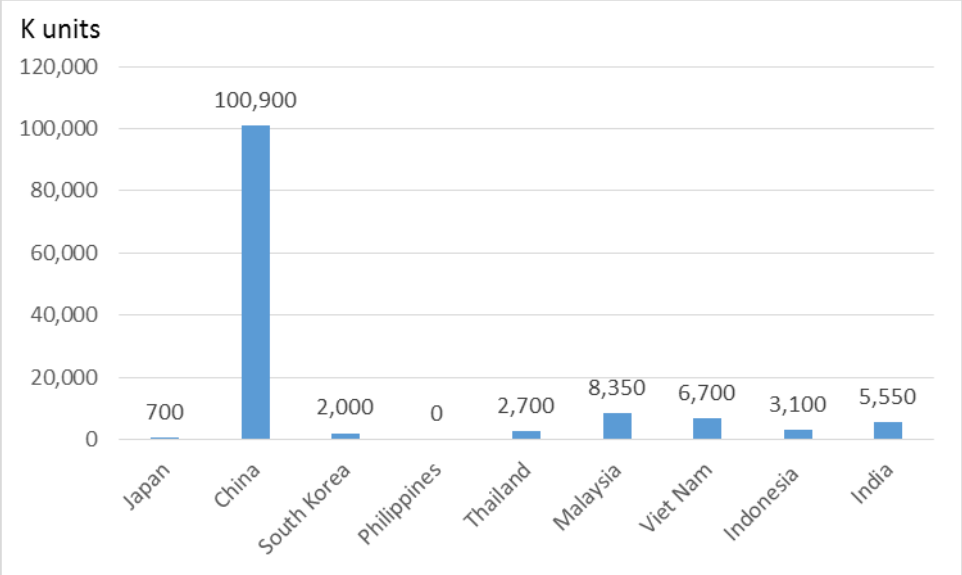
Figure 39 Categories of E&E sector

Location selection for production of these products varies depending on the nature of items. In general, B to C products and electronics parts are mass production items. Production of these items tends to be centralized to enjoy a scale merit and to be located in a cost competitive country. Industrial machines, such as factory automation machinery (mechatronics), are medium-sized mass production products (not large volume like consumer products). Production of industrial machines of multinational companies tends to stay in their home country, while they sell their products in various countries. They invest in a foreign country only when the destination country's market becomes large enough. For heavy electric machinery, number of production volume is even smaller than industrial machines and the production of these products by multinational companies tend not to be decentralized.

For major home appliances, such as refrigerator and washing machine, products are designed to

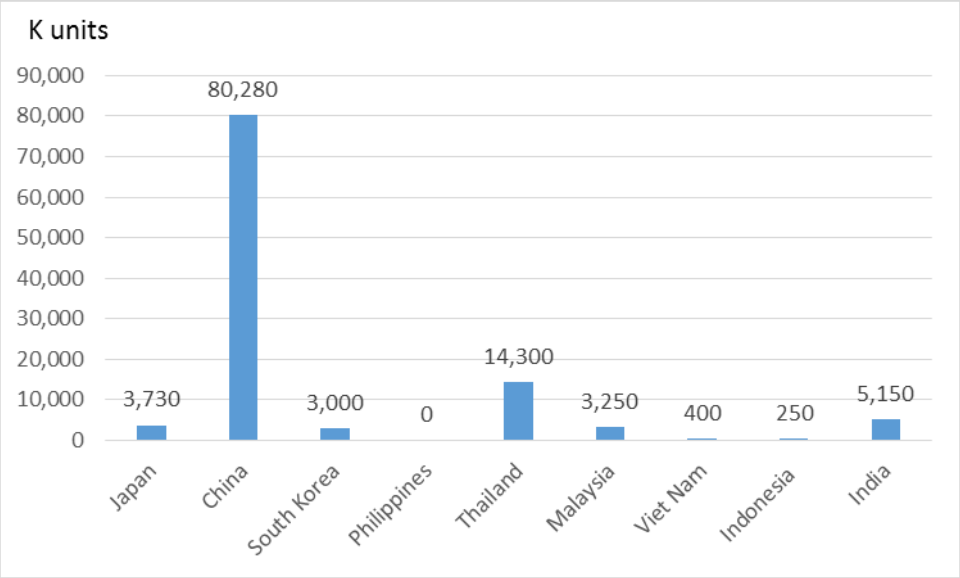
suit to the lifestyle of local market. In addition, those products are heavy and large with hollow inside, which means high logistics cost. Thus, manufacturers tend to decentralize the product location. In Indonesia, Japanese companies such as Panasonic and Sharp have factory of these products, but it is difficult for them to export to other countries, due to the unique design for the local market and high logistics cost.

In terms of the number of production in Asia region, China is overwhelmingly large in many types of electronics products. For ASEAN countries, it depends on the type of product. For Flat Panel Display TV, Malaysia and Viet Nam have large numbers of production. For Room Air Conditioner, Thailand stands out and Malaysia follows. For Smart Phone production, Viet Nam is prominent. Indonesia has certain amount of numbers, but it is because of the regulation of the government and it does not necessarily reflect the global competitiveness of the country. For printers, Viet Nam, Thailand and the Philippines have large volume of production. Indonesia also has certain amount of production, but some manufacturer is shifting production of final product from Indonesia to the Philippines.



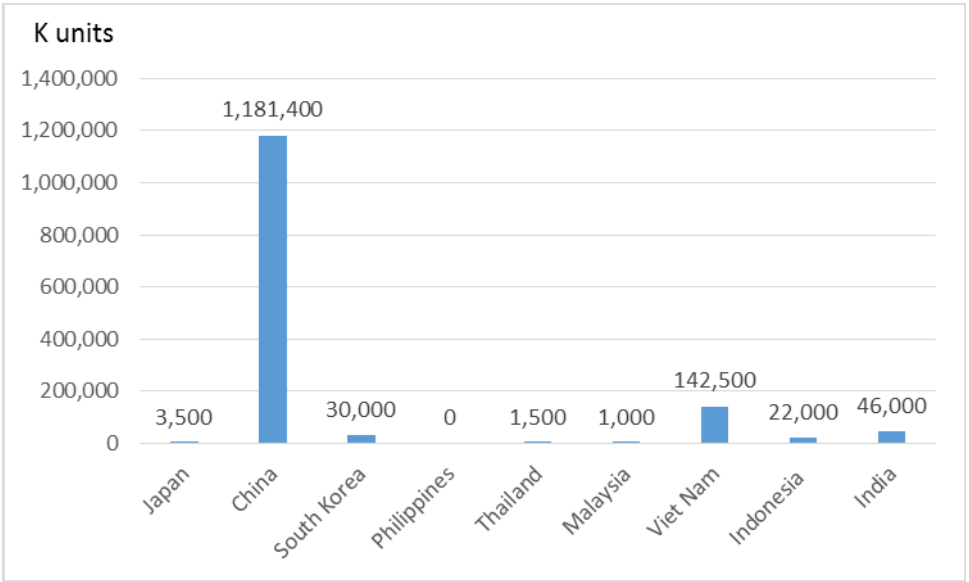
Source: Fuji Chimera Research Institute, Inc. (2017), “Comprehensive Survey of the World Wide Electronics Market 2017”

Figure 40 Number of production of Flat Panel Display TV in major Asian countries (2016)



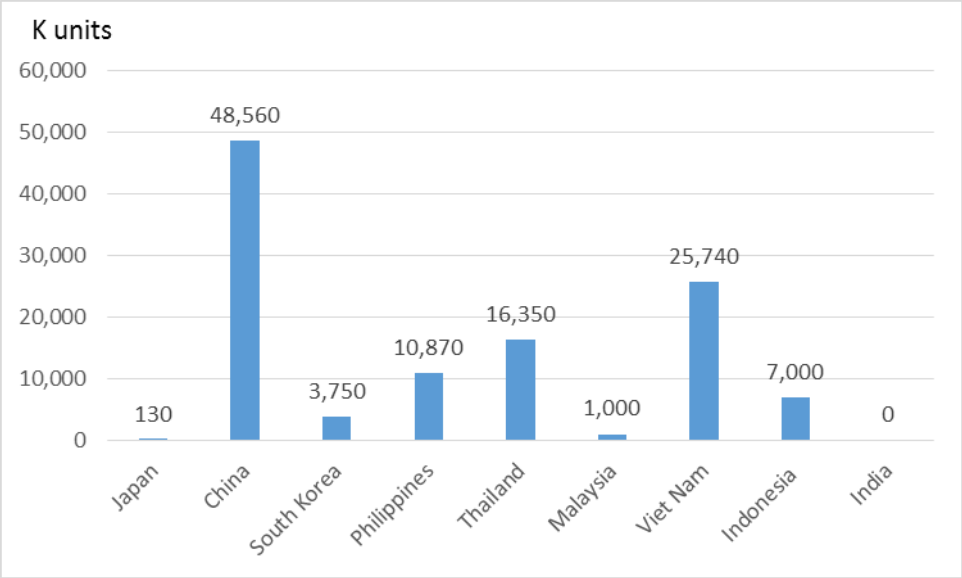
Source: Fuji Chimera Research Institute, Inc. (2017), "Comprehensive Survey of the World Wide Electronics Market 2017"

Figure 41 Number of production of Room Air Conditioner in major Asian countries (2016)



Source: Fuji Chimera Research Institute, Inc. (2017), "Comprehensive Survey of the World Wide Electronics Market 2017"

Figure 42 Number of production of Smart Phone in major Asian countries (2016)



Note: The number includes both page printer (laser printer) and inkjet printer.
Source: Fuji Chimera Research Institute, Inc. (2017), "Comprehensive Survey of the World Wide Electronics Market 2017"

Figure 43 Number of production of Printer in major Asian countries (2016)

Audio visual products and communication device such as TV, smart phone, printer, in general, do not have significant difference of design of the products across countries. Thus they tend to be produced in one place and be exported to other countries. Manufactures of these products pursue an economy of scale, i.e., high cost competitiveness. Among ASEAN countries, Viet Nam is becoming the hub for this type of products. It is reported that South Korean large companies are shifting production from Thailand to Viet Nam. In Indonesia, industrialized area is limited to JABODETABEK and the wage rate is soaring there. Thus, Indonesia does not have a global competitiveness.

For home appliances like air conditioner, refrigerator or washing machine, design or products may differ from country to country depending on the usage and lifestyle of each country. They are large and heavy and the transportation cost is high. So the production of home appliances tend to be decentralized. Only high-end products can be produced in one place and exported to other countries. Thailand and Malaysia have advantages in Air Conditioner and currently Viet Nam is growing in making refrigerator for the regional market.

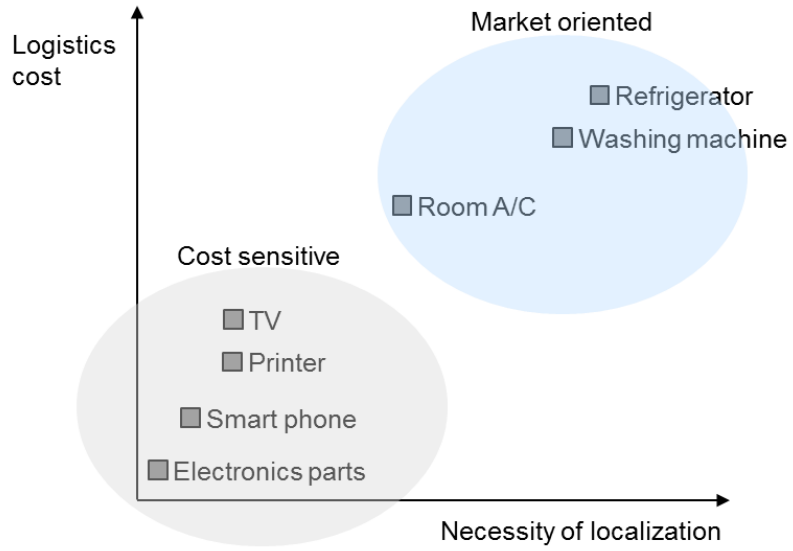


Figure 44 Categorization of electronics products by location selection factors

4.1.2. Current status of B to C electronics

Market situation

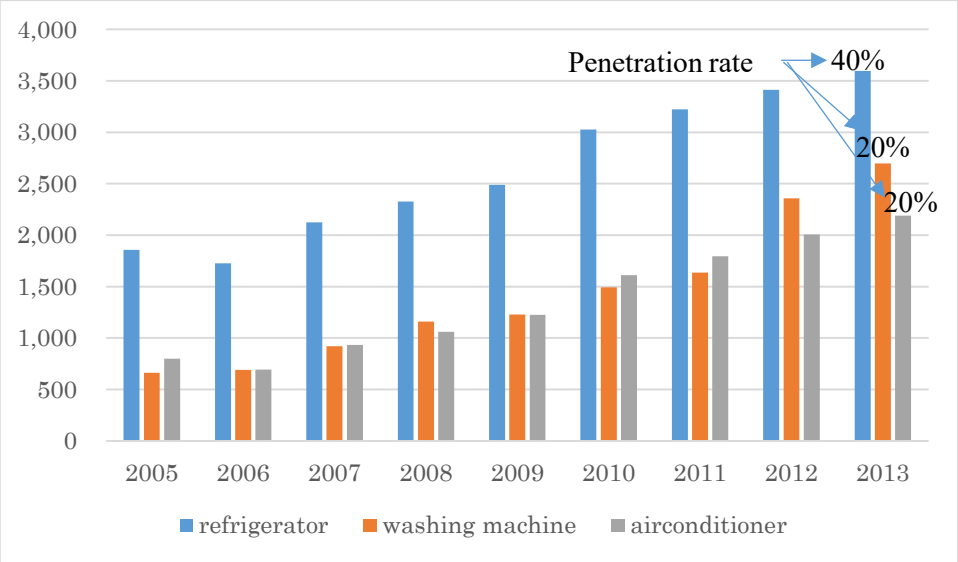
Along with the rise in national income in Indonesia, demand for home appliances such as refrigerators, air conditioners, washing machines, etc. has been growing rapidly. Especially, refrigerators and air conditioners are now available for purchase within monthly income, which has led to increased demand. In addition to rising incomes, improvement of electricity infrastructure at home is leading to rapid demand increase. The penetration rate of refrigerators, air conditioners, and washing machines is 40%, 20%, and 20%, which is still low, and sales growth is expected to continue in the future ("Indonesia Handbook 2015 edition" p198).

Table 12 Sales of home appliances in Indonesia

Year	Refrigerator		Washing machine		Air conditioner	
	Sales units	Growth rate	Sales units	Growth rate	Sales units	Growth rate
2005	1,855	-3.10%	662	-8.80%	800	8.00%
2006	1,725	-7.01%	690	4.23%	692	-13.50%
2007	2,125	23.19%	920	33.33%	933	34.83%
2008	2,326	9.46%	1,159	25.98%	1,060	13.61%
2009	2,489	7.01%	1,227	5.87%	1,225	15.57%
2010	3,026	21.57%	1,491	21.52%	1,610	31.43%
2011	3,223	6.51%	1,637	9.79%	1,794	11.43%
2012	3,411	5.83%	2,358	44.04%	2,006	11.82%

Year	Refrigerator		Washing machine		Air conditioner	
	Sales units	Growth rate	Sales units	Growth rate	Sales units	Growth rate
2013	3,597	5.45%	2,698	14.42%	2,188	9.07%

Note: Sales units 1,000
Source: Indonesia Handbook 2015 edition

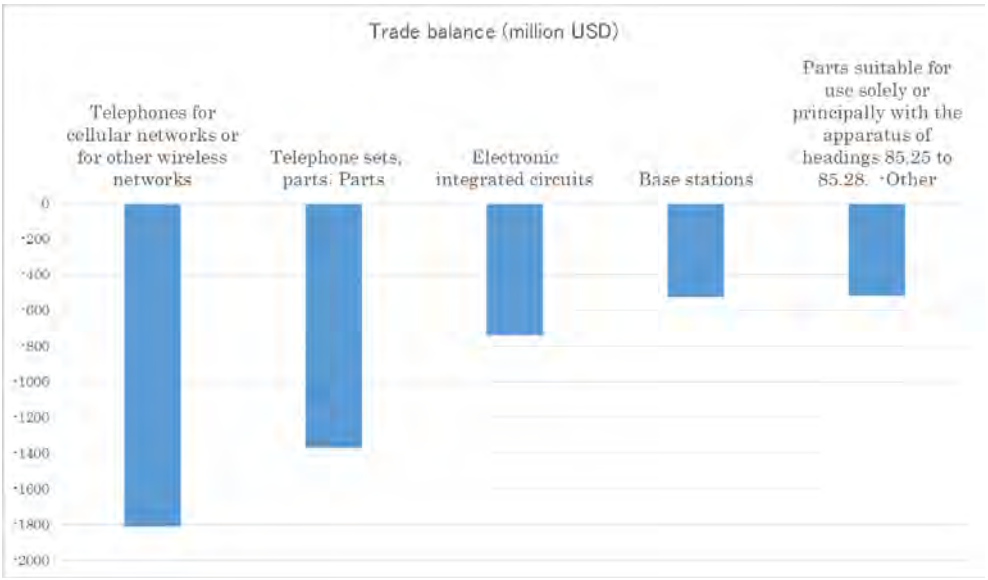


Source: Indonesia Handbook 2015 edition

Figure 45Top 5 E&E items that has trade deficit in 2015

As for the domestic production, refrigerators and washing machines have high domestic production ratio due to high transportation costs, while air conditioners of compact size, of which transportation expenses are cheap, are relying on import from overseas such as Thailand and local production in Indonesia is small.

According to the trade statistics of electrical and electronics products, imports are increasing for mobile phone, electrical equipment and facility, and semiconductor. On the other hand, exports are increasing in harness, audio visual equipment and battery.



Source: Compiled from UN Comtrade data

Figure 46 Top 5 E&E items that has trade deficit in 2015

Table 13 E&E items that has trade surplus more than 1 m USD in 2015

HS code	Article	Trade balance (million USD)
854430	Ignition wiring sets and other wiring sets of a kind used in vehicles, aircraft or ships	605.6
852871	Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus; not designed to incorporate a video display or screen	568.2
852190	Video recording or reproducing apparatus; other than magnetic tape-type	447.5
853221	Electrical capacitors; fixed, tantalum	209.4
852872	Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus; incorporating a colour video display or screen	202.0
850650	Cells and batteries; primary, lithium	189.4
850610	Cells and batteries; primary, manganese dioxide	170.9
850710	Electric accumulators; lead-acid, of a kind used for starting piston engines, including separators, whether or not rectangular (including square)	161.9
853222	Electrical capacitors; fixed, aluminium electrolytic	155.1
851640	Smoothing irons; electric	148.6
851020	Hair clippers; with a self-contained electric motor	108.4

Source: Compiled from UN Comtrade data

Global competitiveness

Due to domestic market growth, local production of large and heavy home appliances such as refrigerator and washing machine uniquely designed for the local market will continue to grow. However, some high-end products for all ASEAN market may be produced in other country and imported to Indonesia. In fact, some Japanese and South Korean companies concentrate their factory in Viet Nam and export products from there to other ASEAN countries. These high-end products are higher value added and they can bare the logistics cost. To realize such global supply chain,

manufacturers look for cost competitive location and among ASEAN countries, Viet Nam became the hub.

For small appliances, including smart phone, tablet, TV, PC peripherals are smaller and lighter than major home appliances. In addition, localization of product design is less important for these products. As a result, “hub and spoke” type of supply chain is common for them. China, Taiwan, Viet Nam and the Philippines are those hub and they export to other countries. Cost competitiveness and the scale of production is crucially important for this type of products.

Electronics companies located in Indonesia is enjoining expanding domestic market but facing difficulties for export competitiveness, due to rapidly rising wages. Lack of upstream suppliers and skilled human resource is also obstacle for the sector to further develop their business. This will be analyzed again in supply chain and value chain analysis.

Supply chain analysis

As of today, final products of home appliances are assembled domestically, but many of components, parts and materials necessary for production are dependent on imports. For multinational companies, they are motivated to establish assembly factories to sell their products in the domestic market, but not much development have been seen in upstream side. Electronics parts are mostly imported from China, Taiwan, Japan, Malaysia and Singapore. Quality, productivity and cost competitiveness need to be enhanced for the upstream development in Indonesia.

Source: Based on discussion interviews with industry

Figure 47 Supply chain analysis for E&E sector (B to C)

For example, in Malaysia, electronics was one of the main focus industries of the country and has been developing human resource for the sector more than 30 years. As a result, there is an accumulation of industry and human resource there. Mechanical and electronics parts are produced there. Even though the cost of production is getting higher, Malaysia still maintain their competitiveness by utilizing skilled labor force.

Value chain analysis

For the value chain, function in Indonesia is mostly concentrated in mass production. Not much necessity for manufacturers to operate upstream function. Some of the companies are shifting from

mass production to process engineering, since they are losing cost competitiveness of the final product. Process engineering includes equipment, jig, mold & die development.

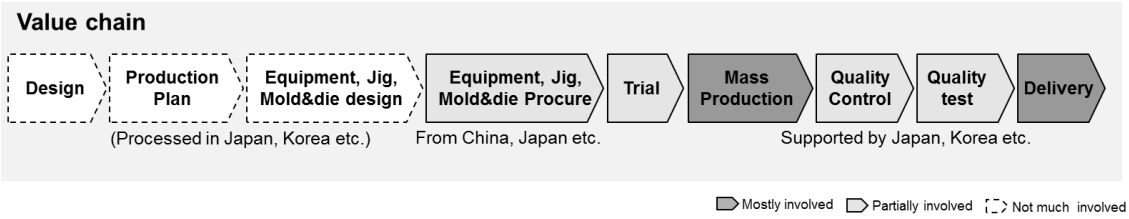


Figure 48 Supply chain analysis for E&E sector (B to C)

Implication from supply chain and value chain analysis

For major players of B to C electronics, they are assembling final products in Indonesia to sell them in local market, rather than export to other countries. For those companies, there are not much necessity and motivation of doing further operation in terms of supply chain and value chain.

To enhance the competitiveness of the sector, Indonesia needs to develop human and technology resources. This may be realized in B to B electronics, which will be discussed in the next section.

4.1.3. Current status of B to B electronics

Market situation

As described above, electronics parts are imported from China, Taiwan, Malaysia and other countries. Even though the market for those electronics parts are expanding, it is globally optimal for manufacturers to import the products.

For industrial machines, the market size has been limited until recently. However, due to the rapid rise of wages, process automation is also rapidly being introduced, especially in automotive sector. According to the discussion interview with industry, annual sales volume of factory automation machinery is about 500 units per year, whereas the same in Thailand is 1,200 units and in China is 15,000 units. Robot machines in field (stock) is estimated about 7,000 in Indonesia whereas 20,000 in Thailand.

Market share structure is that Yaskawa is 30%, followed by Daihen, Panasonic and Fujitsu etc. Most of those already installed robots are welding robots for automotive. Robots for painting is also increasing. So far, almost no handling robots and semi-conductor related robots has been seen in the field.

Global competitiveness

As there has not been much accumulation of B to B electronics in Indonesia, there is no global

competitiveness. Human and technology resource development has been limited. If Indonesia will enhance the sector, rapid catch-up is needed.

Supply chain and value chain analysis

For B to B electronics, there is virtually no supply chain in the country. In terms of value chain, mostly sales, service and maintenance functions of industrial machine and its replacement parts and disposable supply are located.

Implication from supply chain and value chain analysis

Even though the business chance for factory automation in automotive sector is rapidly expanding, the supply chain and value chain in Indonesia is still very limited and only sales, service and maintenance functions are located. However, this sub-sector can be a trigger for further development of the E&E industry. .

4.1.4. Current status and challenges of industrial policy on E&E industry

Industrial policy on E&E sector in Indonesia has been relatively open to international business involvement. However, human resource and technology development for E&E has not yet developed enough for sustainable growth.

For smart phone, the Government of Indonesia mandates to manufacture locally at least 20% of units sold in the local market. To comply with this regulation, smart phone makers established assembling factories in Indonesia. However, these production is not based on the global competitiveness of the country.

4.2.Potential and Constraints

4.2.1. Potential of E&E industry in Indonesia

Industrial machines – high potentiality of process automation

Among sub-sectors of E&E industry, there will be more opportunities in B to B electronics to be globally competitive, since the market expansion and investment by private sector is more probable due to the robust growth of automotive sector.

As described in the chapter on transportation machinery industry, automotive industry has already announced further investment of production capacity in coming years. To realize rapid increase of production volume, manufacturers need to increase productivity. If they rely only on manual labors, training will take time and they will not be able to make it by the start of operation. While shifting existing employees to become highly skilled work force who will manage automated production line,

low value added process should be operated by automation machinery.

Automotive sector is concentrated in Jabodetabek area where wage has been soared rapidly in past 10 years. If those employees continue low value added operation, the productivity will be quite low. The sector has to enhance skills of employees and replace those low value added operation by automation machinery.

In addition, automotive industrial policy is aiming to increase exports including Australia as a targeted destination. However, to be qualified for a global-level market, products should be higher quality. Some processes of automotive manufacturing need automation, since manual operation will not realize the global-level quality.

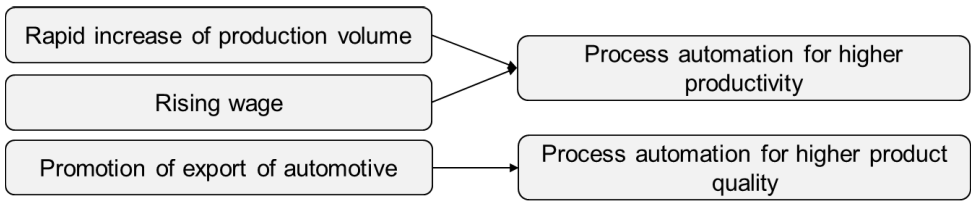
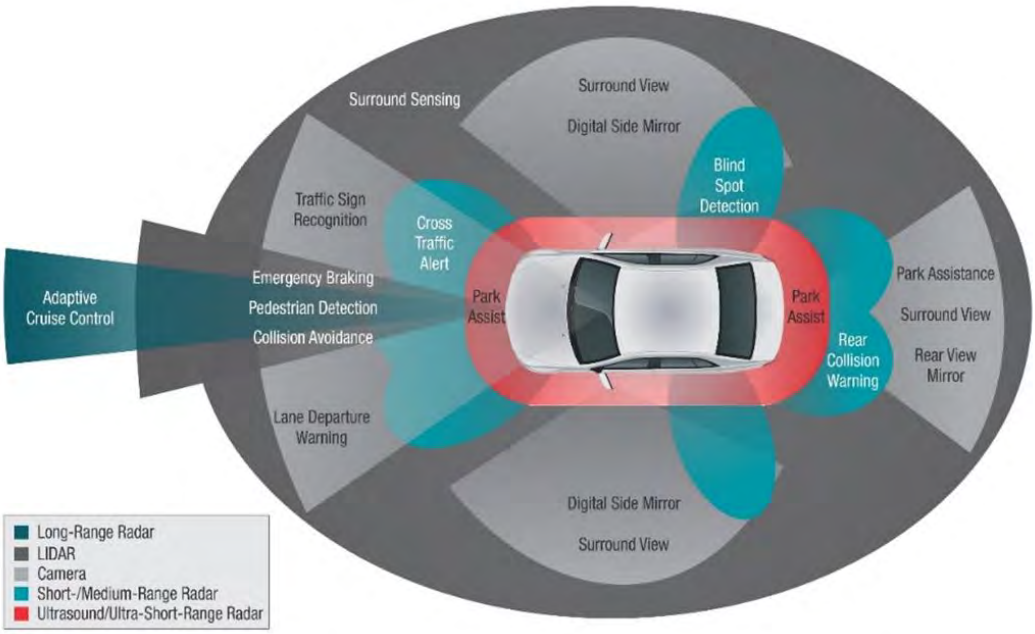


Figure 49 Drivers of process automation in automotive sector

Electronics parts – car electronics

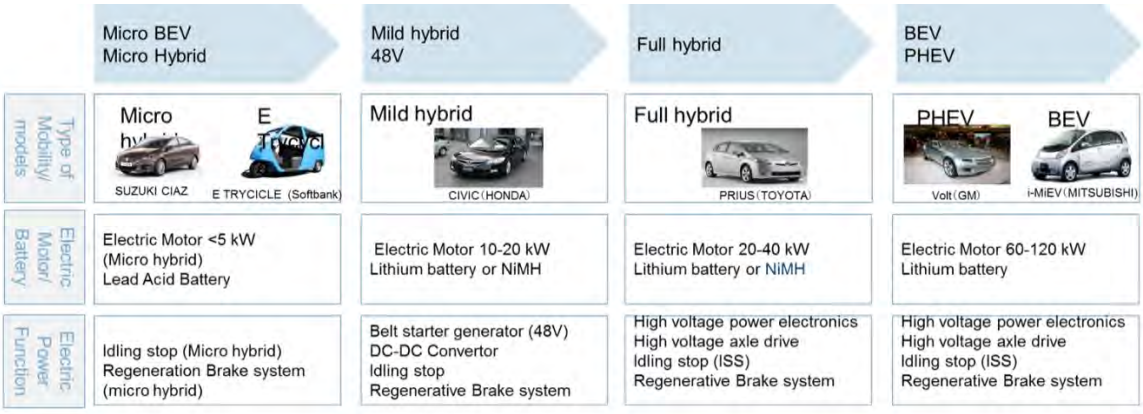
Electronics parts in automotive (car electronics) are increasing for driving support, safe driving, autonomous driving and internet connection of a car. In terms of auto parts manufacturing in ASEAN, Thailand is advanced. However, car electronics is still new and even Thailand is not overwhelmingly advanced in this field. There will be equal chance in ASEAN countries and Indonesia will also be able to take an initiative in car electronics.



Source: Texas Instruments

Figure 50 Advanced Driver Assistance System (ADAS) and sensor technology

Various types of electric vehicles will also use more electronics parts and components. Not only pure battery electric vehicle, but also hybrid vehicle will need electronics parts. Even if those x-EVs will not be launched in the market soon, development of electronics parts should be prepared in advance.



Source: NRI

Figure 51 Types of x-EV and electronic components

Potential electronic components for Indonesia could be Electronic Control Unit (ECU), battery assembly (low to high capacity lithium, 48V battery system), motors, sensors, camera and others.

4.2.2. Challenges and constraints for further development

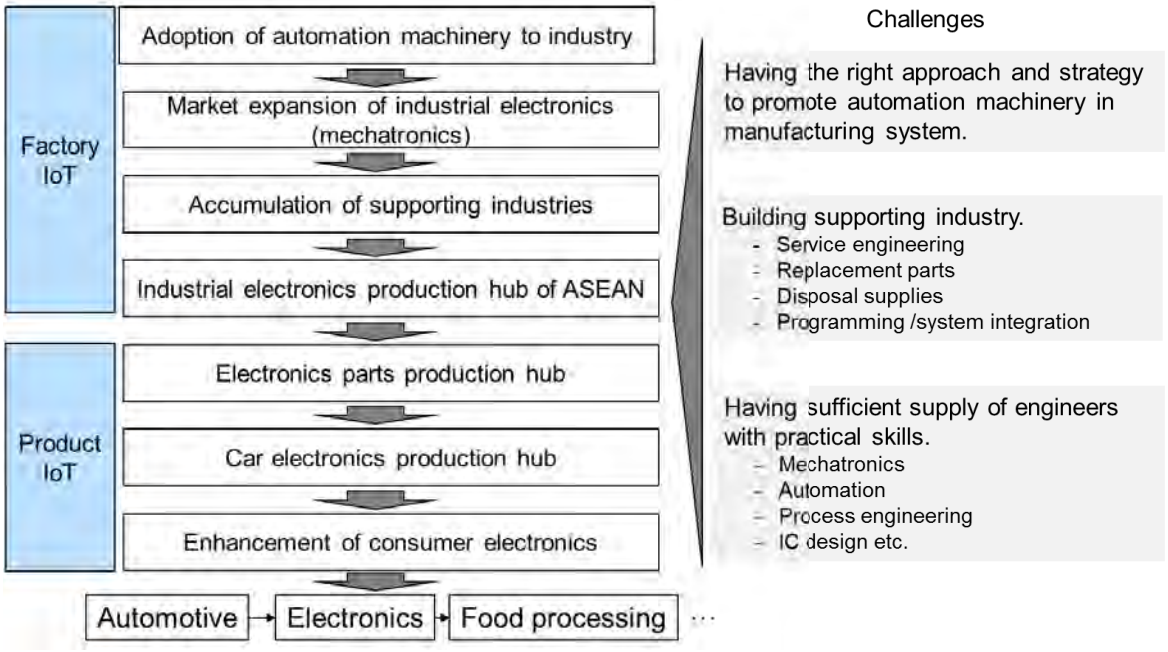
If Indonesia focuses on B to B electronics, the development scenario will be described in the figure below. The starting point is market expansion of industrial electronics, i.e., a trend of rapid introduction of mechatronics in automotive factories. For service and maintenance reasons, replacement parts makers and/or disposable supply companies will start after sales services. Once the size of the market will become large, these companies may establish factory in Indonesia. If the size of the Indonesian market will become the largest among ASEAN countries, then industrial electronics companies will also establish factory in Indonesia.

There will be important and difficult challenges for Indonesia to become industrial electronics hub in ASEAN. As there is virtually no high quality industrial machinery in Indonesia, the country has to depend on foreign technology until domestic industry will grow in the future.

Factory automation equipment such as robot is not a mass production like consumer electronics. If a company invest in a factory, it needs a large market to recover the investment. So far, China has become a large enough market to establish a factory, so several electronics companies invested in China. Each member state of ASEAN is rather small. Industrial manufacturers will most likely invest in only one country in ASEAN and will export to other countries. As of today, the number of robots for production process is much larger in Thailand. The future potential and the speed of growth will be larger in Indonesia, but the country needs to compete with Thailand to attract investments.

In the course of attracting production of factory automation equipment in Indonesia, attracting supporting industry is also important. Supporting industry includes replacement parts, disposal suppliers, programing and system integration for production process and service maintenance engineering etc.

The other challenge is training of engineers with practical skills. Engineers in E&E industry is generally in short and this is one the obstacles for further development of the sector. For industrial electronics, engineers in mechatronics, automation, process engineering and IC design will be needed. Human resource development needs long time to upgrade the skill level of engineers. They are already hard up and it is not too late to expand the education of E&E field.



Source: NRI

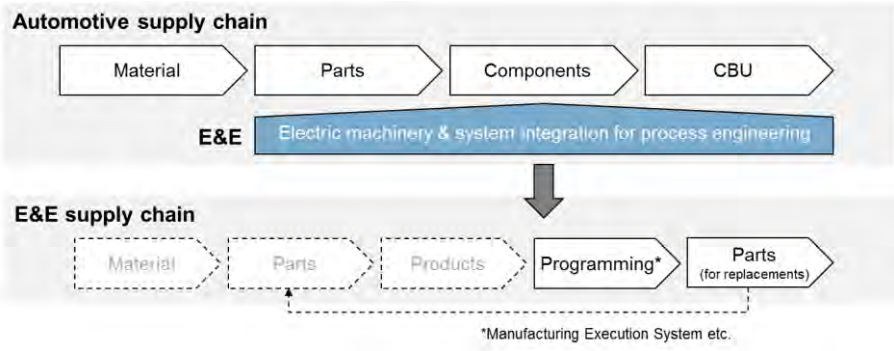
Figure 52 Development scenario of B to B electronics and challenges

4.3.Future vision 2025 and challenges

4.3.1. Future supply chain and value chain of E&E sector

Future vision of electric and electronics industry until 2025 is to upgrade quality and productivity of manufacturing by “Factory Internet of Things (IoT)” and “Product IoT”. This could be regarded as the “Indonesian version of Industry 4.0”

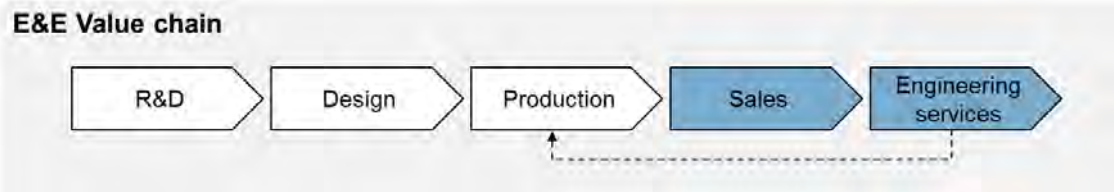
Judging from the current status of E&E industry, domestic market oriented manufacturing, such as localized refrigerator or washing machine will survive, since the local market will continue to grow. However, this sub-sector is based on the domestic (closed) market and they are not necessarily globally competitive. The most promising sub-sector of E&E is industrial machine that will contribute to the expansion of automotive sector. In terms of supply chain, it will start with downstream such as programming and maintenance and operation. Accumulation of these function will be a base for manufacturing of industrial machine in the future.



Source: NRI

Figure 53 Future supply chain of E&E and its relationship with automotive industry

In terms of value chain, sales and engineering services (including system integration of production line, installation of machines, equipment and facility, calibration, operation and maintenance etc.) will be the functions necessary for the first step of Industry 4.0 (factory IoT) in Indonesia and there are good potentiality. Engineering service requires replacement parts for maintenance of industrial machinery. In a long run, this will call for investment of parts manufacturing and then production of final products.

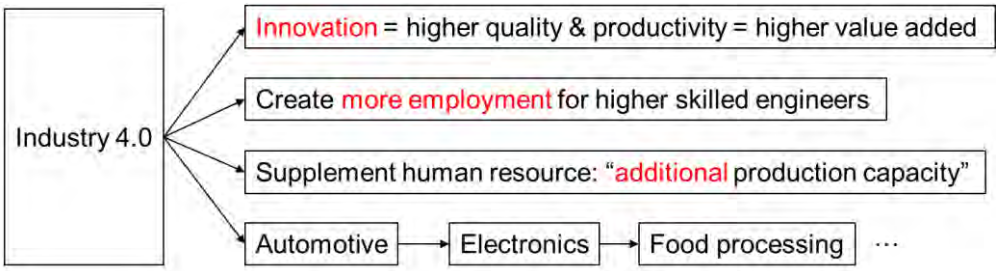


Source: NRI

Figure 54 Future value chain of E&E

4.3.2. Core concept of Indonesian version of Industry 4.0

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



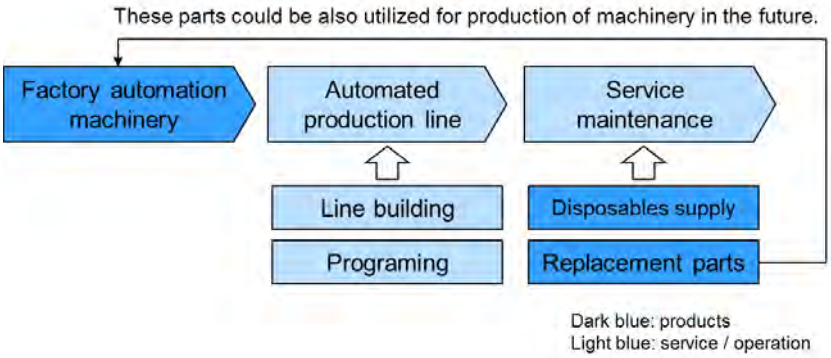
Source: NRI

Figure 55 Core concept of Indonesian version of Industry 4.0

4.3.3. Development scenario of Indonesian version of Industry 4.0

Factory IoT

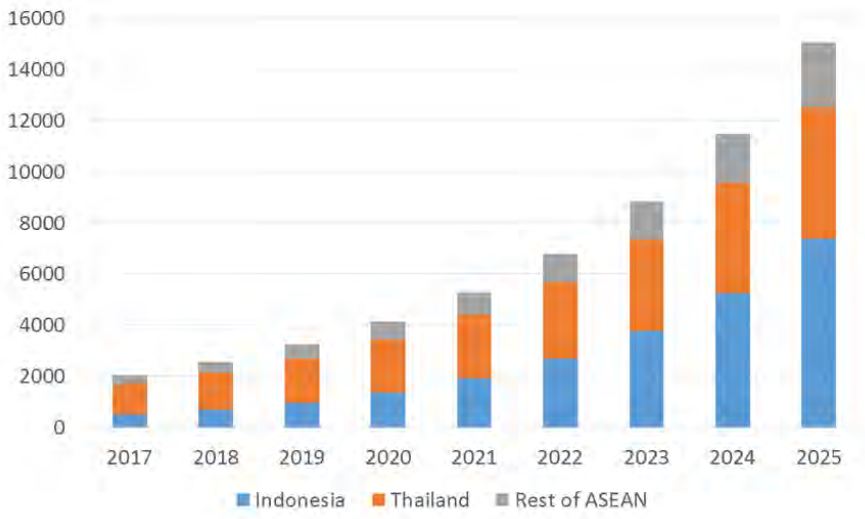
Starting from installment of automation machinery and service maintenance, gradually enhance production of parts and machinery. There are already sales and service offices of some industrial machine manufacturers and replacement parts and disposable supply makers.



Source: NRI

Figure 56 Scenario of automation machinery sub-sector development

Critical mass for inviting production of factory automation machinery is about 15,000 machine sales per year (for robotics), which is equal to the market size of China today. Currently, 1,200 machines in Thailand and 500 machines in Indonesia per year. To become the number one market in ASEAN, Indonesia needs annual increase of 30 to 40% per year.



Source: NRI

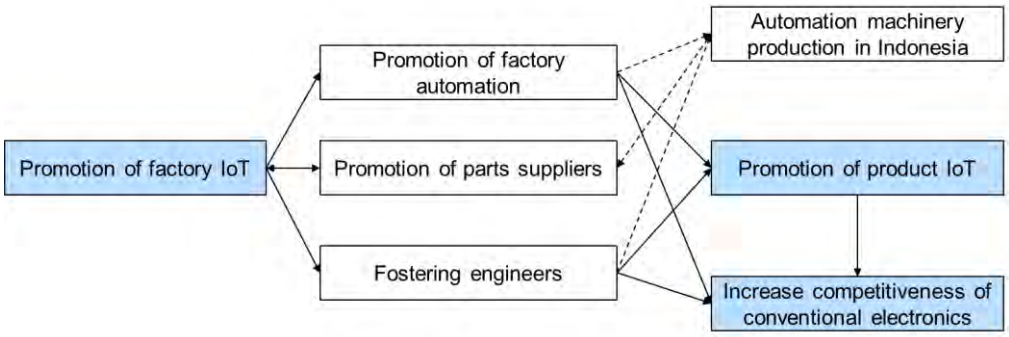
Figure 57 Necessary market growth of robotics in ASEAN to attract production

Product IoT

Car electronics is expected to grow when automotive is more "electronized." Among electronics parts for automotive, some of them, such as wire harness, connectors and motors are mostly labor intensive products. In JABODETABEK region, companies are losing cost competitiveness due to rapid rise of the wage. If logistics cost is not too expensive and lead time is short enough, they may be relocated in Eastern part of Java island, otherwise they will be relocated out of the country.

For higher value added products such as camera, sensors, radar and Engine Control Unit (ECU), China, Taiwan, Singapore and Malaysia are the strong competitors of Indonesia. To compete with these countries, Indonesia needs to introduce automated production process to be productive and train more engineers with practical skills in electronics.

For virtuous cycle of electronics sector development, it is important for Government of Indonesia to disseminate clearly that the government will focus on implementation of Industry 4.0 with significant budget and commitment on specific target achievements by effective policy actions. Commitment of the government is very important to promote investments, since companies are becoming more risk averse under uncertain future of the global market.



Source: NRI

Figure 58 Virtuous cycle of electronics sector development

4.4.Policy scenario

4.4.1. Vision and scenario

The future vision for E&E industry is to upgrade quality and productivity of manufacturing by "Factory IoT" and "Product IoT" (Indonesian version of Industry 4.0). To realize this goal, the country needs to become a factory automation production hub in ASEAN.

Now is the time for introducing and promoting factory IoT, or automation process in production line of automotive and electronics industry. Especially in automotive industry, production line is expanding and higher production quality is required for further development of the sector. Some production process cannot be upgraded with only manual labor, such as painting or spot welding. These processes may be replaced by automation machinery. Automation machinery is already introduced and widespread in Thailand. However, OEMs have excess capacity in Thailand and there is not much room for further expansion at this moment. At the same time, wage is soaring and the cost competitiveness is getting lower. In this context, manufacturers tend to introduce automation machinery to replace employees in Thailand. In Indonesia, the production capacity of OEM is still expanding and parts manufacturers are following the trend. It will be more likely for manufacturers to introduce automation machinery in newly expanded production lines rather than replacing existing labor force.

Currently, Thailand is much advanced in introducing automation machinery, since the high cost (wage) factor is even severer than in Indonesia. If this current trend continues, then Thailand will become the number one and only one production hub of automation machinery in ASEAN. Indonesia has more potentiality to become the hub, since the market is larger and the

size of production will be also larger than Thailand. However, without proactive support by government policy, the country will be left behind. Judging from the tendency of automation machinery companies' investments in foreign countries, they may establish a factory if the market size will become as large as China. For each ASEAN member state's market, it will be difficult or take very long time to become the similar size. Automation machinery company will chose the largest market country as a hub of production in ASAEN and will export to other member states. Looking at the current progress and projected future trajectory, if there is significant policy change in other countries, Thailand has a good chance to become the hub.

To promote factory IoT, the first step is to create a large market of industrial automation machinery in Indonesia. Then to enhance sales and support services of industrial automation, which will become a cluster of replacement parts and disposable suppliers. Training of engineers is also needed to support the industry. Based on the market expansion, accumulation of supporting industry and a pool of practically skilled engineers, industrial automation machinery manufacturers may invest and setup factories in Indonesia.

Training of engineers in electronics will also contribute to promote electronics parts especially for car electronics. Automation machinery will be first introduced in automotive sector and then also in electronics sector to become globally competitive. If this scenario will be realized, then Indonesia will have more potentiality to develop consumer electronics products as well.

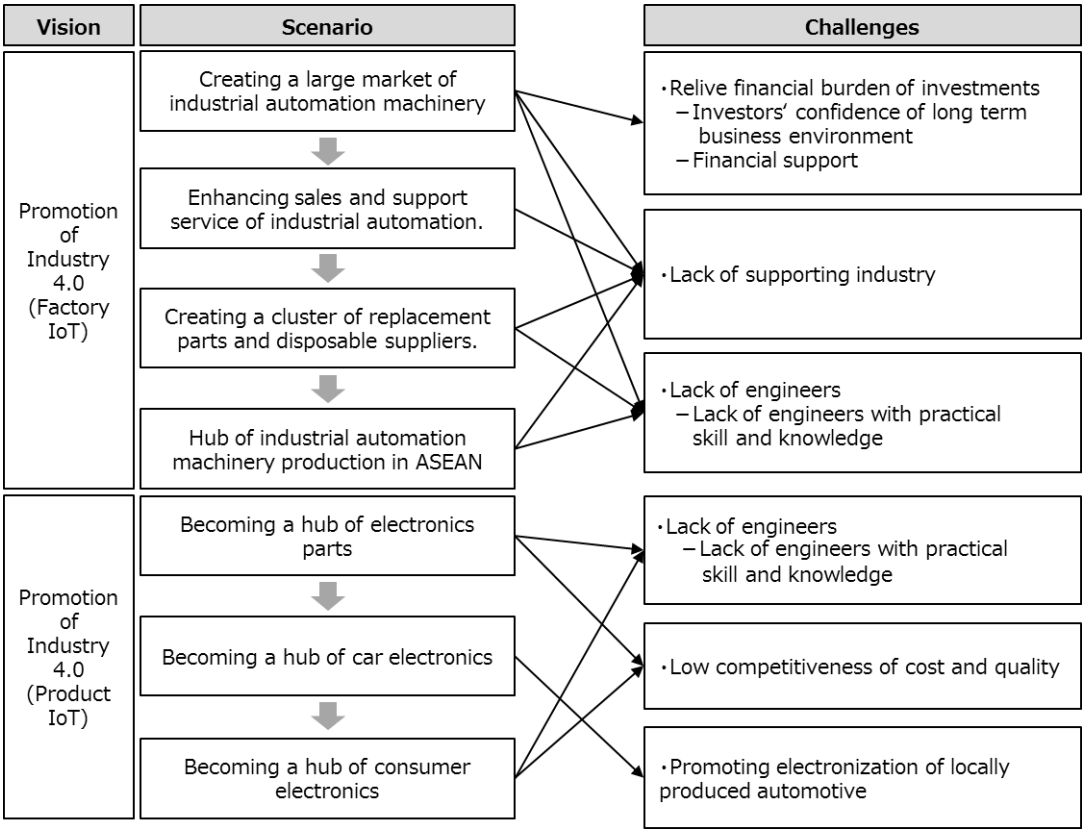
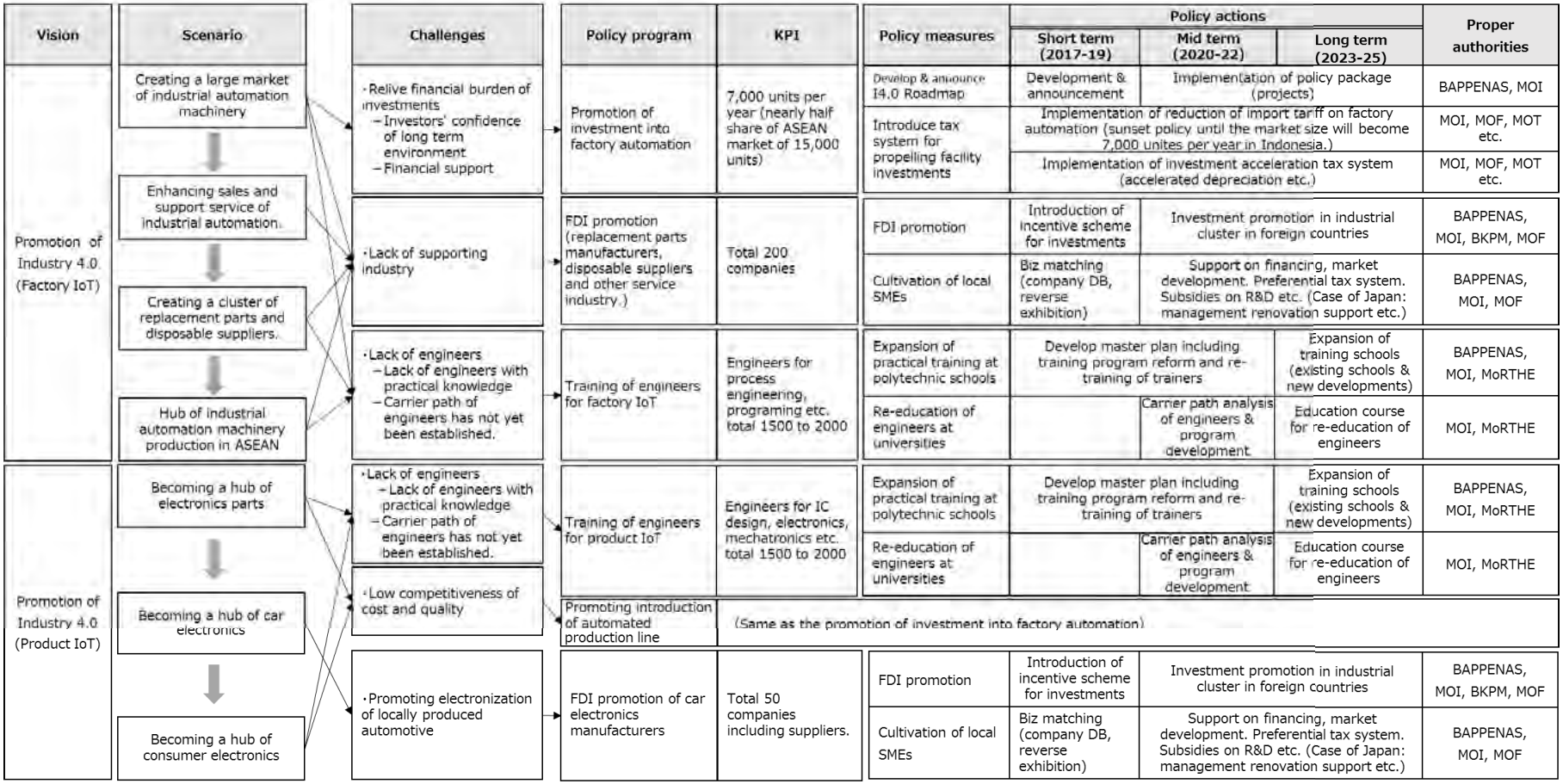


Figure 59 Development scenario for Factory and Product IoT in Indonesia

4.4.2. Policy program and KPI

The whole picture of policy matrix is shown in the below figure.



Vision	Scenario	Challenges	Policy program	KPI	Policy measures	Policy actions: Short term (2017-19)	Policy actions: Mid term (2020-22)	Policy actions: Long term (2023-25)	Proper authorities
Promotion of Industry 4.0 (Factory IoT)	Creating a large market of industrial automation machinery Enhancing sales and support service of industrial automation. Creating a cluster of replacement parts and disposable suppliers. Hub of industrial automation machinery production in ASEAN	・Relive financial burden of investments – Investors' confidence of long term environment – Financial support	Promotion of investment into factory automation	7,000 units per year (nearly half share of ASEAN market of 15,000 units)	Develop & announce I4.0 Roadmap	Development & announcement	Implementation of policy package (projects)		BAPPENAS, MOI
					Introduce tax system for propelling facility investments	Implementation of reduction of import tariff on factory automation (sunset policy until the market size will become 7,000 unites per year in Indonesia.)			MOI, MOF, MOT etc.
						Implementation of investment acceleration tax system (accelerated depreciation etc.)			MOI, MOF, MOT etc.
		・Lack of supporting industry	FDI promotion (replacement parts manufacturers, disposable suppliers and other service industry.)	Total 200 companies	FDI promotion	Introduction of incentive scheme for investments	Investment promotion in industrial cluster in foreign countries		BAPPENAS, MOI, BKPM, MOF
					Cultivation of local SMEs	Biz matching (company DB, reverse exhibition)	Support on financing, market development. Preferential tax system. Subsidies on R&D etc. (Case of Japan: management renovation support etc.)		BAPPENAS, MOI, MOF
		・Lack of engineers – Lack of engineers with practical knowledge – Carrier path of engineers has not yet been established.	Training of engineers for factory IoT	Engineers for process engineering, programing etc. total 1500 to 2000	Expansion of practical training at polytechnic schools	Develop master plan including training program reform and re-training of trainers		Expansion of training schools (existing schools & new developments)	BAPPENAS, MOI, MoRTHE
					Re-education of engineers at universities		Carrier path analysis of engineers & program development	Education course for re-education of engineers	MOI, MoRTHE
Promotion of Industry 4.0 (Product IoT)	Becoming a hub of electronics parts Becoming a hub of car electronics Becoming a hub of consumer electronics	・Lack of engineers – Lack of engineers with practical knowledge – Carrier path of engineers has not yet been established.	Training of engineers for product IoT	Engineers for IC design, electronics, mechatronics etc. total 1500 to 2000	Expansion of practical training at polytechnic schools	Develop master plan including training program reform and re-training of trainers		Expansion of training schools (existing schools & new developments)	BAPPENAS, MOI, MoRTHE
					Re-education of engineers at universities		Carrier path analysis of engineers & program development	Education course for re-education of engineers	MOI, MoRTHE
		・Low competitiveness of cost and quality	Promoting introduction of automated production line	(Same as the promotion of investment into factory automation)					
		・Promoting electronization of locally produced automotive	FDI promotion of car electronics manufacturers	Total 50 companies including suppliers.	FDI promotion	Introduction of incentive scheme for investments	Investment promotion in industrial cluster in foreign countries		BAPPENAS, MOI, BKPM, MOF
					Cultivation of local SMEs	Biz matching (company DB, reverse exhibition)	Support on financing, market development. Preferential tax system. Subsidies on R&D etc. (Case of Japan: management renovation support etc.)		BAPPENAS, MOI, MOF

To achieve the goal of future vision of E&E industry, three pillars of policy program are needed, which are;

- Promotion of facility investments,
- FDI promotion to introduce new technology, proactive support for technology transfer and cultivation of supporting industry, and,
-Training of IoT engineers.

Policy program	KPI(by 2025)	
Promotion of facility investments (automation machinery in production for automotive and electronics)	Both Factory Product IoT	Market size of 7,000 units per year（Half of total ASEAN market of 15,000 units)
FDI promotion to introduce new technology, proactive support for technology transfer and cultivation of supporting industry	Factory IoT	Automation machinery, replacement parts, disposable suppliers, other relevant companies: 200 companies (total)
	Product IoT	Car electronics companies: 50 companies (total)
Training of IoT engineers; practitioners and researchers who will adopt technology and apply it to autonomously develop the sector	Factory IoT	Engineers of process engineering and programing: 1500 to 2000 engineers (total)
	Product IoT	Engineers of IC design, mechatronics etc.: 1500 to 2000 engineers (total)

Figure 60 List of suggested policy program and KPIs

Promotion of facility investment

The first pillar is to promote investments in automation machinery for automotive and electronics. As it is already explained in previous sections, if Indonesia would like to become a hub of automation machinery production hub in ASEAN, the market size should be the largest among ASEAN member states. The Survey Team assume that the critical mass for investment in factory of automation machinery will be 15,000 units sales per year, which is the current market size of China, according to discussion interviews with manufacturers. If the market size of ASAEN reaches that size, manufacturers will consider to invest in one of the member states. At that time, if the market size of Indonesia will have the largest share in ASEAN, say, almost the half of total ASEAN market, it is more likely for them to invest in Indonesia. Thus the key performance indicator (KPI) will be 7,000 units sale pear year in Indonesia. To promote and stimulate the market, proactive policy measures will be needed.

Investments in automation machinery is highly important for Indonesia to become globally competitive. It will support rapid expansion of automotive sector, upgrade the quality of assembling products made in Indonesia and will create more well-paid jobs. If the productivity

of workers remains the same while wage is rising, then they industry will lose competitiveness. Installment of automation machinery will lead to create more jobs for skilled labor force, such as engineers and technicians. This is important step for Indonesian industry to adapt to the current domestic labor market and to be sustainable in global completion.

Introduction of new technology, proactive support for technology transfer and cultivation of supporting industry

The second pillar is to introduce new technology, proactive support for technology transfer and cultivation of supporting industry. Factory automation requires cutting-edge and reliable technology which is currently lacking in Indonesia. The country needs to rely on foreign technology first and then transfer the technology to local companies. Without relying on foreign technology, the quality and productivity will not increase, but it should be well designed to transfer the technology to local companies. To do so, proactive business matching between foreign and domestic companies and training of engineers are crucially important.

"Supporting industry" of automation machinery includes replacement parts and disposable suppliers (such as rare gas). As of today, the market size of Indonesia is about 500 unit sales per year and there are about 10 to 15 supporting industry companies for mainly operation support and maintenance reasons. If Indonesia to expand the market up to 7,000 unit per year, 150 to 200 companies will be needed to support the automated production lines. Thus, one of the KPIs will be 200 companies of supporting industry, both foreign and domestic. For car electronics companies, it is just started and there is no good benchmark country. It will consists of key devices such as semiconductor and component modules. KPI will be 50 companies to be established in Indonesia, which will be rather high target, but the survey team assume that in 10 years, Thailand and the Philippines will also try to attract car electronics companies and strong commitment of the government will be needed.

Training of IoT engineers

The third pillar is to train IoT engineers. Even if foreign companies bring in cutting-edge technology, it will not be transferred if there is no engineers who can adopt it and apply to local companies. Human resource development takes long time and it is not too late to foster engineers. In terms of factory IoT, process engineers and programmers for production line building will be needed. According to discussion interviews with industry people, currently 100 to 150 engineers are working in this field, but the country will need 1,500 to 2,000 engineers to support the largest market in ASEAN. For product IoT, especially for car electronics, engineers such as IC designing (System on Chip will become more important) and mechatronics will be needed. KPI may be the same to process engineers.

4.4.3. Policy measures to achieve KPIs

Development and announcement of specific policy measures for roadmap of Indonesian version of Industry 4.0

An important point for policy measure is for the Government of Indonesia to formally announce and promote Indonesian version of Industry 4.0, in which automation machinery is promoted. If the government shows their long term policy and strong commitment to promote Industry 4.0, then it will greatly help companies to make decision on investment. Clear message and concrete policy measures to support Industry 4.0 is the first policy measure to be implemented.

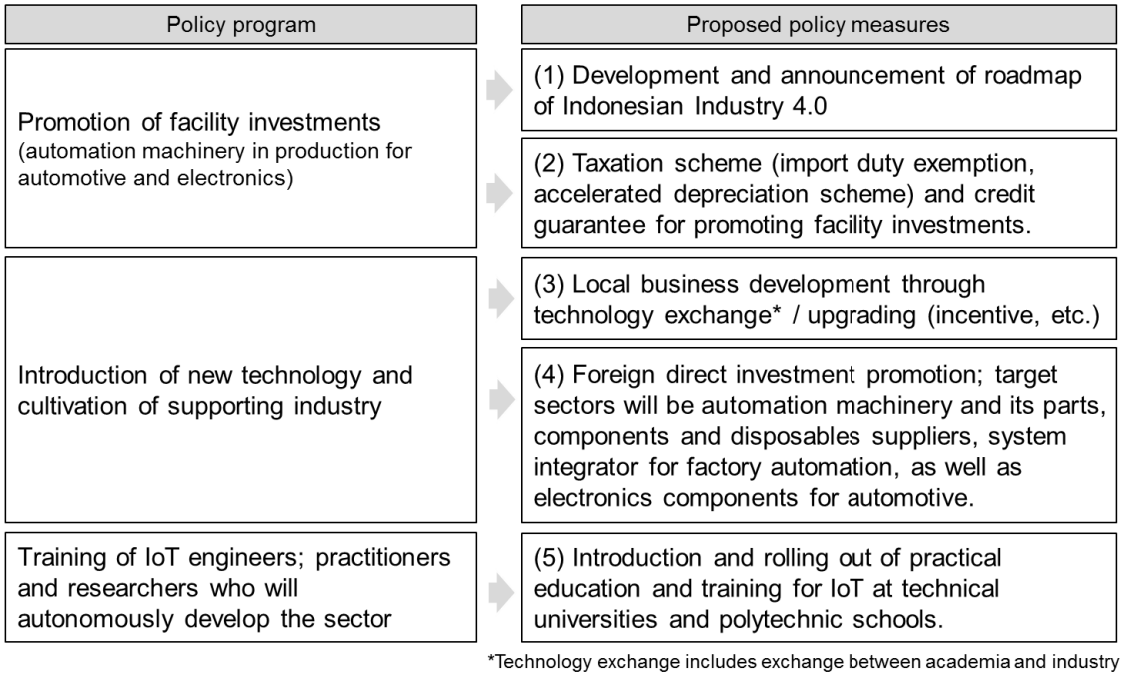


Figure 61 List of policy program and policy measures

Essence of roadmap of Industry 4.0 is that it should be practical, executable and well designed for sustainable development of Indonesian industry, of which foreign industry players might facilitate more efficient learning process and a necessary condition for Indonesia to achieve its policy objective. An important aspect, however, is technology transfer from foreign industry players through local industry players. But it will not materialize if the Indonesian industry ecosystem is not sufficiently prepared. Higher level of engineers who have good

experience in a real business situation will be needed to understand the technology and knowhow. If there will be more such experienced engineers, some of them might spin-out from foreign companies and will establish a domestic company. Proactive support by the government is needed to realize for this technology transfer scenario, otherwise there is limited incentive for private sector to voluntarily transfer their technology. The roadmap should carefully design and show a long term scenario and policy measures to realize the goal.

[Policy actions for short term 2018 to 2019]

The roadmap of Indonesian version of Industry 4.0 should be developed and announced. It should be carefully designed, based on realistic scenario and executable policy support for next 10 years. It should contain information on which companies – both domestic and international – can make decisions of investment in factory IoT (or automation machinery, robots and mechatronics) and product IoT. Necessary information will be the following;

- Clear and concrete image of the goal and target of Industry 4.0 in 10 years;
- Necessary technology to realize Industry 4.0;
- The future ideal manufacturing process in major sectors such as automotive and electronics;
- Future vision of industrial structure of major sectors, i.e., division of roles between foreign and domestic companies in contribution to the industrial development;
- Measures of technology transfer from foreign companies to local companies?
- Policy support (policy package) to be implemented by the government, which include measures and process to secure the budget support.

Effective public dissemination plays important role in securing support, not only for all government agencies, but also to obtain the understanding and commitment from business leaders—both national and international.

[Policy actions for mid and long term 2020 to 2025]

Policy package should be consistently implemented over years. Manufacturing sector takes long term to be competitive, since accumulation of technology, facility and human resource are needed. If the policy will not continue for some years, then private sector cannot be confident of the future of industrial development of that country and investment will be inactive.

To be consistent for long term, setting up a steering committee to secure the budget for policy package and monitor the implementation and achievement by high-level and inter-ministry members.

Taxation scheme for promoting facility investments

In addition to the policy announcement, preferential taxation scheme for Factory IoT investment will be also effective. For example, exemption of import duty on the cutting-edge automation machinery and approval of deductible expenses for donated machinery to technical universities and polytechnic schools will accelerate new investments. As currently Indonesia domestic market has not matured yet, the state-of-the-art automation machinery will be imported in majotiy as there is not yet exist equivalent producers in Indonesia.

Important thing for the first step is to expand the domestic market and relaxation of import duty will be effective to promote automation machinery in Indonesia. Companies sometimes sell their old machinery and then install new one with better capacity. Even though these old ones are not the latest, but they may be still better than current machinery in technical universities and polytechnic schools.

[Policy actions for short to long term 2018 to 2025]

To implement reduction or exemption of import tariff on factory automation machinery and equipment. For the first step, Indonesia has to import cutting-edge machinery from foreign countries.

Other scheme will be implementation of investment acceleration tax system, such as accelerated depreciation system or approval of income deduction of donated machinery to technical university and/or polytechnic schools.

Local business development by technology transfer from foreign companies

Local business development is the most important and difficult part of policy measures. Manufacturing industry needs accumulation of technology, high quality manufacturing facility and human resource. Technology should be first introduced from foreign countries. Facility investment is crucially important, since the quality of product is determined by the quality of machinery. However, high quality machinery is generally expensive and it will take long time for companies to recover the investment. It is difficult for medium and small enterprises to invest in high-end machinery. Human resource training is also burden to medium and small enterprises. Business matching with foreign companies, policy support for facility investments and human resource training are inevitable for local business development.

[Policy actions for short term 2018 to 2019]

When the government promote foreign direct investments, it is also important to promote

business matching with local companies. Potential investors in the near future will be medium and small companies with high technologies and some of them may need local partner for better localized operation. Local companies need to be transferred the latest technology, otherwise there will be little development of the industry.

Japanese governmental organization such as JETRO has already made a list of Indonesian companies. It should be fully utilized when the Government of Indonesia will conduct FDI promotion in foreign countries.

For local small and medium companies, they claim that they cannot find a business chance with large companies including foreign companies. Thus, reverse exhibition, where large companies show their procurement needs and potential purchase goods, will be effective for local companies to know what sort of business chance is existing in the country. By cooperating with industrial associations and/or foreign organizations such as JETRO, reverse exhibition should be organized for business matching.

[Policy actions for mid and long term 2020 to 2025]

For local companies to be included in a global value chain, introduction of higher technology is needed, which can be realized by installment of cutting-edge machineries. However, especially for small and medium companies, invest in expensive machinery is such a burden to business management, especially when the future of business development is not clear. Sometimes large companies require large production capacity to deliver products in a large quantity. SMEs may need to merge together to realize such large operation. So financial support for invest in cutting-edge machinery and/or in merger and acquisition among companies will be effective.

Foreign Direct Investment Promotion: Target Sector Will be Automation Machinery and Its Parts, Components and Disposable Suppliers, System Integrator for Factory Automation, as well as Electronics Components for Automotive

Efficient and productive manufacturing system needs cutting-edge technology. Until domestic industry will become competitive enough, Indonesia needs to promote foreign direct investment in some specific sub-sectors, namely, automation machinery, its parts and components, disposables suppliers and car electronics parts and components companies.

[Policy actions for short term 2018 to 2019]

For those targeted sub-sectors, more preferential incentives and lower requirement for minimum investment amount will be effective, since not all of them are large multinational companies. Currently, Thailand prepares generous incentive for investment with higher level of

technology.

Table 14 Incentive scheme by BOI of Thailand

	BOI	BOI+	BOI++
Legal basis	Investment promotion Act	Revised investment promotion act	Competitiveness enhancement act
Targets for promotion	Sector-based Promote investments in targeted industries in accordance with the Seven-Year Investment Promotion Strategy (2015-2021)	Technology-based Promote investments in core technologies in which Thailand has high potential.	Strategic Investment Promote investment that is in line with Thailand 4.0 and the New technologies and high-impact investments which cannot be attracted by other incentives
Core incentives	• CIT exemption ≤ 8 years • ≤ 50% CIT reduction ≤ 10 years • Deduction up to 70% of the invested capital on net profit derived within 10 years (ITA) • Exemption of import duties on machinery, raw materials, material imported for R&D purpose • Non-tax incentives, e.g., permission to own land, permission to bring in foreign experts.	• CIT exemption for 9 – 13 years for projects that utilize advanced technology and innovation, or R&D projects as prescribed by the Board. • Other incentives in accordance with the BOI Act.	• CIT exemption not exceeding 15 years for targeted industries. • 10 billion bath grants for investment projects engaged in R&D, innovation or human resource development in specific areas. • Other incentives in accordance with the BOI Act

Source: BOI, Thailand

IoT specialist who will promote foreign direct investments will be needed to define and assess the type of investments and determine whether the government to offer the most preferential incentive or not.

[Policy actions for mid and long term 2020 to 2025]

Investment promotion in industrial cluster in foreign countries will be effective. In about 10 years ago, the Board of Investments of Thailand went around local parts of Japan to promote investments by those local medium and small companies with high technology. Some of the mechatronics companies are located in Kyushu region or somewhere other than large cities such as Tokyo or Osaka. IoT specialist will contribute to promote investment by giving advice to potential investors from specialist view point and by giving feedbacks from industry to the government.

Introduction and rolling out of practical education and training for IoT at technical universities and polytechnic schools

Industry people from electronics industry point that engineers in electronics are lacking in Indonesia for further industrial development. For example, in Malaysia, the government focused on fostering engineers in electronics for more than 30 years and they have produced

many good engineers who are leading the sector in ASEAN. Panasonic, for example, have established an R&D center for home appliance in Malaysia for more than 15 years.

For further development of the electric and electronics sector, in addition to good operators, Indonesia needs more engineers and technicians and it should be aligned with the roadmap of Industry 4.0. In terms of promotion of production automation, more mechatronics engineers will be needed who has good knowledge and experience of PLC programming, production line building etc. For development of product IoT, more focused education and training of electronics will be needed, for example, logic design of IC for ECU, sensors, motors, camera etc.

Judging from various opinions from industry and explanations from technical universities and polytechnic schools, it seems that universities teach fundamentals but not necessarily applied to real engineering business whereas polytechnic graduates are good at using practical tools such as three dimensions CAD, but they tend to lack fundamental knowledge of science. Even some advanced polytechnic schools, training of automation production system is still introductory level. Training of more practically skilled engineers and technicians will be needed.

[Policy actions for short term 2018 to 2019]

To upgrade the quality of education and training, training program should be developed, based on a deep cooperation with the industry and professors, lecturers and trainers need to be re-trained. Machinery and equipment for education and training may need to be updated to the latest ones that are currently used in industry. These actions should be implemented in some selected and advanced schools as the short term goal.

[Policy actions for mid and long term 2020 to 2025]

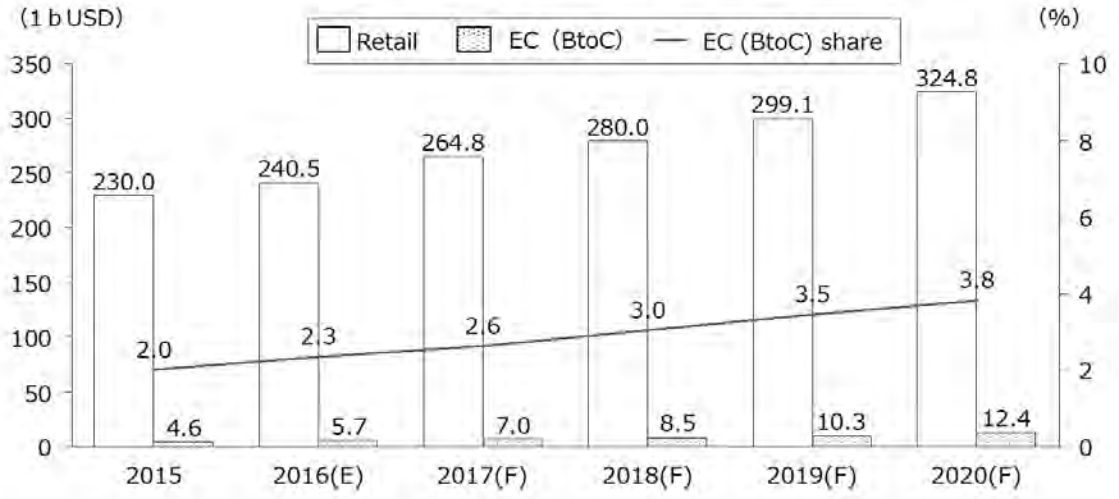
Once the abovementioned policy actions are proved successful, it should be rolled out to other training schools throughout the country.

4.5. Electric Commerce and Industry 4.0

4.5.1. A brief overview of the Electric Commerce in Indonesia

This section outlines the Electric Commerce (e-commerce, or EC) in Indonesia, because EC is incorporated as part of the manufacturing supply chain, especially in its downstream. EC is emerging with new talents in information and communication technology and these technologies are likely to contribute to Industry 4.0 by fusing with the manufacturing industry.

The size of EC market (B to C) in Indonesia is about $ 5.7 billion in 2016. It is expected to expand steadily in the future, which is expected to be more than twice as high as the current level of 12.4 billion by 2020. Although the rate of EC in retail sector has increased year by year, it is 2.3% as of 2016, which is still small compared to the whole retail market. It is expected to continue to increase in the future, up to 3.8% in 2020.



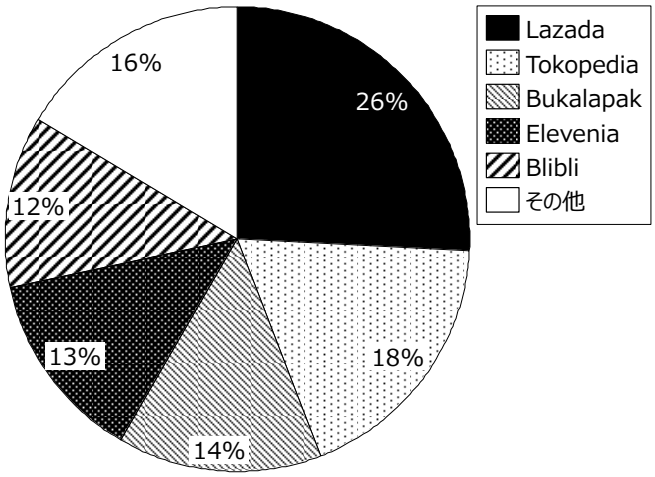
Note: (E) for estimated data, (F) for forecasted data

Source: eMarketer (2016)

Figure 62 Trend of the size of EC market in Indonesia and forecast

As players involved in the EC industry, there are EC platforms, settlement platforms, and logistics companies. In the past, the supply chain in the EC sector has been fragmented, but recently there has been a movement of vertical integration. Logistics company Go-jek acquired settlement company, for example.

As of April 2017, Lazada has 26% share of EC share in Indonesia. The following Tokopedia is a provider of platforms for C to C (customer to customer). As for the other companies, mergers and acquisitions are underway as the EC market is rapidly expanding.



Source: ecommerceIQ (2017)

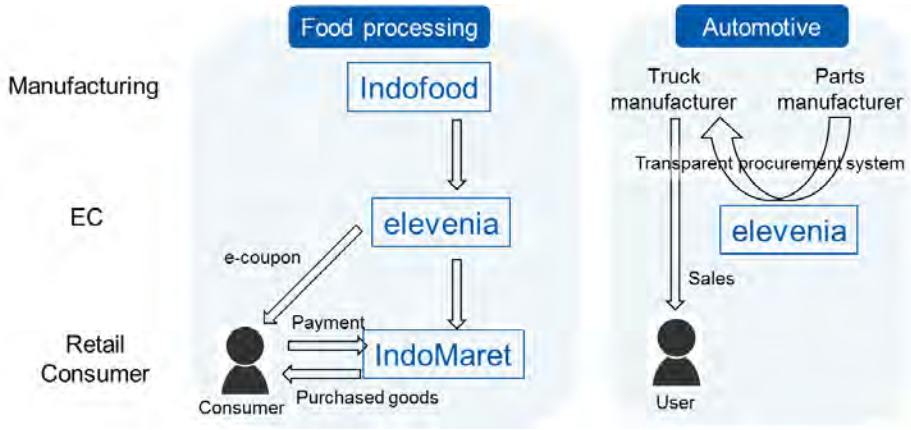
Figure 63 Share of EC companies in Indonesia (Page view base in April 2017)

4.5.2. A case of EC incorporated in the manufacturing supply chain

Salim Group is a conglomerate with a wide range of business lines including manufacturing and retail sectors. It links e-commerce with the real economy, and develops various services.

One such case is processed food of Indofood. Consumers can get benefits when purchasing processed foods of Indofood through elevenia, an EC of the group. In addition, consumers can receive the product and make payment Indomaret, the Salim Group retail store.

In addition, there are automotive manufacturers under the umbrella of Salim Group, and EC of the group is also used for selling final products through e-commerce and procurement of parts by automotive manufacturers.



Source: Based on the discussion interview with elevenia

Figure 64 Business model of Salim Group including EC (elevenia)

4.5.3. Potentiality and challenges of EC in the context of Industry 4.0

The expansion of e-commerce business is considered to have a positive significance for the development of the manufacturing industry.

As a development scenario of the electrical and electronics industry, Industry 4.0 will be the key, which means digitalization of the manufacturing industry. Collect and analyze information from production line, or execute supply chain optimization using information system will be some of cases of IT aspects of Industry 4.0. By enhancing the connectivity of products to the Internet (product IoT), the value added of the product could be increased. In such a situation, there is a possibility to utilize Indonesian's excellent ICT engineers. In fact, there are cases in which a world-famous Japanese robot maker develops software embedded to robot products in India, even though the company does not have any production line in India.

In Indonesia, the diffusion of robots and the introduction of Industry 4.0 are yet to come. However, even without the production of robots, it is also important to promote software development to prepare for future Industry 4.0 generation.

At present, graduates from engineering departments at top-level universities tend to be committed to e-commerce business, rather than manufacturing. In general, those high level engineers do not have tendency to work in the manufacturing industry. Make them interested in digitization of the manufacturing industry is a challenge.

On the other hand, many students who are educated at the next level after the university, such as Polytechnic, have a deep understanding of the manufacturing industry. By extending their capabilities, it is necessary to realize Industry 4.0.

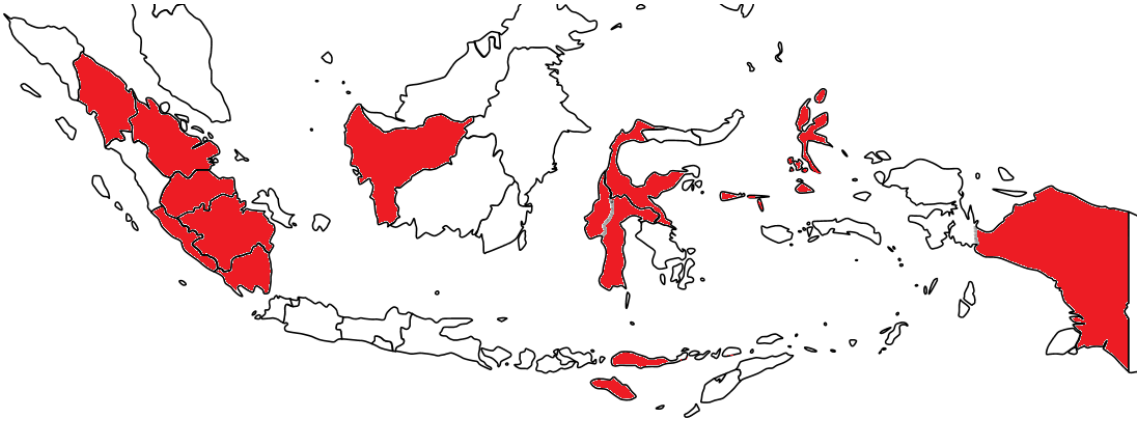
5. Food Processing Industry

5.1.Current status

5.1.1. Overview of the sector/Industrial Outlook

Geographic significance of the food processing value chain

The supply chain for food production starts with the agricultural and fishery industry. This upstream industry of the food processing industry is the major industry and source of employment outside Java. As evidenced in the following diagram, many provinces outside Java are having more than 40% of the labor market in the Agriculture, Forestry, Hunting, and Fisheries industries (as shown in red).



(Source) Data from BPS- August National Labor Force Survey, 2016
(* Note) Provinces in red are employing more than 40% of the labor market for the Agriculture, Forestry, Hunting, and Fisheries industries

Figure 65 Provinces where the Agriculture, Hunting, and Fisheries is the major industry with more than 40% of the labor market*

Global competitiveness

The supporting industry in the upstream of Indonesia's food processing supply chain has a large production capacity. For example, Indonesia produces many agricultural products, such as palm oil, coconuts, cinnamon, cocoa, coffee, fruits, sugar cane, etc. in large quantity, ranking among the top of agricultural production in the world.

Table 15 Global ranking of Indonesia's Agricultural production (2013)

Product	Production (mil. USD)	World Ranking
Oil, palm	11,701	1
Coconuts	2,023	1
Cinamon	128	1
Palm kernels	1,776	1
Rice, paddy	19,297	3
Cassava	2,450	3
Cocoa, beans	807	3
Coffee, green	751	3
Mangoes, mangosteens, guavas	1,233	4
Chillies and peppers, green	813	4
Fruit, tropical freshnes	1,099	5
Bananas	1,509	6
Groundnuts, with shell	599	6
Maize	1,747	7
Sugar cane	1,107	7

Source: FAO-FAOSTAT

However, the food products produced from these world ranking agricultural products, such as sugars and sugar confectionery, chocolate, etc. are lagging behind Thailand, in terms of exports.

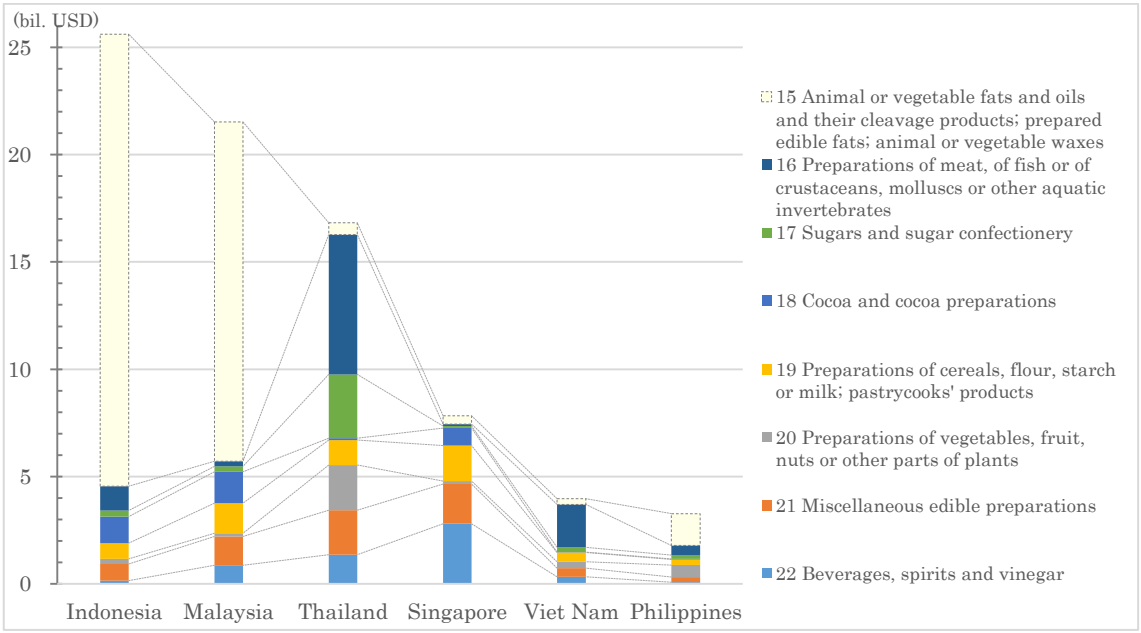
Table 16 Global ranking of Indonesia's Processed Food Export amount (2014)

		World Ranking		Export amount	
HS #	Commodity	Indonesia	Thailand	Indonesia (mil. USD)	Indonesia / Thai (%)
16	Preparations of meat, of fish, etc.	13	2	945	16%
17	Sugars and sugar confectionery	28	2	219	8%
18	Cocoa and cocoa preparations	10	46	1,308	1215%
(1806)	Chocolate and other food preparations containing cocoa	47	50	45	131%
19	Preparations of cereals, flour, starch or milk; pastry cooks' products	23	18	707	60%
20	Preparations of vegetables, fruit, nuts or other parts of plants	37	10	282	13%
21	Miscellaneous edible preparations	22	9	844	43%
22	Beverages, spirits and vinegar	60	19	138	10%
16-22	Subtotal	23	9	4,443	28%

Source: Comtrade

Indonesia's processed food export seems to be quite large among the ASEAN countries, but if we exclude palm products, export of processed food is less than 1/3 of Thailand's in 2014. (In terms of

world ranking of processed food export, Thai ranks 9th, Malaysia ranks 21st, and Indonesia lags behind their peers, ranking 23rd.)

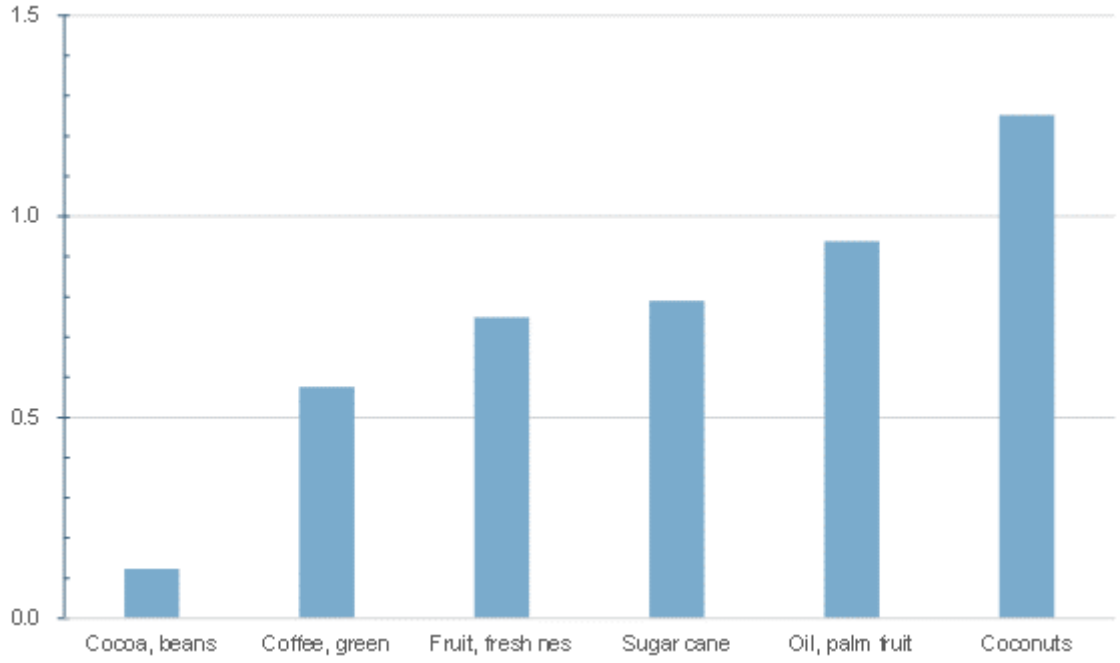


(Source) Comtrade
(Note) Export amount of dairy products within HS04 and processed coffee within HS09 was less than 50 million USD for all 5 countries, in 2014.
(HS 2 digit code commodities #15～22, 2014)

Figure 66 Major ASEAN countries' export of food products

There could be many reasons for the lagging processed food exports from Indonesia. However, interviews with food processors revealed the fact that the quality and quantity of standardized agricultural products are not enough for the food processors to compete in the export market, with countries such as Thailand or Philippines, etc.

In addition to Indonesia's poor quality/standardization compared to Thailand, it seems that the productivity of the agricultural inputs are lower than Thailand, which could further reduce the competitiveness of the agricultural inputs and food products produced from these local products..



(Source) FAO-Stat, 2014
(Production (ton)/Plant Area, 2014)

Figure 67 Relative Yield (Indonesia/Thailand)

5.1.2. Current status and challenges of industrial policy on food processing industry

Main Policy Objective

Food self-sufficiency/food security and reducing volatile food price movements is one of the priority issues in the current food policy. This can be observed from the fact that supporting food security is one of the criteria to determine the Priority industry in the Indonesian Medium-Term Development Plan 2015-2019. Moreover, reaching food self−sufficiency and maintaining it at safe levels, containing enough nutritional quality and availability for every household is the main policy objective for food industry stated in the Vision and Mission of RPJPN 2005−2025.

Encouraging the development of manufactured goods and downstream processed food industries to increase exports of less volatile products is considered as the political challenge for the food industrial policy.

Focus of food processing policy

The Master Plan of National Industry Development has selected priority industry groups to be developed in 2015-2035, of which Food industry and Agro-Based Upstream Industry are two industries selected among the ten priority industry groups.

Furthermore, the following are the types of priority industries which are included in the national

priority food industry group are: (i) Fish Processing, (ii) Milk Processing, (iii) Freshener Material, (iv) Vegetable Oil Processing, (v) Fruit & Vegetable Processing, (vi) Flour, and (vii) Sugar Cane Based Industry. Whereas for Agro-Based Upstream industry group are the following: (i) Oleo-Food, (ii) Oleo-Chemical, (iii) Chemurgical, (iv) Cattle Feed, (v) Wood Based, and (vi) Pulp and Paper Industry.

In order to secure food self-sufficiency and price stability, Indonesia has continued to regulate exports of certain commodities on a voluntary basis (voluntary export restraints). For example, obtaining a certificate of origin from the Association of Indonesian Coffee Exporters / Indonesia Coffee Exporters Association (GAEKI) has been a tool to control exports.

5.1.3. Supply chain and value chain analysis

Current status: Supply chain

There are two types of Indonesian processed foods, in terms of global competitiveness. The first type of Indonesian food products are globally competitive products, produced with economies of scale, by large corporations who can control the quality of the whole supply chain, and supplied by imports of high quality ingredients or raw material. For example, Indonesian instant noodles makers are producing the lowest cost and largest amount of instant noodles in the world, despite the fact that Indonesia imports all of the basic raw material, wheat, from overseas to produce flour to produce noodles in Indonesia, not only for the large domestic noodle loving consumer market over 200 million, but also for the export market, in the middle east and African countries, especially for the Halal market in those countries. However, this type of food processing industry is more on the exception, rather than the norm.

The second type of Indonesian processed food lack global competitiveness and are supplied by (low quality) domestic raw materials and the (final) food product is either mostly imported or produced from imported intermediary material. However, most of these imported food/materials are manufactured from agriculture products produced in large volume in Indonesia, mostly by small farmers, collected by different middleman, and exported with limited processing or value adding. For example, Cacao are exported as raw material, and imported back after processed overseas after mixing the Indonesian raw materials with higher quality/flavor foreign raw materials and/or produced under highly controlled factories in foreign countries with economies of scale as intermediary material (couverture) or final products (chocolate).

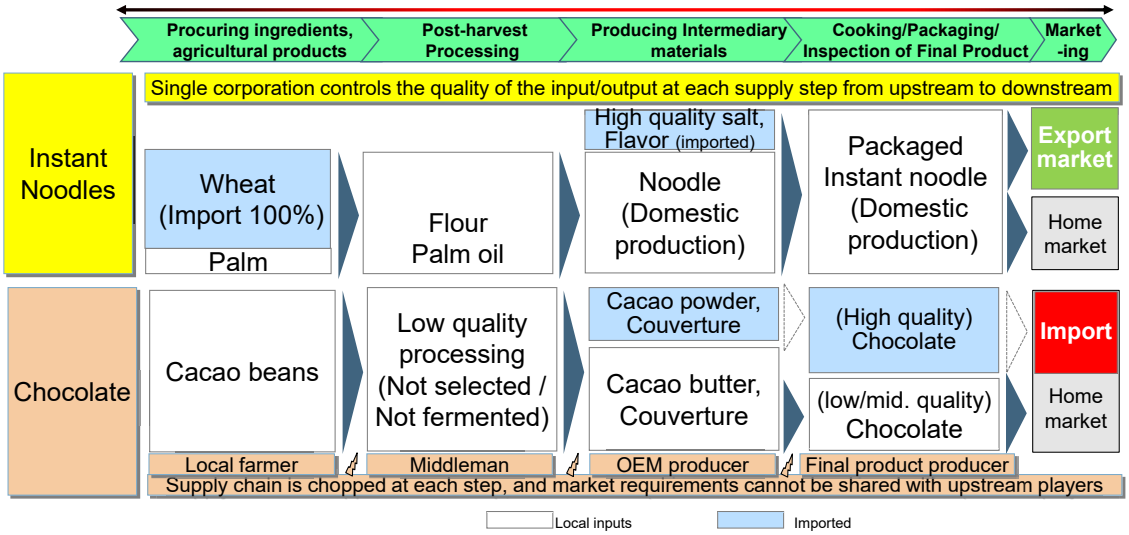


Figure 68 Examples of Supply Chain / Production Process of Indonesia's food industry

There are already large food producing companies in Indonesia, such as Indofood, Garudafood, Mayora Indah, as well as Nestle, Unilever, etc. However, Multinationals in Indonesia are focused on the domestic market, not exports, and large Indonesian food companies have been able to export, but may shift factories abroad, if Indonesia's market condition does not improve, especially in terms of restricted imports of some critical food ingredients such as high quality salt and sugar.

Table 17 Domestic and Foreign Sales of major domestic food processing companies

Name of company	Share pf packaged food in Indonesia (value, 2016)	Sales (Trillion Rp)	in Indonesia	to Foreign	Foreign %	Note
PT Indofood Sukses Makmur Tbk	7.4%	66.8	61.6	5.2	8%	Sales of processed food is 30T.Rp Top ranking export destinations are Saudi Arabia, Vietnam, Nigeria, China, South Korea, The Philippines
PT Nestle Indonesia	4.0%	NA	NA	NA		
PT Frisian Flag Indonesia	3.3%	NA	NA	NA		Subsidiary of Koninklijke FrieslandCampina N.V.
PT Unilever Indonesia Tbk	2.4%	40	38	2	0	Export is only to related parties in foreign countries
Garudafood Group	1.8%	NA	NA	NA		
PT Ceres	1.7%	NA	NA	NA		Formerly subsidiary of Delfi/Petra Foods Ltd., sold to Meiji.
PT Heinz ABC Indonesia	1.7%	NA	NA	NA		
PT Sarihusada Generasi Mahardhika	1.7%	NA	NA	NA		Subsidiary of Danone Baby and Medical Nutrition N.V.
PT Kalbe Farma Tbk	1.6%	8.4	7.8	0.6	7%	Sales and export is counted for only Consumer health & Nutritionals
PT Mayora Indah Tbk	1.5%	18.3	10.1	8.3	45%	Sales comprises of food processing and processing of coffee powder, instant coffee, and cocoa beans. Export is mostly to Asia.
PT Nutricia Indonesia Sejahtera	1.5%	NA	NA	NA		Nutricia is part of Danone
Indolakto PT	1.5%	NA	NA	NA		Was part of Danone, but bought out by Indofood
PT Tiga Pilar Sejahtera Food Tbk (Alam Makmur Sembada	1.4%	3	NA	NA		Export Candy, Instant noodle, Vermicelli, biscuit, etc.
Salim Ivomas Pratama Tbk	1.4%	14.5	13.5	1.0	7%	Sales of Edible oil and fats is 10 T.Rp
Sub total	32.7%	150.6	130.8	17.3	11%	

(Source) Table created by NRI, based on annual reports and data of Euromonitor
(Note) Firms highlighted in yellow are Indonesian food companies.

Non-competitive products are found in many food area, including seafood products. According

to interviews with the food processing industry, the weak competitiveness can be attributed to small scale non-standardized low quality agricultural/marine products, which cannot be used to gain economies of scale and high cost of transportation, including lack of cold chain. For example, pineapple juice would be cheaper to produce and imported from the Philippines, where they have large plantations to produce standardized pineapples, compared to the fragmented pineapple market in Indonesia, where numerous middleman collects unstandardized agricultural products.

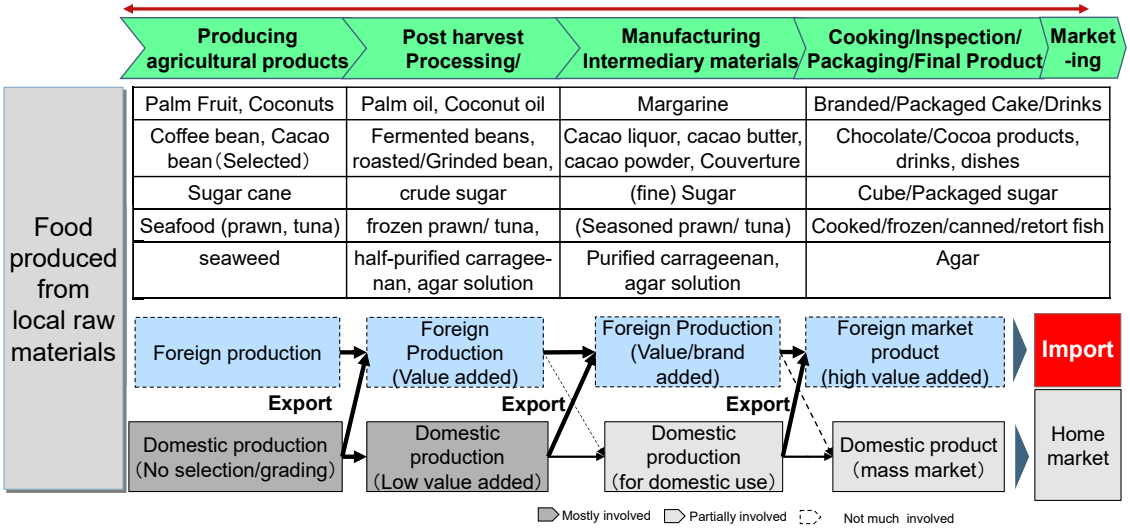


Figure 69 Supply Chain / Production Process of food industry (using raw material produced locally)

Implication from supply chain and value chain analysis

Considering the fact that Indonesia has a large domestic market which consumes large amount of food products, such as noodles, it may be easy for Indonesia's food producers to gain economies of scale, and not having a competitive upstream agricultural sector, per se, would not be a serious challenge. However, if the objective is to expand and to penetrate into a highly competitive global food products market, then the current mode of production will no longer be sufficient.

If food companies, can control the supply chain and the quality of raw materials, and utilize economies of scale in the domestic market, and coordinate with farmers to produce more standardized products, with higher economies of scale and quality, there can be more food products to become further competitive in the export market, while being more able to provide food security through higher efficiency in production/distribution.

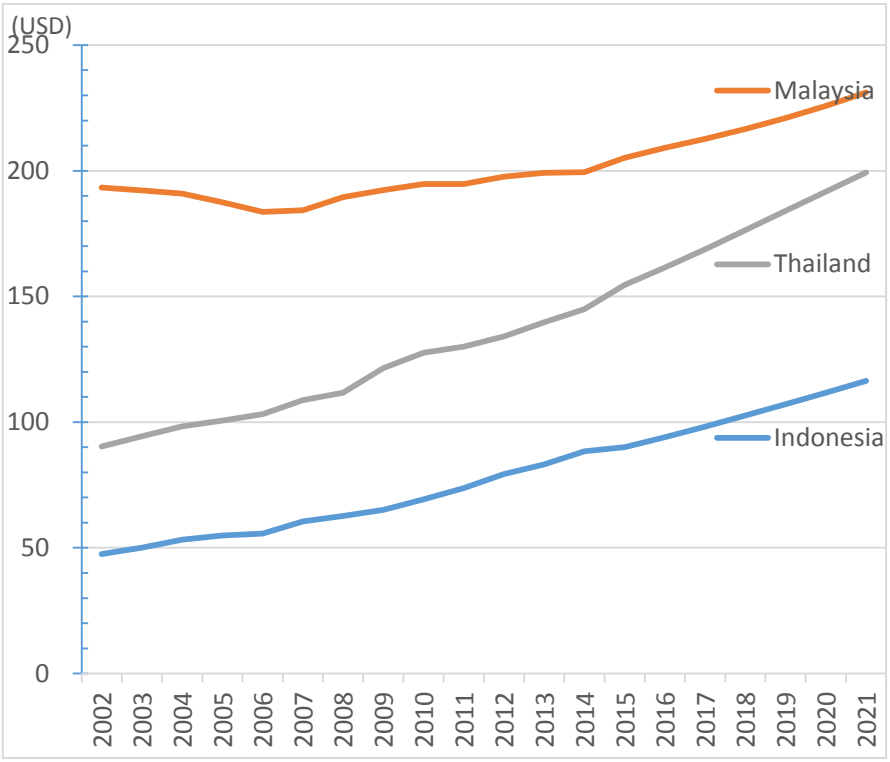
5.2.Potential/constraint

5.2.1. Potential of Food Processing industry in Indonesia

Potential: Growth of Domestic Consumption of packaged and Halal food

Indonesia's domestic sale of packaged food is about 1/2 of Malaysia or Thailand, per capita, but

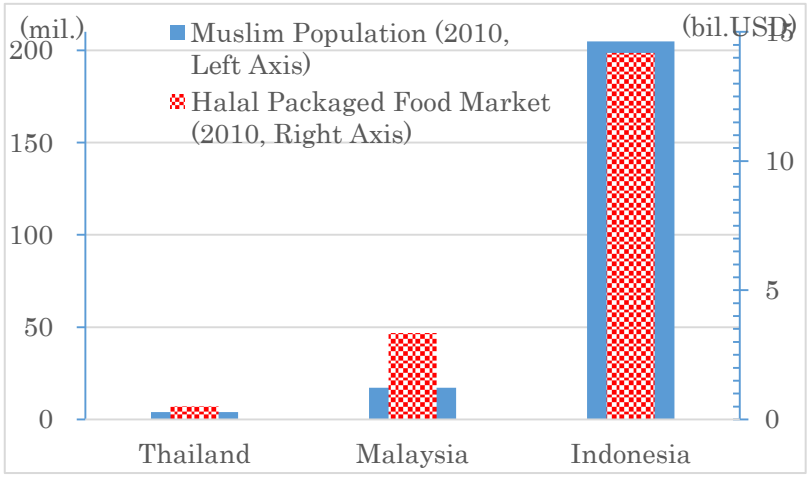
due to the growth of per capita income, the packaged food purchased are able to increase both in terms of volume and quality, and is projected to double within 14 years.



(Source) Graph created by NRI, based on data from Euromonitor

Figure 70 Per Capita Packaged Food Sales

However, the total amount of food consumption by the whole population, especially, Halal food consumption, in Indonesia is about 4 times larger than Malaysia, and 28 times larger than Thailand, due to the large size of Muslim population which amounts to about 200 million. If Indonesia firms can dominate the domestic halal market, Indonesia's food processing industry has a large potential to grow, through economies of scale.



(Source) Graph created by NRI, based on data from Euromonitor and Pew Research Center

Figure 71 Halal Packaged Food Market (2010)

Constraint: Regulations restricting industrial growth

Many restrictions on trade and investment are bottlenecks for the food processing industry to develop a competitive supply chain for the domestic/world food market.

Restrictions on distribution are limiting opportunities for improvement in productivity, innovation and competitiveness in the supply chain from upstream (agriculture) to downstream (retail/export market)

Table 18 Examples of Restrictions prohibiting innovation and growth of Indonesia's food Industry

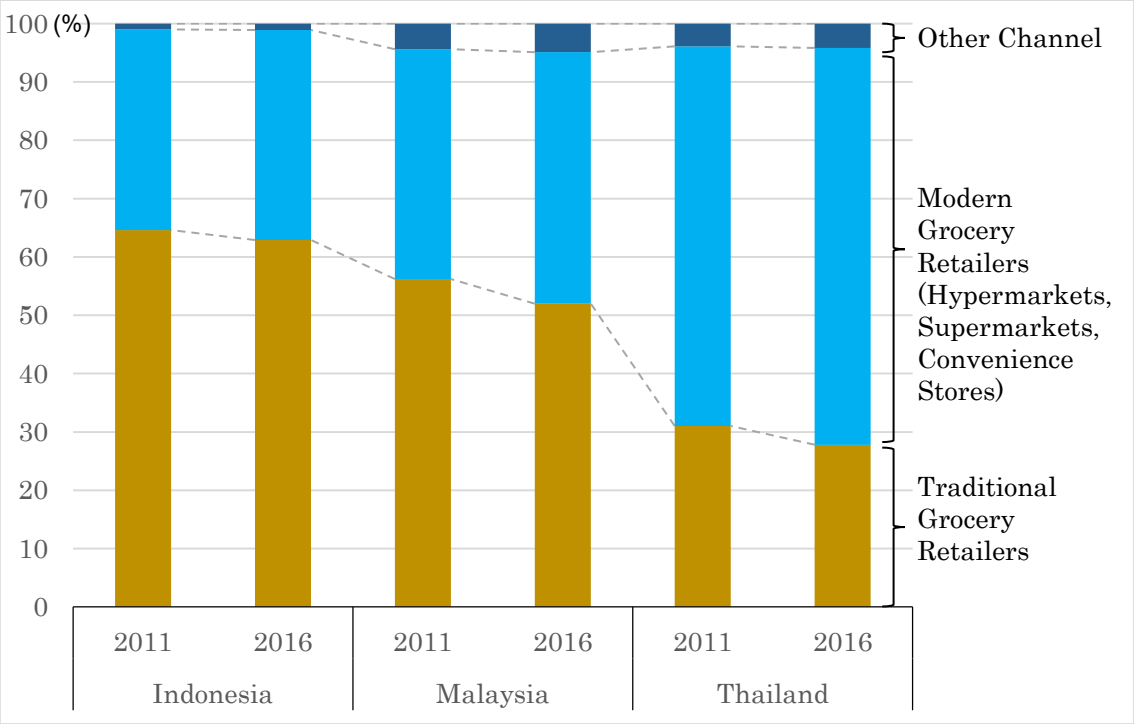
Type of restriction	Sector	Content of Restriction
Foreign Investment to Indonesia	Cacao and Coffee, post-harvest processing	Foreign ownership 95% allowed, but with more than 20% of raw material has to be coming from own plantation.
	Transportation	Only up to 49% ownership is allowed
	Department Store	For floor size 400-2000 ㎡, foreign ownership up to 67% is allowed but within shopping mall.
	Small supermarket (<1200 ㎡), minimarts (<400 ㎡), Convenience store	Foreign investment is not allowed (100% owned by Indonesian)
Import quota	High quality food ingredients (such as 99.9% refined/pure salt, sugar, etc.)	Import quota exists for high quality ingredients (such as 99% salt, sugar, etc.), for industrial use, which limits the production/export of competitive food processed in Indonesia, as domestic refined salt/sugar, etc. cannot match the quality/purity and cost provided by imports.

(Source) Presidential Regulation of the Republic of Indonesia, Number 44 Year 2016, etc.

5.2.2. Challenges and constraints for further development

Development of Distribution Industry

Domestic distribution is migrating to modern trade as rising middle class consumers require more value added/healthier products from efficient/high quality distributors. The large buying power of the modern trade distributors shall enforce competition among Indonesia's suppliers while enhancing governance among productivity and quality control. Therefore, the growth of Modern Trade distributors, shall facilitate the improvement of efficiency and competitiveness of the food processing value chain in Indonesia.



(Source) Graph created by NRI, based on data from Euromonitor

Figure 72 Break down of Distribution Channels for Packaged Food

5.2.3. Challenges from intraregional and extra-regional Competition

Potential & constraint: Trade Liberalization

Market integration will open export opportunities for the globally competitive firms, but will intensify competition within the domestic market.

- Trend to seek liberalization and harmonization of trade and investment regulations shall continue, increasing foreign food manufacturers' access to Indonesia's market and domestic competition.

- If the local manufacturers (and their upstream food material suppliers) cannot improve their value added nor productivity, their ability to reinvest in the supply chain will decrease and eventually, the whole supply chain's competitiveness will decrease further and may eventually, run out of business.

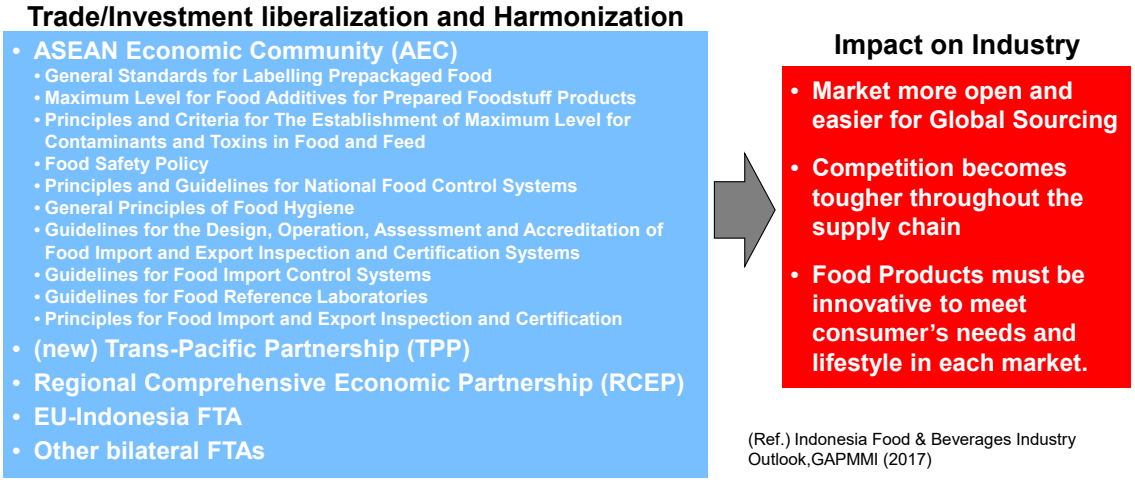


Figure 73 Impact of Trade/Investment liberalization / Harmonization

Challenges: Foreign export drive and investment policy competition

As mentioned before, Indonesia may face challenges of competitions in the region (e.g. Thailand, Malaysia, Philippines, Vietnam, etc.) as well as outside of the region (e.g. China and India), as free trade agreement such as AEC and ASEAN -China Free Trade Agreement will take full effect in the coming years. China may build up huge excess production capacity of food products in the future, which will trigger export drive to neighboring countries, as it happened with other manufacturing products such as steel. Development of India's food industry, including halal export, is also expected in the near future as Indonesia's domestic market expands, and each country will be willing to utilize their agricultural sector to address their domestic unemployment issues.

This regional competition may be a threat to Indonesia due to their strong cost competitiveness and their recent export promotion policy. As shown below, many neighboring countries have been implementing incentives for production investment in general. Malaysia has been promoting their halal food products and have introduced a fast track for halal certification issuance within 3 days. However, multinational foreign firms tend to focus on supplying to the domestic market after their FDI has been completed, as mentioned above. In light of this tendency, Thailand has been implementing an interesting tariff free policy for re-exportation, which shall be discussed in further detail in the next section.

Table 19 Comparison of incentives provided in other countries (in Thailand, China, Vietnam)

Incentives \ Country		Thailand (for business eligible for investment promotion)	China (for business eligible for investment promotion)	Vietnam (for incentive investment sectors)
Tax incentives	corporate tax	Corporate income tax can be exempted 3 years up to 8 years	Corporate income tax ：25%can be reduced to 10%, (various revenue items can be deducted)	Preferential tax rates, duration of entitlement to such rates exist. Investor's losses after tax finalization, can be carried forward up to five years
	import duties	Exemption of import duties on machinery and raw materials used in production for export	Exemption of Import duties on machinery/equipment for own factory	Exemption of import duty on equipment, materials, means of transportation and other goods for project implementation.
Non-tax incentives	Land	Permit to own land (where foreign ownership is prohibited, in general)	(Land cannot be owned by foreign firms)	Cannot own land, but exempted from payment of or a reduction of land rent and land use fees
Government promoters		The Office of the Board of Investment (BOI) is responsible for promoting investment, both into Thailand and overseas.	Government agencies provide country information on macro economy, business investment environment, legal and government system, etc. State owned FIs provide financial support for FDI	Ministry of Planning and Investment (MPI) and（Ministry of Industry and Trade (MOIT) promote FDI

In order to cope with challenges from neighboring countries, Indonesia needs to strengthen cost competitiveness through development of supply chain. As mentioned in supply chain analysis, Indonesia needs to improve the quality and productivity of local agricultural content through investment and cooperation within the whole value chain in order to be globally cost competitive.

As mentioned before, Indonesia, with its large population (over 260 million people) and halal food demand in the ASEAN region has an enormous competitive advantage in terms of potential domestic (halal) food market, as this could be used for economies of scale in food production.

In order to reach and surpass the export level of Thailand's processed food, which is about 16 billion USD, Indonesia needs to more than triple or quadruple their exports, to become the No.1 exporter in the region in terms of processed food.

In order to achieve this goal to become a major player in global food production market, Indonesia should maximize its potentials, while solving challenges/ issues that limit achievement of potentials. Firstly, taking advantage of its large halal domestic market, Indonesia has potential to become export hub of halal food, especially for emerging markets. In other words, Indonesia can increase export through pursuing global economies of scale strategy, focusing on investment and export, as has been the case for Thailand. There are a number of challenges/ issues to achieve its potential, arising from weak supply chain (lack of large scale high productivity local raw material suppliers compared to Thailand and lack of suppliers with specific/high technologies/standardization), missing value chain (lack of local suppliers capability in engineering, quality and productivity), mismatch of human resource (lack of marketing/distribution network), infrastructure bottleneck (to utilize the

agricultural and fishery resources outside of Java island) , and lack of investment incentives (less ease of importing materials/machines and free export) as shown in the figure above. In order to realize its potential, policy program needs to be crafted to promote agglomeration/corporatization of the upstream industry (agriculture and fishery) and strengthen cost competitiveness with higher net local content (value excluding all imported parts / total cost of goods), while at the same time addressing major challenges /issues mentioned above.

5.3.Future vision 2025 and challenges

5.3.1. Reference for Future Food Industry Vision

Thailand's Vision for the Food Industry

Thailand has positioned food processing industry as the key strategic sector for economic development and has coherent policies to become the "world's kitchen". In contrast, Indonesia only has ministry-wise, product-wise and very long term goals, such as the Ministry of Agriculture's long term goal of becoming the major supplier of staple food for the world by 2045. Although Indonesia has a priority to achieve food security/self-sufficiency, we believe that concurrently developing a strategy for globally competitive food value chain would have synergies for the self-sufficiency policy and also for keeping food price affordable, by increasing per capita income (by adding more value to a wide range of products) and reducing price (in line with improvement in productivity). Increasing economies of scale, speeding up productivity investment and R&D for import substitution, are part of the expected synergies which will be needed in the very near future, to face stiffer import competition from FTAs that are coming effective, which could make food competitiveness irreversible, long before 2045.

In order to reach their vision, Thailand has been relatively open to imports of food ingredients. While there are high tariffs applied to imports competing with some of the locally produced products, products can be imported tariff-free if the final product is for re-exportation. This tariff-free policy for raw material and machinery for re-exportation use is one of the striking differences between the Thai and Indonesian food trade policies. Indonesia does not seem to have a coherent free tariff policy for re-exportation to encourage export, while not disturbing the domestic industry which could be under jurisdiction of several ministries (such as, Trade, Agriculture, Marine Affairs and Fishery, Industries). Moreover, the quota and tariff for high quality ingredients (salt, sugar) to be used by food processers for exports, are determined several months in advance, which makes the food processors difficult to adjust to the fluctuating world market. Although the government has assisted the domestic salt and sugar industry to develop refineries which are already producing high quality refined salt and sugar, the products which such government led facilities can currently produce, has

not yet reached the purity level required for export and has not been able to match the price of imported ingredients at such refined level.

Moreover, Thailand provides many types of tax incentives, such as 50% reduction on corporate income tax for limited time, without limiting the beneficiaries' size, with a strategy to enhance FDIs. Indonesia, in contrast, only provides corporate income tax exemption for small firms. Compared to Thailand, Indonesia's tax incentives could have a smaller impact on exempted tax revenue, but it would only limit opportunities for FDIs which have higher level of technology investment and larger employment capacities, with larger tax revenue (after the exemption period). Coordinated/coherent tax policies to enhance productivity investment should also have a synergy effect on the self-sufficiency policy.

Table 20 Comparison of Visions for the Food Industry (Thailand vs Indonesia)

Food Policies \ Country		Thailand	Indonesia (current status)	(Challenges)
Vision/Target		"Kitchen of the World" • world top 5 food exporter • largest exporter of halal • Thailand 4.0 (incl. food)	No coherent cross-ministerial vision to develop a globally competitive food value chain industry (focus on self sufficiency, no synergy with exporting)	Coordinate ministries to catch-up / surpass Thai
Restrictions/Tariffs	Tariffs / quotas / Local Content requirement	Exemption on raw materials & machinery for "export" production	Import of certain high quality ingredients, critical to value added products, is limited by quota / tariff	De-regulation is necessary to unleash the full potential of food product export
	Export tax / Restrictions	None	There are registration requirements and taxes for exporters of certain export items (eg. Coffee)	
	Foreign currency	None	Exchange of more than USD 100,000 per month requires approval from central bank	
Tax Incentives	Corporate Income tax exemption	50% reduction up to 8 years	Only small enterprises are entitled to a 50% discount.	Effective Tax incentives should be provided to enhance investment for productivity
	Deduction on utility costs	Double deduction	None	
	Deduction on infrastructure cost	Allowed for qualified cost (eg. construction)	None	

Thailand's Multi-sector collaboration

(Case)Thai government has been facilitating collaboration with educational and research institutes for the food industry, as below. This type of collaboration among agencies shall be applied in Indonesia

THAILAND FOOD VALLEY Project

- Overview
  - Objective: Facilitate research linkages among Academics, Governments, and Industries for the strategic development of new products truly relevant to market demands
  - Major Roles of Each Linkage:
    - Governments: provide funds, tax incentives, and real estates
    - Academics: provide advanced research and bright students and eventually technology transfer
    - Industries: provide real-world problems, commercialization opportunities, and seed funds
  - Execution & Implementation
    - Initiated by Department of Industrial Promotion (DIP, in MoI) since late 2012, following the approach, widely used in the Netherlands
    - Organization: Government led, infrastructure-wise, working as big committee
    - Regional specialization: Northern (vegetables and processed fruits), North-eastern (meat production), Southern (fisheries, pineapples, coconuts)
- Results
  - More than 120 participating entrepreneurs being enabled to convert research results into commercial success.
  - Innovative agricultural processed food products tagged with "commercially viable" each year. e.g. :
    - Durian drink, Food supplement jelly, Rice diet for fast weight loss, Vegetables mix in tablet form, Powdered wine, Instant pumpkin soup, Rice pies with Thai food ingredient, Rainbow noodles using colourful vegetables, fruits and noodles, Gac fruit sauce rich in β-carotene and lycopene, etc.

Figure 74 Example of Thailand's facilitation of multi-sector (public-private) collaboration

5.3.2. Vision for Indonesia's Future Food Industry

In light of the above advanced vision in Thailand, and the current mid-term goal of food security, Indonesia should envision its own future food processing industry as follows.

Future Vision: To become the largest food processing/ export center in ASEAN

Future vision of food processing industry until 2025 is to upgrade the quality and productivity of the whole food processing value chain, and "become the largest food processing/ export center in ASEAN", not merely for the food security of its nation, but also for the food security of the world.

By developing such large and competitive industry, the food value chain is expected to become one of Indonesia's major source of income from the world, as well as a source to balance its trade and stabilize Rupiah's purchasing power in world trade.

KPI: Triple production, Quadruple export, Quintuple added-value by 2025

The target KPI[3] to achieve the above vision by 2025 is to improve productivity/efficiency and Triple production, Quadruple export to catch up with Thailand, and Quintuple added-value by

[3] These growth figures are in nominal figures (not discounting for inflation) based on data from the Statistical Yearbook of Indonesia (2014, 2017). the annual growth rate of gross output for food and beverage production (excluding palm oil) has been around 17% during 2011-2014. Likewise, growth rate of value added of food and beverage production (excluding palm oil) has been around 28%, during 2011-2014. However, growth of export during 2011-2014 has been only 6.4%, but in order to reach the level of Thailand by 2025, Indonesia needs to stretch their efforts to double their growth rate (to around 12%, from the level of 2014).

upgrading the products and quality of the whole value chain, by 2025.

5.4.Policy scenario

5.4.1. Policy scenario

Indonesia's food products utilizing economies of scale are competitive in global markets. Value-added products will be in greater demand due to the growing middle-income, but will face competition from foreign imports. If Indonesia food processors could take further advantage of their economies of scale from their large domestic market, and improve the value added of the processed food products, Indonesia has a large potential to grow in terms of industrial food production.

Having discussions with the industry participants, three priority challenges emerged which needs to be addressed in order to reach its potentials and overcome the constraints;

1) Accelerate growth of export business based on scale of domestic market

- Import restrictions on key ingredients limits export growth
- Improve quality/productivity/ scale of domestic raw materials

2) Improving the Value Added of Processed Food

- Food standards are not well implemented/enforced
- Product development & investment is not enough to improve quality and productivity
- Develop and deliver higher quality food materials

3) Upgrading the Logistical Infrastructure

- Improve speed, cost and quality (e.g. cold chain, electricity) of logistical infrastructure

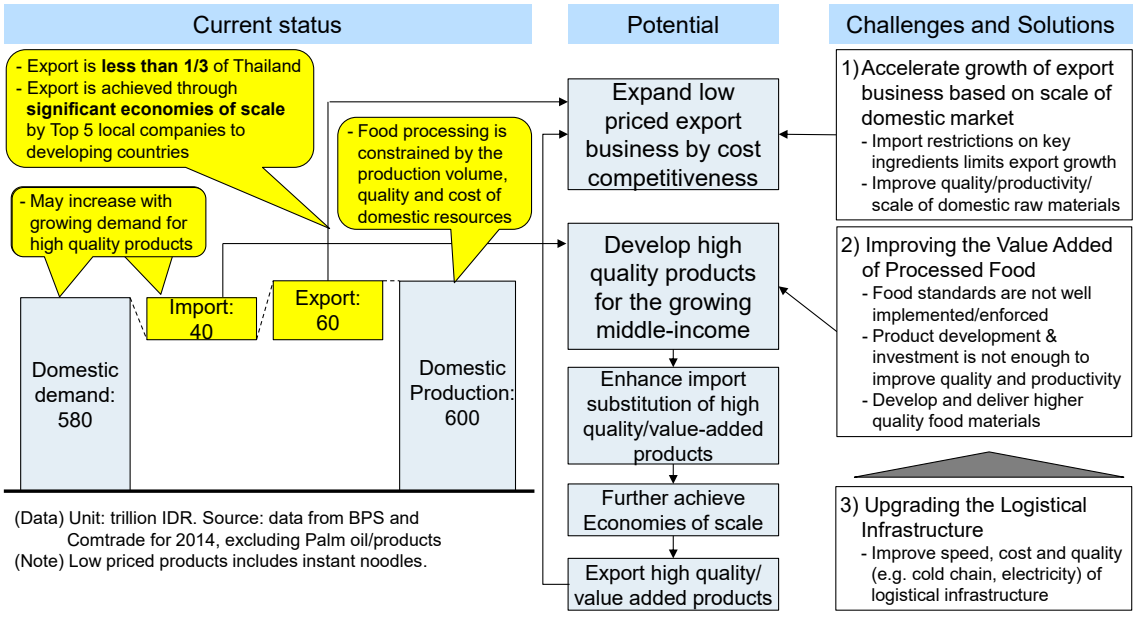


Figure 75 Development scenario for Food Processing/Export Center in ASEAN

5.4.2. Policy program and KPI

The whole picture of policy matrix is shown in the below figure.

Policy Program	KPI	Policy Measures	Implementation steps/actions of the Policy Measure			Ministry In charge:	
			Short Term (2017-19)	Mid Term (2019-21)	Long Term (2022-25)	in charge:	Promoting/Supporting
1) Expanding export business based on advantage from economies of scale	Export amount of processed food (Target: 4 times of the 2014 export by 2025, excl. palm products)	(1) Relax restrictions on import of high quality ingredients that cannot be produced competitively in Indonesia for industrial use	(1)-1:Relax restrictions on the import of high quality ingredients which cannot be produced competiively in Indonesia, but are necessary for export products	Enlarge the scope of repeal on import restrictions	Repeal all related import restrictions gradually in line with progress of competiiveness of ingredients and policy of SC/VC	MOT, MOA	MOI, EKUIN/ BAPPENAS
		(2) Align policies to radically improve quality, value-added and productivity of the raw materials to enhance economies of scale and competitiveness of the whole SC	(2)-1:Establish a joint policy committee to align agricultural and food processing policies for the development of efficient food supply chain.	Decisions on joint policies	Implementation/evaluation/management of the decisions	MOI, MOA, MoMAF	MoI,, EKUIN/ BAPPENAS
			(2)-2:Establish and support pilot projects between farmers, large/middle food processors and foreign distributors, etc. which links the whole SC/VC from upstream to processing and distribution (downstream), facilitated by preferential lending from EXIM bank	Implement agricultural policies which links the whole SC/VC	Implement and evaluate impact of agricultural policies which links the whole SC/VC	MoA、MoMAF	MOI,, EKUIN/ BAPPENAS, MOTP
2) Improving the Value Added of Processed Food	Added-Value of processed food (Target: 5 times of the 2014 added-value by 2025, excl. palm products)	(3) Improve efficiency in the implementation of food standard to reduce time for pre-market food registration and to upgrade national level of food safety	(3)-1:Clarify regulations on approval standards and evaluation time/days in line with international standards.	Increase number of approval institutions and evaluators.	Increase approval evaluators and training.	BPOM/ MORTHE	MoI, EKUIN/ BAPPENAS, MOT,MOA
			(3)-2:Develop financial incentive schemes for R&D/Investment on projects for improving the capacity of BPOM and food processing companies	Implement financial incentives on investment on equipment/ facility for the certification	Evaluate/revise policy measure as necessary	BPOM, MOI, MOF	MoI, EKUIN/ BAPPENAS, BI, MOA
		(4) Facilitate collaborations/matching between food processing companies and large scale distributors/foreign firms, etc. to develop market opportunities (incl. export market) and enhance investment to improve productivity in the whole supply chain	(4)-1:Establish policy coordination taskforce related to the pilot projects and incentive schemes which links the whole SC.	Evaluate/revise policy measure and enlarge scope of projects as necessary.	Roll out as a nation wide program, as necessary.	BKPM, MOT、MOI	MoI, EKUIN, BAPPENAS
			(4)-2:Develop financial incentive schemes for pilot projects' R&D/Investment	Evaluate/revise policy measure and enlarge scope of projects as necessary.	Roll out as a nation wide program, as necessary.	MOF, MOI, MoA, MoT, MoTP	MoI, EKUIN/ BAPPENAS
			(4)-3:Plan for establishing public food research center for food processing SMEs	Establish pubic food research centers outside Java region	Evaluate/revise policy measure as necessary	MOI, MoA, MoMAF, MoRTHE	MoI, MoT, EKUIN, BAPPENAS
		(5) Promote collaboration with foreign entities, who have global value chain, advanced technology and value added products (such as healthy/functional food, etc.)	(5)-1:Develop a database to identify the production product/quality/capacity/needs of medium size farmers/food processors	Share and update information with distributors, exporters, etc. in domestic and foreign markets		MoT, MOI、MoA, MoMAF, BKPM,	MoI/BPS
			(5)-2:Conduct promotion activities and host exhibitions to enhance matching of foreign firms and SME processors	Increase commercial officers at certain embassies	Increase export facilitators in the regions (Establish Indonesian version of JETRO, merge with BPKM, if necessary)	BKPM	MoI, EKUIN/ BAPPENAS, ,MoA, MoT, MoFA
3) Upgrading the Logistical Infrastructure	Long range delivery total cost and time of specific goods (Reduced by 30%)	(6) Develop / streamline logistical infrastructure (maritime/land transportation, sea port facilities, post harvest facilities, etc., especially for long distance, multi-mode, end to end delivery)	(6)-1:Establish policy taskforce for pilot projects of food specific basic infrastructure (Post harvest processing-drying storage, Water pipeline, cold chain logistics,etc.)	Conduct pilot projects to verify the impact of investment and change in policy coordination	Revise/establish necessary decrees/regulations, etc.	MOTP, MoPW, MoT	MOI, EKUIN/ BAPPENAS, MOA、MOP
			(6)-2:Identify the obstacles for improving the delay/cost issues at major logistical routes for the pilot projects	Conduct pilot projects and revise/establish decrees to address the obstacles, as much as possible in the short run.		MOTP, MoPW, MoT	MOI, EKUIN/ BAPPENAS, MOA, MOP, MOI

To address the above issues, the following steering program (0) and 3 policy programs are drafted with KPIs by 2025, which are:

- 0. Policy implementation
- 1. Expanding export business based on advantage of economies of scale
- 2. Improving the Value Added of Processed Food
- 3. Upgrading the Logistical Infrastructure

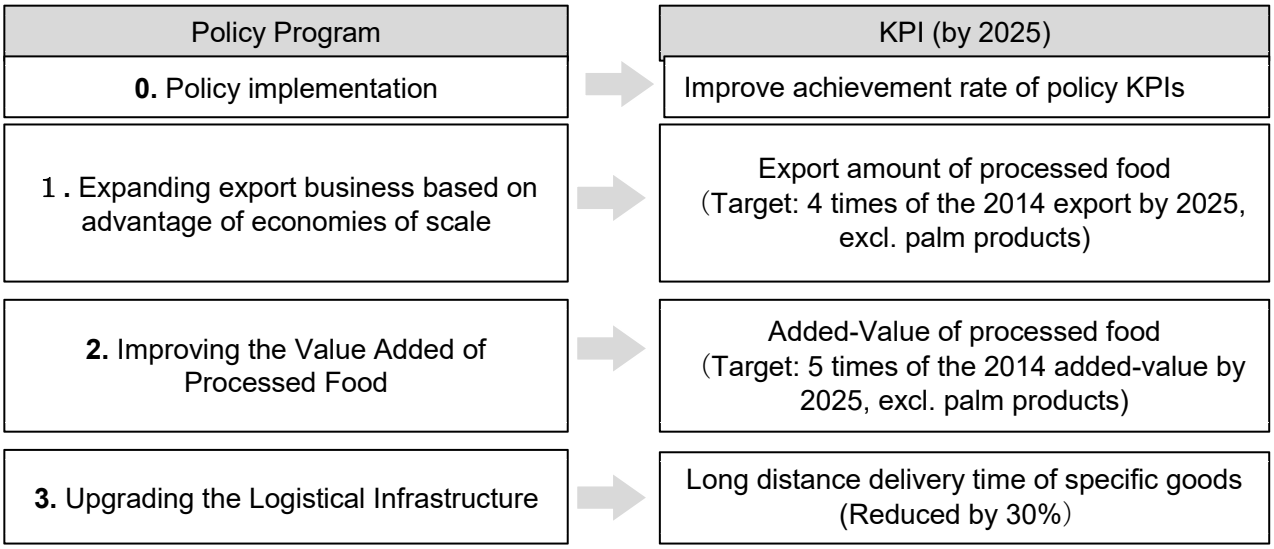


Figure 76 Policy program and KPI

1. Expanding export business based on advantage of economies of scale

Products enjoying economies of scale are globally competitive, but export growth is limited by import restrictions on ingredients, salt, sugar and the quality/productivity of agricultural raw material The enhance faster growth of processed food export, while improving the productivity, quality and competitiveness of the raw material sector and whole SC, there are two policy measure that Indonesia can start to implement:

1. To relax restrictions on impor of high quality ingredients that cannot be produced competitively in Indonesia for food industry: and
2. To align policies to significantly improve quality, value-added and productivity of the raw materials to enhance economies of scale and competitiveness of the whole SC

The KPI could be 4 times of 2014 export by 2025, excluding palm products.

2. Improving the Value Added of Processed Food

Production of many agricultural/ fishery products in Indonesia ranks among the highest in the

world. However, quality and productivity of the agricultural products must be improved, in order for the final product coming out of Indonesia's food supply chain to compete with foreign/import products.

The productivity and the value-added of processed food can be further improved by upgrading the hygiene quality standards and product development functions in Indonesia, as listed below:

1. Enhance efficiency of food standard and halal certification implementation and reduce time for food registration and upgrade level of food safety;
2. Facilitate collaborations/matching between food processing companies and large scale distributors/foreign firms, etc. to conduct R&D&D, develop market opportunities (incl. halal, export) and enhance investment to improve productivity throughout supply chain; and
3. Enhance collaboration/Foreign Direct Investment with foreign entities, for their global value chain and technology for R&D&D of value added products.

The KPI could be set to 5 times of 2014 food products added-value by 2025, excluding palm products

3. Upgrading the Logistical Infrastructure

Sea toll road and other government initiatives to improve logistics have been introduced. However, door to door delivery time and cost of certain processed food are so high that it would be faster and cheaper to produce and deliver certain processed food from nearby countries.

Reducing the time, cost and temperature for transportation in Indonesia may enhance product shelf-life and reduce costs for general consumer. This efficiency can be achieved by developing and streamlining logistical infrastructure which not only include maritime or land transportation, sea port, electricity facilities, but also include post harvest and cold-chain facilities--especially outside Java area. The target is to reduce long distance delivery time of specific goods by 30 percent.

5.4.3. Policy measures to achieve KPIs

(1) Relax restrictions on import of high quality ingredients that cannot be produced competitively in Indonesia for industrial use

The objective is to let export product manufacturer freely decide, and import, the amount and quality of food ingredient needed for their export products, to seize the opportunity of export growth. The immediate focus should be on importers of high quality salt, sugar, flavors, ingredients which are imported for the production of export-oriented food products and which cannot be produced competitively in Indonesia for industrial use. MoI should identifies and make list of import

restrictions which need to be relaxed for the growth of export of processed food, with measures to assure compliance (not for consumer use) in cooperation with Food and Beverages Association (GAPMMI) and Ministry of Trade. The next step would be for MoI to discuss with Ministry of Agriculture (MoA), MoT, CMEA for implementing the gradual repeal of related import restrictions, in line with the progress in competitiveness of ingredients guided by the policies of competitive SC/VC.

(2) Align policies to radically improve quality, value-added and productivity of raw materials to enhance economies of scale and competitiveness of SC

There are two sub-policy measures to address the agenda of this policy measure:

Action (2)-1 Introduce mechanism to align policies for enhancing agriculture and food processing

The objective is to align agricultural and food processing policies for the development of efficient food supply chain which include government's monopoly on distribution of certain goods which will be incorporating competent authorities along the supply chain for food processing and distribution, including the supporting industries, such as MoA, Ministry of Marine and Fisheries (MoMAF), MoT. Coordinating Ministry of Economic Affairs, together with MoI, MoA and MoMAF to set up taskforce to align agricultural and food processing policies to enhance productivity, quality and export and decides on some pilot projects to be promoted of which its progress will be used as the basis for policy alignment to be decided and implemented.

Action (2)-2 Introduce incentive policies to promote business that integrates SC/VC

The objective is to identify obstacles/challenges for developing a globally competitive SC by enhancing efficient production, distribution and pricing along the SC through the implementation of pilot projects. The targeted pilot projects/participants should be producers, processors and distributors of world ranking raw agricultural products (cocoa, coffee, mango, etc.)

(3) Enhance efficiency of food standard implementation to reduce time for pre-market food registration and to upgrade national level of food safety

There are two sub-policy measures to address the agenda of this policy measure:

Action (3)-1 Clarify regulations on approval standards and evaluation

The objective is to speed up product approval for food registration to enhance R&D&D and increase value added with National Food and Drug Agency (BPOM) as the focus agency.

There are three suggested agendas which are as follows: **(i) Clarifying required documents and**

approval standards to be in line with international standards. Especially, clarify, announce and monitor maximum registration time (e.g. 3 months from application), better data submission process and simplifying documents and procedures, **(ii) Increasing number of approval institutions and evaluators** for pre- and post-market food testing, and (iii) **Increasing approval evaluators and training to ensure quality of processed food.**

Action (3)-2 Enhance Implementation of Food Standards

The objective is to enhance national level of hygiene quality of food through the investment in testing equipment in large and medium size food processing firms in order for them to meet higher standard and criteria. It can be implemented through developing financial incentive scheme for investment on R&D/testing projects at food processing companies. One option is through the provision of tax incentive or "Policy bank" loan for investing in equipment / facilities to qualify for international standards, such as ISO22000/HACCP. In addition to that, **m**onitoring and evaluation of the implementation of such scheme is important to ensure the achievement of the higher quality food products.

(4) Facilitate collaborations/ matching between food processing companies and large scale distributors/foreign firms, etc. to conduct R&D&D, develop market opportunities, (incl. halal, export) and enhance investment to improve productivity throughout supply chain

There are three sub-policy measures to address the agenda of this policy measure:

Action (4)-1 Set up taskforce for food SC linkage

The objective is to align policies (agricultural, distribution, transportation, food processing, and trade) to enhance development of efficient and coordinated food supply chains for domestic and export market. The target entity of this sub-measure is large scale end buyer (foreign buyer, domestic exporter, modern trade retailer, conglomerate, etc.) as well as local medium and large food processing company and local small and medium size raw material producer.

Establish policy coordination taskforce for setting up pilot projects and incentive programs to strengthen R&D&D and productivity by linking the whole food processing SC. Advertise and enlist volunteers willing to conduct pilot projects where the large scale buyer specifies the conditions of the food product and the food processing company specifies the required conditions on raw material and the raw material producers in the region work together with the processing company to find the ways to deliver the required product. Establish policies and incentives (including financial incentives) to strengthen R&DD and productivity, by linking the whole SC.

Action (4)-2 Enhance R&D&D by financial incentives

The objective is to improve productivity by way of increasing capacity and technology aspect in the whole supply chain through investment in R&D&D, and necessary technology/equipment upgrades. Target entity is large scale end buyer (foreign buyer, domestic exporter, modern trade retailer, conglomerate, etc.), and local food processing company (large/medium size), local raw material producer (medium/small size Farmers, fishermen, etc.). This can be done by developing and implementing fiscal/financial incentives for R&D&D investment on the pilot projects. Nationwide rollout program will be done commensurate on the progress of the pilot project.

Action (4)-3 Enhance food research for food processing SMEs

The objective is to facilitate research linkages among Academics, Governments, and Industries (from upstream to downstream) for the strategic development of new products using/improving local raw material, local production and addressing needs of growing middle class. The target entities are small and medium size local food processing company, local raw material producer (farmers and fishermen) and large scale end buyer (not processer; foreign buyer, domestic exporter, modern trade retailer and conglomerate.)

(5) Enhance collaboration/Foreign Direct Investment with foreign entities, for their global value chain and technology for R&D&D of value added products

There are two sub-policy measures to address the agenda of this policy measure:

Action (5)-1 Develop database to identify capacity & needs of farmers/processors

The objective is to develop a platform to enhance business matching and development of global supply chains for all entities in Indonesia's food processing supply chain. This will connect farmers and small size processors and to put it on a visible platform to medium and large size raw material producers/food processing company as well as foreign business entities, especially one who have global value chain, advanced technology and high value added products (such as healthy/functional food, etc.). The activities are to design content of Data Base (DB) that identify the production product/quality/capacity/needs of medium size farmers/food processors and to develop methodology of information gathering and maintenance of the access to the DB. This DB will be shared and updated all the information with domestic and foreign markets.

Action (5)-2 Conduct promotion/exhibitions to further enhance FDI in food processing

The objective is to enhance business matching and development of global supply chains for all entities (including SME processors) in Indonesia's food processing supply chain. The activities are

to conduct promotion activities and host exhibitions in domestic and foreign markets, utilizing and updating the DB, to enhance foreign entry in line with BKPM/MoT's on going activities. International exhibitions shall enhance the opportunity and necessity to improve the packaging capacity (i.e., upgrading the design and functionality of the package; food preservation, etc.) of Indonesian food manufacturers, which can appeal to the foreign market.

Especially, focus on matching to produce healthy/functional food, etc. in Indonesia. This can be done by **s**haring and updating information in the DB and exhibitions with domestic and foreign markets through the commercial officers as well as promoting participation in the exhibitions. Institutional improvement on export facilitators (MoT-DG of National Export Development) is also very important to the success of the initiatives.

(6) Develop / streamline logistical infrastructure (maritime / land transportation, sea port facilities, post-harvest facilities, cold-chain, etc. especially outside Java)

There are two sub-policy measures to address the agenda of this policy measure:

Action (6)-1 Coordinate policies for food logistics

The objective is to improve productivity of the supply chain by reduction in delivery time, cost and loss by policy coordination. The target entities are transportation, public works and cold-chain infrastructure for the logistics and water supply for food processing supply chain. This can be done by setting up policy taskforce for improving food specific basic infrastructure and setting up and prioritizing major logistical route to experiment as pilot projects to verify the impact of investment in the logistic. Continuing deregulation to address the obstacles for the long run (including rules/standards for cold chain logistics, as required by the industry) is also important.

Action (6)-2 Improve efficiency in the major logistical routes through social experiments

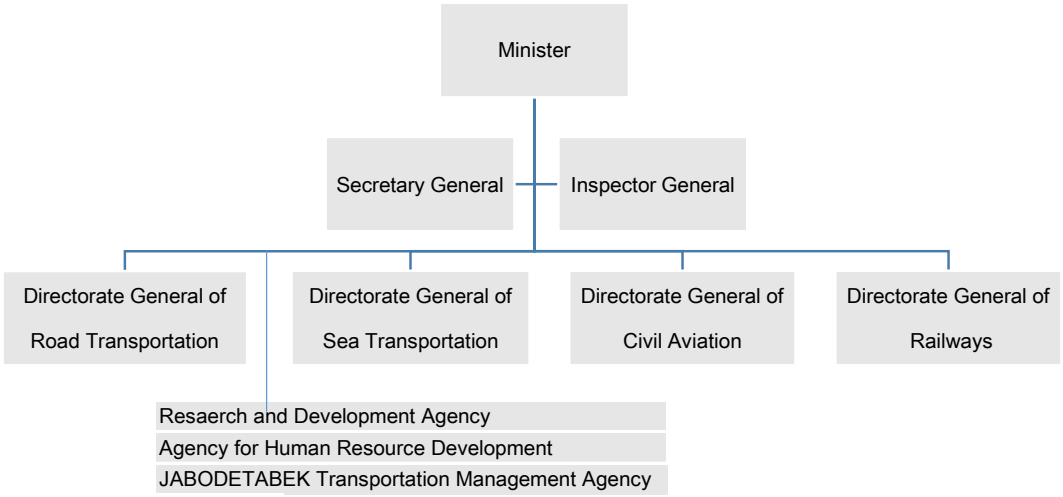
The objective is to improve productivity of the supply chain by reduction in delivery time, cost and loss, by verification through establishment of alternative logistic route scenario. The targeted entities are transportation, public works for the logistics and water supply for food processing SC along the major logistical routes selected as pilot projects by the policy taskforce.

6. Infrastructure and Logistics

6.1. Infrastructure Development Planning Framework

6.1.1. Institutions

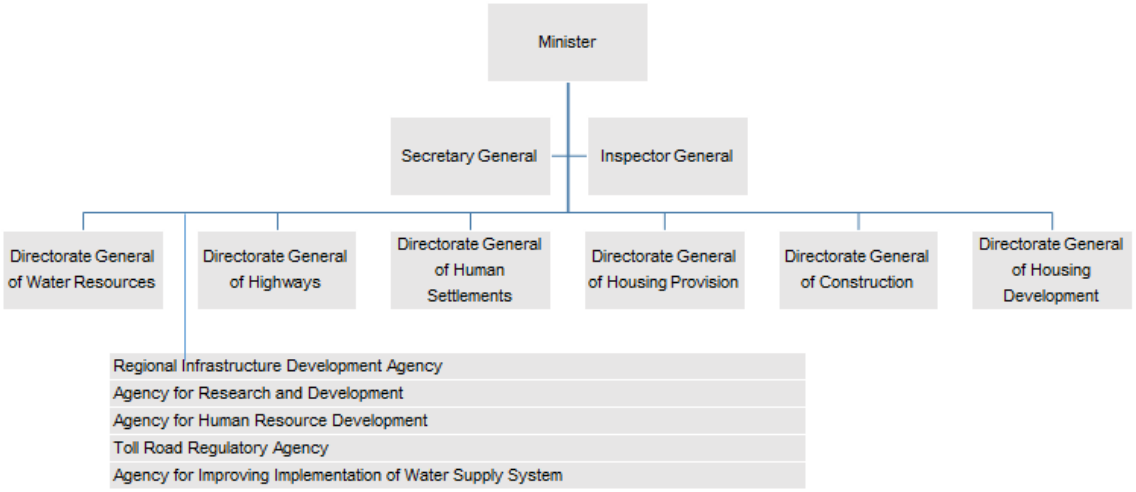
As national government bodies, the Ministry of Transportation (MOTr) and Ministry of Public Works and Housing (MPWH) handle the infrastructure and logistics. As shown in the Figures, MOTr consists of General Directorates by transport modes, namely road, sea, air and railway.



Source: MOTr.

Figure 77 MOTr Organization Chart

MPWH consists of General Directorates of Water Resources, Road Construction, Housing Provisions etc. The main duties in infrastructure and logistics are water supply, road construction and regional planning.



Source: MPWH.

Figure 78 MPWH Organization Chart

6.1.2. Infrastructure Development Plans

Based on the medium and long term National Development Plans, each ministry prepares corresponding Medium-Term Plans (RENSTRA) and Implementation Plans (RENJA). In addition, some plans are prepared by ad-hoc basis, e.g. MOTr prepared "National Transport System Plan (*SISTRANS*)" to meet the regional needs and to harmonize transport modes. The MPWH made "National Toll Road Development Plan" in 2006 to support economic activities by free and toll road maintenance and development.

6.2.Current Situation and Issues in Infrastructure and Logistics

6.2.1. Roads

Overview

General Directorate of Roads under MPWH administrates National Roads. Provinces and Municipalities administrate respective road category. The next Table shows the total length of road by area and category.

Table 21 Road Classification by Region

Unit: km

Region	National	Province	Municipality	Total
Sumatra	13,710	17,417	153,730	184,857
Java	6,534	14,409	92,520	113,463
Lesser Sunda Islands	3,422	3,965	30,416	37,803
Kalimantan	7,620	6,054	49,894	63,568
Sulawesi	8,793	5,728	68,541	83,062
Maluku	2,975	2,575	10,132	15,682
New Guinea	3,963	5,268	18,747	27,978
Total	47,017	55,416	423,980	526,413

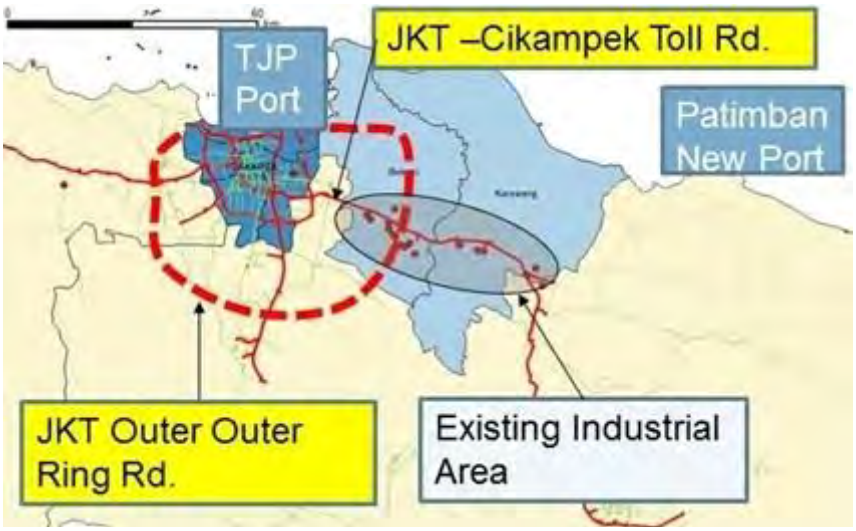
Source: Statistical Yearbook of Indonesia 2017.

Highways

The highways have been constructed by public expenditure and private concession. Their operations such as toll collection are conducted by private companies including state owned enterprises. Then, each section of highway has toll booth.

Jakarta urban area has two major toll ring roads (Jakarta Inner Ring Road (JIRR) and Jakarta Outer Ring Road (JORR 65.km)) and several radial routes (Figure below).

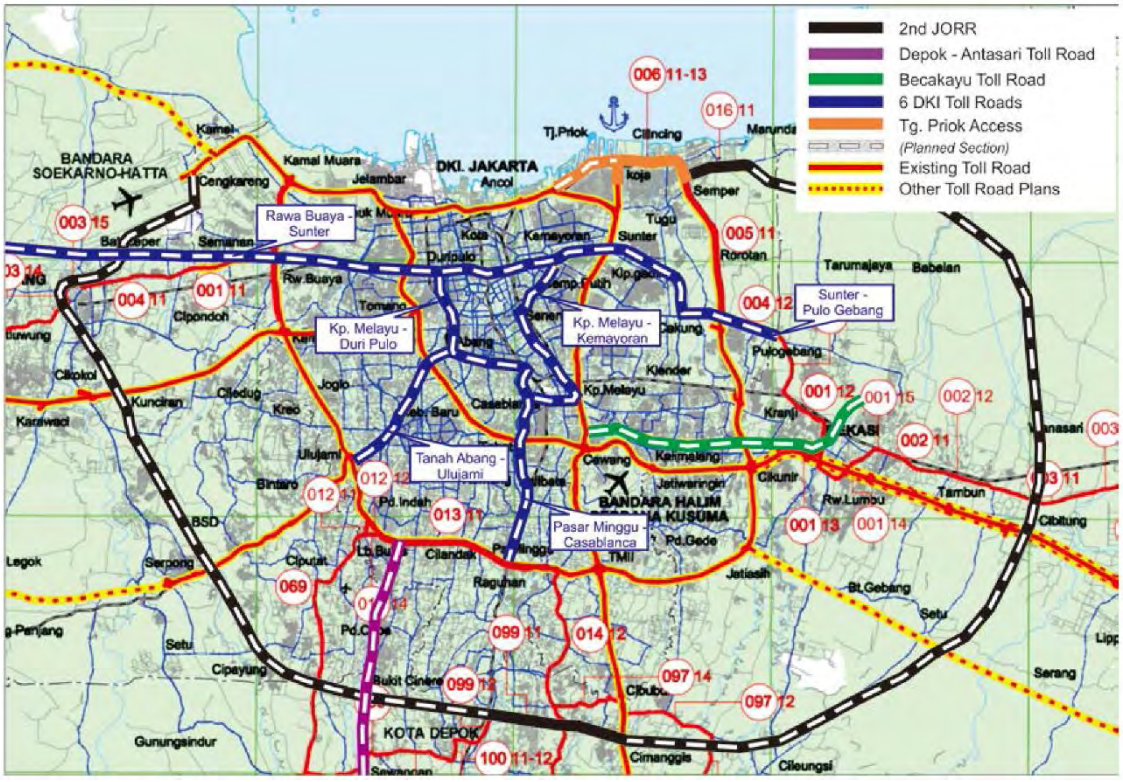
In addition, the Jakarta Outer Outer Ring Road (JOORR), also called as Second Jakarta Outer Ring Road (JORR-2), is currently under construction. The 9.2km southern section of JORR-2 is currently in service.



Source: JICA Survey Team

Figure 79 Location of Major Highways and Industrial Area

Jakarta – Cikampek Toll Road connects Jakarta and industrial estates in Bekasi and Karawang. This is important routes for industries but the traffic volume on it are progressively increasing and is congested seriously (Figure above and next Table). Consequently, the congestion negatively influences the productivity of whole industries in the area.



Source: ALMEC Corporation.

Figure 80 Highways in Jakarta Urban Area

Table 22 Traffic Volume on Some Highway Sections in Jakarta

Unit: 1,000 vehicle

Highway Section	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jakarta - Cikampek	123,250	125,104	132,603	176,352	194,875	201,598	205,465	214,982	220,939	205,481
JIRR	174,947	180,751	188,271	196,628	205,405	207,634	205,959	208,108	294,365	300,809
JORR	105,985	112,542	119,392	131,078	139,931	145,747	150,575	157,887	151,517	193,163

Source: Jasamarga

Trans Java Highway

Trans Java Highway is a national project of 1,167km Highway connecting Java Island transversally. The highway has started as stretches from major urban areas such as Semarang and Surabaya. Since 2000s, the Government introduce concession scheme by private fund and construction work had been made (Figure below. However, some concessionaires abandoned the construction in fear of low profitability and fund shortage and state and transferred the scheme to owned construction companies.

At the end of the year 2017, the 562km section is in use and 606km is under construction. The full completion is expected in 2019.

Figure 81 Trans Java Highway Network.

6.2.2. Railway

Overview

The Directorate General of Railways of MOTr administrates the railway matters and Indonesian Railway Company (PT. Kereta Api Indonesia: KAI) operates existing railways. The Government owns 100% of KAI stock and railroad tracks. KAI has rolling stocks and station buildings and maintains the railroad tracks. Consequently, the railway system is vertically separated.

Railway Network

Major railway routes are as follows:

Sumatra Island －Medan ～ Rantauprapat —Padang ～Pariaman —Bandar Lampung ～Lubuklinggau and Palembang,
Java Island —Jakarta～Cirebon～Semarang～Surabaya —Jakarta～Bandung～Yogyakarta～Surabaya～Malang～Banyuwangi
Total business line 4,684km

Source: KAI.

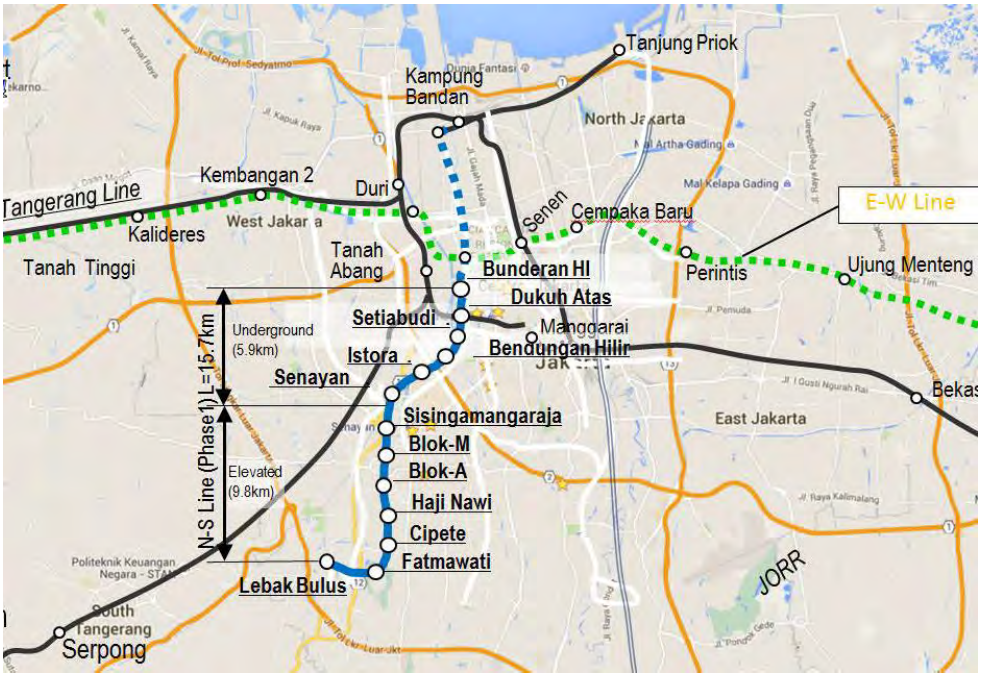
Figure 82 Railway Network on Java Island

Urban Railway Network

Indonesia Commuter Railway Company (*PT Kereta Commuter Indonesia*) is operating urban commuter trains as KRL JABODETABEK in Jakarta on the same railroad track as KAI.

There are other urban railways in Jakarta as follows:

(i) Mass Rapid Transit MRT (Under construction): The Phase I of North-South Line has been put in service in March 2019. JICA finances the Project. Feasibility Study for East-West Line is in progress.



Source: PT. Mass Rapid Transit (MRT) Jakarta.

Figure 83 Jakarta MRT Routes

(ii) Light Rail Transit: LRT(Under construction) : Two routes are under construction by private sector. DKI Jakarta plans other 7 routes.

(iii) Railink (Soekarno-Hatta Airport Link): Most section is shared with the commuter line track. It has been in service since December 2017. Total length is 36 km long. The Railink Company (PT. Railink. A subsidiary of KAI) operates the line.

Outside of Jakarta, Medan Railink (Medan Airport Line) is operational. The Government also forecasts the almost additional ten urban railway project including Light Rail Transit (LRT) will be operational within several years.

Cargo Transportation

KALOG (Kereta Api Logistics) Company, a subsidiary of KAI, operates almost all freight transportation on rail. The company does the business in the following areas:

(i) Coal transportation (mostly in Sumatra Island)

(ii) General cargo transportation (11 scheduled routes)

(iii) Container transportation (4 scheduled routes. Table below.)

(iv) Parcel transportation (8 scheduled routes. Cargo wagon is attached with passenger train)

Especially, the container train has sufficient capacity of 30 wagons and each wagon has 40 ft. long. The 13.5 scheduled container trains weekly connect Jakarta (Sungai Lagoa Station) and Surabaya (Kalimas Station) in 18 hours.

Table 23 Schedule Container Trains

Name	Terminal		TEU Capacity/ Train	Time (hour)	Frequency
KALOG1	Jakarta (Sungai Lagoa)	Surabaya (Kalimas)	60	18	Every day/Direction
KALOG2	Jakarta (Sungai Lagoa)	Surabaya (Kalimas)	60	18	3 times / Week/ Direction
KALOG5	Jakarta (Gudang)	Surabaya (Kalimas)	60	18	Every 2 days / Direction
KALOG JICT	Jakarta (JICT)	Chakarang Dry Port	60	2	Every day/ Direction

Note: JICT: Jakarta International Container Terminal.

Source: KALOG.

Table 24 Freight Volume on Rail

	Year	2012	2013	2014	2015	2016
Indicator	Unit					
Ton	1,000	23,619	26,755	33,460	32,034	35,304
Ton-km	1,000,000	6,951	8,190	9,883	10,057	11,120
Average distance of freight tranported	km	294	306	295	314	315

Source: Statistical Yearbook of Indonesia 2017.

The total cargo volume is gradually increasing and is 35.3 million ton and 11.1 billion ton km in 2016. This means the average length of transportation is 315km and the railway is more preferred than road transportation.

However, the container tariff on railway and double handling[4] cost made container transport on railway less attractive than container transport on truck.

6.2.3. Sea Transportation

Overview

General Directorate of Sea Transportation of MOTr administrates sea transportation and port matters. Under the Directorate, Indonesia Port Corporation (IPC. State Owned Enterprise. *PT Pelabuhan Indonesia: PELINDO*) operate some major port. IPC is divided from I to IV and IPC II operates Tanjung Priok Port in Jakarta.

[4] Loading and unloading operation at the both terminal stations.

Table 25 Port Classification

Port Management Body	Operators	Number of Ports	Port Classification	
			International	Local
Public Ports 1.Commercial Port 2. Non Commercial Port	 Indonesia Port Corporation Government Unit	 112 544	 72 8	 40 536
Special Ports	Private Sector -Industry -Mining -Fishery -Agriculture -Tourism etc.	1,233	51	1,182
Total		1,889	131	1,758

Source: MOTr.

Table 26 Loaded and Unloaded Cargos by Region and Type

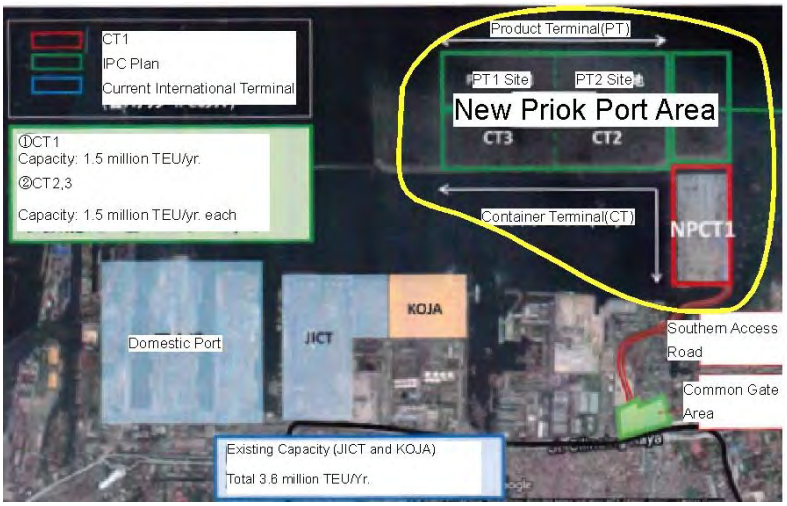
Unit: ton

Region	Domestic		International	
	Unloaded	Loaded	Unloaded	Loaded
Sumatra	47,634,776	58,879,214	14,627,410	35,326,248
Java	117,482,863	47,881,056	62,409,218	9,984,977
Lesser Sunda Islands	8,456,296	3,605,115	1,237,021	1,127,141
Kalimantan	93,515,635	162,796,739	16,501,411	288,790,373
Sulawesi	19,190,601	14,314,495	3,662,924	3,408,860
Maluku	2,760,045	3,787,474	0	0
New Guinea	7,295,406	3,045,347	420,451	1,363,310
Total	296,335,622	294,309,440	98,858,435	340,000,909

Source: Statistical Yearbook of Indonesia 2017.

Tanjung Priok Port

Located in the northern part of Jakarta, Tanjung Priok Port consists of 8 terminals as follows: (i) Jakarta International Container Terminal (JICT) T1, (ii) JICT T2, (iii) Koja Container Terminal, (iv) Tangguh Samudera Jaya (TSJ), (v) Koja, (vi) Multi Terminal Indonesia (MTI), (vii) Mustika Alam Lestari (MAL), and (viii) New Priok Container Terminal (NPCT) 1



Source: NPCT1 and JICA Survey Team

Figure 84 Tanjung Priok Port Layout

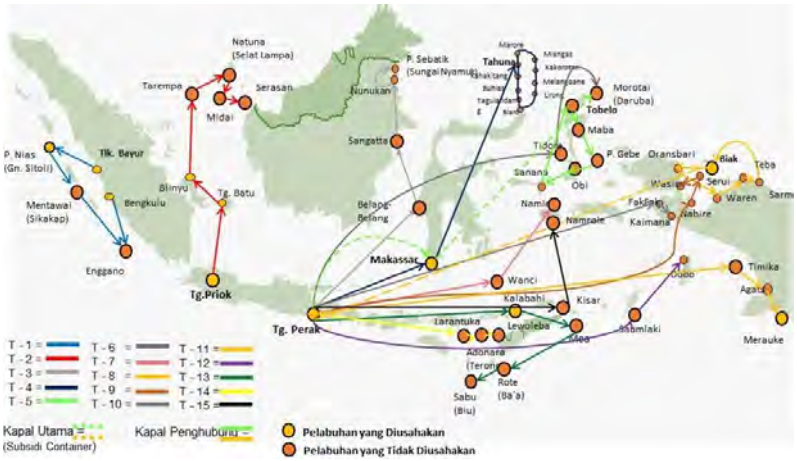
Among these, the NPCT 1 became operational since 2017 by a PPP scheme by Mitsui and Company Limited and Nippon Yusen Kaisha. With this new terminal addition, the container handling capacity increased from 3.5million TEU (Twenty Foot Equivalent Unit)/year to 5.1 million TEU /year.

Patimban Port

Located 120 km east from Jakarta, the Patimban Port Project is in progress with JICA's financial support. The project includes container terminal (final capacity 7.5 million TEU/ year), automotive terminal, and access road improvement. With the port completion, certain part of cargo in Tanjung Priok is expected to transfer to Patimban Port and current traffic congestion is to be mitigated.

Sea Toll Road Program

MOTr launched Sea Toll Road Program to mitigate the economic gap between Java Island and other areas by subsidizing cargo tariff on specific routes. MOTr has 15 routes of Sea Toll Road Program at present.



Source: MOTr.

Figure 85Current 15 Routes of Sea Toll Road Program

6.2.4. Civil Aviation

Overview

General Directorate of Civil Aviation of DOT administrates civil aviation and airport matters. There are 296 airports in Indonesia. All airports are classified by Airport Operating Certificates (AOC) in Indonesia (Table below). Among them, 28 airports among them are international and 56 airports have runways with length of 2001m~3000m and 4 airports have runway longer than 3001m. PT Angkasa Pura (I-II) and other state – owned companies are engaged in actual airport operation.

Table 27 Airport Classification

Classification	Number
Class I, IA, IB	34
Class II, IIA, IIB	24
Class III, IIIB, IIIC	120
Class IV	1
Class V	1
Others/ Unclassified	116
Total	296

Source: MOTr.

Some low wetland area such as in Kalimantan has not established sufficient road network within island and it requires air transportation for daily living goods transportation.

Airlines

Various Low Cost Carriers (LCC) joined the domestic market and 14 airlines are operating domestic scheduled flight.

Table 28 Airlines operating scheduled domestic flights (2017)

Name	IATA/ICAO	Registered Aircrafts
Garuda Indonesia	GA/GIA	85
Indonesia AirAsia	QZ/AWQ	23
Lion Mentari Airlines	JT/LNI	93
Wings Abadi Airlines	IW/WON	30
Sriwijaya Air	SJ/SJY	40
Kal Star Aviation	KD/KLS	4
Travel Express Aviation	XN/XAR	12
Citilink Indonesia	QG/CTV	20
Transnusa Aviation Mandiri	M8/TNU	4
Batik Air Indonesia	ID/BTK	n/a
Asi Pudjiastuti Aviation	---	n/a
Aviastar Mandiri	MV/VIT	n/a
Sky Aviation	SY/ SSY	n/a

Note: IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
Source：MOTr.

In addition, three airlines are operating scheduled domestic cargo flights.

Table 29 Airlines operating scheduled domestic cargo flights (2017)

Name	IATA/ICAO	Registered Aircrafts
Cardig Air	8F/CAD	3
Tri-Mg Intra Asia Airlines	QY/TMG	4
My Indo Airlines	2Y/MY	3

Source: MOTr.

Air Transportation

The air transportation is increasing significantly as next two Tables. Number of domestic passengers grew at 5.8 % annually from 2012 to 2016.

Table 30 Domestic Air Transportation

Description	Unit	2012	2013	2014	2015	2016
Aircraft km	1,000	555,748	457,301	524,978	500,324	568,767
Aircraft departure	times	614,712	638,011	636,436	659,091	764,156
Passenger carried	1,000 person	71,421	75,770	76,498	76,628	89,358
Passenger-km	1,000 person-km	69,235	62,096	67,404	65,171	73,894
Freight Carried	ton	571,668	539,257	584,571	564,048	604,209
Freight Carried	ton-km	11,832,444	5,542,218	6,040,023	5,940,621	6,495,651

Source: Statistical Yearbook of Indonesia 2017.

Although passeger volume is growing rapidly, the freigth volume is stable. The growth of highway network may be substituting air freight transportation within Java Island.

Table 31 International Air Transportation

Description	Unit	2012	2013	2014	2015	2016
Aircraft km	1,000	138,721	160,242	158,434	144,604	161,986
Aircraft departure	times	69,946	82,966	77,972	70,357	71,787
Passenger carried	1,000 person	9,938	10,965	10,252	9,534	10,377
Passenger-km	1,000 person-km	23,264	24,443	23,859	23,293	27,924
Freight Carried	ton	90,692	110,512	117,902	87,067	111,595
Freight Carried	ton-km	12,028,236	2,692,298	2,680,833	2,568,531	3,124,130

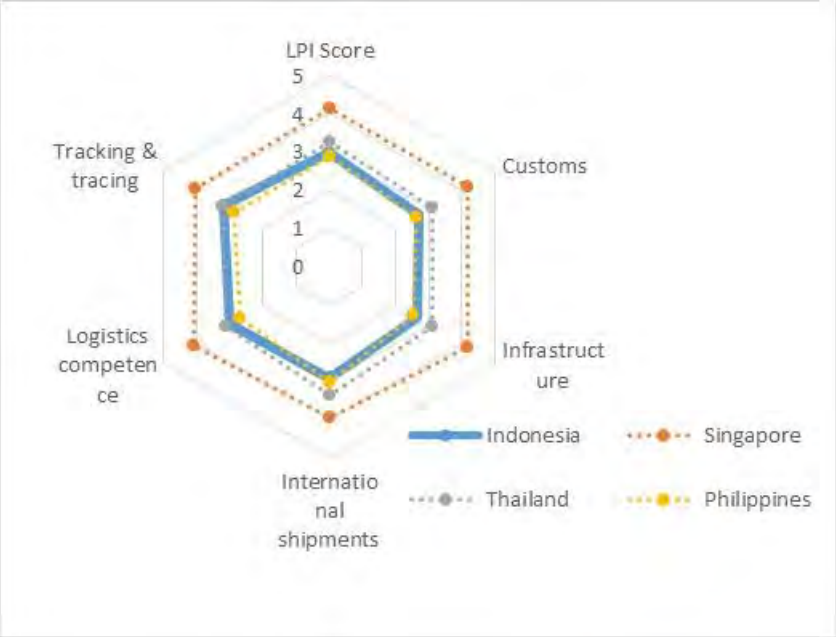
Source: Statistical Yearbook of Indonesia 2017.

The international freight volume is fluctuating by year. It seems the domestic economic conditions are influencing the volume.

6.2.5. Logistics

Overview

As shown above, the transportation administration is governed by each mode. Since 2010s, the World Bank-advocated Logistics Performance Indicator (LPI) has been prepared and published and various policy and program have been made.



Source: World Bank LPI Homepage.

Figure 86 Logistics Performance Index (2016) of Indonesia and Other ASEAN Countries

In this context, "Blueprint of National Logistic System Development (SISLOGNAS)" was approved in March 2012. The concept was included in MP3EI and the connectivity of Six Mega Economic Corridor were emphasized.

Although these concept and plans have been made, the national administration is based on transportation mode as ever.

Issues in Logistics

The Survey Team identified the following issues:

Institutional Aspects:

- The Government administration is by mode and the inter-modal link is relatively weak.
- Some government bodies are working both as regulator and operator.
- Custom clearance takes time and the rules are changing frequently without clear announcement.

Physical Aspects:

- Industrial agglomeration is concentrated in eastern part (Bekasi and Karawang) of Jakarta. Consequently, it causes severe traffic jam on Jakarta – Cikampek Toll Road.
- All cargoes are concentrated in Tanjung Priok Port. Dwelling time (staying time) of containers at the port is long and it became controversial.

- Land transport depends on trucks. Some long distance container transport can be shifted to railway transport.
- Dry Ports at Chikarang (Bekasi Province) and Gedebage (Bandung City) are underutilization.
- Intercity highway is not well developed.
- Cold chain is not well developed. Some area cannot utilize reefers.

6.3. Tentative Policy Action Idea in Infrastructure and Logistics

6.3.1. Concept

Based on the policy and programs of three industrial sectors and existing situation of infrastructure and logistics above, the Policy Actions in this sector should consider the following factors:

- To mitigate the existing traffic congestion in Jakarta suburban areas.
- To establish smooth logistics system from port and inland production points.
- To expand and to develop industrial areas to outside of existing areas efficiently.
- To develop bases of industries outside of Java Island.

For these, existing infrastructure projects, including National Strategic Projects, should be proceeded as scheduled and more private and public investment in infrastructure are required. In addition, it is necessary to establish a long term area-wise industrial development policy and plan. Especially, the area development of the hinterland of Patimban Port is a key issue. The following two Policy Actions (Tentative) are proposed as 1: Upgrade Sea Toll Road Program to Strengthen Supply Chain for Non-Java Industrial Agglomerations and 2: Development of Java Automotive Industrial Belt as below.

6.3.2. Upgrade Sea Toll Road Program to Strengthen Supply Chain for Non-Java Industrial Agglomerations

As described above, Sea Toll Road Program is a national program of sea transportation and is working effectively. At the same time, part load problem has been identified because eastbound cargo exceeds westbound cargo.

Based on the existing situation of Non-Java industrial agglomeration, this Policy Action aims to develop balanced and effective sea routes with the following components:

- Develop a plan to upgrade the Sea Toll Road Program for the improvement of supply chain of the three industrial sectors. This starts with agro-based industry.
- Examine expected input and output by the industrial agglomerations.
- Reconsider routing, frequency, vessel type and tariff on industrial plan and existing resources.

6.3.3. Development of Java Automotive Industrial Belt

There is a big opportunity for supply chain of automotive industry to expand itself to the whole Java Area because the Trans Java Highway is scheduled to be completed by 2019. In addition, the completion of Patimban Port, Kendal Industrial Park and up speeding of railway will also impact the supply chain.

Currently, Java Island holds six industrial agglomerations, namely Cilegon, JABODETABEK, Cirebon/Tegal, Semarang, Ceper/Surakarta and Surabaya (Table Below).

Table 32 Existing Six Industrial Agglomerations in Java Island

Location	Major existing sector	Auto related companies	Potential for development
Cilegon	Petrochemical, steel	Material (steel) for	Close to raw material supply base
JABODETABEK	Automotive, electronics	OEM, Tier1&2	High labor cost accelerate relocation to outside of JABODETABEK area. Patimban Port will be an export hub port for
Cirebon/ Tegal	Ship building, construction	None	Cheap labor force, machinery suppliers in Tegal
Semarang	Labor intensive industry like garment, wood & rattan furniture	Sumitomo Wire harness	Cheap labor force (50% of Jakarta) , Semarang Port under development ,modern industrial estates More industrial estates are to be developed.
Ceper/ Surakarta	Casting	Casting makers	Cheap labor force Agglomeration of casting makers and educational institutions.
Surabaya (ERBANGKERTO SUSILA)	Ship building	Prima Group (spring)	Collaboration with technology university (ITS) Gateway to East Indonesia

Source: JICA Survey Team.

This Policy Action aims to expand existing automotive industries concentrated around Jakarta to whole Java by preparing integrated develop plan and consists of the following components:

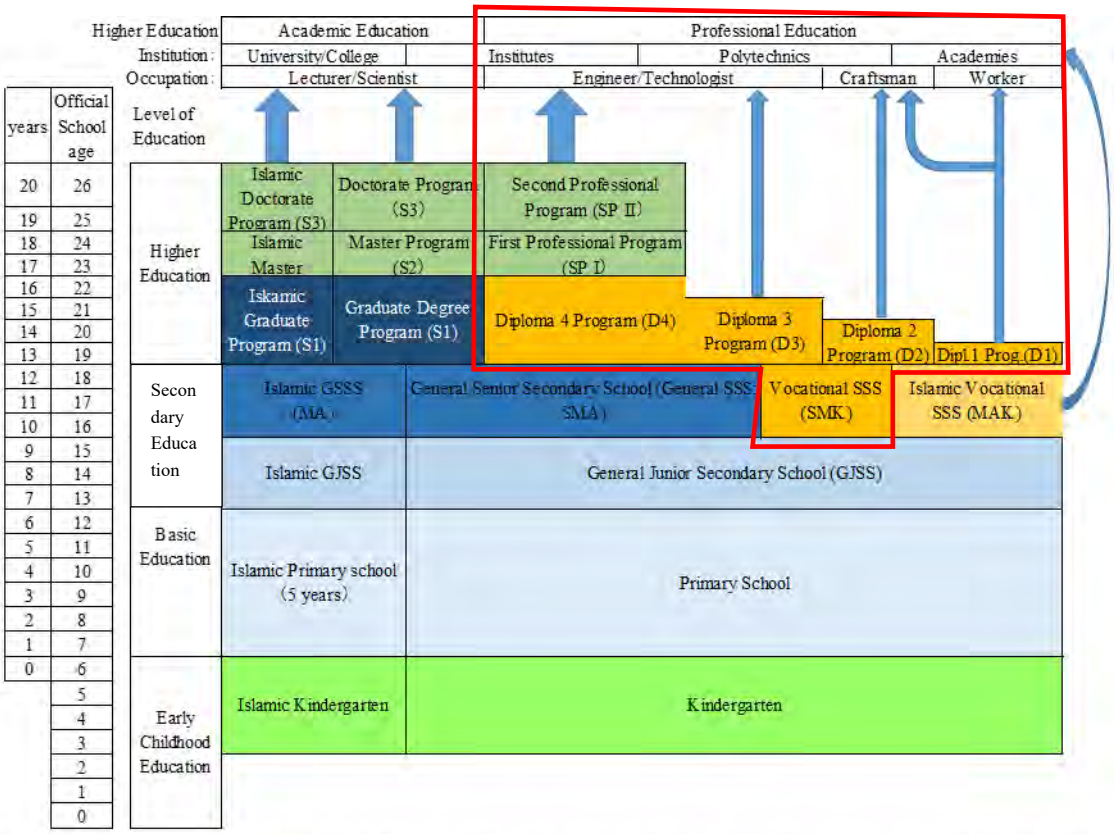
- Detailed marketing study to attract automotive industry for five industrial agglomerations (except JABODETABEK) (by MOI and IEAI (Industrial Estate Association of Indonesia)).
- Integrated multimodal freight terminal development at each port and surrounding area (by MPWH and MOTr).
- Development promotion of industrial estates in Central Java taking after Kendal Industrial Park (KIP. National Strategic Project.) (by KIP and MOI).
- Introduction of tax incentives by zoning for industrial location.

7. Current status and issues of industrial human resources

7.1. Current status and issues of educational institutions

In Indonesia, there are primary, secondary and higher education. There are two types of secondary education: early (junior high) and late (high). SMK is established as an industrial human resources training institution, and SMK educates manufacturing know-how and supplies human resources to the production site.

In the higher education, in addition to the university, Polytechnic is set up. In the university, research and education of mechanical engineering is carried out mainly by engineering department. Polytechnics are more practical than universities and are entrusted by manufacturing companies. These graduates of higher education institutions are engaged in relatively upstream processes, such as working as designers in various manufacturing industries, or managing production managers in production management.

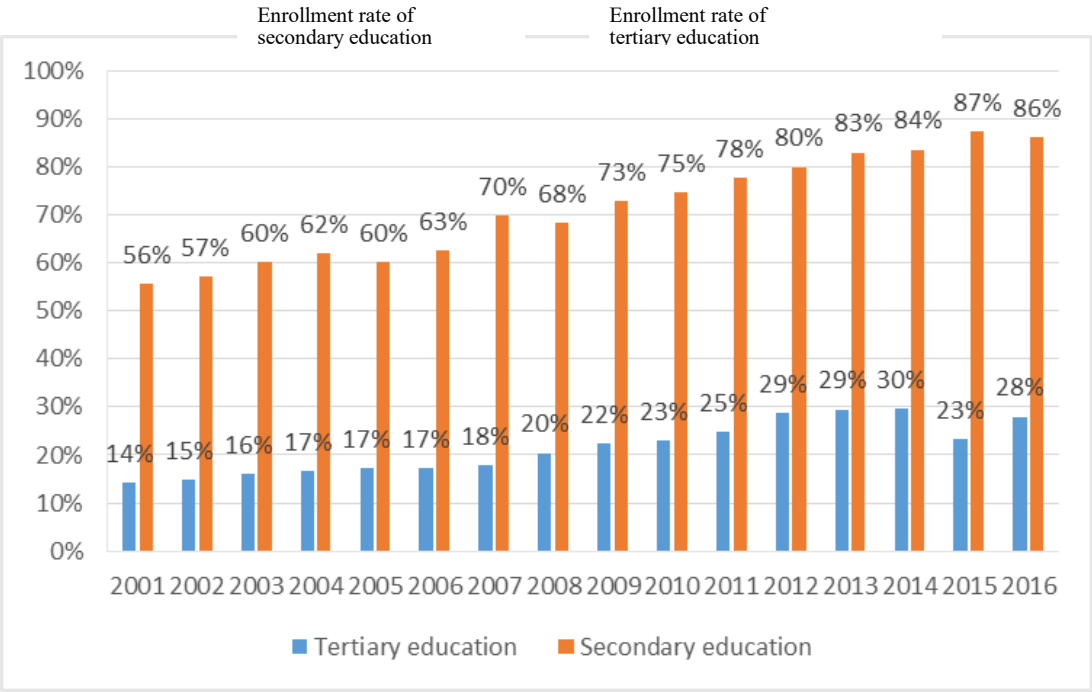


(Source) Ministry of Education and Culture, Center for Educational Data and Statistics and Culture "indonesia Educational Statistics in Brief 2015/2016"
Nuffic (Dutch organisation for internationalisation in education) "The Indonesian education system described and compared with the Dutch system"

Note: Red frame is the scope of industrial human resource development

Figure 87 Indonesian school system and overview of higher vocational education institutions

The enrollment rate is higher than 80% for secondary education (junior high school, high school, etc.), more than 30% for higher education (universities, vocational schools, etc.), both of which are increasing except for the year of 2015, whereby enrollment rate of tertiary education decreased.



Source: Based on World Bank "World Development Indicator"

Figure 88 Changes in enrollment rate by education level in Indonesia (total number of people)

In 2014, Politek (Polytechnic) has 186 schools throughout Indonesia, and approximately 70,000 new students have enrolled. However, the number of institutions and the number of new students are only 5% to 6% of the institutions of higher education.

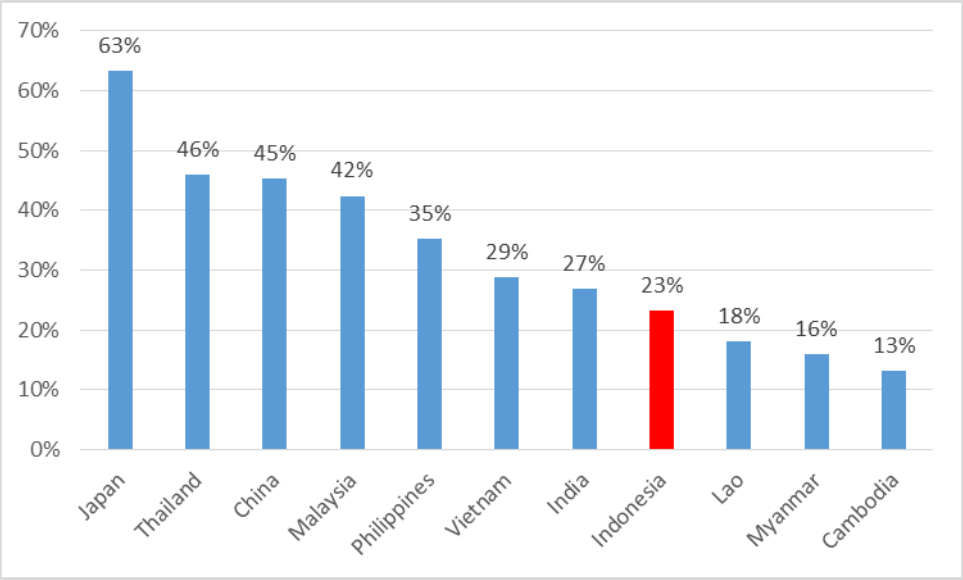
Table 33 Outline of higher education institutions in Indonesia

		Public	Private	Total	Ratio
Number of institutes	Total	122	3,124	3,246	100%
	University	63	469	532	16%
	Institute	13	60	73	2%
	School of Higher Learning	-	1,426	1,426	44%
	Academy	-	1,020	1,020	31%
	Community College	3	6	9	0%
	Polytechnic	43	143	186	6%
Number of enrollment (new students)	Total	438,640	1,020,025	1,458,665	100%
	University	378,311	557,973	936,284	64%
	Institute	18,496	31,849	50,345	3%
	School of Higher Learning	-	316,444	316,444	22%
	Academy	-	86,249	86,249	6%
	Community College	-	-	-	-
	Polytechnic	41,833	27,510	69,343	5%

Source: Ministry of Research, Technology and Higher Education "Higher Education Statistical Year Book 2014/2015"

Secondary education (junior high school, high school, etc.) exceeds 80%, higher education (university, vocational school, etc) also exceeds 30%. In this way, the advancement of highly educated workers has progressed, and the quality of workforce is also improving.

Opportunity of university education is still limited in Indonesia. University graduates are typically national elites and they do not tend to work for manufacturing sector engineers.



Source: Based on World Bank "World Development Indicator"

Figure 89Enrolment ratio for tertiary education for major countries in Asia

7.2. Current status and problems of industrial human resources in industry

The business activities in the target industry are mainly based on simple work centered on processing and assembly. These companies hire many workers and conduct business activities. Especially in the automobile industry and the electronics industry, the companies are engaged in business activities by hiring a large number of workers in an industrial estate near Jakarta.

In recent years, the processing and assembly industries are losing international competitiveness due to high wages and difficulties in domestic procurement of raw materials and parts. Some companies, mainly export processing, are withdrawing from businesses such as closing plants.

From now on, industries are trying to increase high added value from simple work, and to strengthen international competitiveness. Therefore, in each company, workers have sufficient experience, working as a skilled worker to improve productivity. Engineers contribute to sophistication of the production process. In addition, the needs for designers and developers developing new products are also increasing.

On the other hand, educational institutions in Indonesia are becoming more important to the quality of education, but there is still a gap between industry and educational institutions.
Workers-level workforce are graduates from secondary educational institutions such as SMK (junior high school, high school etc). However, they are not educated as the industry demands. Currently, the government is also working on policies for education in this part (details will be described later).

Engineers are centered on polytechnic graduates. From the industrial perspective, it is not possible to train human resources in a practical manner, except for some polytechnics. For this reason, companies that have educational systems in some companies, such as some major companies, hire new graduates and educate in-house, but many companies mid-career who have experience in another company.

The companies located in Indonesia have few cases of product design yet, and the needs for designers and developers have not become obvious. However, in recent years companies have started to develop products, and in the future the needs for designers and developers will increase.

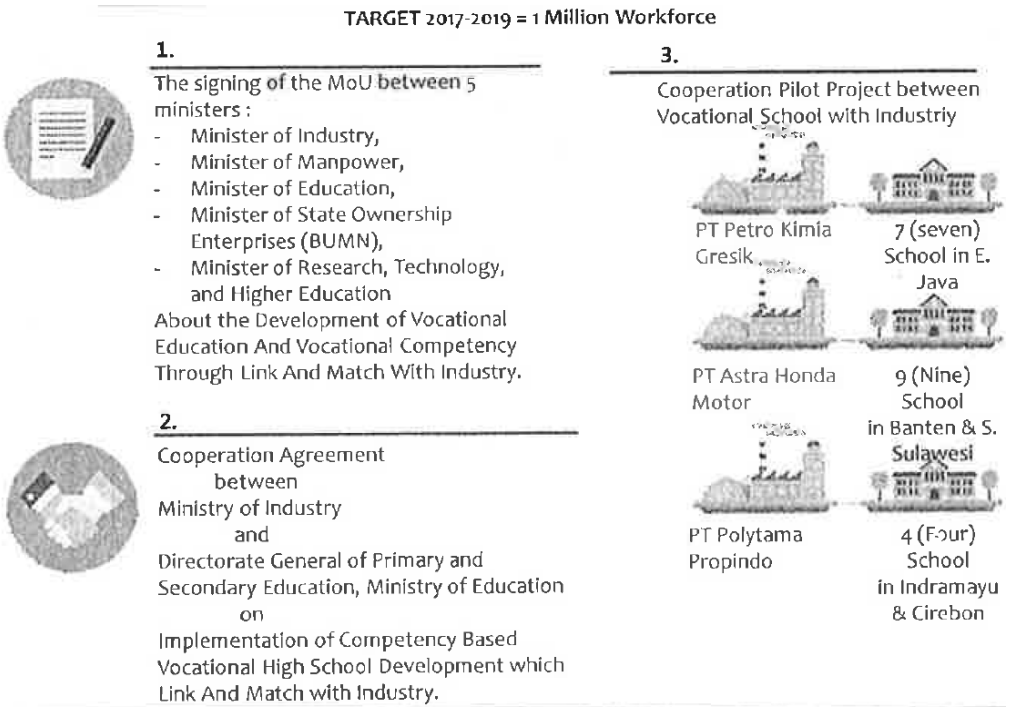
Table 34 Challenges on human resources from perspective of the industry

	Type of human resource		
	Researcher/Engineer Manager	Engineer/Technician	Worker
Typical institutions	University of Technology	Polytechnic	Professional school Technical senior secondary school
Current situation and issues	In the future, the needs from the industry will increase. Universities are developing academic researchers, but only few firms are conducting Research. Joint development projects between University and manufactures are mainly done by foreign corporations.	Educational institutions are not practicing human resources development. Target industry, supporting industry in particular, needs to recruit graduates from Polytechnic, but the students prefer to work with large corporations.	Educational institutions are not practicing human resources development. Graduates from Professional school and Technical senior secondary school do not necessarily meet the requirements such as basic skill.

Source: Study team

7.3. Issues and Current Policies in Industrial Human Resources

A Cabinet Order (Presidential Decree No 9, 2016) on the revitalization of educational institutions was enacted in 2016. In particular, this is aimed at improving SMK, realizing employment rate of graduates and expanding teachers. Specifically, it aims to cooperate with 355 companies with 845,000 students for 1775 SMKs by 2019. Astra Honda Motor (motorcycle company), Astra Daihatsu (four-wheel vehicle company), Evercross technology (mobile phone company), Djarum (tobacco company), Unggul Semesta (machine enterprise), etc. have participated.



Source: From the Ministry of Industry Presentation Material on the First Industrial Dialogue (May 17, 2017)

Figure 90 Outline of SMK-industry collaboration program

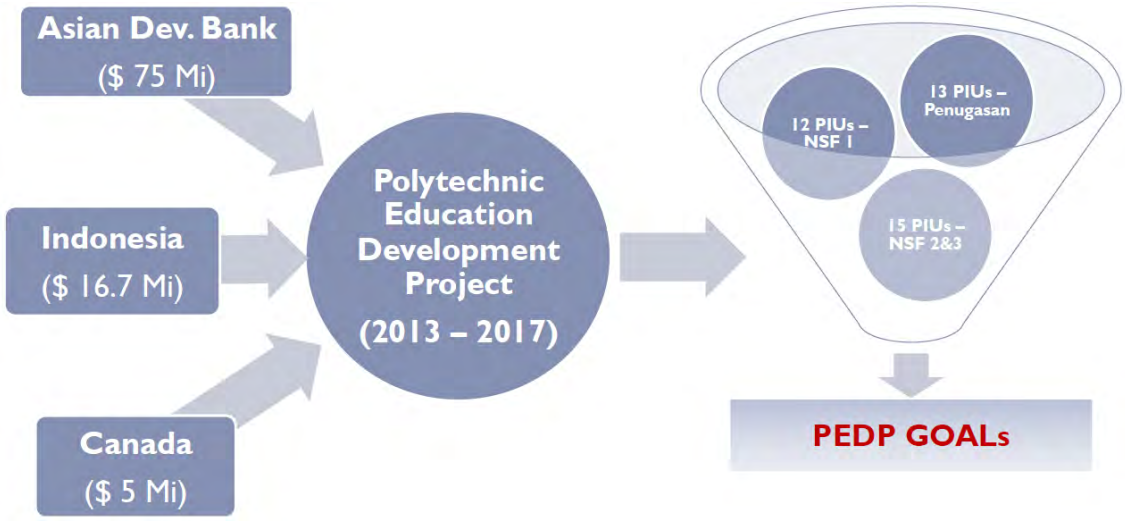
Following the Presidential Decree of 2016 (No 9, 2016), MoRTHE decided to reform the vocational educational institution that produces human resources that can be employed and absorbed in the industrial sector centered on Polytechnic. As a representative, there is the Polytechnic Education Development Project (PEDP) which is being implemented with the support of Asian Development Bank (ADB). PEDP is a program aimed at sophistication of equipment and teacher training for 13 Polytechnic from January 2013. Subsequently, ADB has expanded to 75 million USD, the Canadian government USD 5 million, the Indonesian government to the budget size of USD 16.7 million, and 40 Polytechnics participate. Initially, PEDP was planned until December 2017, but it was decided to extend it, and details are being discussed at present.

Table 35 PEDP overview (at start)

Aspects	Arrangements		
Implementation period	2 January 2013−31 December 2017		
Project management			
(i) Oversight body	Project steering committee Deputy minister for human resources and cultural affairs, BAPPENAS (chair); Director general, DGHE (cochair); MOEC, Ministry of Finance, BAPPENAS, Ministry of Manpower and Transmigration, private sector (KADIN & other industry associations as ad hoc members) (members)		
(ii) Executing agency	DGHE, MOEC		
(iii) Key implementing agency	13 polytechnic institutions		
(iv) Project management unit	PMU, DGHE: 7 permanent staff and 5 support staff		
Procurement	ICB & NCB	Multiple contracts	$51.25 million
	Shopping & direct contracting	Multiple contracts	$5.00 million
Consulting services	QCBS, CQS, and ICS	259 person-months national and 3 person-months international	$2.20 million
Social marketing campaign	CQS	Multiple contracts	$0.55 million
3 studies	CQS, ICS	Multiple contracts	$1.40 million
Advance procurement action	Consultants for the capacity development program, procurement specialist, and finance expert		
Disbursement	Loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012 as amended from time to time) and detailed arrangements agreed upon between the government and ADB.		

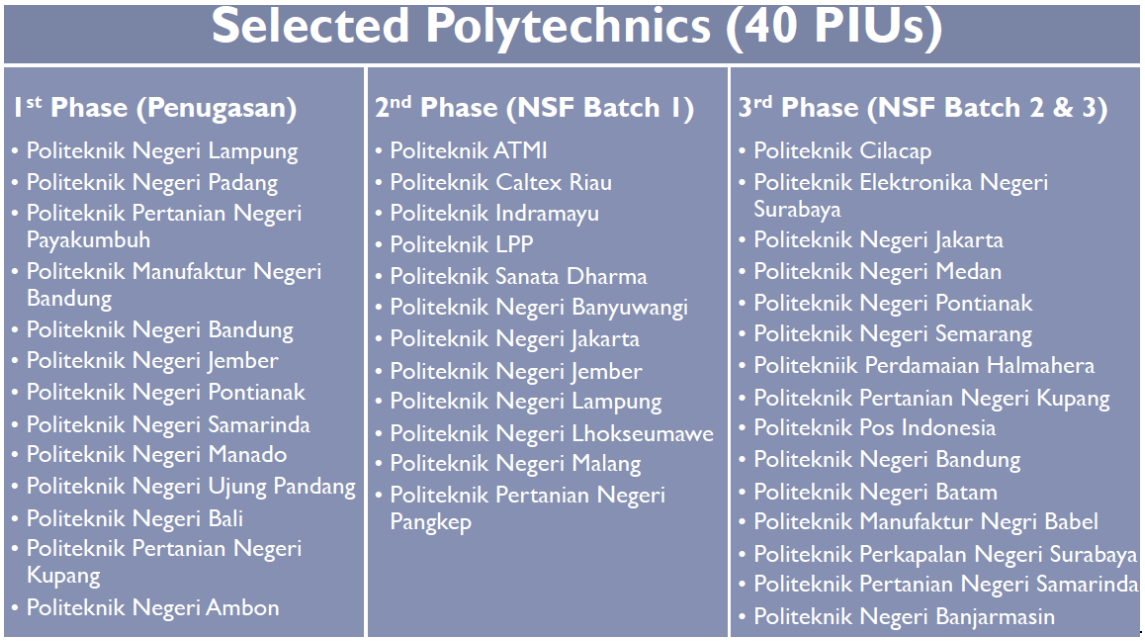
ADB = Asian Development Bank, BAPPENAS = National Planning Development Agency, CQS = consultants' qualifications selection, DGHE = Directorate General of Higher Education, ICB = international competitive bidding, ICS = individual consultant selection, KADIN =Chamber of Commerce MOEC = Ministry of Education and Culture, NCB = national competitive bidding, QCBS = quality- and cost-based selection.
Source: Asian Development Bank.

Source: Republic of Indonesia: Polytechnic Education Development Project (ADB September 2012)



Source: Ministry of Higher Education Presentation Material

Figure 91 Overview of PEDP (as of the end of 2017)



Source: Ministry of Higher Education Presentation Material

Figure 92 PEDP participating schools

7.4.Direction for Realization of Vision in 2025

Some of the Politek graduates are highly appreciated in the sector. They have more practical knowledge and skills for manufacturing and better sense of engineering for manufacturing. For the future management persons, Politek graduates could be the candidates. Offering them opportunities to go back to higher education and/or upgrading the quality of education of Politek so that the Politek can offer not only diplomat but also degree equivalent to university education.

While enhancing Politek schools, Technical senior secondary schools should be also upgrade their training program to be more practical.

Even though there will be a huge opportunity in R&D&D, if Indonesia cannot foster capable researchers and engineers, other ASEAN countries will take initiatives.

Higher educational institutions are producing top leaders in various sectors, but more practical engineers who will contribute to innovation at product development and The R&D&D are necessary for upgrading the sector. Some of polytechnic schools are producing good students with practical skills, but these training should be further upgraded and expanded.

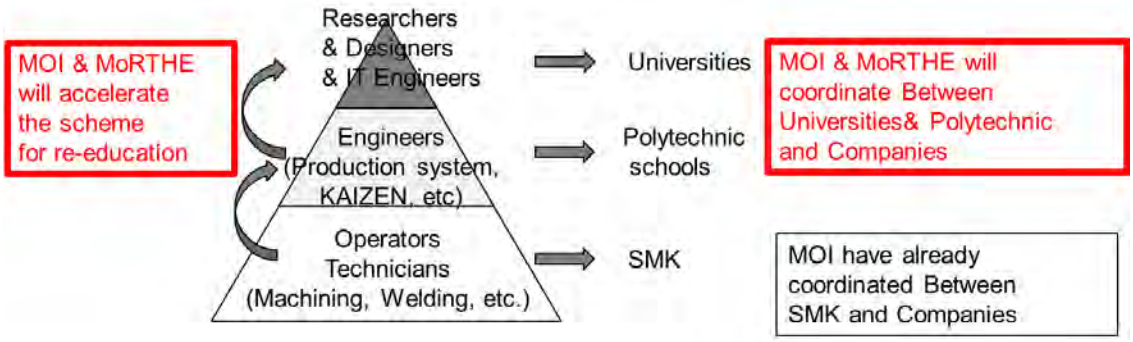
Industry has pointed out the following points to Politek and universities.

Politek.

Compared with Japan, practical education such as the use of tools such as CAD / CAM and machine operations such as machine tools can be done. Meanwhile, there is a lack of thinking oneself, the ability to think principles, the ability to apply, and so on.

University.

Although I understand the theory, I often do not know the site, I am familiar with individual expertise but I am not good at compounding. For the example, although it is possible to design using CAD and CAE, considering 3 Dynamics (Material Dynamics, Thermo Dynamics, Fluid Dynamics), etc., which will be a design that can't be manufactured and it is very expensive to produce, It is a design that is not done (it becomes a form but it does not move).

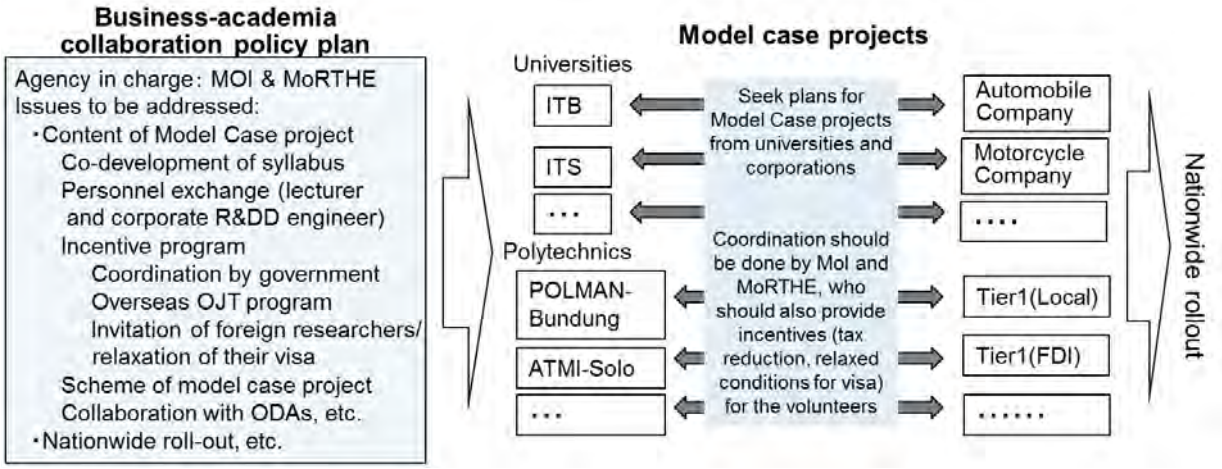


Source: JICA Study team

Figure 93 Issues and challenge of the industrial human resources

In Japan, the Basic Science and Technology Law was amended in 1995, and industry-academia collaboration was strengthened. In 1998, the TLO Law was formulated, promoting collaborative research between universities and industries. In 1999, the Bayh-Daw Law was formulated, created a mechanism that companies can use the research results of the university, and provided support such as government subsidies. In addition, there has been an increase in becoming a university professor from industry. There are also cases where companies establish donation courses at universities

MoI and MoRTHE drafts policies to support business-academia collaboration. Promotion measures (incentive programs), Pilot project, Nation-wide roll-out plan should be drafted. Select about 3 universities or polytechnics by proposal competition, and have them draft syllabus under the coordination of MoI and MoRTHE, which facilitates business-academia collaboration and personnel exchanges. Nation-wide roll-out should be based on the success of the model case projects.



Source: JICA Study team

Figure 94 Image of the pilot project

8. Review of JICA's past cooperation

8.1.Outline

JICA and its predecessor have been supporting Indonesian industrial sector since late 1960s. In this sector, Indonesia is the largest recipient country of Japanese technical cooperation in the world. In order to utilize the past experience of cooperation in industrial sector between Indonesia and Japan, this section briefly reviews some selected projects in the sector. Seventeen projects since 1992 were selected in industrial development and trade promotion sector as below:

Industry Development Subsector

No. Project Title

1 Technical Cooperation for the CVEST Vocational Training Development Project

2 Project on Supporting Industries Development for Casting Technology in Indonesia

3 Study on Strengthening Capacity of SME clusters in Indonesia

4 Study on Human Resources Development for SMEs focused on Manufacturing Industry in Indonesia

5 Development Study for Small and Medium Industry Promotion (tentative)

6 The Project for Development of Industry based on Local Resources in South Sulawesi Province

7 Project for Welding Technique Improvement

8 Manufacturing Industry Fundamental Technology and Driver Sector Development (Electrical and Electronic Equipment)

9 Cooperation for Strengthening Clusters (SENTRA) of Small and Medium Industries

10 Project on Small and Medium Industry (SMI) Development based on Improved Service Delivery in Indonesia

11 Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery

Trade Promotion Subsector

No.Project Title

12 Strengthening for Export Promotion Organization

13 Project on Service Improvement of NAFED

14 Project for Administration Improvement of Trade Related Regulations, Systems and Procedures

15 Project for Establishment and Capacity Building of Regional Export Training and Promotion Centers

16 The strengthening of the Utilization of Indonesia-Japan Economic Partnership Agreement (IJEPA)

17 Data Collection Survey on Promotion of Japanese SME's Development to Vietnamese and Indonesian Industrial Estates (tentative)

8.2.Findings

Table below shows some factors analyzed from document review. Under the situation, this survey found followings.

In the industrial subsector, technical cooperation started to transfer the technology element such as metal processing and casting (Project Numbers 1, 2, 7, 8 and 11).

At the same time, it shifted to cluster approach and human resources development, especially in Small and Medium Enterprise (SME) sector since 2000s. The Urata Report ("Policy Recommendation for SME Promotion in the Republic of Indonesia") in July 2000 influenced this shift and the Report emphasized the importance of SME development in economic activities. These Projects (Numbers 3, 4, 5, 6, 9 and 10) supported the SME policy and program development under MOI.

In the trade promotion sector, the cooperation started in the late 1980s as the support to Indonesia Export Training Center: (IETC) which continued until mid-2000s. The cooperation saw remarkable achievements for tackling Asian currency crisis in the late 1990s. Then it expanded the support to Regional Export Training and Promotion Centers (RETPC) and export promotion through National Agency for Export Development (NAFED) under Ministry of Commerce. Finally, Ministry of Trade (MOT) reorganized NAFED to Directorate General of National Export Development (DGNED). JICA Projects (Number 12~15) continuously supported to establish related institutions for export development.

"Strengthening of the Utilization of Indonesia-Japan Economic Partnership Agreement (IJEPA) (Project Number 16)" supported to solve an issue for the revision of IJPEA in 2014. "Data Collection Survey on Promotion of Japanese SME's Development to Vietnamese and Indonesian Industrial Estates (Project Number 17)" in 2012 was aimed to provide information of industrial estates to Japanese investors. These two projects are relatively independent from the existing stream of JICA's cooperation. However, these are aimed to contribute to the bilateral relations between Japan and Indonesia and this is a new trend of JICA's cooperation program.

In both subsectors, the external environment changed rapidly through the Asian Financial Crisis in 1997. The change orientated these projects from national focus toward provincial or local focus along with the Indonesia decentralization process.

Table 36 Outline of JICA cooperation projects

No.	Project Title	Output	Duration	Factor Analysis				Applicability/ Expandability to Other JICA Projects
				Type	Input	Timing	C/P Ownership	
1	Technical Cooperation for the CVEST Vocational Training Development Project	D3 level instructors were trained. Staff of planning and management were trained.	1992～1997	Project Type Technical Cooperation	14 long term experts 23 short term experts 18 C/Ps and others.	CEVEST was recognized as an excellent center among higher technical training and upgraded to Echelon II training facility. Although CEVEST had trained technicians steadily, the number is decreasing after 2000 by administrative reform, economic downturn and outdated technologies.	*CEVEST*	*Because financial independency of Vocational Training Schools is basically difficult, external support is required regardless of economic situation*
2	Project on Supporting Industries Development for Casting Technology in Indonesia	Institute for Research and Development of Metal and Machinery Industries(IRDMMI or MIDC)'s service to small and medium casting enterprises have been improved.	1999～2005	Technical Cooperation	8 long term experts 61 short term experts 40 C/Ps and others.	Influenced by Asian Economic Crisis, target group was expanded for casting industries for agricultural machineries in addition to automotive parts.	MIDC. It created a sense of solidarity within C/P and many C/P voluntarily wanted further improvement of their technical level.	While considering the spread of MIDC to other technical departments, the monitoring of technical services of the foundry and the strengthening the system for further provision are to be made.
3	Study on Strengthening Capacity of SME clusters in Indonesia	Based on the results of three pilot projects, a master plan and action plans to create dynamic clusters are recommended.	2001～2004	Development Study	Study Team members. 8 members. 4 in metal and machinery parts cluster. 6 in export oriented cluster.	It was a difficult time for Indonesian SME cluster to survive or not towards the globalization by WTO and ASEAN Free Trade Area after the Economic Crisis.	As a working group for the pilot project, C/P formulated cluster promotion strategies and action programs together with small and medium enterprises and provided advice and adjustment functions in	This led to "Project on Small and Medium Industry (SMI) Development based on Improved Service Delivery in Indonesia (No.10)."
4	Study on Human Resources Development for SMEs focused on Manufacturing Industry in Indonesia	The current situation and problems of SME human resources development in rural areas were clarified. The role of the Ministry of Industry and DINAS in SME human resources development was clarified .SME human resources development program to be provided by DINAS was proposed.	2005～2008	Development Study	Input of study team	Based on Urata Report in 2000, JICA conducted "Study on Human Resource Development for SMEs Focused on Manufacturing Industries in Indonesia(2003-04)(Not listed.)" and its recommendation led GOI to establish a Committee of SME Human Resources Development under MOI General Directorate of SME (IKM) and Education and Training Center (PUSDIKLAT). Under the Committee, GOI created a Working Group and showed strong commitment in this field.	*MOI and Provincial Government Bureau of Industry and Commerce.*	*This can be a model program to local governments.*
5	Development Study for Small and Medium Industry Promotion (tentative)	Formation of Development Study Draft -Current situation and problem analysis on promotion of small and medium enterprise cluster -Pilot project implementation in target area -A comprehensive action plan formulation program was proposed.	2008	Development Study	Input of study team	*Similar with above*	MOI and others.	*This resulted in the implementation of "Cooperation for Strengthening Clusters (SENTRA) of Small and Medium Industries." This is the project (No.9) below.*
6	The Project for Development of Industry based on Local Resources in South Sulawesi Province	Processing local resources have been promoted by strengthened clusters and their values added.	2009～2012	Technical Cooperation	10 experts. 11 trainees in Japan. Provision of equipment. Local cost.	Community Economic Movement Program (CEMP. 2004-07) was initiated by South Sulawesi Provincial Government and identified 11 specialty products. The program was positively evaluated in its results, but there were still issued to be solved regarding the sustainability after the program.	At the time of Ex-Ante Evaluation, many C/P left their positions and the Special Team was not functioning.	
7	Project for Welding Technique Improvement	A model program for welding technology improvement was introduced, and trainers were trained accordingly.	2010～2012	Technical Cooperation	22 short term experts. Local cost.	Welding technologies was an important process in metal working for international competitiveness and there was not sufficient numbers of welding workers and welding engineers with necessary skills. "Strategic Plans of MOI 2010-2014" positioned to welding technology capability to be improved. The GOI requested as a partial support under the Indonesia – Japan Economic Partnership Agreement (IJEPA) and the MIDEC (Manufacturing Industry Development Center) Initiative.	The Indonesia Welding Society (IWS), the C/P, had only one full-time staff and its operational capability as secretariat to manage certification system is low. IWS does not have appropriate institutional setup with roles and functions.	
8	Manufacturing Industry Fundamental Technology and Driver Sector Development (Electrical and Electronic Equipment)	Situation of output is not clear.	2010～2012	Technical Cooperation	Short term experts. Operational cost	The GOI positioned electronical and electronics equipment sector as a priority industry. In order to strengthen industrial competitiveness in this field, it was necessary to develop a standard certification infrastructure, but the certification and the testing organizations did not meet their respective capability to meet with international standards in accordance with the International Electrotechnical Commission	*Unknow n*	
9	Cooperation for Strengthening Clusters (SENTRA) of Small and Medium Industries	- Current status and issues of micro and small business cluster promotion are organized. - Improve the capacity of C/P institutions to analyze issues and implementing and managing capability through implementation of each survey and pilot projects. - Based on the pilot project, an action plan including the draft guidelines for monitoring and implementation of central and local governments on the promotion of clusters utilizing regional resources are formulated.	2008～2011	Development Study	Input of study team	GOI has taken various initiatives with the cluster promotion approach as the central policy for SME promotion and regional industrial promotion. However, strengthening the competitiveness of small and medium-sized enterprises in the rapidly changing domestic and foreign economic environment did not have a visible effect. In addition, local governments are did not fully develop from the conventional sector promotion approach. In order to efficiently and effectively deploy the measures of cluster promotion nationwide, it was requested to establish an implementation system and establish a method, such as preparing guidelines at the implementation stage as soon as possible.	General Directorate of SME of MOI. Target two provinces (West Java Province and West Sumatra Province. Ownership is unknown.	*Reconsider cluster promotion approach?*
10	Project on Small and Medium Industry (SMI) Development based on Improved Service Delivery in Indonesia	MOI prepared "Technical Guideline - Facilitation of Local Industry Development."	2013～2016	Technical Cooperation under Loan Project	Experts	Based on previous studies, improvement and enhancement of service delivery system of SMIs' support by governmental and other organization to develop clusters was urgent.	Directorate General of SMI of MOI published Technical Guideline in 2016.	
11	Project on Enhancement of Metalworking Capacity for Supporting Industries of Construction Machinery	Technical service providing capability of targeted metal working organizations for metalworking companies was improved.	2014～2017	Technical Cooperation Project	Experts (8 fields) Operational cost. Training in Japan.	Among 14 manufacturing sectors under MIDC Initiative, GOI prioritized metal working and requested technical cooperation to GOJ.	C/P promoted to establish "Association of Supporting Industries Promotion for Construction Machinery (tentative name)" in Action Plan draft 1.	

No.	Project Title	Output	Duration	Factor Analysis				Applicability/ Expandability to Other JICA Projects
				Type	Input	Timing	C/P Ownership	
12	Strengthening for Export Promotion Organization	Master Plan to strengthen NAFED organization / function was formulated. Through the creation of a master plan and the implementation of pilot projects, technology transfer to contributes to the improvement of NAFED's ability to solve problems was implemented.	2007～2008	Development Study	Input of study team	It was necessary to improve competitiveness of non-oil and gas industries.	The National Agency for Export Development, (NAFED) Ownership is unknown.	
13	Project on Service Improvement of NAFED	Presidential Decree in 2010 reorganized NAFED for Directorate General of National Export Development (DGNED).	2010～2015	Technical Cooperation Project	11 experts. Provision of equipment. Training in Japan	It was necessary to realize the output of "Strengthening for Export Promotion Organization (No.12)."	The project made some recommendation for DGNED thereafter .	
14	Project for Administration Improvement of Trade Related Regulations, Systems and Procedures	Trade related regulation, systems and procedures are simplified and well-organized with improved efficiency and effectiveness as well as the establishment of National Single Window (NSW) System. Trade Rulebook was developed in January 2007.	2006～2008	Technical Cooperation Project	5 experts. Provision of equipment. Training in Japan.	It was necessary to realize the recommendation of "The Study on Trade Related Systems and Procedures in the Republic of Indonesia(2015) "	Unknown	
15	Project for Establishment and Capacity Building of Regional Export Training and Promotion Centers	Model RETPCs (Surabaya, Medan, Makassar, and Banjarmasin) provided trade training, trade information/ promotion services to local SMEs.	2002～2006	Technical Cooperation Project	5 long term experts 17 short term experts Training in Japan Equipment and others.	In decentralization trend, it was necessary to establish RETPC to expand the results of IETC to rural areas.	NAFED Indonesia Export Training Center (IETC) Regional Export Training and Promotion Center (RETPC)	*Further situation of RETCs is unknown.*
16	The strengthening of the Utilization of Indonesia-Japan Economic Partnership Agreement (IJEPA)	MOC, local governments (issuers of Certificate of Origin (COO)), and private exporters understood IJPEA preferential tariff and MOC's capability to verify the economic impact by free trade.	2010～2014	Technical Cooperation Project	Experts. Provision of equipment. Training in Japan.	GOI had a willingness to start renegotiation of IJEPA after five years' entry into effect in 2014.	C/P positively supported to hold 21 seminars at 18 locations to raise capabilities of mainly local government staff about IJEPA COO issuance.	There may be similar need with other countries, especially ASEAN, which has EPA with Japan.
17	Data Collection Survey on Promotion of Japanese SME's Development to Vietnamese and Indonesian Industrial Estates (tentative)	It supported Japanese mid-sized and SMEs to deploy overseas and developing countries to improve technical level.	2012	Development Study	Input of study team	In July 2011, the Tokyo Chamber of Commerce and Industry stated "Support for promoting the use of overseas industrial sites for small and medium enterprises" in "Priority Requests on Measures to Support International Deployment of SMEs"	None.	Proposal of rental factories for Japanese SMEs. Support by Japanese Yen loan to Viet Nam.

9. Policy packages

9.1.Overview of policy packages

Policy measures proposed in the previous chapters regarding 3 target industries are compiled to policy packages. This is to ensure that recommendations from this Study can be applied broadly to the whole industries in order to achieve increase global competitiveness and higher value added of the whole industrial sectors of Indonesia.

They are the following 6 policy packages.

- Inter ministerial committee
- Local enterprise/SME development
- Promotion of R&D&D local and foreign investment
- Human resources upgrade
- Logistical infrastructure upgrade
- Promotion of export friendly environment

Table 37 Proposed policy packages

Policy package	Transportation machinery	Electric and electronics	Food processing	Ministry in Charge
①Inter-ministerial committee	(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	• Bappenas • Coord Min Econ Affairs • Coord Min Marine Affairs • Coord Min Human Dev Cultural Affairs • M of Industry • M of Finance • BKPM • M of Energy Mineral Resources • M of Manpower • M of Public Works • M of Research, Technology and Higher Education • M of Trade • M of Transportation • M of Agriculture • National Agency of Drug and Food Control (BPOM) • Central Bank • etc
②Local enterprise/SME development	(1) Attract investment to auto parts industry (2) Raise engineering, quality, and productivity of suppliers	(3)Local business development through technology exchange/upgrading	(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&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	

Note: Numbers in each columns are those of policy measures recommended in the previous chapters. The following sections will describe each of policy packages.

9.2.Implement industrialization plan (Inter-ministerial Committee)

As discussed in chapters of each target industries, most of the recommended policy measures require inter-ministerial coordination. Therefore, we would like to recommend a policy

implementation cycle, namely, “Implement industrial plan through the enactment of Inter-ministerial Committee”, as the first policy package.

This is to apply strong driving force and proactive commitment of relevant government agencies and deep involvement of industry to all of the implementation steps such as preparation of master plan/ road map, implementation of the policy, and monitoring the progress of the policy.

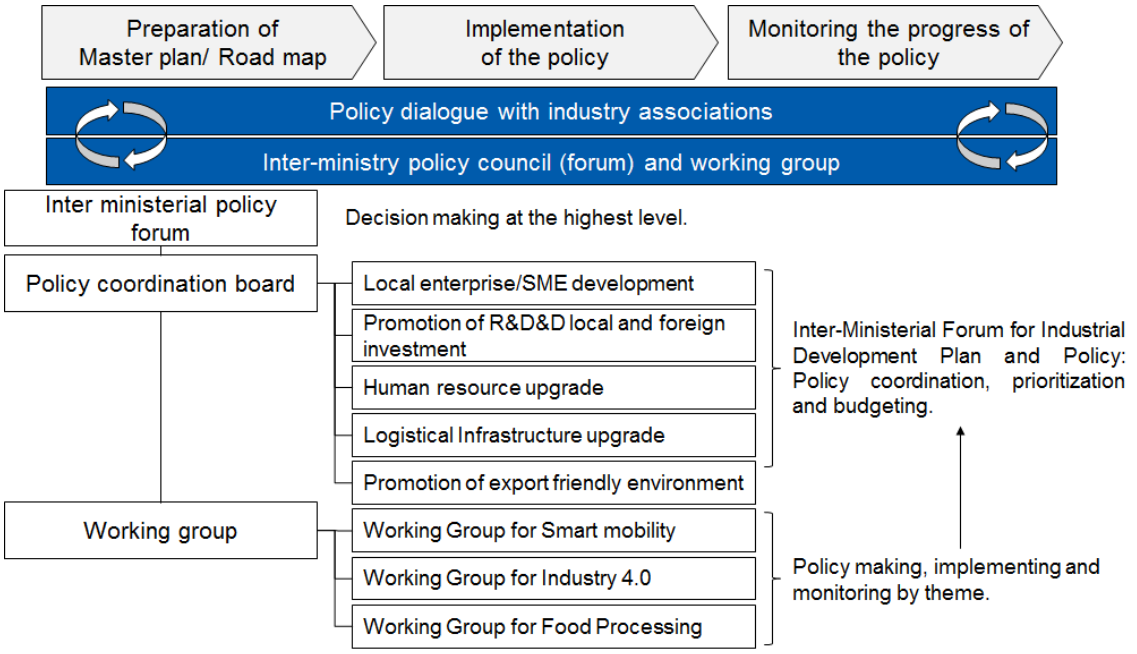


Figure 95 Inter-ministerial Committee

The proposed inter-ministerial forum comprises of 3 tiers organizational structures. Working group is established according to specific industrial plan, road map, and other higher level industrial policies. Working group is in charge of policy making, implementing and monitoring.

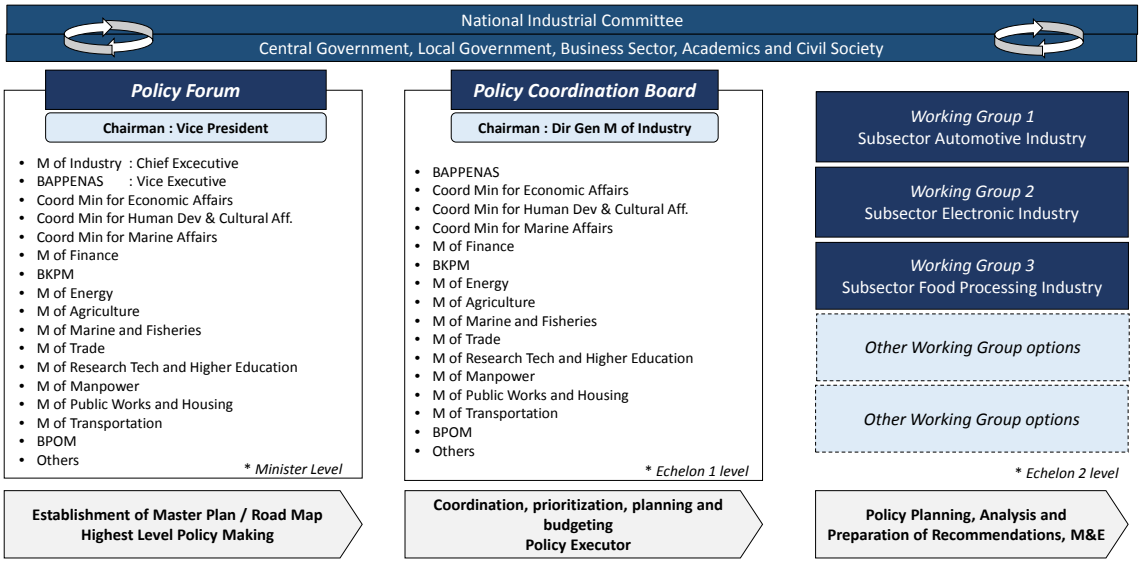
Policy coordination board is to consolidate policies from viewpoints of policy packages’ classification such as local enterprise/SME development, promotion of R&D&D local and foreign investment, human resource upgrade, logistical infrastructure upgrade, and promotion of export friendly environment, etc. Policy coordination board shall prioritize various policies with allocation of budget to maximize the expected benefits as a whole of implemented policies, by reversing inconsistent policies, by coordinating the timing of implementation among different policies with similar objectives, and planning supplementary policy to mitigate adverse effects of a certain policy, under the higher target goal to increase global competitiveness and higher value-added.

Inter-ministerial forum, as the highest organizational level, empowers all the policies in terms of planning, implementation, and monitoring/evaluation.

Composition of the each levels might be the followings.

- Policy forum is Minster level and chaired by Vice President.
- Policy coordination board is echelon 1 level, and chaired by Director General of Ministry of Industry.
- Working groups are echelon 2 level.

Participating line ministries and coordination agencies might be designed as shown in the next chart.



Source: BAPPENAS

Figure 96 Example of structure of the policy coordination forum

9.3. Local Enterprise/SME Development

This Study reveals that local enterprise/SME development policy has not effectively worked so far in terms to suppliers to contribute to globally competitive industries, although general MSME development policies have achieved expanded MSMEs as indispensable players of the national economy.

In order to accelerate global competitiveness, the government if Indonesia needs to support the development of local SME through growing SMEs to meet high-volume requirement from clients through Business Matching, Training/dispatch of expert, and financial support.

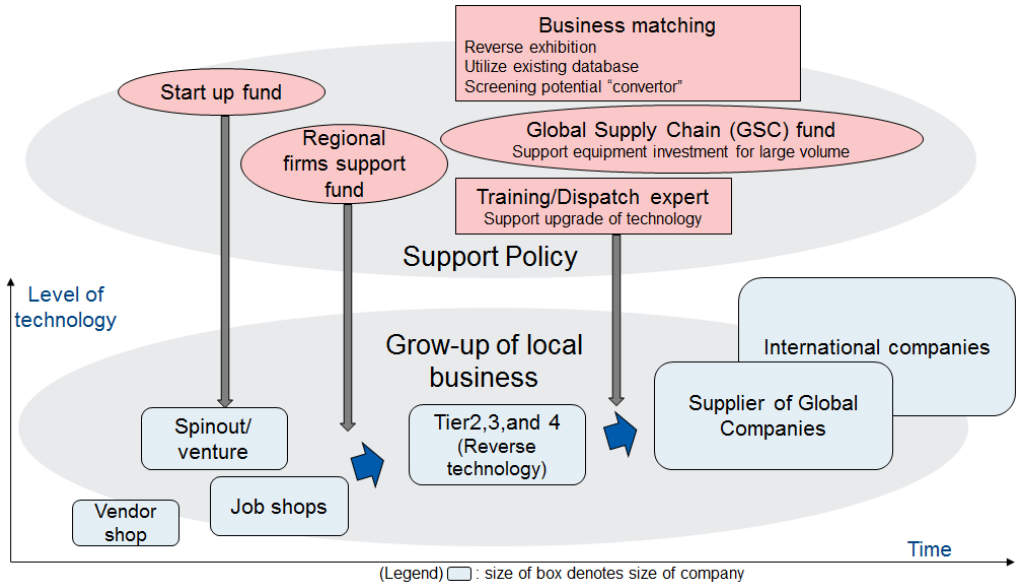


Figure 97 Supporting local business and SMEs policy based on stages of grow-up

As for policy means of financial support, it is recommended to develop preferential finance scheme to focus on specific stage of growing stages such as start-up and upgrading to global suppliers as well as regional business firms. In this scheme, government-owned banks perform loans with low interest rate backed by low finance from the government. Target enterprises of this financial scheme could be SMEs which receive other support programs such as technical assistance by experts and business matching.

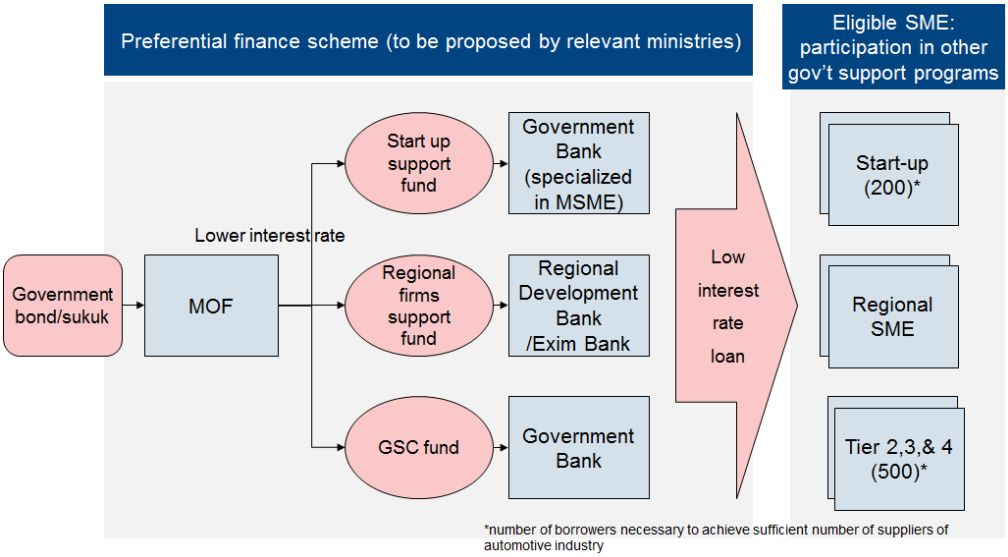


Figure 98 Proposed preferential financial scheme

Indeed, there is an existing policy measures to support financing SMEs which is Kredit Usaha Rakyat (KUR), government-supported credit guarantee for SMEs. This is very successful in terms of coverage of micro and small sized enterprises. However, due to limited amount size, this financial supports does not meet demands from SMEs in industrial sectors because size of their financial demands far exceeds the ceiling amount to be guaranteed under KUR.

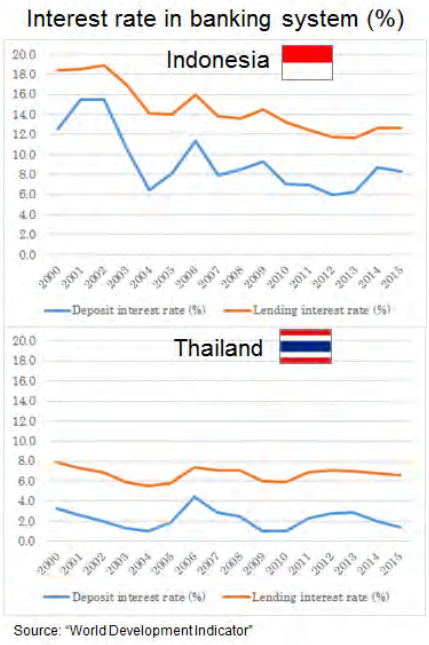
Those SMEs in industrial sectors shall go to commercial banks seeking for their proper loan products. However, interest rate applied by commercial banks in Indonesia is significantly higher than neighbor countries such as Thailand.

Size of SME loan and Credit Guarantee Scheme

	Thailand	Indonesia
SEM loan/ GDP*	41.9%	6.4%
Guaranteed loan/ GDP*	2.05%	0.88%
CG scheme	PGS Up to THB40M(Rp16B) Startup: Up to THB2M Community Business: Up to THB3M Micro enterprise: THB10,000-200,000	KUR Basically for "first-time borrower" Micro: Up to Rp20M Ritel: Rp20-500M

CG: Credit Guarantee
PGS: Portfolio Guarantee Scheme
KUR: Kredit Usaha Rakyat

*In 2014
Source: ADB Asia SME Finance Monitor 2014, Bank Indonesia.



Source: "World Development Indicator"

Figure 99 Comparison of SME finance promotion between Indonesia and Thailand

For the purpose of industrial promotion, it is recommended to consider new preferential finance scheme to supply larger sized loan with cheaper interest rate, because KUR is designed to provide credit enhancement to micro and small-sized business, and credit guarantee for medium-sized enterprises would require sophisticated risk management scheme based on historical data, which would take time to star operation.

9.4.Promotion of R&D&D local and foreign investment

Promotion of R&D&D needs to be furnished as comprehensive packages, involving different ministries.

In Indonesia there are few promotion policies for R&D&D activities, there are also regulations such as difficult investment from overseas on R&D&D. In order to activate R&D&D activities domestically, related ministries and agencies should promote policies such as deregulation on R&D&D investment, tax incentives for R&D&D activities, promotion of R&D&D with industry-academia cooperation, human resource development, and so on. For example, R&D&D is regarded as service industry and thus foreign capital ratio in R&D company is limited in most cases, whereas Thailand approves 100% foreign owned R&D&D if the sector is promoted by BOI.

Policy measures	Details of policy measures	Leading / Supporting
Relax rules for foreign capital regulations for R&D&D	• 100% for R&D&D (definition of R&D&D: market research, testing/evaluation, product design for domestic & export)	MOI BKPM
Comprehensive packages for R&D&D	• Tax deductions (100% of R&D cost→ 300%) and special visa for experts for companies, import tariff exemption for equipment imports)	MOF, MOI BKPM, BAPPEAS
Promote transfer of R&D&D knowledge to local companies	• Encourage foreign companies to transfer of R&D&D knowledge/ skills to local companies n exchange for tax deductions for R&D&D	MOI MoRTHE
Promote R&D&D cooperation with Univ.	• Tax Incentives given to companies which engage in cooperation with universities (setting up new univ. courses, sending experts, National EV project (MOLINA), etc)	MOI, MOF MoRTHE
Promote R&D&D supporting services	• Relax foreign investment regulations for R&D&D supporting services (testing/ evaluation services, design service., etc)	MOI MoRTHE
Develop human resource for R&D&D	• Develop curricula for R&D&D in tech universities for specific industry in cooperation with business sectors	MOI MoRTHE

Source: based on local interviews

Figure 100 Policy measures and ministries in charge for R&D&D promotion

9.5.Human resource upgrade

As discussed in the chapter of Human resource development, higher educational institutions shall further accelerate education of more practical engineers who will contribute to innovation at product development and R&D&D.

In higher education in Indonesia, research and educational activities in the academic field are active, but cooperation with industry is not active. The proportion of graduates of science and engineering universities and graduate students finding employment in the industrial field cannot be said to be high. It is necessary to promote collaboration between industry and universities. It is important for the government to show policies on industry-university collaboration, to formulate policies aimed at realizing it and to implement it. For the implementation, it will be promising to first implement the pilot project and refer to the outcome, and formulate the basic policy and concrete policy planning.

For practical implementation under Inter-Ministerial coordination, the Study team proposes "Model Case project on Industry-government-university collaboration" of which steps are described as follows.

- MoI and MoRTHE drafts policies to support business-academia collaboration.
- Promotion measures (Incentive programs), Pilot project, Nation-wide roll-out plan should be drafted
- Select about 3 universities or polytechnics by proposal competition, and have them draft syllabus under the coordination of MoI and MoRTHE, which facilitates business-academia collaboration and personnel exchanges.
- Nation-wide roll-out should be based on the success of the model case projects.

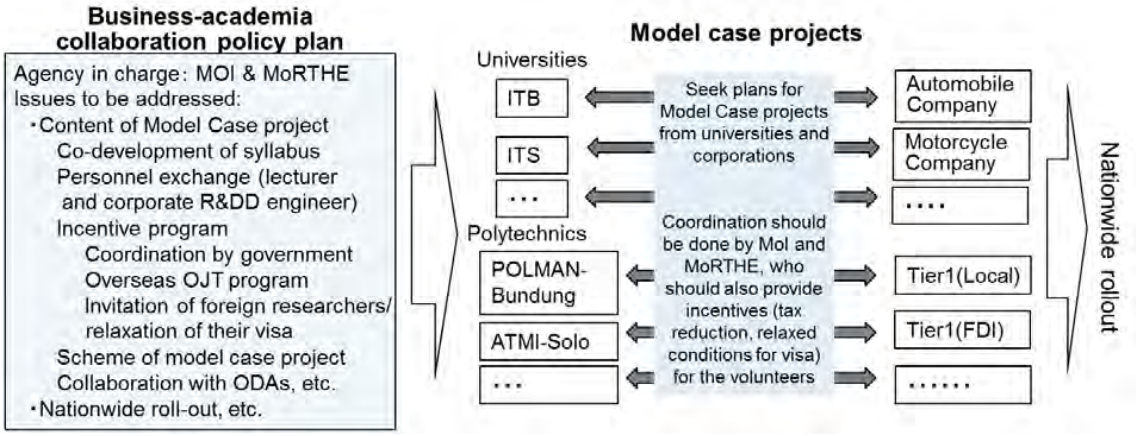


Figure 101 Model Case project on Industry-government-university collaboration (Draft)

9.6.Logistical infrastructure Upgrade

As discussed in the chapter of Infrastructure and Logistics, logistical infrastructure such as roads, highways, railways, sea transportation, port and civil aviation is being accelerated in developing under development plans such as Medium-Term Plans (RENSTRA), Implementation Plans (RENJA), and other plans on ad-hoc basis, prepared by ministries in charge such as the Ministry of Transportation (MOTr) and Ministry of Public Works and Housing (MPWH).

According to views of private business sectors, however, challenges remain in functionality of the infrastructure as a whole connected chain of various modalities. In particular, utilization of the developed sea toll road is still low due to lack of cargo from east to west and poor connectivity of different modality of transportation.

In this regard, it is proposed to implement policy action “Upgrade Sea Toll Road Program to strengthen Supply Chain for Non-Java Industrial Agglomerations”.

Outline of Policy Action

- Develop plan to upgrade the Sea Toll Road Program for the improvement of supply chain of the 3 industrial sectors (e.g., start with agro-based industry).
- Examination of expected input and output by the industrial agglomerations.
- Reconsider routing, frequency, vessel type and tariff based on industrial plan and existing resources.

(Note) Based on Industrial estates under National Strategic Project (NSP) and Sea Toll Road Program

Figure 102 Upgrade Sea Toll Road Program

Another critical challenge is deteriorating efficiency of JABODETABEK area in terms of core supplying agglomeration to auto industry due to high concentration which causes higher cost of land and labour.

Therefore, it is recommended to implement policy action “Development of Java Automotive Industrial Belt” to expand supply chain area from west to east inside Java.

Outline of Policy Action

- Java Automotive Industrial Belt Development Plan
- Strategically place about 5 industrial districts besides JABODETABEK. At that time, consider securing human resources, efficient logistics, promotion of industry-academia cooperation, etc. (MOI, IEAI (Indonesian Industrial Park Industrial Association))
- Tax treatment by zoning for new industrial clusters (MOF, MOI, IEAI (Indonesian Industrial Park Industrial Association))
- Infrastructure development capable of efficient logistics. Specifically, we will develop infrastructure such as harbors, highways, cargo railroads and multimodal cargo terminals. Establishment of each port and surrounding areas and wide area access network, (by Ministry of Public Works and Housing, MOCT)
- Development and improvement of container transport on railway (by MOCT and Kareta Api)
- Development promotion of industrial estates in Central Java as well as Kendal Industrial Park(KIP) (National Strategic Project) (by KIP, MOI)
-

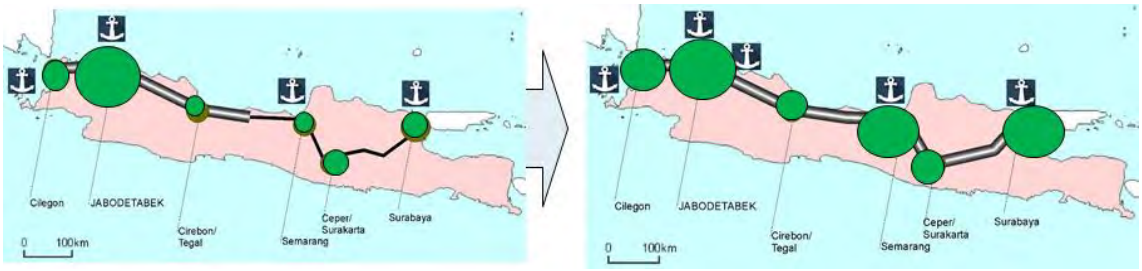


Figure 103 Development of Java Automotive Industrial Belt

9.7.Export environment improvement

9.7.1. Achievements of Economic Policy Package

Trade environment has been improved by the Economic Policy Packages according to views of Japanese FDIs. Almost all regulations which had been specified by those packages as target of deregulation, counted up to 215, were eliminated or revised, according to the government announcement. Achievements of such deregulations have been confirmed in the “Ease of Doing Business” (EODB) which the World Bank conducts every year. Ranking of Indonesia has been improved to 72nd in 2018, in continuous uptrend from 120th in 2014, 106th in 2016, and 91st in 2017

Economic Policy Package No. 12 aims at accelerating the ranking of “Ease of Doing Business” up to 40th place in the world, as well as further shortening procedure time and reducing costs in

export. Economic Policy Package No. 2 seeks for Interest rate tax cuts for exporters. Economic policy package No. 7 reduces income tax over the two years of employees of companies exporting 50% or more of sales. The economic package No. 11 expanded government-subsidized loans for export-oriented small & medium enterprises.

9.7.2. Monitoring system to focus on competitiveness of export

In the meantime, in order to further strengthen global competitiveness, it is recommended to develop specific policy to further support manufacturers of final goods and subcomponents to procure intermediary goods with required specification.

As discussed in the chapter of transportation machinery, there is still import barriers for common components such as steel wire, bolt & nuts for final process and assembly, which require strict SNI (National Standard of Indonesia), despite no local product available that can meet specification requirement of automotive manufacturers.

Also discussed on the chapter of food processing industry, import quota of intermediary products is one of the challenges which keep export potential from being fully materialized. Due to such import quota system, it is difficult for the food processing makers to procure, flexibly according to market demands, high quality salt, sugar, flavors, and ingredients which are imported for the production of export-oriented food products and which cannot be produced competitively in Indonesia for industrial use.

In considering background of the challenges observed as barriers for the components supplied for automotive industry, there is mismatch of recognizing the issues between regulators and users of supplied goods. Specification required by users often include their own requirements of standard, quality control and capacity to ensure stable and continuous supply, which are not considered in drafting regulation of import restriction.

In the case of food processing, regulators' concern is misuse of materials imported for industrial input. However, the users need to meet changing market demands and tend to stay on conservative side to limit production plan under potential in order to strictly abide by the regulation.

In is recommended to establish a continuous communication including Ministry of Trade, Ministry of Industry and Business Associations to relax import barriers such as quota and duties based on common understanding of goods which are not locally available, and to monitor the most updated capacity of local suppliers, and usage of imported materials with same goal to maximize global competitiveness and export.

It is a high priority requirement to avoid suspension of supply with high quality for competitive industry and whole business sectors. In parallel with enhancing capacity of local contents by promotion of R&D&D, it is necessary to remove barriers in importing intermediary goods with necessary specification as much as possible.

9.8.Industrial Dialogue

Progress of the study was shared with Government of Indonesia through 4 times of Industrial Dialogue. Schedule and agenda of each Industrial Dialogue is shown in Annex.

Among them, the final study result have been comprehensively compiled and shared with Government of Indonesia in the 4th Industrial Dialogue, where both Minister of BAPPENAS and Minister of MOI attended and provided key note presentations.

Table 38 Overview of Industrial Dialogue # 4

Date	April 17th , 2018
Venue	Shangri-La Hotel, Jakarta
Organized by	BAPPENAS, JICA
Attendants	Total attendants: About 180 (Including 28 from Press) Of which: Ministers: 2 Echelon 1: 6
Opening remarks	- Leonard V.H. Tampubolon, Deputy Minister of Economic Affairs, BAPPENAS - Kawanishi, Hiroyuki, Senior Deputy Director General, Group Director for Private Sector Development, Industrial Development and Public Policy Department, JICA
Keynote speech	- Bambang Brodjonegoro, Minister of BAPPENAS - Airlangga Hartarto, Minister of MOI - Kozo Honsei, Minister / Deputy Chief of Mission, Embassy of Japan, Indonesia
Closing remarks	- Leonard V.H. Tampubolon, Deputy Minister of Economic Affairs, BAPPENAS - Naoki Ando, Chief Representative, JICA Indonesia Office

In the morning session, results of the JICA Study is shared and discussed.

Minister of BAPPENAS, in his keynote remarks, stressed important role of manufacturing industry, in order to raise the economic growth rate. For this, productivity must be enhanced through human resource development which may be significantly improved with further FDI presence, and larger R&D expenditure by triple helix, as well as improved input from resource/agriculture sector (for food processing, in particular). He hopes cooperation between the two countries will facilitate implementation of the recommended policies.

Minister of Industry spoke Indonesia should take advantage of 4th Industrial Revolution to increase the share of manufacturing to GDP, focus on digitalization to increase productivity. He

explained about a just-announced roadmap of Making Indonesia 4.0 which highlights 5 sectors and 10 priority issues (more details in the later chapter). He confirmed MOI will establish National Industrial Committee (KINAS) to pursue Making Indonesia 4.0 (refer to later chapter for details).

In the afternoon session, BAPPENAS and the JICA Team proposed structure and procedures of KINAS. KINAS will be structured based on various existing law and other regulations. JICA will support initial operation of KINAS as a think tank. KINAS will be started by organizing working groups of the 3 industrial sectors such as automotive, electrical & electronics, and food processing.

10. Collection of data of Indonesian companies

The Study Team implemented data collection survey of enterprises (micro data survey) in the target industries for "Empirical analysis on supply chain and production network of Indonesian companies"[5].

This analysis is being conducted by a Japanese professor separately from work of the Study Team, but it is still under a part of the Study. Results and implications suggested from the analysis are expected to be a significant input to Industrial Dialogue and recommended policy of the Study.

The micro data survey includes two different locational types. First one is Nationwide Survey. Second one is Tegal Survey of which target area is limited to Tegal Regency (kabupaten).

The survey was outsourced to third party entities, which is University of Indonesia, Institute for Economic and Social Research (LPEM-FEUI).

The followings describe the data collection of the micro data survey.

10.1. Objective and requirements of the data survey

This analysis aims at clarifying comprehensive inter-enterprises network to analyze tendency of growth and performance of enterprises depending on position (such as up-stream to down-stream) in the network.

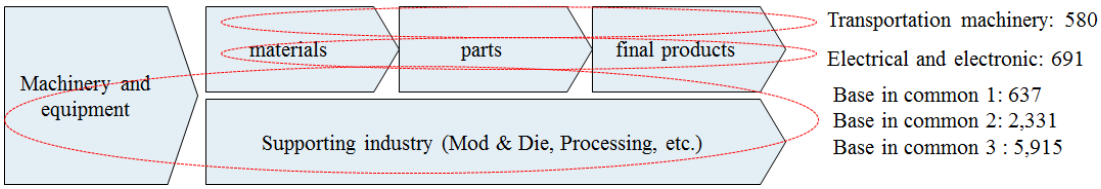
10.2. Nationwide Survey

In order to avoid duplication with existing micro-survey conducted by BPS and reduce the burden for the respondents, it is planned to merge newly surveyed data with existing database (as of 2014) collected and published by BPS. Enterprise survey of BPS covers medium and large sized enterprises. Therefore, the micro data survey under this study also targeted the same size categories.

10.2.1. Scope of target enterprises

First of all, enterprises producing materials, parts and final products which are specific to either Transportation machinery or Electrical and Electronic sector are defined, and each of the number of establishments are 580 and 691 respectively, according to BPS-Statistics Indonesia's "Manufacturing Industrial Statistics 2014". Then, enterprises which supply items or processing common to both sectors are defines. 3 optional types of classification, from narrow to broader coverage, are defined, such as "Base in common" 1, 2 and 3.

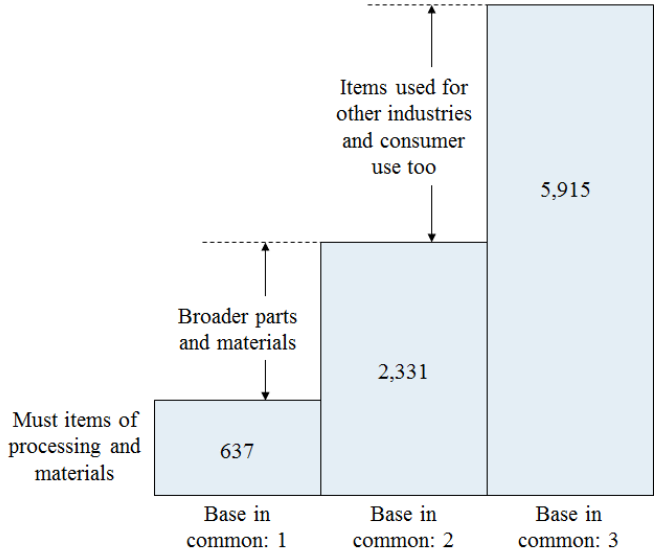
[5] Please see Annex for the study result.



(Source) The number is based on BPS-Statistics Indonesia "Manufacturing Industrial Statistics 2014"

Figure 104 Scope of target enterprises of the data survey for supply chain and production network analysis

Base in common 1 is the narrowest which covers only must-items and processing for the target industries. Base in common 2 further covers broader parts and materials. Base in common 3 covers all possibly relevant items which may include items mainly used for other industrial sectors and even for consumer use.



(Source) The number is based on BPS-Statistics Indonesia "Manufacturing Industrial Statistics 2014"

Figure 105 Comparison of 3 different types of coverage of target enterprises

Initial scope of target enterprises includes transportation machinery (580), electrical and electronic industry (691), and base in common 1 (444), of which total number is 1,336 establishments. Due to the larger size of missing target enterprises out of the list, the target sectors has been expanded to Base in common 2 in the later stage of the survey.

10.2.2. Area of Nationwide Survey

Nationwide Survey was implemented based on key locations such as Batam, Jakarta, Krawang, Bogor, Kab Bekasi, Malang, Bandung, Semarang, Surabaya and Sidoarjo, Kota Tangerang, and Kota

Serang, of which total number of samples in the list reached to 1,335[6]. This selection of locations is because most of the enterprises of the target industries are located in Java and Batam.

10.2.3. Questionnaire of Nationwide Survey

Existing enterprise survey by BPS (2014) includes basic profile of the company, workers composition and wages/salaries, fuel and lubricant input, energy used/sold, other expense, raw materials input, and goods produced.

Under consideration of merging with the existing BPS data, the micro data survey under this Study focused on collecting data such as 1) Specification of customers and suppliers and items sold/purchased and technical support received in the supply chain network, 2) Business service and outsourcing services such as finance, management/administration, technical design, and testing, and 3) Human resource of technical experts and human resource development.

Details of the questionnaire is attached in the Annex.

10.2.4. Results of Nationwide Survey

After starting the survey, it has been revealed that missing ratio of the target samples are as high as 29%. Therefore, the target segment has been expanded to include Base in Common 2.

At the end of the survey, size of samples sought by the survey was 1,588. Among them, number of effective samples (to be contacted) was 915 due to reasons such as “sought but not found”, “foreclosed, relocated and not in category any more”. Among the samples which are contacted, the number of effective responses was only 262 due to reasons such as “declined to participate”, appointment process stalled”, and “response was not completed (under process of appointment)”.

Table 39 Results of response among target samples

Total in the list	1,588
Found and contacted	915
Survey Completed	262
Declined to Participate	213
Appointment	27
Appointment Process Stalled	413
Sought but not found	486
Foreclosed, Relocated, Not in Category	152

Source: Nationwide survey

[6] This number includes, not only the directory of BPS survey 2014, but also LPEM’s original samples from their previous survey, etc.

10.3. Tegal Survey

10.3.1. Target scope of Tegal Survey

Tegal Regency is located in north-west part of Central Java Province. This area is selected for the micro data survey because 1) metal processing SMEs are developed in Tegal Regency, and 2) the location itself is expected to have advantage if supporting industries is extended to the east from JABODETABEK where factories are already overbuilt and cost of input such as wages and land prices become high.

Figure 106 Location of Tegal

The list which Study Team received from Tegal Regency includes 2,192 industrial entities of which majority is Micro and Small Sized business entities. Within the Tegal Regency, District of Talang and Adiwerna holds 72% of the whole entities. Therefore Tegal Survey mainly focused those 2 districts.

Regarding the business sectors, the survey targeted all the industrial sectors with small exclusion such as “Manufacture of Goods Jewelry of Precious Metals for Personal Purposes” and “Manufacture of Domestic Non Electric Cooking and Heating Equipment”, etc. which are not relevant to the target industries of the study.

10.3.2. Questionnaire of Tegal Survey

Different from Nationwide Survey, There is not preceding survey which can be merged with the data collected in this survey, questionnaire of Tegal Survey includes basic information such as profile of business entities, basic financial information and employment data on top of the information of supply chain network, business services, human resource development and innovation which are similar to the questionnaire of Nationwide Survey.

The questionnaire of Tegal Survey is attached in Annex.

10.3.3. Result of Tegal Survey

The survey was implemented by directly visiting factories and offices along the main industrial streets because the address of the directories were not so accurate. Survey team of LPEM-FEUI visited 562 firms of which 510 firms responded effectively (response rate is 97.7%).

Total number of effective samples is 501. By districts, Talang and Adiwerna share majority.

Table 40 Distribution of effective responses by districts

District	Count	Percent
ADIWERNA	207	40.6
BUMIJAWA	21	4.1
DUKUHTURI	36	7.1
LEBAKSIU	1	0.2
PANGKAH	1	0.2
SLAWI	3	0.6
TALANG	237	46.5
TARUB	4	0.8
Total	501	100

Source: Tegal Survey

10.4. Empirical analysis on supply chain and production network of Indonesian companies

Collected data through the surveys discussed above are used for the empirical analysis on supply chain and production network of Indonesian companies conducted by Professor Todo of Waseda University. He made a presentation titled “Innovation and Management Capability of Firms in

Indonesia: The Role of Networks among Firms and with the Public Sector" on May 18th, 2018, to members of Working Group of pre-KINAS (An inter-ministerial coordination framework supported by Phase 2 of this Study, of which details will be explained in the next chapter). The presentation is attached in Annex of this report.

The result/findings of the empirical analysis was a valuable insight for discussion among the government of Indonesia, including policy discussions at pre-KINAS as well as focus group discussion for RPJMN 2020-2024. The collected data is also used for cost benefit analysis to justify recommended policy discussed in pre-KINAS.

11. Implementation of Pilot Project to support plan, implementation and monitoring of industrial policies through inter-ministerial coordination

BAPPENAS and MOI confirmed, at the 4th Industrial Dialogue (April 17th 2018) to establish National Industrial Committee (KINAS) in order to plan, implement and monitor industrial policies based on road map of Making Indonesia 4.0 (I4.0) through inter-ministerial coordination. Study Team was requested to perform a project management unit as well as a think tank to support working group (WG), echelon 2 level, and Policy Coordination Board (PCB), echelon 1 level. MOI prepared a project office in MOI building for Study Team.

11.1. Preparation and work plan

JICA Study Team proposed work plan according to request from BAPPENAS and MOI. Objective of the pilot project is to support starting KINAS. KINAS is recommended to comprise of three stages, such as Policy Forum which is attended by the ministers of relevant ministries and chaired by Vice President, Policy Coordination Board (PCB), which is chaired by Deputy Minister of the Ministry of Industry (MOI) who takes charge of industrial policy. The three Working Groups (WGs) are supposed to be set up in accordance with the scope of Phase 1 of this study such as automotive, electrical & electronics, and food processing.

Among those three stages, Study Team is supposed to support PCB and three WGs in the work plan.

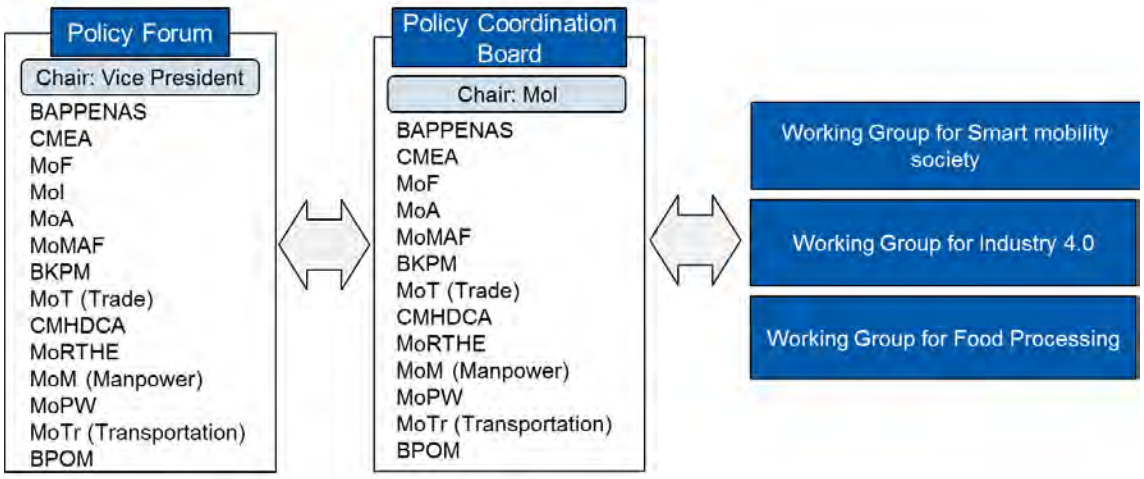


Figure 107 Structure of KINAS at the beginning of the pilot project

Study Team organized the team for the pilot project composing of (i) project members, (ii) local researchers, and (iii) alliance with academics in Indonesia and resource persons in academics of

Japan. Under the limited resources, Study Team designed assignment of the members so that at least one of the members are working onsite closely with MOI and BAPPENAS. Also, Study Team tried to make most of previous study and insight supplied by academics of Indonesia such as industrial experts in LPEM in preparation of policy recommendations, and request attendance of those experts at meetings of KINAS.

Under those assumptions considered in the Work Plan, Study Team proposed a schedule of the pilot study including 4 times PCB and 8 times WG in the period from April 2018 to March 2019.

As discussed later, however, number/frequency of PCB and WG was reduced due to delay of formalization of KINAS. Therefore topics discussed in WG and PCB were not separated by industrial sectors, but based on policy programs throughout the industrial sectors.

11.2. Framework of plan, implementation and monitoring of industrial policies through inter-ministerial coordination

11.2.1. Establishment of Inter-Ministerial Committee (Policy Coordination Board (PCB))

11.2.1.1. Background and bench mark study

This section discuss necessity and case studies of other countries to successfully implement industrial policies through inter-ministerial coordination. As discussed in the previous chapters, most of the recommended policy measures require inter-ministerial coordination. Therefore we recommend a policy implementation cycle, namely, as the first policy package. The proposed inter-ministerial committee comprises of 3 tiers organizational structures, namely Working Group (echelon 2 level), Policy Coordination Board (PCB) (echelon 1 level), and Policy Forum (Minister level).

This concept was further elaborated to be in line with political context of Indonesia and discussed in the 4th Industrial Dialogue organized on April 17th 2018. Study team introduced some case examples of other countries which are successful in the 4th Industrial Dialogue. Summary of those benchmark study will be described in the followings.

1) Case of Japan

In Japan, issues to be decided at Cabinet Meeting shall be cleared at Vice-Ministerial Conference in advance. In order to reach to agreement at Vice-Ministerial Conference, inter-ministerial communication at director/sub-director level or Working Group level seek for negotiable results. In

parallel, Cabinet Office Legal Bureau coordinates policies under discussion to prepare for the legislation.

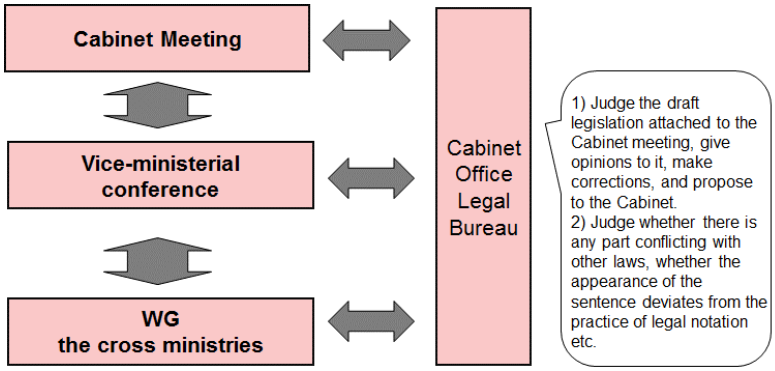


Figure 108 Involvement of Legal Bureau

Law on Cabinet Office stipulates Council on economic and fiscal policy and Council for science, technology and innovation.

Council on economic and fiscal policy

Council on Economic and Fiscal Policy (CEFP) was established for Prime Minister-led coordinated economic and fiscal policy and grand design of annual budget. Role of CEFP includes (i) Basic policy for economy, fiscal policy and annual budget, (ii) Coordinating important issues and consistency and continuity, and (iii) Advise to related ministers to achieve those policies. Topics discussed include issues towards middle and long-term development such as (i) Development and growth in middle and long-term, (ii) Vitalization of local economy, (iii) Reconstruction from the Great East Japan Earthquake, (iv) Promotion of innovation, (v) Globalization, (vi) Decline in the number of children and work-style renovation, and (vii) Renewal of education system.

Prime Minister Koizumi desterilized “Council on Economic and Fiscal Policy” as top-down decision making platform for policies which shall have inter-ministerial influences. This is to make top-down decision with priority and budget simultaneously. Deadline to finalize discussion paper to be submitted to the council forces middle-to-high level officials (in related ministries) to reach to agreement on controversial policies (otherwise, it would be your fault). Experts (Resource Person) are often composed of highly respected academic and business persons, which make process and results of policy making trustworthy.

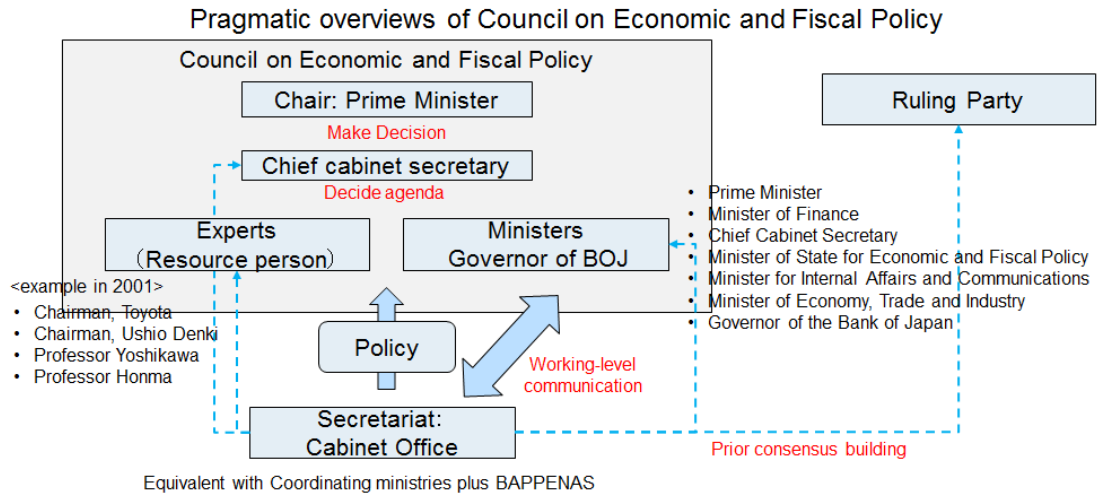


Figure 109 Pragmatic overviews of Council on Economic and Fiscal Policy

Industry-Academia-Government collaboration policy

Cabinet Office (CAO) stipulated Science and Technology Basic Act which is base for specific laws such as Act on the Promotion of Technology Transfer from Universities to Private Business Operators. CAO also organizes Council for Science, Technology and Innovation chaired by Prime Minister to discuss critical and inter-ministerial issues.

CAO established Industry-Academia-Government Collaboration Promotion Conference. This conference works as reward system to facilitate innovation projects under industry-academia-government collaboration. Each of the relevant Ministries reward individual projects which are celebrated at Industry-Academia-Government Cooperation Summit

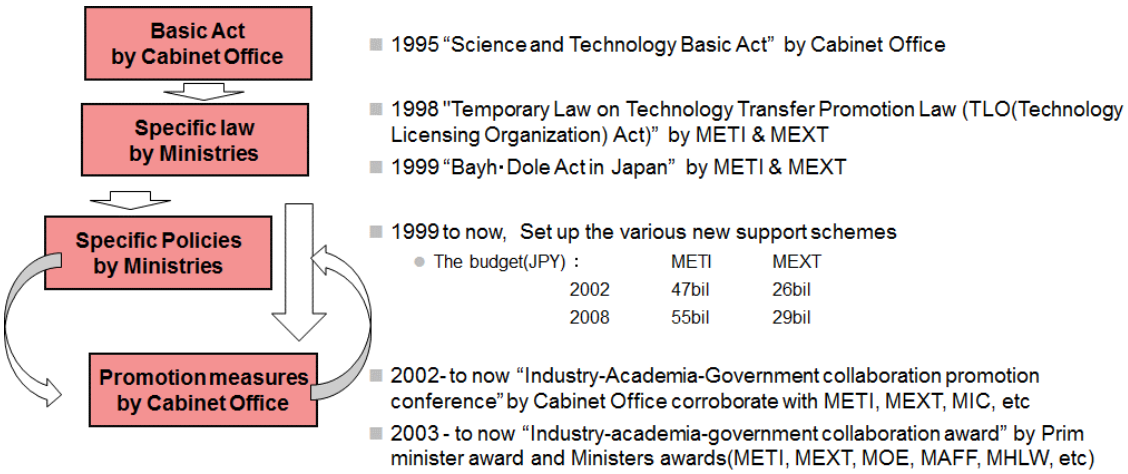


Figure 110 Case Example of Industry-Academia-Government collaboration policy

Under such coordination scheme, specific projects are planned and conducted by individual ministries such as Ministry of Trade, Economy and Industry (METI), Ministry of Education, Culture, Sports, Science and Technology (MEXT), Ministry of Environment (MOE), Ministry of Agriculture, Forest and Fisheries (MAAF), and Ministry of Health, Labor and Welfare (MHLW),.

2) Case of Thailand

Ministry of Industry (MOI) has announced 10 major industries for upgrading Thai industry, dubbed as First & New S-Curve, which has become pillars for industrial policy. The policy was crafted and announced by MOI in Nov 2011 by May 2011. The policy has been strongly embraced by The Board of Investment of Thailand (BOI), which is under Prime Minister Office, to attract new investments by offering comprehensive and competitive incentives.

Figure 111 Policy for 10 major industries in Thailand

Thailand has crafted Battery Electric Vehicle (BEV)/P Plug-in Hybrid Electric Vehicle (HEV) Promotion Policies in 2017, under leadership of MOI, Office of Industrial Economics (OIE) and BOI in coordination with concerned ministries. The policy is based on the "First S-Curve and New S-Curve, which has been crafted by coordination between OIE, Energy Policy and Planning Office, Ministry of Energy (EPPO), and Ministry of Science and Technology (MOST) upon receiving policy direction from Office of Prime Minister. OIE, BOI, MOI organized a Working Group (WG) and invited all concerned ministries for revision of the policy. Finally, each ministry was assigned to make regulations; MOI, BOI, and MOI

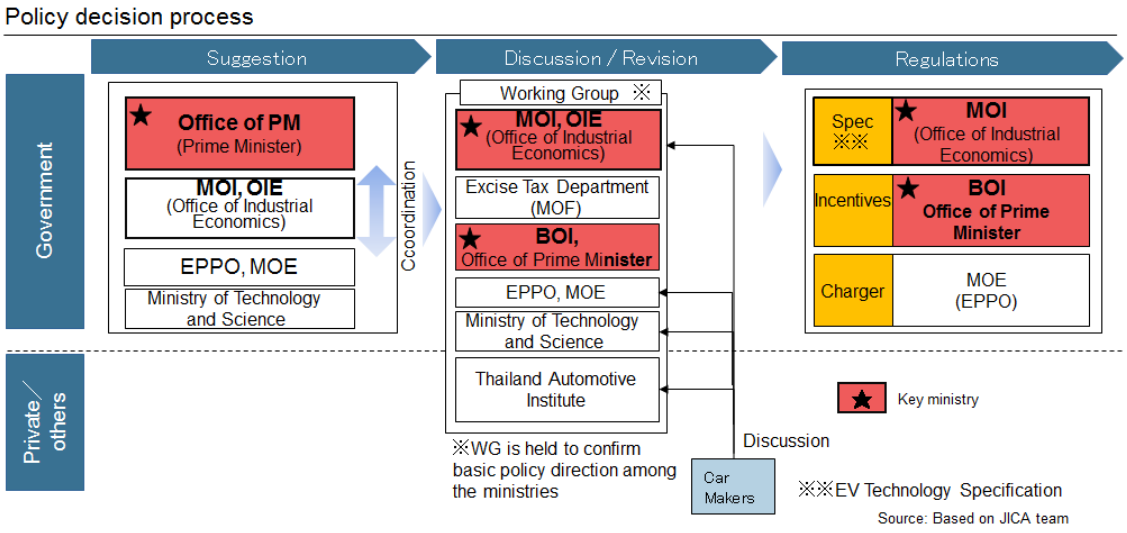


Figure 112 Policy decision process of Thailand

3) Case of Malaysia

In Malaysia, Prime Minister Department (JPM) played a leading role to craft National Automotive Policy Framework through inter-ministerial coordination. The National Automotive Policy Framework was suggested by Cabinet Committee chaired by PM and was crafted by Prime Minister Department in Oct 2005. Ministry of International Trade & Industry (MITI) and its think tank, Malaysia Automotive Institute (MAI), took leading role of drafting comprehensive National Automotive Policy (NAP) based on the Framework. Finally, the Policy was reported to Cabinet Committee, and then submitted for Cabinet decision.

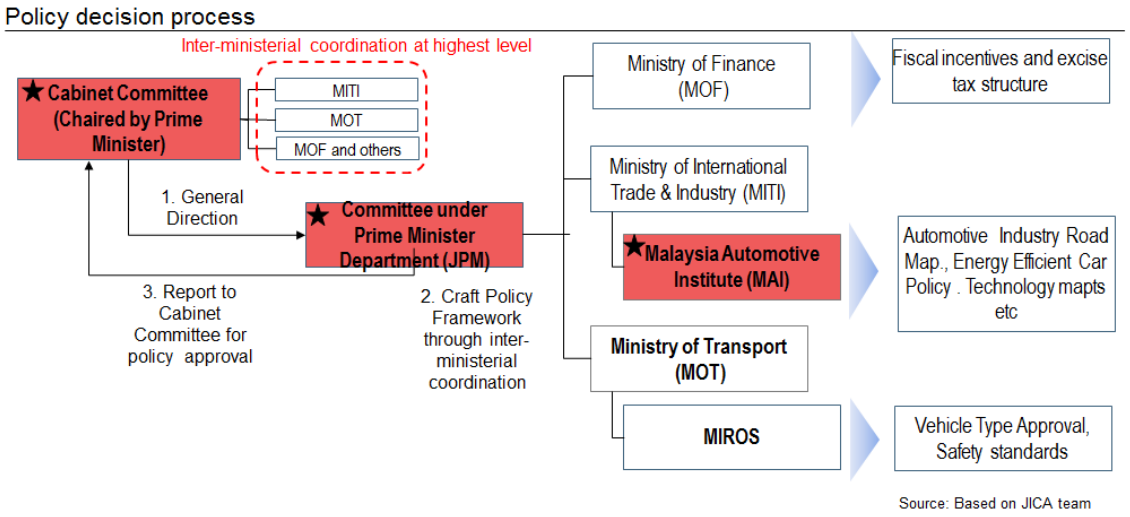


Figure 113 Policy decision process of Malaysia

11.2.1.2. Development of National Industrial Committee (KINAS)

According to BAPPENAS (Presentation at the 4th Industrial Dialogue), there are several legislative documents which are related to inter-ministerial policy making/implementation for the purpose of industrial development.

First is Law on Industry among which Article 112 stipulates the National Industrial Committee. This Committee is to support the industrial development objective as referred to in Article 3 of the Law. And it is said that further provisions on the organizational structure and work procedure of the National Industrial Committee shall be stipulated in a Presidential Regulation. Article 113 of the Law says that the National Industrial Committee may form a working group consisting of relevant experts in Industrial sector from government, Industrial association, academic field and/or general public.

Second one is Presidential Regulation No. 8/2016 which stipulates The National Economic and Industrial Committee (KEIN). KEIN is tasked to convey strategic advice in determining national economic and industrial policy to the President, with notes to Steering Committee of which chair is Coordinating Minister for Economic Affairs.

Third one is Presidential Instruction No. 7/2017 which requires ministries and non-ministerial government institutions to report to related Coordinating Ministers in every formulation, enactment and implementation of policy. For cross-sector policies that are strategic, important, and have broad implications nationally, the proposing Minister and Head of Government Institutions shall submit written policy proposal to the President through related Coordinating Minister to be discussed in a Cabinet Meeting to obtain a Decision.

Fourth one is Presidential Decree No. 17/2017 (Synchronization for the Process of National Development Planning and Budgeting) which stipulates a joint role for the MOF and Bappenas in the budget formulation process.

Table 41 Regulatory frameworks on industrial policy governance

Legislative document	Relevant key stipulation
Law No.3/2014 (Law on Industry)	Article 112 (1) "In order to support the Industrial development objective as referred to in Article 3, a National Industrial Committee shall be established."
Presidential Regulation No. 8/2016 (The National Economic and Industrial Committee: KEIN)	Stipulate The National Economic and Industrial Committee (KEIN) which is advisory role to President.
Presidential Instruction No. 7/2017 (Coordinating Minister)	Regarding policy with strategic/nationwide impact or cross- sector policies, written policy proposals should be submitted to the related Coordinating Minister.
G Presidential Decree No. 17/ 2017 (Synchronization of National Development	Stipulate Minister of BAPPENAS shall coordinate in financing of projects and integrated expenditure utilization for National Priority Programs/Projects.

Legislative document	Relevant key stipulation
Planning and Budgeting Process)	

(Source) Based on "The 4th Industrial Dialogue: Concept of National Industrial Committee" (April 17th 2018, BAPPENAS), and various meetings with BAPPENAS

Minister of Industry confirmed to establish National Industrial Committee to implement Making Indonesia 4.0 Roadmap which was presented at Indonesia Industrial Summit 2018, April 4-5 2018. Making Indonesia 4.0 is a roadmap for industrial development. The Roadmap chose 5 regionally competitive manufacturing sectors which have the most potential under the 4th Industrial Revolution for Indonesia. Those are Food and beverage, Textile and apparel, Automotive, Chemical, and Electronics. The Roadmap also listed up 10 national cross sectoral priorities to accelerate its manufacturing sector development with consideration that major factors slowing down industry improvement initiatives are often cross-sectoral. Those 10 national priorities compose of (i) Reform material flow, (ii) Redesign industrial zones, (iii) Embrace sustainability, (iv) Empower SMEs, (v) Build nationwide digital infrastructure, (vi) Attract foreign investment, (vii) Upgrade human capital, (viii) Establish an innovative ecosystem, (ix) Incentivise technology investment, and (x) Reoptimize regulations and policies.

Figure 114 10 priority issues of Making Indonesia 4.0

Minister of Industry aims at pursuing the Roadmap by making use of the National Industrial Committee (KINAS).

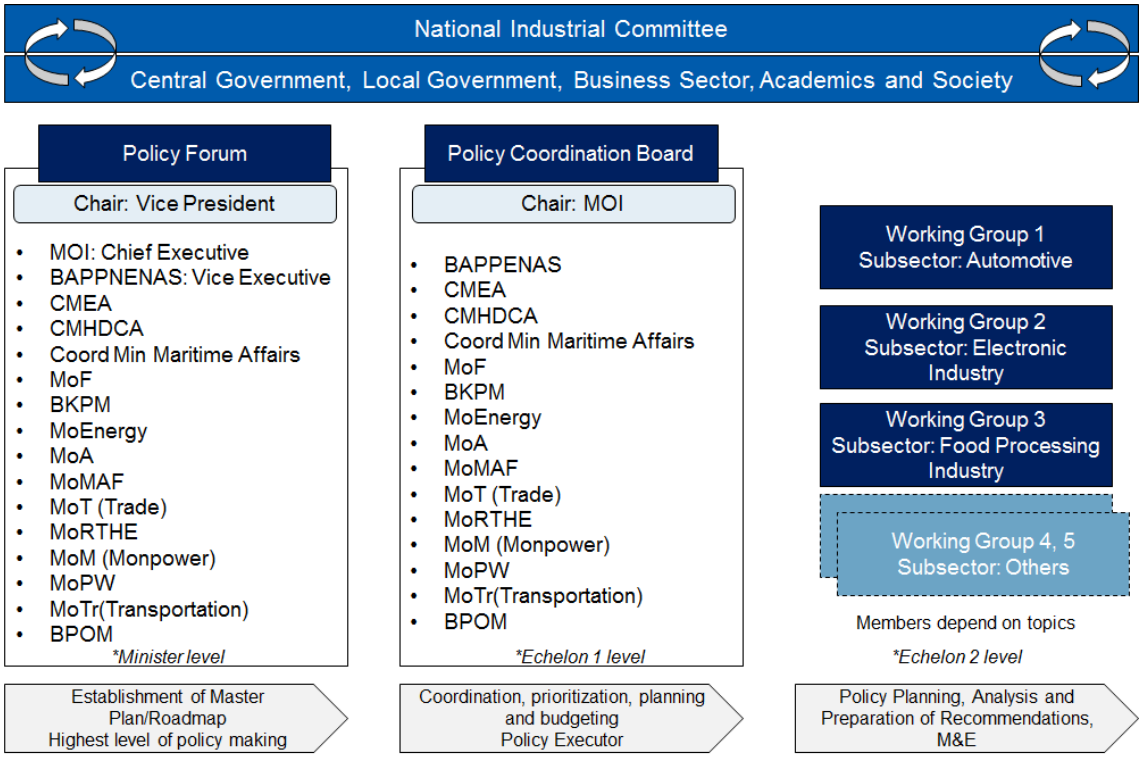


Figure 115 Conceptual structure of KINAS proposed by BAPPENAS

BAPPENAS and MOI coordinated to start KINAS. Considering it will take months to a year to formalize KINAS by Presidential Regulation, BAPPENAS and MOI agreed to start from practical trial which includes Working Group discussion and PCB discussion. JICA Study Team supports this trial as a function of PMU and Think tank.

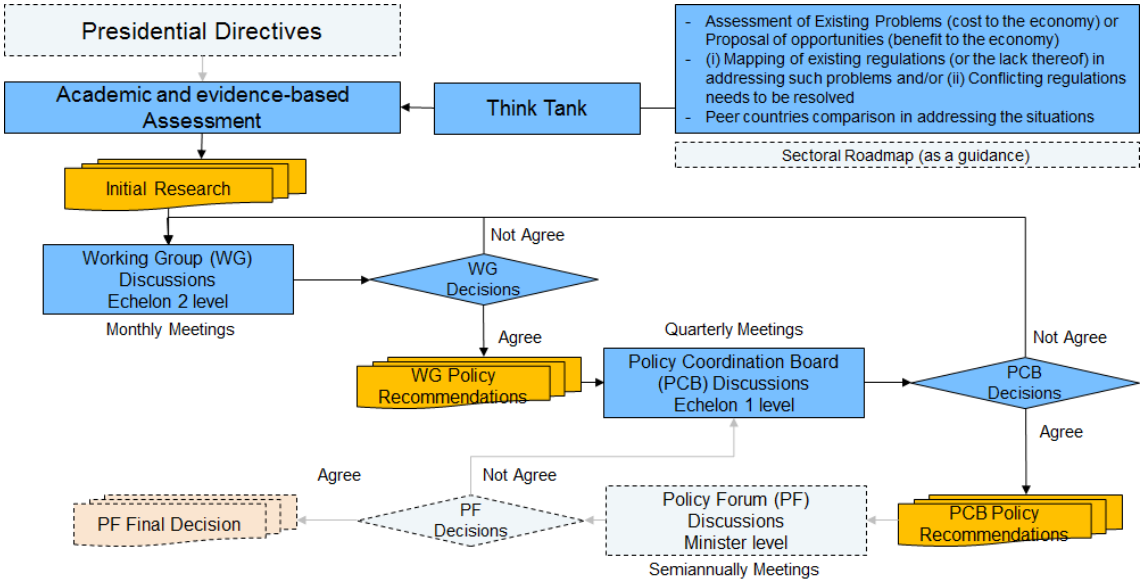


Figure 116 Preliminary procedure of decision making under KINAS (designed by BAPPENAS)

According to preliminary procedures of KINAS, Study Team closely work with BAPPENAS and MOI. Followings are main tasks of Study Team.

- Recommend policy measures to be discussed at WG based on the recommendations of Phase1 in coordination with Academics including Japan and Indonesia,
- Support MOI/BAPPENAS in drafting Policy Recommendation document, and
- Support MOI/BAPPENAS in preparing WG and PCB.

It is supposed to pass final policy recommendation agreed through the process of KINAS to process of drafting regulation. According to a JICA expert at Ministry of Law and Human Rights, the followings are standard steps of drafting regulations.

1. Relevant Line Ministry drafts regulations such as Law, Government Regulation, Presidential Regulation, and Minister Regulation, etc.
2. The relevant Line Ministry holds inter-ministerial meeting of which members are specified the Line Ministry to review/revise the draft.
3. Ministry of Law and Human Rights checks/examines the draft in terms of consistency with existing regulations.
4. Relevant Coordinating Ministry resolves and finalize the draft if there is any dispute.

Regulation on KINAS

MOI held intensive discussion meetings at practical level towards the end of year 2018. The discussion focused to decide on the two options in terms of base which the presidential regulation

shall rely on. First option is to rely on Article 112 of the Law on Industry, while the second one is not to rely on the Law but rely on the Roadmap of Making Indonesia 4.0. Pros-cons of those two options are summarized in the following table.

Table 42 Pro-cons of two options of legal formalization of KINAS

Options	Option1: Presidential regulation to materialize the National Industrial Committee (Original concept of BAPPENAS)	Option2: Presidential regulation to implement the Roadmap of Making Indonesia 4.0
Legal base	Based on Article 112 of the Law on Industry	Independent on Article 112 of the Law on Industry. The presidential regulation shall include formal authorization of the Roadmap of I4.0.
In relation with the Roadmap I4.0	KINAS covers broader scope of I4.0, which is same as objective of the Law on Industry, while KINAS may, for the coming years, focus on implementation of the Roadmap of I4.0.	KINAS (or another name of committee) aims at solely implementing the Roadmap I4.0.
Advantage/disadvantage	It could be more sustainable platform to pursuit the Law on Industry.	Convenient as a Showcase of making Indonesia 4.0. Pros and Cons on the Roadmap itself might influence on strength of inter-ministerial coordination.

In the result, the second option was prioritized. It is still a remaining option to establish KINAS basing on Article 112 of the Law on Industry, according to BAPPENAS.

11.2.2. Establishment of Working Group (WG)

Under the circumstances discussed above, due to the delay of legislation of KINAS, WG is decided to be held not by sectors, but by policy measures considering limited resources of relevant ministries who attend and get involved in discussion under pre-KINAS. Being requested to recommend policies to be discussed and proposed in the pre-KINAS, Study Team advised optional topics to BAPPENAS and MOI such as promotion of R&D&D, local enterprise/SME development, Human resource upgrade, logistical infrastructure upgrade, and promotion of export/business friendly environment which are the key recommendations in Phase 1.

As a result of intensive discussion with BAPPENAS and relevant Directorates of MOI with consideration to the priorities proposed in Making Indonesia 4.0, the following three topics are put forth to WG meetings, of which two topics are discussed in PCB meetings.

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

MOF happened to be drafting regulations on tax incentive to facilitate R&D and HRD to respond to policy direction of the President. MOF shared the draft with BAPPENAS. The objective and mode of such tax incentive is quite similar to one of the Study Team's recommendations which are based on bench mark study of Thailand in Phase1.

11.2.2.2. Financing Program for SME

Preferential finance scheme for SMEs aiming at strengthening suppliers and increasing local contents is one of the recommendations in Phase 1. The concept is slightly modified to (i) focus on medium-sized enterprises rather than general focus on SMEs, and (ii) focus on investment for innovation.

11.2.2.3. Development of Biofuel and Ecosystem

JICA Team identified willingness of Japanese business to coordinate with Indonesia in developing and commercializing more sophisticated biofuel than that is used currently and planned in the near future. Further upgrade of biofuel would be in line with Indonesia's roadmap of automotive industry and I4.0 as well. In this regards, Study Team proposed sub-WG with attendance from MOI and Japanese enterprises.

11.3. Tax incentives for RD&D and industrial human resource development

11.3.1. Outline of WG and PCB

Working Group on RD&D Incentive and Human Resource Development Incentive Program for the Industrial Innovation was held on July 16th 2018.

Table 43 Outline of WG on Tax Incentive

Date	July 16th 2018
Location	BAPPENAS, Room SS4
Attendant institutions	BAPPENAS: - Directorate of Industry, Tourism, Creative Economy - Directorate for Small Medium Enterprises and Cooperation MOI: - Planning Bureau - Agency for Industrial Research and Development (BPPI) - Secretariat of Directorate General of Small, Medium & Multi-various Industry (IKM), MOF - Fiscal Policy Agency (BKF)

	CMEA BKPM Bank Indonesia ERIA LPEM

Policy Coordination Board was held on October 22th 2018.

Table 44 Outline of PCB on Tax Incentive

Date	October 22th 2018
Location	
Attendant institutions	Bpk Leonardo Tampubolon, Deputy of Economy of BAPPENAS Bpk Harris Munandar, Secretariat General of MOI BAPPENAS: - Directorate of Industry, Tourism, Creative Economy MOI: - Planning Bureau MOF: - Fiscal Policy Agency (BKF) BKPM CMEA Bank Indonesia

11.3.2. Tax Incentive on R&D&D

Indonesia has the lowest R&D investment as a percentage of gross GDP, in terms of Gross Expenditure on Research and Development (GERD) according to GDP per capita. Indonesia's GERD is lower than Vietnam and India.

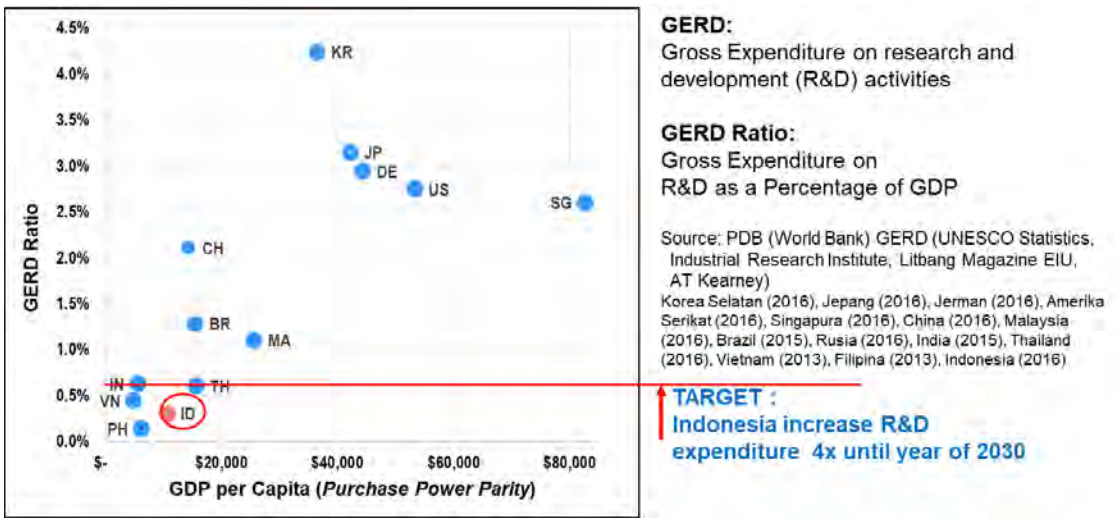


Figure 117 GERD and GDP per capita

Indonesia has a small amount of private sector R&D investment. Private sector R&D investment is 78% in Japan, 70% in Thailand and 50% in Malaysia, but only 9% in 2016 in Indonesia. Most of

Indonesia's R&D investment is government-related. From now on, it is necessary to promote private sector R&D investment like other countries in Asia.

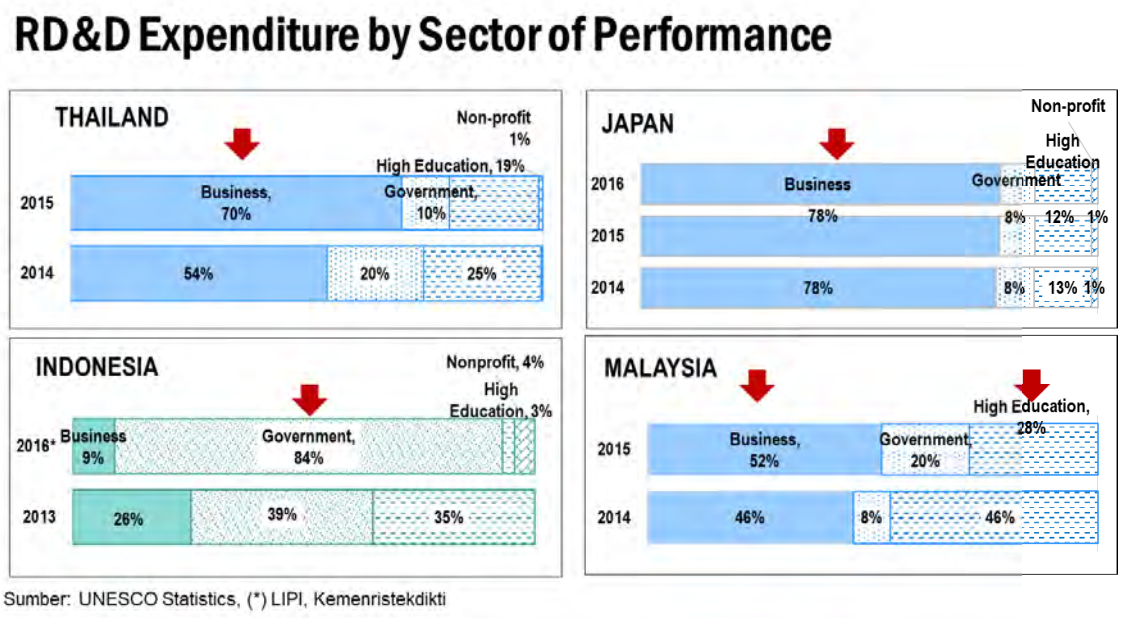


Figure 118 R&D expenditure by sector in comparison with other countries

ASEAN countries are working on promoting R&D investment. In Malaysia, R&D investment is promoted by incentives for investment including R&D investment, incentives for preferential industries, and incentives for Pioneer Status.

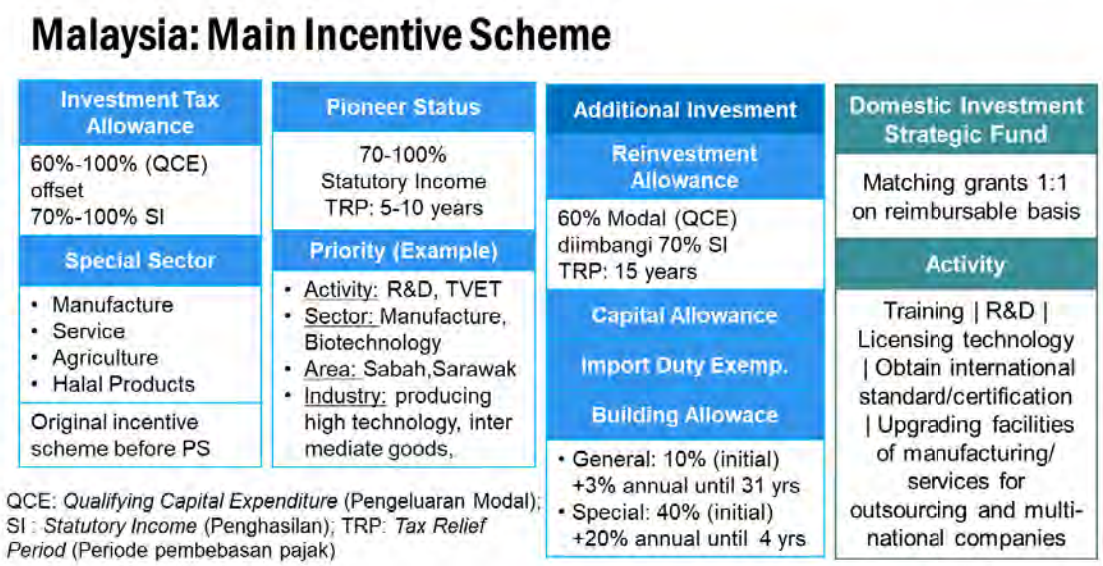


Figure 119 Incentive scheme of Malaysia

Thailand is also promote R&D investment through various incentives by BOI.

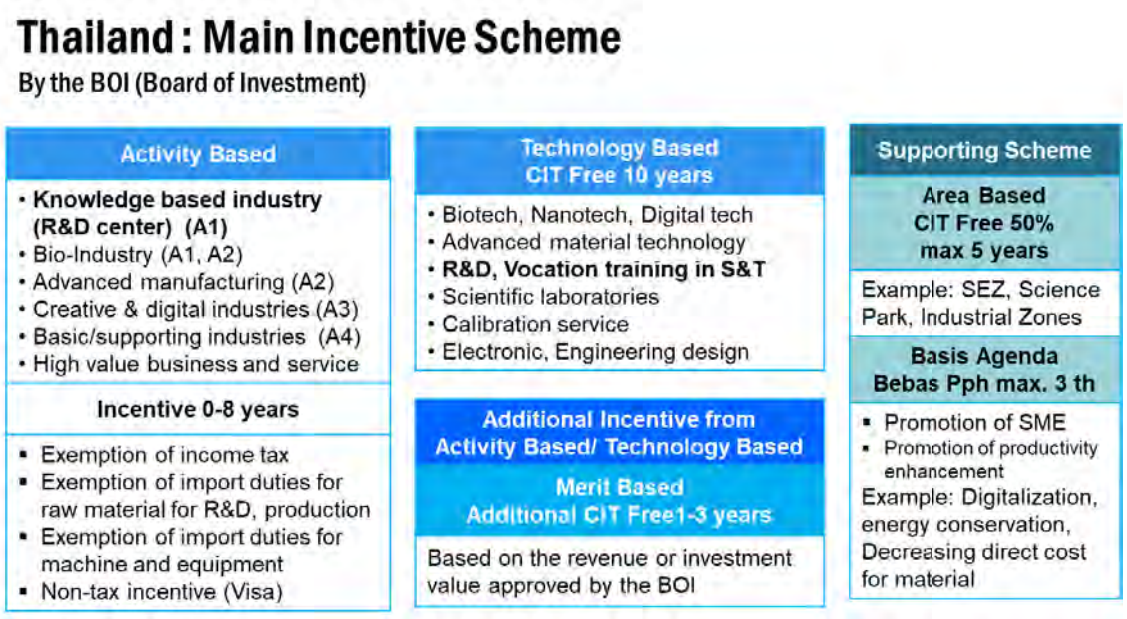


Figure 120 Incentive scheme of Thailand

The WG and PCB discussed on R&D incentives in Indonesia, referring to the efforts of neighboring countries. The points of discussion are as follows.

- Should be the largest incentive in ASEAN countries. However, there is concern about the decrease in tax collection.
- Should the target be only domestic companies or include foreign investment companies.
- Handling of incentives by obtaining patents. There are many non-patentable R&D.
- Grant incentives when they are put into practical use as an outcome of R&D.
- Grant incentive for R&D activity by industry-academia collaboration.
- Period of giving incentives.

Following the above argument, the PCB suggested the following. MOF will implement this as a ministerial order in response to this recommendation.

Table 45 Proposed incentive for R&D

Target	Tax deduction
Cost of RD&D	·Deduct taxable income by 300% of R&D&D costs for calculation of corporate income tax ·Can be carried forward up to 5 years
Asset acquisition for R&D&D	·Accelerate depreciation years by half (Category I: 1 year, Category II: 2 years, Category III: 4 years, Category V: 5 years)

11.3.3. Tax incentive on human resource development (HRD)

Indonesia has less than half of the other countries in labor productivity of major Asian countries. Low labor productivity is mainly due to low skills. In order to improve Indonesia's low labor productivity, promotion of human resource development is required.

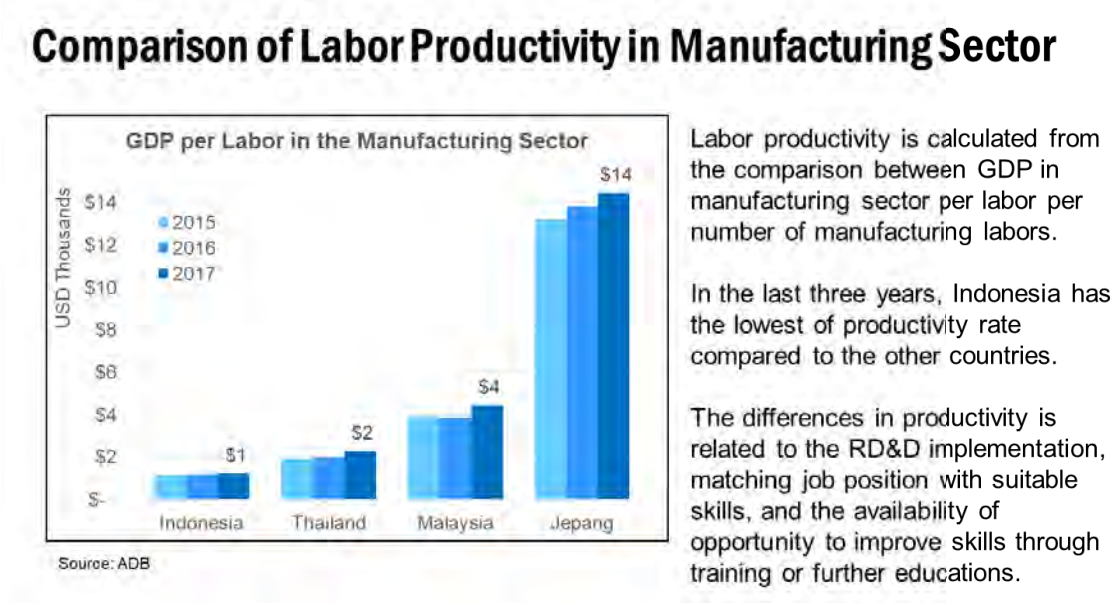


Figure 121 Comparison of labor productivity in manufacturing sector

In Indonesia, there is an incentive system for internship and vocational training. Similar schemes exist in Thailand and Malaysia. There is no big difference between the incentive systems in these three countries. In Indonesia, there are not many companies who know this system, and the actual use is not many. Problems in Indonesia's system have been pointed out, such as its classification becoming finer. Therefore, KINAS (JICA Study Team) suggested changing the framework and making it easier to use as in other countries.

Comparison of Tax Deduction Scheme for HRD

Countries	Malaysia (Double Deduction)	Thailand (Revenue Dept.)	Saat ini/ Draft PMK	KINAS
Component of tax deduction	200%	200%	200%	200%
Scholarship	**200%** In Malaysia, pemagangan is incentivized under *intermship* scheme	--	PMK 246/2008 100%	**200%** - Beasiswa - Pelatihan di Unit Pelatihan, *in-house* - Pemagangan guru, siswa, lulusan 1 th.
Vocation/ training		**200%** - Vokasi (DVT, pelatihan bergerak) - Pemagangan dalam bentuk belajar-bekerja	UU 36/2008 100%	
Pemagangan (*apprenticeship*)			Draft: 100% + 100% guru, umum	
Asset	Supporting training (separated scheme) **10% (year 1) +3% annually (30 yr)**	Supporting training (separated scheme) **40% (year 1) +15% annual (4 yr)**	**200% (separatd)** *teaching factory*, apprenticeship	**accelerated by half period** *teaching factory*, apprenticeship, Training
Period	1 year	1 year	N/A	*Carry forward* 5 th
Cap Reduction	--	Industry size	N/A	--

Figure 122 Comparison of tax deduction scheme for HRD

The WG and PCB discussed the incentives for HRD in Indonesia. The main points are as follows.

- Should be a system that is cheap and easy to use in ASEAN countries.
- Targets not only domestic companies but also foreign investment companies

Following the above argument, the PCB suggested the following. MOF will implement this as a ministerial order in response to this recommendation.

Table 46 Proposed Tax deduction scheme for HRD

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;
Asset acquisition for HRD	Accelerate depreciation years by half (Category I: 1 year, Category II: 2 years, Category III: 4 years, Category V: 5 years)

11.4. Financing Program for SME on Industrial Innovation

11.4.1. Outline of WG and PCB

Working Group on Financing Program for SME on Industrial Innovation was held on August 16th 2018.

Table 47 Outline of WG on Financing Program for SME on Industrial Innovation

Date	August 16th 2018
Location	Ministry of Industry, Lt. 2, Ruang Rajawali
Attendant institutions	BAPPENAS: - Directorate of Industry, Tourism, Creative Economy - Directorate for Small Medium Enterprises and Cooperation MOI: - Planning Bureau - Agency for Industrial Research and Development (BPPI) - Directorate of Resilience and Industrial Business Climate (KIUI, BPPI) - Secretariat of Directorate General of Small, Medium & Multi-various Industry (IKM), - Directorate of Small and Medium Food Industries, Wood Products and Furniture (IKM), - Directorate of Small and Medium Industries for Chemical, Clothing, Various and Craft (KSAK, IKM) CMEA Ministry of Cooperative & MSME Bank Indonesia Bank Exim

Policy Coordination Board was held on February 14th 2019.

Table 48 Outline of PCB on Financing Program for SME on Industrial Innovation

Date	February 14th 2019
Location	Hotel Bidakara
Attendant institutions	Bpk Leonardo Tampubolon, Deputy of Economy of BAPPENAS Bpk Harris Munandar, Secretariat General of MOI BAPPENAS: - Directorate of Industry, Tourism, Creative Economy MOI: - Planning Bureau MOF: - DG Financing and Risk Management (DJ PPR) - Fiscal Policy Agency (BKF) CMEA OJK Bank Indonesia Bank Rakyat Indonesia (BRI) Bank Mandiri

11.4.2. Recommended policy measure

Following policy recommendation is compiled by JICA Study Team (as think tank of pre-KINAS) based in accordance with results of discussion of WG and PCB.

11.4.2.1. Background of supply side

Indonesia is highlighted with small size of financial market as represented by monetary aggregate (M2 / GDP) (39.6%) compares to Malaysia (137.1%), Thailand (127.4%) and Vietnam (117.0%). This disadvantage is structural, mainly caused by evacuation of financial assets to after the financial crisis in late 1990s. The small sized financial market causes structural over-demand on supply of funds. Accordingly, high historical volatility of financial assets, particularly that of sovereign debt securities and rupiah, upheaves risk premium. These financial and macro economy conditions entail very high cost of funds which includes cost of equity (=return on capital required by shareholders) and cost of debt.

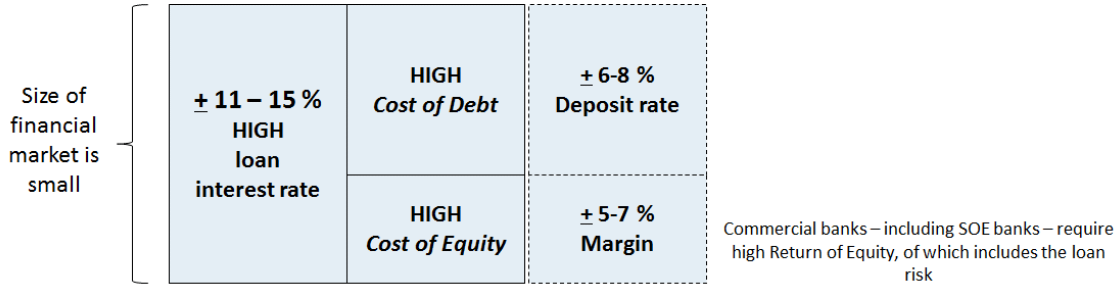


Figure 123 Typical case of structure of banking interest rate

Accordingly, finance to SMEs in Indonesia is small (6.9% as of 2017) as compared with the peer countries (Malaysia: 21.6%, Thailand: 41.9%, Vietnam: 26.6%, as of 2014). Although government-owned commercial banks are dominant in the banking system, they are commercial banks listed in stock market, which limits their capacity to perform preferential loans to customers. Besides, liquidity position of total commercial banks are always tight. Therefore, loans by commercial banks are only selective with high interest rate.

It can be said that Indonesia faces more market failure in terms SME finance than the peer countries. Government intervention to SME finance is focusing on financial inclusion of micro and small businesses in Indonesia rather than support for growth and innovation of medium-sized enterprises. For example, maximum size of credit guarantee for SMEs supported by government is much smaller than the peer countries.

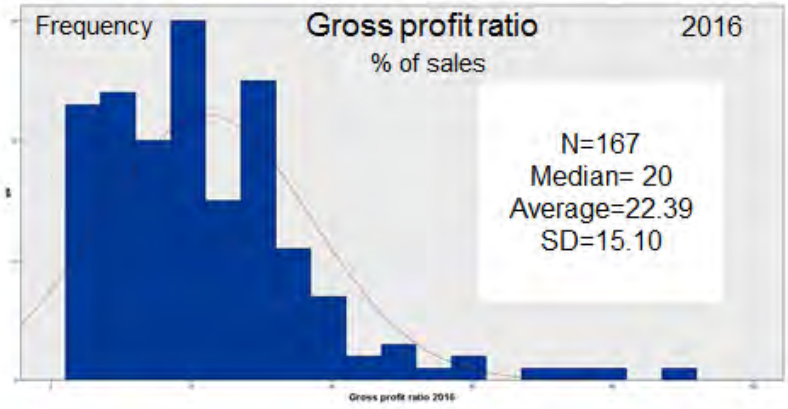
- In Thailand, credit guarantee is available up to THB 40million (Rp16 billion). Guaranteed loan outstanding is 2.05% as %GDP, and manufacturing account for 22.3% in 2014.

- In Malaysia, Credit Guarantee Corporation Malaysia Berhad (CGCMB) and Syarikat Jaminan Pembiayaan Perniagaan Berhad (SJPP) provides guarantee in RM 50 million (Rp180B), and RM 5 million (Rp18B), respectively. Total guaranteed loan outstanding is 6% as % GDP.
- In Indonesia, Kredit Usaha Rakyat (KUR) supports "first-time borrower" with ceiling amount of Rp 500 million, and processing industry only account for 5.6% in 2017. Guaranteed loan outstanding is 0.98% as %GDP. KUR is very successful in terms of outreach to non-bankable small businesses, as a policy means for financial inclusion. But it is difficult to recognize KUR as a policy of financing to industrial development.

On top of credit guarantee for SMEs, various financial programs are provided/supported by government in the neighbor countries. In Malaysia, for example, Special Funds by Bank Negara Malaysia, Malaysian Technology Development Corporation (MTDC), and Malaysian Industrial Development Finance Berhad (MIDF) support various demands such as increase of production capacity, technological innovation, automation of factory/services, and export penetration, etc. In Indonesia, as already discussed, state-owned commercial banks are not able to perform roles of policy loan programs.

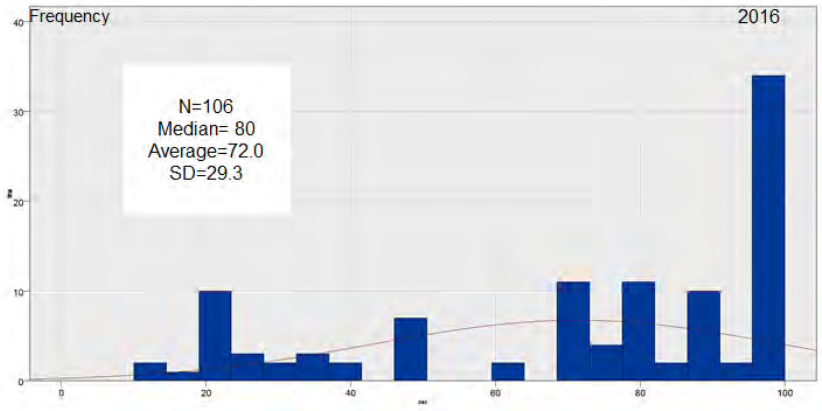
11.4.2.2. Background of demand side

Looking at demand side, medium-sized enterprises face financial difficulties. According to statistical assessment based on enterprise micro data of BPS, cost of debt is too high as compared with their typical operating profit ratio to justify new investment financed by external debt. Availability of funds in terms of size is also a challenge. Among medium-sized enterprises who borrowed loan in 2016, borrowed amount was smaller than planned for about half of the borrowers, according to survey implemented in 2017.



Source: Enterprise survey under JICA Study for globally competitive industry 2017
Note: Transportation machinery, Electrical & Electronic and their supporting industries

Figure 124 Distribution of Gross profit ratio of medium-sized manufacturing enterprises



Source: Enterprise survey under JICA Study for globally competitive industry 2017
Note: Transportation machinery, Electrical & Electronic and their supporting industries

Figure 125 Ratio of amount actually borrowed as compared with planned amount (%)

11.4.2.3. Necessity of financial support to medium-sized manufacturing business

Having viewed those analysis above, it is necessary to develop government intervention to support medium-sized enterprises in financing for growth and innovation.

One of the possible options of policy measures might be expanding KUR to cover larger sized loan amount to match financial demands of medium-sized enterprises for growth and innovation. However, it shall be noted that capacity for credit appraisal, monitoring and risk management for the expanded coverage would be quite different from those being currently implemented for ample numbers portfolio comprising only small-sized loans focusing on retail vendor business. Actually, it is not credit risk but rather long-term funds and low interest rate that commercial banks would need in order to extend loans with appropriate size and moderate interest rate for medium-sized manufacturing enterprises.

11.4.2.4. Recommendation on financial scheme

Study Team, as a think-tank of pre-KINAS, drafted recommendation of Financing Program for the Industrial Innovation. This aims at supporting medium-sized enterprises doing innovation and technology development. This section will discuss about financial scheme to mitigate difficulties observed in financing medium-sized manufacturing enterprises discussed previously, before elaborating target projects in next section.

According to interviews and statistics, typical interest rate of bank loan applied for business enterprises are:

- 6% (cost of funds) + 5% (margin) =11%.

Cost of funds is represented by weighted average of debt of banks, such as deposit and bonds. Margin generally comprises of operation and administrative costs, compensation for loss caused by

default/downgrade, and profit required by equity market/shareholders.

Proposed scheme aims at facilitating medium-to-long term loans with preferential loan interest rate, while retaining flexibility of participating commercial banks to decide loan conditions applied to their customers according to the banks' policy and strategy, and maximizing incentive upon the banks to facilitate disbursing the preferential loans to customers.

MOF disburses loan with subsidized interest rate (3% under current market) to National Interest Account (NIA), a revolving fund account opened at each of the participating banks. The Banks can mix funds from NIA and their own funds for each of loans to customers (end borrowers). The portion from NIA shall be served to end borrowers with maximum 3 % of margin on the borrowed rate (3%+3% = 6% for end borrowers). Maturity of the loan to NIA is 3 years and it can be rolled over upon maturity. The subsidized interest rate 3% is only applied for portion which is used for disbursement to end borrowers, while interest rate applied for the idling portion of NIA shall be commercial rate of 3 years debt in wholesale market. This would incentivize the banks to accelerate disbursement to end-borrowers. Credit risk of the end borrowers are fully taken by the banks. If loans under this program fall into non-performing loan (NPL), the amount attributed to the portion shall be replaced by the banks' own funds.

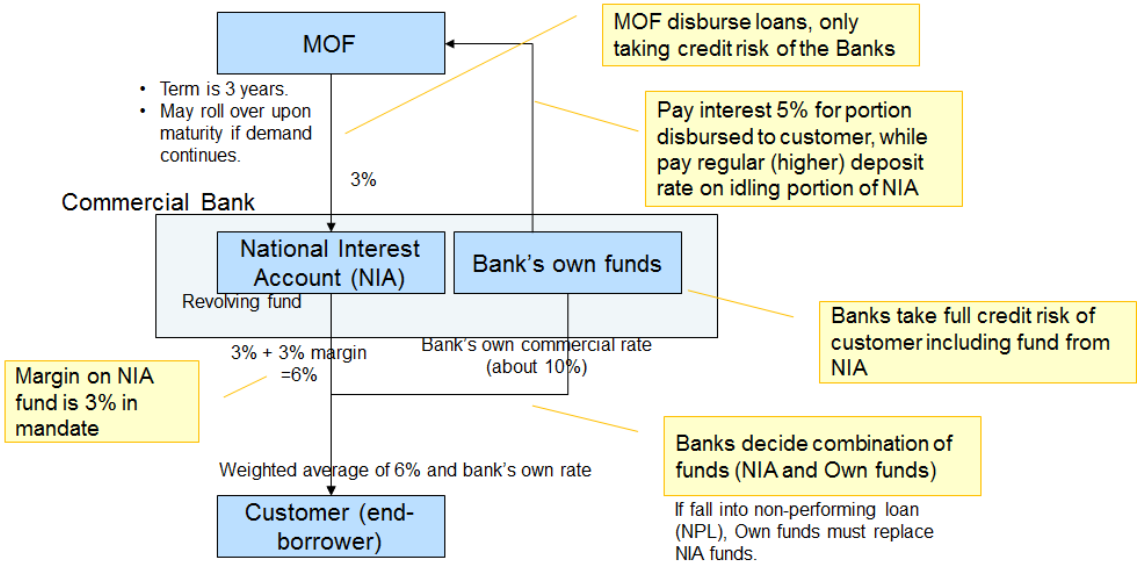


Figure 126 Recommended financial scheme

11.4.2.5. Recommendation on target project

Objective of this financial program is to increase value added of industry by supporting medium-sized industrial enterprises in implementing investment aiming at products/services innovation and/or process innovation, in particular. Products/services innovation may aim at expansion of business fields (products, services, industrial sector of customers, etc.). Process innovation may aim at increasing value-added of a certain business filed by speed-up, cost-down,

precision-up, and process changes, etc.

Table 49 Recommendation on target investment projects

Type of loan	Purpose	Eligible usage of proceeds
Investment for growth	Expansion of production capacity through product innovation and/or process innovation.	Purchase of machinery and equipment, plant/logistics building, etc. Land acquisition is excluded. Additional working capital to operate the invested capitals.
Commercialization of R&DD	Utilize R&D&D successfully completed and implement new investment for (1) product innovation and/or process innovation, or (2) meet/ compliant with new globally recognized standard.	Purchase of machinery and equipment, plant/logistics building, or/and intangible capital (such as software). Land acquisition is excluded. Additional working capital to operate the invested capitals.
Technology Acquisition	To acquire registered intellectual property with significant sales volume in the country of origin. Usage of funds shall be the followings; Licensing or acquisition of technology, Purchase of proprietary or directly related manufacturing equipment	Purchase (1) copyright license and/or acquiesce industrial property rights (patent, industrial design of product, trademark, geographical indication, method and layout design, trade secret) directly to improve manufacturing process, (2) Purchase of proprietary or directly related manufacturing equipment
HALAL Technology Development	HALAL certification is prerequisite. Invest for expansion of production capacity and/or product/process innovation in one of the following sectors. -Food & Beverage -Ingredients and Additives Cosmetics & Personal Care -Pharmaceutical & Nutraceuticals -Innovative Halal Products and Services	Purchase of machinery and equipment, plant/logistics building, or/and intangible capital (such as software). Land acquisition is excluded. Additional working capital to operate the invested capitals.
Sustainable Technology Development	Sustainable reporting is prerequisite. Invest for expansion of production capacity and/or product/process innovation in one of the following activities. - Implementing green building and/or efficient site/plant location management - Developing renewable energy or increasing energy efficiency - Developing collective water management or increasing water efficiency - Developing recycling process and circular waste management - Improving Health, Safety and Environment (HSE) and pollution remedy (water, air quality) - Switching suppliers or increasing efficiency of materials and logistics	Purchase of machinery and equipment, plant/logistics building, or/and intangible capital (such as software). Land acquisition is excluded. Additional working capital to operate the invested capitals.

Type of loan	Purpose	Eligible usage of proceeds
	- Other innovative sustainable products / services	

Participating Financial Institutions (PFIs) shall check eligibility in purpose and usage of proceeds through their regular appraisal and monitoring procedures.

Purpose:

- PFI shall check it in assessment of business plan related to applied investment project and such business plan will contribute to product innovation and/or process innovation.

Eligible usage of proceeds:

- PFI shall check usage of proceeds at disbursement and appropriate operation through regular monitoring.

11.4.2.6. Recommendation on program management

MOI and MOF in coordination handle the program. Study team recommended principles such as;

- Avoid too much burden of participating banks, and
- Programs shall flexibly respond to market demand and other situation.

According to such principles,

- Annual budget shall depend on planning report submitted by the banks,
- Check of eligibility is left to the banks in accordance with internal policies of each banks,
- Activity report submitted by the banks shall be comprehensive but not necessarily in details. Separately, MOI/MOF can conduct onsite examination and check details based on documents and onsite of the end-borrowers if necessary,
- Annual report shall evaluate achievements and challenges in the past year and supply implications for the next year's program (size of amount, target investment project, sectors, etc.)
-

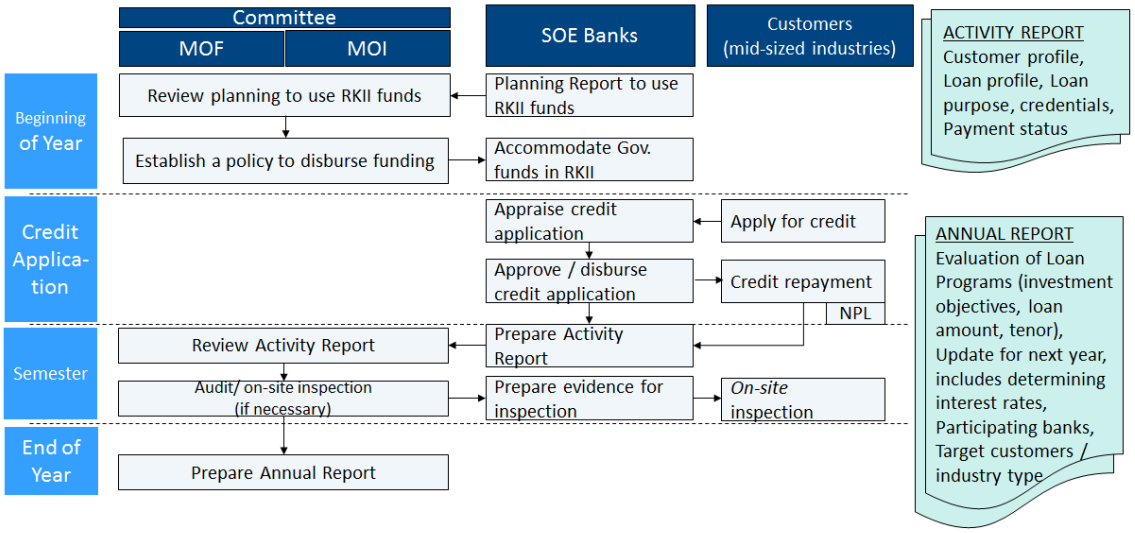


Figure 127 Scheme of program management

11.4.2.7. Cost and benefit analysis

Assumption for calculation of benefit

According to micro survey of manufacturing enterprises, it is identified that medium-sized enterprises which implemented innovation is;

- 1.2 times larger value added per workers.
- 1.8 times larger capital per workers.

Table 50 Impact of innovation

Size criteria	Innovation experience	Sales annual growth	Value added/ workers	Sales/ workers	Capital/ workers
	JICA Survey	JICA survey	BPS, Rp thousand		
Total assets excluding land and building <10,000 Rp million or Annual sales <50,000 Rp million	(a)Implememted product innovation in past 3 years	4.4%	98,463	179,226	41,303
	(b)No innovation	0.0%	80,296	173,521	22,323
	(a)/(b)	N/A	1.23	1.03	1.85

Source: BPS Enterprise survey 2014, and Enterprise survey under JICA Study for globally competitive industry 2017 with scope of Transportation machinery, Electrical & Electronic and their supporting industries

Assumption for calculation of cost

It is recommended to set 3% for 3 years loans to NIA opened at each PFIs.

Using Government Bond (SUN) 3-years market rate, 7.8% as of September 2018, as reference of market interest rate, cost of the financing scheme shouldered by the government is calculated as 7.8% - 3% = 4.8%.

The results of cost and benefit analysis is shown in the next table. Among total number of target enterprises which is 14,540, it is assumed that 40% of them apply to this program. With some further assumptions described in footnote of the table, it is estimated that total loan amount disbursed from NIA is 3,680 billion and cost of finance (negative margin shouldered by the government) is estimated to be 179 billion. On the other hand, benefits include 3,241 billion additional value added, 2,087 billion additional gross profit, and 261 billion additional corporate income tax.

Table 51 Result of cost benefit calculation

Size criterial	Items	Total number of establishment	Potential borrowers	Capital investment per establishment	Additional sales per workers	Additional value added per workers	Workers per establishment	Total loan amount	Additional value added	Additional gross profit	Cost of interest rate	Cost of interest	Additional tax
	Unit	number	number	Rp million	Rp million	Rp million	number	Rp billion	Rp billion	Rp billion	% point	Rp billion	Rp billion
Total assets excluding land and building <10,000 Rp million or Annual sales <50,000 Rp million		14,540	6,109	2,689	21	18	79	3,680	3,421	2,087	4.86%	179	261

(Note)

- Total number of establishments: Based on BPS “annual manufacturing survey” 2014, conditioned by "Total assets excluding land and building <10,000 or Annual sales < 50,000”.
- Potential borrowers: ratio of "not implementing innovation" in 2017 JICA survey is applied to the BPS data.
- Capital investment per establishments: Assume potential borrowers match same level of capital per worker as those implementing innovation if they implement investment for innovation.
- Additional sales, value added: Assume potential borrowers match same level of sales per worker and value added per worker as those implementing innovation
- Workers per establishments: Average value of BPS statistics
- Total loan amount: 40% of potential borrowers apply this program. Loan to value is 80%. Of which the loan amount, 70% originates from NIA, while 30% is from banks’ own funds.
- Additional gross profit: Value added minus wages
- Cost of interest rate: Difference between 3 years government bond yield and lending rate from MOF
- Additional tax: Assuming 50% of gross profit is profit before tax, subject to 25% of income tax.

11.4.3. Discussion issues at pre-KINAS

11.4.3.1. Main discussion issues at WG

WG held on August 16th 2018 discussed and agreed necessity of such financial support, and agreed on (i) Funds for NIA shall originate from government budget rather than Bank Indonesia (proposal as of WG is suggesting funds from Bank Indonesia), (ii) BAPPENAS and JICA Team shall

make details with broader coverage of discussion with relevant government agencies and commercial banks before submitting the proposal to PCB.

11.4.3.2. Main discussion issues at PCB

Study Team updated the proposal with detailed procedures as well as cost benefit analysis requested during various meetings after the WG.

PCB confirms and supports the recommendation, with request on further elaborate and design of the scheme, such as;

- Confirm mode and method to disburse from the government budget,
- Consideration of risk management (including necessity of credit guarantee by government),
- Further elaboration of definition of innovation (target investment) towards details, and
- Consider to further decrease the interest rate applied to the end customers.

11.5. Development of Biofuel and Ecosystem

11.5.1. Outline of WG

Working Group (WG) on "Biofuel Development Technology" was held on In February 15th, 2019. The WG was proposed by the think tank/JICA study team in order to encourage government / private sector discussion on future development of biofuel. Toyota has expressed interest in joining discussion as presenter at the WG to present their views on potential of biofuel in Indonesia and on future biofuel technology development. In total 19 people joined the meeting as shown below.

Table 52 Outline of WG on Development of Biofuel and Ecosystem

Date	February 15th , 2019
Location	7th Floor, Director's room, BAPPENAS
Attendant institutions	• BAPPENAS: - Directorate of Industry, Tourism, Creative Economy - Directorate of Energy, Mineral, Mining MOI: - Maritime Industry, Transportation, Defense Planning Bureau - Ministry of Energy and Mineral Resources – Bioenergy - Toyota Daihatsu Engineering & Manufacturing Co., Ltd.(TDEM)） from Thailand, Toyota Motor Manufacturing Indonesia (TMMIN)

11.5.2. Background of biofuel technology development policy

11.5.2.1. Background and issues

Indonesia adopts B20, the highest blending level of biodiesel in the world, while other countries such as Thailand and EU sets maximum blending at B7. There are two major factors behind biofuel technology development policy in Indonesia.

1) Greenhouse gas (GHG) emission commitment by Indonesia government.

The first factor is reduction of GHG. At COP 21 held in Dec 2015, President Jokowi pledged commitment to reduce GHG 29% from BAU (Business As Usual) and 41% with International assistance in 2030. Transport sector contributes around 30% of total Co2 emission after increasing from 20% in 2007 due to rapid growth of vehicle market in the last decade. In order to achieve 29% Co2 reduction, transport sector needs to reduce 85MtCO2e (4-wheel 31MtcCo2e). According to APROBI (Biofuel Manufacturer Association of Indonesia), B20, bio diesel with CPO (Crude Palm Oil) 20%, has reduced 8.8 MT Co2e in 2016.

Table 53 Target of Co2 reduction

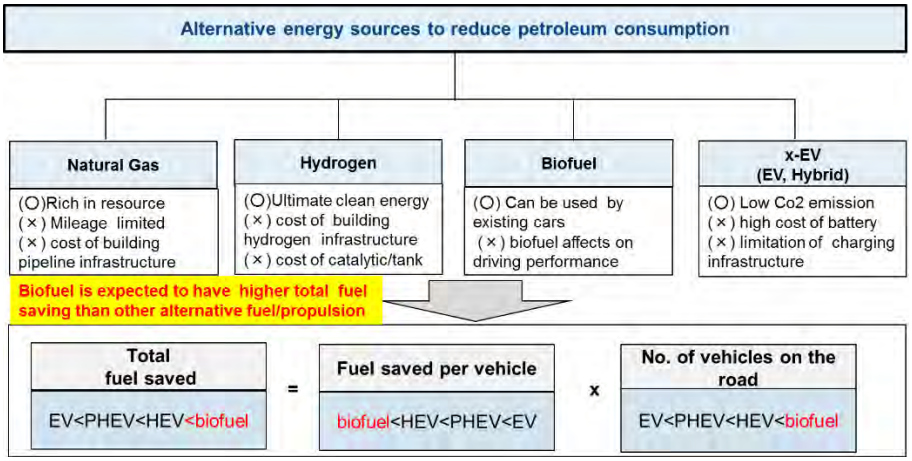
Sector	GHG Reduction	
	$MtCO_2e$	% of total BAU
Energy	**314**	**11%**
Waste	11	0.38%
IPPU*	2.75	0.10%
Agriculture	4	0.32%
Forestry	650	17.2%
Total	834	29%

Sub-Sector	GHG Reduction Target	
	$MtCO_2e$	% of Energy Sector
Transport (4-wheel)	**85** (31)	**27.1%** (9.9%)
Industry and Household	188	60%
Others	41	13%

Source: Compiled from Indonesia government material on GHG

2) Energy security

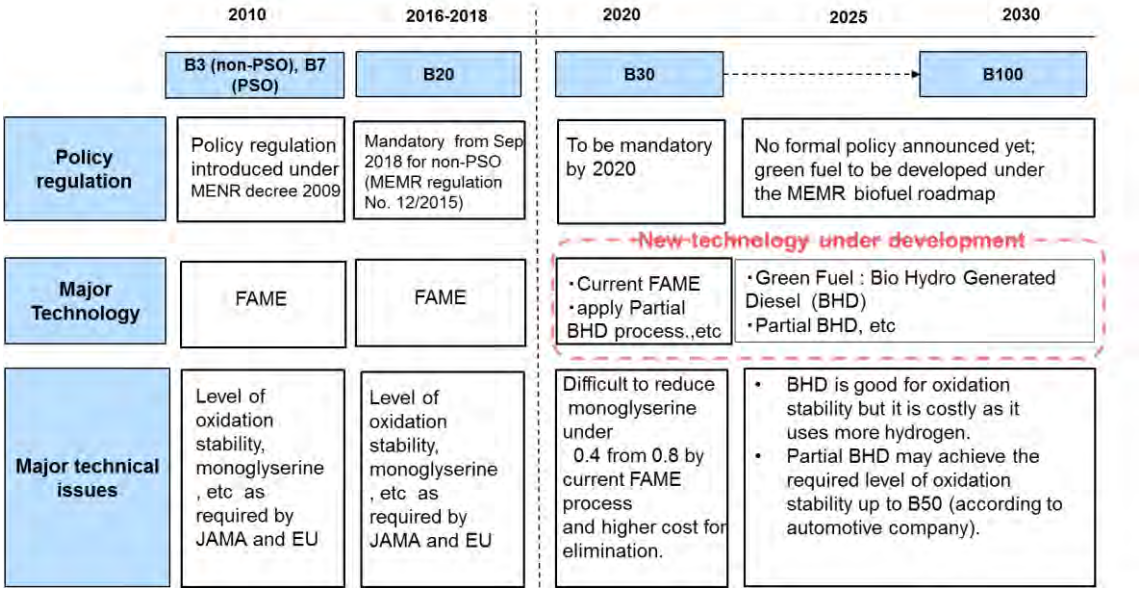
The second factor for biofuel development is energy security. Reduction of import dependence of energy is priority for the country as it is primary cause of trade deficit. Biodiesel can replace imported oil by CPO to certain extent according to the level of CPO blending. According to APPROBI, biodiesel development started in 2005, when Indonesia had become net importer of oil. Since then, there has been strong pressure to increase its blending level in order to address growing trade deficit due to increase in energy consumption. According to the interview with the automotive company, biofuel has potential to contribute to reduction of fuel import in a much shorter period and in larger volume compared to other alternative energy sources such as electric vehicles (EV)., etc as it can be applied to existing vehicles in use without much modification of engines as summarized below; on the contrary, EV not only needs to import battery and other key components for assembly, it also requires huge budget to invest in infrastructure.



Source: JICA/NRI survey

Figure 128 Comparison of alternative energy resources

In view of the benefits that biofuel can bring to the nation, Ministry of Energy and Natural Resources (MENR) has made it mandatory to gradually raise biodiesel blending, starting from B3 (non-PSO:non- subsidized diesel) , B7 (PSO: subsidized diesel) in 2010, and then to B15 in 2015. According to the MEMR regulation No. 12/2015 and roadmap of biofuel, MEMR made it mandatory to raise blending to B20 by 2016 (delayed to 2018 for non-PSO) and B30 by 2020.



Note: PSO (subsidized fuel) and non-PSO (non-subsidized fuel)
Source: JICA/NRI survey based on MENR materials and interviews to industry

Figure 129 Comparison of alternative energy resources

11.5.2.2. Major issues of current biofuel policy

The major issues of the current biofuel policy are summarized as below;

1) Challenge of current FAME (Fatty Acid Methyl Ester) to address required level of biofuel quality

- The more the concentration of biodiesel, the more stringent quality for B100 is required for quality concerning specifications such as oxidative stability and monoglyceride (MG) level; for example, MG level, which causes freezing of fuel at low temperature, needs to be reduced from current level of 0.8% for blending with diesel to make B20, while 0.4% for B30 according to JAMA (Japanese Automotive Manufacturer Association).

Table 54 Recommendation of MG level for B100

	10℃	15℃	20℃
B10	0.5% NG	0.8% NG	0.8% NG
B20	0.46% NG	0.6% NG	0.6% NG
B30		0.5～0.6% NG	

Source: JAMA

2) Details of roadmap beyond B30 has not been specified yet

- According to biofuel roadmap by MENR, green fuel will be developed after B30, but no specification for green fuel as been determined yet.
- It is challenging for higher content of bio fuel beyond B30 to achieve required fuel quality by using existing technology of FAME.

3) Cost of Green fuel is expected to be more costly than FAME

- According to biofuel roadmap by MENR, green fuel will be developed after B30, but the technology for green fuel is still under development and is not commercialized yet.
- The cost of green fuel is expected to be much higher than biofuel, as it requires hydrogen and equipment for hydrogenic process.

Table 55 Comparison of Green Fuel and Bio Fuel (FAME)

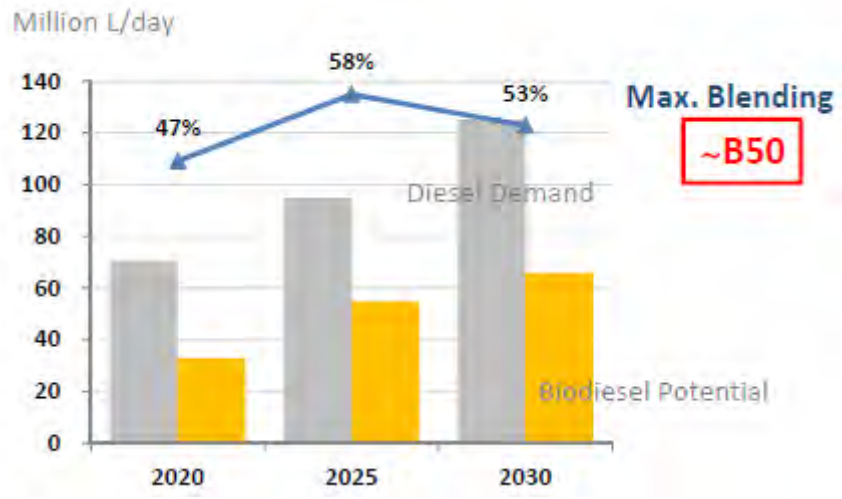
	Green-fuel (BHD)	**Biofuel (FAME)**
Definition	Green-fuel is a type of biofuel that does not contain oxygen atom and consists of hydrocarbons in the same class with hydrocarbons in the equivalent fuel through hydrogenic process. Green fuel for diesel is called BHD (Bio-Hydrofined or Hydrogenerated diesel) and bio gasoline for gasoline.	Biofuels are produced through a process known as sesterification, a process in which fats and oils from plants and other living creatures are broken apart to yield very long molecules (ester group) that contain oxygen atom
Advantage	The process can completely eliminate oxygen	The process of FAME is simple and

	atoms and the quality is equivalent to regular diesel.	investment required is quite small
Disadvantages	The cost for hydrogen and hydrogenic process is high, leading to higher fuel cost; more than 10% higher than regular diesel.	Biodiesel freezes at warmer temperatures due to remains of monoglycerite and is less stable during long term storage (lower oxidative stability)

Source: compiled from MENR material and other open internet sources

11.5.2.3. Potential of Biofuel for Indonesia

Despite technology challenges for biofuel, Indonesia has huge potential as biofuel producer due to its rich reserve of COP and other plants. According to analysis by the automotive maker, Indonesia is capable to achieve B50 and can satisfy nearly 50% of diesel demand by 2020. On the contrary, Thailand can achieve only up to B20 due to limited supply of CPO. If Indonesia can successfully develop high quality and cost competitive biofuel, Indonesia can maintain as major global producer and exporter of biofuel in the long future.



Source: ERIA "Study on Asia Potential of Biofuel Market" 2014

Figure 130 Forecast Maximum Blending

In order for Indonesia to become the most competitive global biofuel producer, Indonesia may need to put in effect following measures;

1) Speed up development of biodiesel beyond B30 by adopting readily available and affordable technology

- Some argue that Indonesia may rather develop transitional biofuel technology between FAME and BHD; technology that can minimize cost up while improving biofuel quality, before moving to highly costly green fuel or BHD.

- Indonesia government, academia and private companies can strengthen collaboration and jointly conduct cost / benefit studies of all future bio technologies available in order to select affordable and applicable technology for Indonesia.

2) Develop a quality system / standards to control fuel quality from upstream to downstream

- As biofuel quality often degrades due to condition of storage and transport, Indonesia can develop fuel quality standards for each process and quality monitoring system using IOT (eg., easy check of quality through portable devices., etc and traceability using sensors., etc)

3) Establish competitive process to reduce green gas emission.

- Biofuel is regarded as Co2 emission neutral fuel, but certain countries and environmental NGOs claim that development of palm oil plantation itself actually caused deforestation and destruction of peats in major oil producing countries like Indonesia and Malaysia.
- In order to respond to these criticism, Indonesian government established Indonesian Sustainable Palm Oil (ISPO) to provide guidelines on Co2 emission for palm oil plantation
- The system to minimize green gas emission may need to be developed further for the whole process from plantation, CPO collection, and CPO processing for biodiesel.

By achieving 1), 2) and 3), Indonesia can become the most competitive exporter of biofuel as well as regional leader in creating sustainable eco system for biofuel.

11.5.3. Discussion and result of WG

At the WG, there were three major speakers. First is Toyota (TDEM and TMMIN), which recommended on future clean biodiesel. Second is Director of Maritime Industry, Transportation, and Defense of Ministry of Industry. And third is BAPPENAS.

1) Toyota's View

Toyota Daihatsu Engineering and Manufacturing (TDEM) has presented its view on clean biodiesel. Toyota defines clean biodiesel as which can achieve Co2 emission level on par with Battery Electric Vehicle (BEV) if measured in WWT (Well to Wheel) and PM2.5 emission on par with normal air if DPF (Diesel particular filter) is used.

2) MOI's view

MOI expressed view on future biofuel plan and green fuel using industrial vegetable oil.

- Even if Indonesia had strategy to produce biodiesel, the maximum development would be B40 for now (instead of B50 as proposed by Toyota).
- Currently, Indonesia has developed biodiesel with target to implement B30 in 2020. But after that, MOI will focus on developing green fuel using the industrial vegetable oil (IVO).

- IVO is also using a hydrogenated process, similar with gasoline and diesel. But the chemical property is similar with petrol-based oil and without heavy contaminant (such as Sulfur). Source of IVO can be CPO, jatropha, trunks and other oils from vegetables.
- MOI concern for lowering emission is not priority, but the fast development of IVO is put in emphasis. Therefore, it is important to endorse IVO to increase energy sustainability, increasing local endowment and energy security.
- As long as Toyota support the new biofuel technology, H-FAME, MOI will also support biofuel development with this technology.

3) BAPPENAS' view

BAPPENAS has commented on Toyota and MOI and proposed future direction to MOI.

- Development for green fuel will unlikely achieve the economy of scale – compared to CPO
- In the process, it is OK to include small farmers (for inclusivity) but for the industrial scale, the CPO-based for biofuel and green fuel should be endorsed to increase energy resilience and local empowerment
- Directed to MOI that BAPPENAS will support MOI for both ways, or even for one of biofuel (B-50 or green fuel). The national development planning (RPJMN) target is to achieve green industry in 2024. Therefore, MOI should support the production of renewable energy.

4) Conclusion and future actions in WG

MOI, BAPPENAS, and Toyota agreed on the significance of developing new biofuel technology through collaboration between government, university, and private company. The concrete next actions could not be discussed in details but following steps and tasks were agreed for future collaboration.

- The pilot project for the technology to be implemented next year (2020). The development should be step-by-step, first of all developing B40 pilot project (2020), then B50 (after B40 succeed),
- Meanwhile, Toyota Indonesia (TMMIN) and Ministry of Energy and Mineral Resources – Bioenergy (EBTKE) will assess the investment cost of the new technology of H-FAME (crystallization), and compare with the cost of current technology of FAME (additional distillation)
- Further discussion will be held regarding collaboration strategy (with JICA) on biofuel and green fuel development, especially for RD&D

11.5.3.1. Implication on JICA policy proposal

JICA Study Team's purpose of holding small WG for biofuel was to facilitate discussion between policy makers and stakeholders for policy decision making and implementation. As biofuel involves

many different government organizations such as MOI, MEMR (EBTKE), and Ministry of Research, Technology, and Higher education (RISTEKDIKTI) and BAPPENAS, and different stakeholders such as OEMs, biofuel makers such as APROBI, and academia for R&D&D, it is desirable to have several places/ channels for policy discussion. The small WG on biofuel has successfully opened opportunity for discussion between responsible ministry, especially MOI and Toyota on the new biofuel technology. Since the WG has agreed on collaboration, the next step will be to design more concrete collaboration scheme, which will be discussed among stakeholders and government policy makers.

It may be fruitful if more extended WG is held next time with invitation for other participants such as RISTEKDIKTI, academia such as ITB and association (GAIKINDO), and other technology cooperation organization to discuss on future technology collaboration schemes for biofuel.

11.6. Review of progress of the pilot project

Study Team monitor the progress of the pilot project (Phase 2) and report periodically to JICA based on the schedule updating table we shown in the next table.

Table 56 Progress check table (as of March 2019)

Topics	Jul-Aug	Sep	Oct	Nov	Dec	Jan	Feb	March & Succ	Ministries
KINAS	KINAS Presidential regulation				MOI→Ministry of Law and Human Rights (MoLHR)			Presidential regulation	MOI BAPPENAS
					FGD				
RD&D/HRD	Jul16 WG		Oct22 PCB	Update →MOI→MOF		MOF is drafting Ministerial Regulation→MoLHR			MOI, BAPPENAS CMEA, BKF
		Arrange meeting							MoRTHE, BKPM
SMEファイナンス	Aug16 WG						Feb14 PCB	Discuss with MOF	MOI, BAPPENAS BKF, MOCS
		Informal discussion	Policy draft	arrange meeting					BI, MOSOE
Bio-Fuel							Feb15 Sub-WG	MOI	MOI, BAPPENAS CMEA, MOEMR
			Study		arrange for WG				MoRTHE
Export/FDI promotion for I4.0								Draft in FR	MOI, BAPPENAS CMEA, MOT
		Study			Study				Custom Office
Others	End of Aug				12/5 FGD			Wrap up	
	Renewal of MOI internal organization				RPJMN 2020-2024			JICA Report	

MOCS:Ministry of Cooperative and SME
MOSOE:Ministry of State Owned Enterprises

It is successful to implement pilot trial in operation of KINAS as far as it is bottom up approach. Study Team may suggest some of the key challenges faced during the process of the pilot project as follows.

1) Institutionalization of KINAS

There is argument between KINAS based on Law on Industry and KINAS only based on Making

Indonesia 4.0. However, conflict between political decision and preference based on government officials and academics might not necessarily ruled out because such challenges are often observed in other countries as well.

2) Agenda setting for WG

As Making Indonesia 4.0 is yet to be detailed, Study Team proposes policy measures to be discussed in pre-KINAS in coordination with academics such as LPEM. This approach took time by explaining issues and receiving feedback with many directorates, resource persons and private sectors.

3) Preparation for KINAS meetings

It is a challenge to be forced to change the meeting schedule many times before it is finally fixed. Besides, attendance of echelon 2 officials in WG and echelon 1 officials in PCB is not necessarily high. This may be due to priority of those meetings for invited members is not always high because KINAS is not yet formalized.

4) Role of WG and PCB

In terms of policy planning, background and necessity of proposed policies and best choice of optional policy measures are not necessarily understood by the members. In terms of institutionalization (draft for regulation) of such policies, it seems not to be enough to well elaborate in discussion on relationship between the recommended policies and existing regulations.

11.7. Lessons and recommendations

11.7.1. Proposal of topics and process of recommendation

First, it is found, at least under bottom up approach, that the PCB meeting needs to discuss proposed policies in broader scope from necessity of the intervention, choice of policy measures, to mode of formalization. This tends to make issues to be focused vague, hence, the PCB conclusions may not be the final one but results in requesting further investigations to the proposing body. Top down approach might enable the higher committee (Forum or PCB) to decide on necessity of government intervention and to order the lower body to discuss design of policy measures.

Secondly, capacity of making policy recommendations shall be enhanced. Sectioning silo even within MOI might disturb developing consensus of ministry as a whole. In this regards, experience of intensive discussion on key initiatives of Roadmap of Making Indonesia 4.0 may contribute to developing mode of consensus building.

Thirdly, it is recommended to discuss one policy recommendation continuously by core members including private sectors. Also standardization of process of policy making, such as (i) issues development, (ii) information collection (checking previous studies and interview of resource persons), (iii) communication with beneficiaries and counter-beneficiaries, issues streamlining, and

policy draft, for example), would be helpful to fasten the process and make it easier to share goals and schedule among the members/higher officials.

11.7.2. Call of KINAS meetings

Under the pilot project, schedule of the meetings are often postponed and attending ministries/agencies are limited regardless of broadly assumed scope of attendants. This challenges might be mitigated under officially formalized KINAS for I4.0.

In order to further encourage and motivate invited ministries and agencies to attend the meetings with deeper preparation for serious discussion, it is necessary to ensure and disseminate significance and issues to be discussed in the meetings.

11.7.3. Discussion and agreement in KINAS meetings

First, it is recommended to involve legal experts such as Ministry of Law and Human Rights in the policy making. Under the pilot project, attendants of the KINAS meetings are not necessarily sure on consistency between recommended policies and existing laws and other regulations. This would make it difficult to reach to agreement on choice of policy measures.

Secondly, stipulation of rules on operation of KINAS meetings would be helpful in upgrading significance of KINAS meetings, and in facilitating serious and positive discussion. Such rules may include (i) attending persons are supposed to represent the ministry or agency, (ii) mode of participation in the decision making when the members absent, (iii) agreed conclusion in the meetings would bind all the composing member ministries/agencies

12. Final meeting and recommendations

Initially, it was planned to conduct an industrial dialogue at the end of the third survey. However, at request of BAPPENAS, instead of industrial dialogue, warp-up meeting was held.

Therefore, as an alternative measure, JICA Study Team assessed the progress and achievement of industrial policy measures recommended in the third survey, and made a list of policy measures that have not been yet considered in detail. Those remaining policy measures are summarized as “Further potential approach”. As far as possible, the study team discussed with departments in charge of relevant ministries and agencies about the contents of the approach that can be implemented in the future. This section summarizes the progress, the contents of the approach that can be taken in the future, and the results of discussions.

Some of the policy measures recommended by the Study Team in April 2018 have been already discussed among relevant ministries and policy briefs have been scrutinized during the third survey. Starting with the establishment of inter-ministry working groups and policy coordination board, some important developments have been achieved.

Lunch Meeting: Wrap Up Meeting for Globally Competitive Industry 2017-2019

Venue: Al Nafoura Upper Level Restaurant, Le Meridien Hotel, Jakarta

Date/ Time: March 26th, 2019/ 12.00-14.00

Attended by BAPPENAS, MOI, JICA, Study Team

12.1. Inter-ministry policy forum

12.1.1. Achievements

As for the inter-ministry policy forum, working groups (WGs, composed of echelon II members from relevant ministries) and Policy Coordination Board (PCB, composed of echelon I members from relevant ministries) have been conducted for several policy issues. A forum, to which ministers participate, has been cautiously considered in Ministry of Industry (MOI) and the orientation of the forum has been decided. It will be realized by an executive order.

Concrete policy measures for five sectors and ten priority issues pointed out in the report of “Making Indonesia 4.0” have been also being continuously discussed in MOI and it is expected to hold WG and PCB for each theme.

12.1.2. Further potential approach

So far, the Ministry of Industry has been preparing for the inter-ministry forum to be established as a committee with a limited period and role, with the sole purpose of realizing Making Indonesia 4.0. However, the significance of the policy making process across ministries has been fully recognized through pilot activities of WGs and PCBs. For this reason, it is desirable to establish as a permanent organization based on the Law of Industry, not limited to Making Indonesia 4.0.

In the pilot activities of WGs and PCBs, multiple ministries have participated and active discussions have been made. However, ministries such as the Ministry of Higher Education and Science and Technology, the Ministry of Transport, and the Ministry of Public Works and People's Housing, have not yet actively participated in the meeting, although they seem to have an important relationship with the policy content. It is important that more relevant ministries gather and discuss in those meetings.

The Ministry of Industry is currently examining the realization of Making Indonesia 4.0. However, in formulating concrete policies aiming at the realization of a globally competitive industry, it is expected that the contents of external experts who are familiar with the target sector will also be incorporated to create more advanced content.

12.2. Local enterprise / SME development

12.2.1. Achievements

The financial scheme of investment funds for SMEs was discussed in the PCB and progressed to the point where policy briefs were scrutinized in BAPPENAS. The legislation in the near future is expected.

12.2.2. Further potential approach

Until today, Indonesia's industrial policy has tended to focus on the protection of small and micro-sized enterprises, and it has been difficult to form a financial scheme for the investment of medium-sized enterprises. However, it is medium-sized companies that are likely to participate in the global supply chain, improve Indonesia's industrial value added, and contribute to export promotion in the future. Compared to small and micro enterprises, medium-sized enterprises have higher potentiality to realize global-level quality and production quantities. However, even medium-sized companies do not have sufficient financial resources, and they cannot make the necessary investment in the production, and currently they are not able to improve the quality of their products. Therefore, the implementation of this policy measure is expected to encourage the improvement of the level of local companies in Indonesia.

With this regard, Ministry of Industry's Industrial Resource Access and International Promotion Bureau pointed that “if a medium-sized company is incorporated into the global supply chain, business opportunities will be increased for small and micro enterprises that supply to those medium-sized companies. In this way, small and micro-sized enterprises will be indirectly integrated into the global supply chain. Therefore, support for medium-sized enterprises will lead to the development of small and micro-sized enterprises, too. "

As a further potential approach, holding a reverse trade fair (reverse exhibition) in order for medium-sized enterprises to find business opportunities will be effective. In the reverse trade fair, SMEs can understand business opportunities by observing displays of large companies’ needs and requirements on parts, processing technology and quality levels and discussions with those potential customers. Based on these information, medium-sized companies can make decision on of capital investment if necessary. In this sense, it is an event of business matching. It will contribute to solve issues that large companies do not know where there is a medium-sized company with potential, or that medium-sized companies do not know what products, quantity, quality, delivery time are

required by potential client.

12.3. Promotion of R&D&D local and foreign investment

12.3.1. Achievements

Regarding the incentive system for Research and Development and Design (R&D&D) investment, the policy brief was reviewed in the PCB, and the examined contents were sent from the Ministry of Industry to the Ministry of Finance and legislation is being expected.

12.3.2. Further potential approach

There are still two major issues concerning R&D&D. First, in the both sectors of transportation equipment and electrical and electronics, particularly design capability is expected to develop. Therefore, training of engineers with high design capability is required. In Vietnam and the Philippines, there are many examples of digital drawing creation and digital design simulation on computer using CAD and CAE. Such improvement in the capability of engineers necessary for design development is required.

Another issue is the implementation of research and development that contributes to industry. Making Indonesia 4.0 aims to improve the global competitiveness of the Indonesian industry by improving productivity and quality. For that purpose, for example, innovation in production technology, research and development for achieving global quality level, and material development that contributes to new product development are required. While centered on universities, it is required to fully receive the opinions and needs of the industry and to further promote technological development for industrial development. Some portion of national research and development funds may be spared and utilized for technology development directly contributing to the industrial development.

12.4. Human resource upgrade

12.4.1. Achievements

With regard to the incentive system for investment in training of industrial human resources, a policy brief was reviewed in the PCB, and the contents examined were sent from the Ministry of Industry to the Ministry of Finance. After reviewing by the Ministry of Justice and Human Rights, legislation and enforcement are expected.

12.4.2. Further potential approach

Industrial human resource development still has many issues. Firstly, graduates of engineering colleges of high quality universities tend to find a job in sectors where compensation is higher than manufacturing. In Thailand or in the Philippines, higher education has been popularized and

enrollment rate for higher education became higher. Those university graduates are finding employment in a variety of sectors, including manufacturing. On contrary, engineers who have graduated from higher education are still scarce in Indonesia, and they tend to enter into sectors other than manufacturing, such as mineral resources, energy, and finance. On the other hand, polytechnics graduates receive practical training that can be used in the actual manufacturing field and are contributing to the sector. However, in general, they are weak in basic scientific knowledge and thus it is difficult for them to apply their knowledge to further development of the business. An important factor in promoting Making Indonesia 4.0 is, for example, an initiative to raise productivity autonomously at a factory, with ingenuity by each engineer or technician. Or it is to perform more value-added functions such as design and development. However, current Polytechnic education and training has generally not reached to such a level.

Secondly, in order to raise manufacturing competitiveness to an international level, producing products of higher quality is necessary for Indonesia to compete with products of leading countries such as Thailand. For this reason, there is a high possibility that automation systems will be sequentially introduced in processes (such as painting and spot welding in the automobile industry) where high quality cannot be realized by manual labor. However, in the current education and training in polytechnic, in most cases, equipment and training contents such as production machines are outdated, compared to the level at the actual industrial field.

In order to improve such a situation, it is necessary to improve collaboration with industry, in particular, to improve the contents of education and training of Polytechnic, and to modernize the machineries and equipment used for education and training. In addition, it is important for engineers and technicians who graduated from Polytechnics to work as key persons to support the advancement of the manufacturing industry by learning basic scientific knowledge at universities while working and reinforcing and applying to the business.

During the course of discussion on the incentive scheme for human resource development investment, investment for current employee's training including attending night class of higher education became not eligible for the incentive, due to the reason that it is a duty of a company to train their employees. Training of employees for the current business of the company is already being conducted by each company. On the other hand, basic knowledge such as taught in universities cannot always be taught in companies. In addition, it is not easy for companies to support individual employees to learn such basic knowledge of science of higher education level, since it will take a long time to monetize such investment into the human resource. To support engineers and technicians of Polytechnic graduates who are already working in industry to acquire basic knowledge at night class of universities etc., or support university graduates to brush up knowledge while working is important for strengthening the global competitiveness of the manufacturing industry in the future.

For this reason, it will be important to expand the night-time courses, to provide a scholarship for those who study while working, or to provide incentives to companies that make it easy for employees to do such studies.

Regarding the review of the contents of education and training in Polytechnic, the lack of engineers, especially in the electronics sector, is frequently pointed out in both the transport machinery and electrical and electronics sectors. Learning of technology development such as product IoT, and technology used for electronic parts of the ever-increasing automobile are required. Automobiles also require engineers for design and development, where mechanical engineers are required. From the viewpoint of improving the production process, mechatronics, factory automation, and engineers for production IoT are considered to be required. Focus technical areas are required to be grasped through continuous dialogue between industry and education and training institutes, and adapted to the actual needs.

12.5. Logistical infrastructure upgrade

Of the three target sectors, the automotive industry is concentrated in the JABODETABEK area. However, the area is heavily congested, labor costs are rising, and cost competitiveness is very weak.

In fact, with the progress of industrial infrastructure development such as extension and construction of expressways and development of Patimban Port, the location of companies is gradually shifting to the eastern part of Java. In Central Java, the labor cost is still sufficiently competitive, so infrastructure development that facilitates industrial activities will be developed toward the central and eastern parts of Java Island, and industrial estate development with an emphasis on the automotive sector. By giving priority to industrial human resource development, innovation and research and development centers focusing on automotive including electronics used for automotive in such areas, it is expected to form a highly competitive and robust industrial cluster.

In this way, forming the “automotive industry belt” in the region from the west to the central part of Java Island, and in the long run to Surabaya will strengthen Indonesia's global and export competitiveness. In addition, if an automotive industrial cluster is formed, more location of electronic parts adopted for automobiles is also expected.

While the Indonesian government places emphasis on development outside Java, on the other hand, it is also expecting industries in Java to upgrade the competitiveness of the country. In the context of industrial area development, northern part of Java Island is considered to be very important to form an integrated industrial cluster of production, industrial human resource development, innovation and R&D as an “Java Automotive Industrial Belt”.

The Ministry of Industry’s Regional Industry Bureau is currently in the process of redefining the industrial zone within Java. The formation of automotive industry belt was recognized as an effective measure in a discussion with the Bureau. In particular, as there are many sea ports in the

northern part of Java, resources from, for example, Sulawesi will be transported to the belt by domestic sea transportation it would be expected to be used as input for the automotive industry.

12.6. Promotion of business friendly environment

The weakness of automotive sector of Indonesia is upstream processes in the supply chain. This is considered to be attributable to the fact that the investment of foreign SMEs has been stagnant, since the minimum investment amount for granting investment incentive is too high for medium-sized but highly competitive foreign companies. As a result, technology transfer to local companies has not been occurred and industrial agglomeration like Thailand has not been formed yet.

The electrical and electronics sector of Indonesia once grew significantly in export processing zones such as Batam Island, but has since lost its global competitiveness as Batam Island's cost advantage diminishes. However, in conjunction with the development of the automobile industry in central Java, along with the development of industrial infrastructure and industrial estates in central Java, there will be a good possibility of restoring competitiveness again through the establishment of export bonded processing zones. As with the automotive sector, it is necessary to improve the business environment while confirming the needs of the industry for industrial human resource development, innovation, and research and development.

As for food processing, production areas that spread throughout Indonesia are considered to be sufficiently price competitive. However, due to quality issues, it has not sufficiently reached overseas markets. It is important to improve quality and brand power by reviewing import quotas, quality assurance, and the globally recognized halal certification system.

These discussion above is summarized in a following table.

Table 57 Achievements and further potential approach

Policy package	Achievements	Further potential approach
①Inter-ministerial forum	- Two PCB meetings were held already. - A forum is being considered by MOI. - Roadmap (policy measures for Indonesia 4.0) is being considered by MOI	- Establishment of KINAS as a permanent committee under the law of industry. - Involvement and commitment of ministries not yet participating to current PCB and WGs - Concrete policy measures for realizing Indonesia 4.0.
②Local enterprise/SME development	- Policy brief on financial scheme for investments by SMEs has been examined in PCB. It is being refined by BAPPENAS.	- Holding business matching (such as reverse exhibition etc.)
③Promotion of R&D&D local and foreign investment	- Policy brief on incentive scheme for investments in R&D&D has been examined in PCB. It is expected to be sent from MOI to MOF.	- Comprehensive policy package for promotion of R&D&D should be considered in detail and implemented.
④Human resource upgrade	- Policy brief on incentive scheme for investments in HRD has been examined in PCB. It is expected to be sent from MOF to Ministry of Law and Human Rights.	- Concrete policy measures for fostering researchers and engineers by academic-business coordination and re-education to be considered.
⑤Logistical infrastructure upgrade	- Discussed with relevant agencies.*	- Development of Java Automotive Industrial Belt
⑥Promotion of business friendly environment	- Discussed with relevant agencies.**	- Special export environment for I4.0 (ex: export processing zone).

Note:* Directorate of Industrial Zone of MOI; **Directorate of Industrial Resources Access and International Promotion of MOI

13. Annex

13.1. Empirical analysis on supply chain and production network of Indonesian companies

May 18, 2018
Industrial Dialogue
BAPPENAS and JICA

Innovation and Management Capability of Firms in Indonesia: The Role of Networks among Firms and with the Public Sector

Yasuyuki Todo
Waseda University

Analysis Based on Firm-Level Data

2 surveys conducted in 2017

- Nationwide survey
  - Transport machinery industry, electrical and electronic machinery industry, and their supporting industries
- Survey in a secondary city
  - Tegal, Jawa Tengah
  - Metal industry

Particular attention to firm networks

- Supply chains
- External training
- Research collaborations

to examine their roles in promoting innovation and management capability

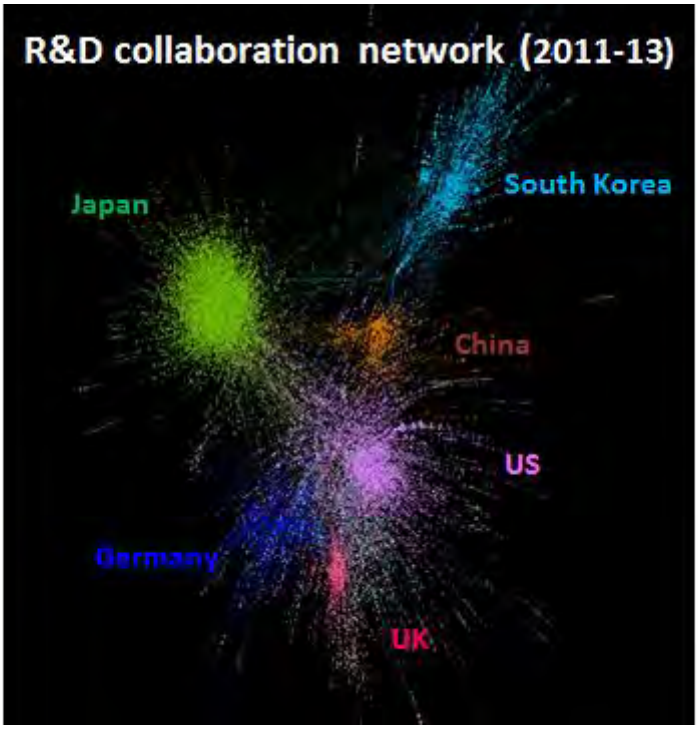
2

Empirical results based on firm-level data

Firm network is the major source of knowledge diffusion

- **From FDI (Indonesia)**
  - When absorptive capacity of domestic firms is high (Takii 2005)
  - From customers (final assemblers) to suppliers (Blalock & Gertler 2008)
  - When foreign-owned firms conduct R&D locally (Todo & Miyamoto 2006)
- **Also from domestic firms (Japan)**
  - From customers and suppliers, particularly those in distant regions (Todo, et al. 2016)
- **Through inter-firm research collaboration (developed countries)**
  - Particularly international collaboration (Iino, Todo, et al. 2018)
- **Through industry-university research collaboration (Japan)**
  - Particularly with good universities in the same region. More effective than R&D subsidies. (Nishimura et al. 2011)

4



5

Nationwide survey

- Target 1,271 firms in the 2014 BPS data
  ➔ collect data from 262 firms

Province	#	%
BANTEN	45	17.18
DKI JAKARTA	25	9.54
JAWA BARAT	91	34.73
JAWA TENGAH	19	7.25
JAWA TIMUR	45	17.18
KEPULAUAN RIAU	37	14.12

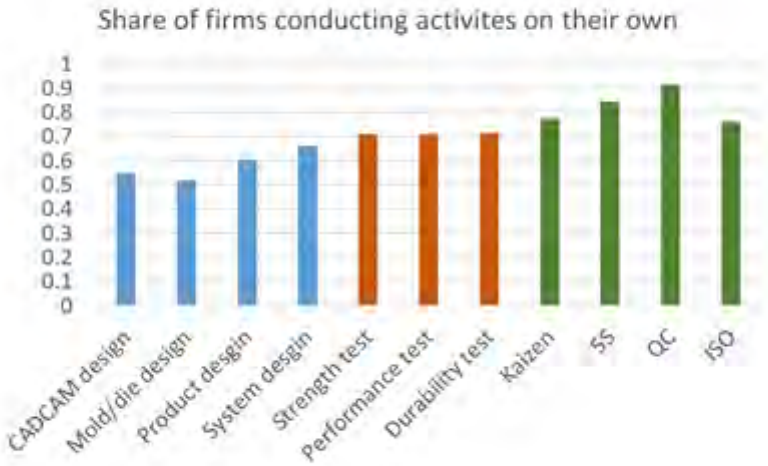
Industry	#	%
Transportation	72	29
Electrical/electronic	95	38
Supporting	81	33

	#	%
Domestically owned	157	60
Foreign owned	105	40
Japan	60	
Singapore	14	
South Korea	10	
Malaysia	6	

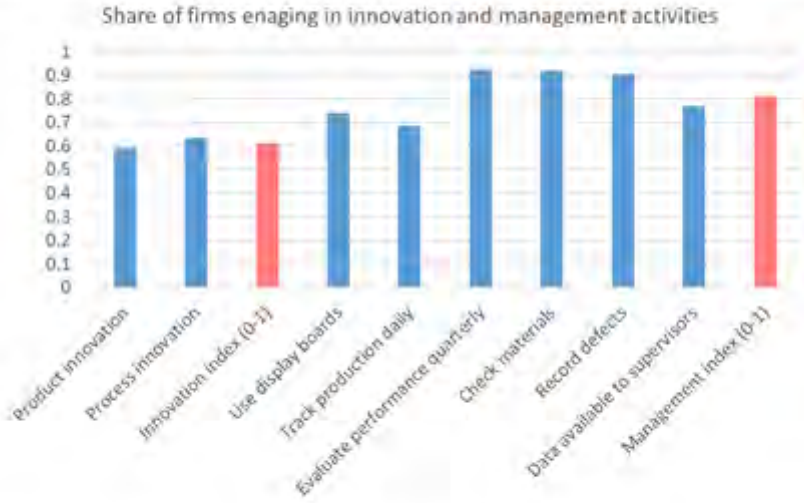
	Mean	Median	Min	Max
# employees	376	140	4	3326
Gross income (bil. rupiah)	2,371	22	0.05	233000

6

Technological capacity

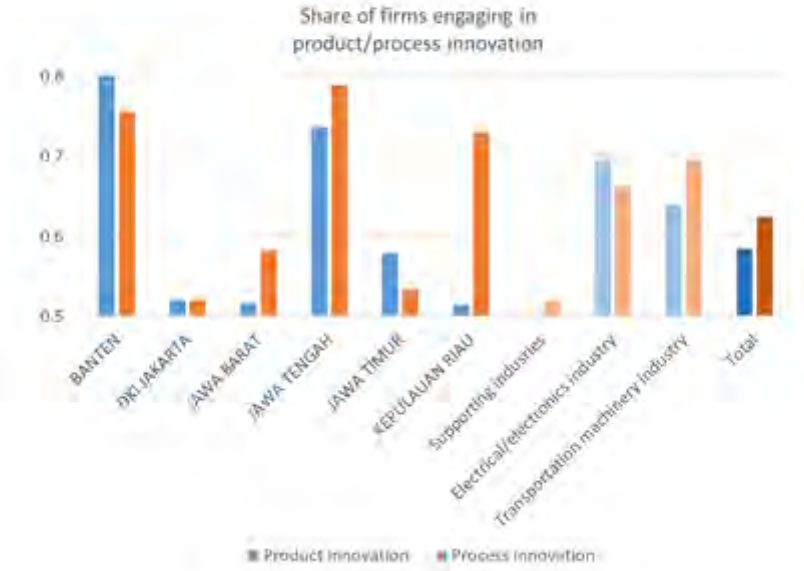


Innovation and management capability

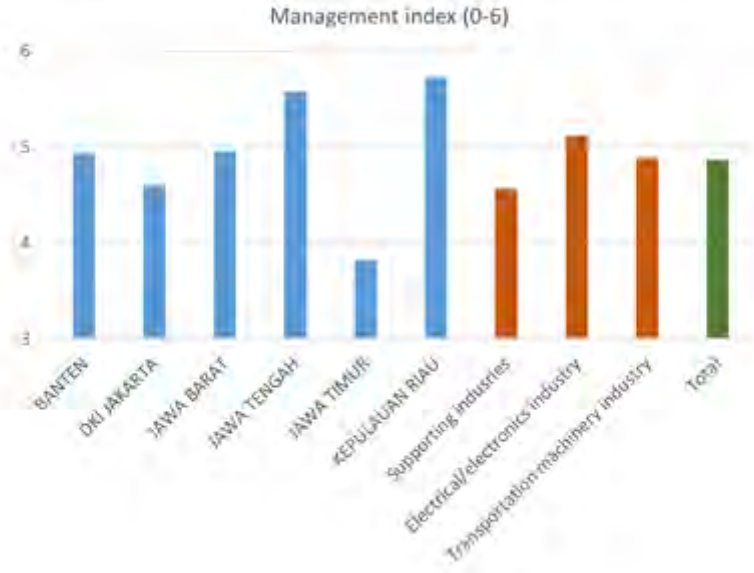


Innovation index = product innovation (Y/N) + process innovation (Y/N)
Management index = average of 6 types of management activities

Innovation capability

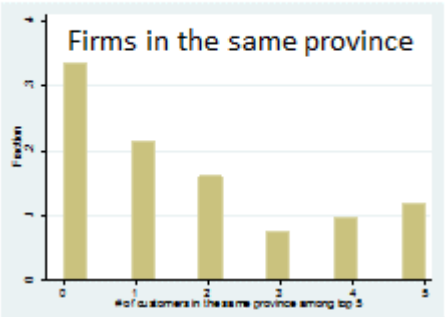


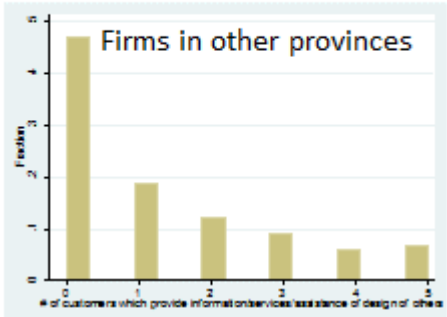
Management capability

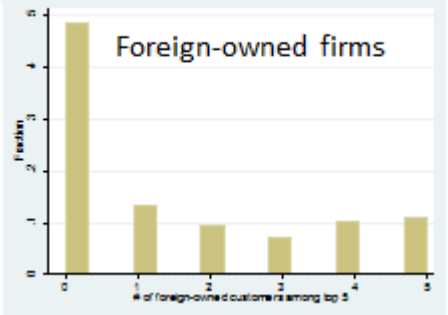


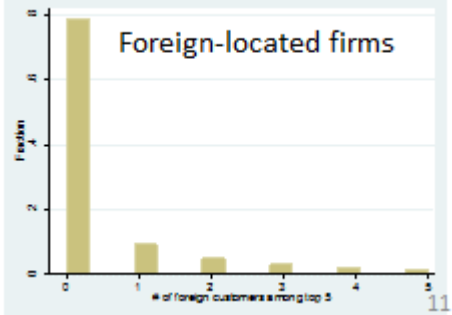
10

of customers by type among top 5



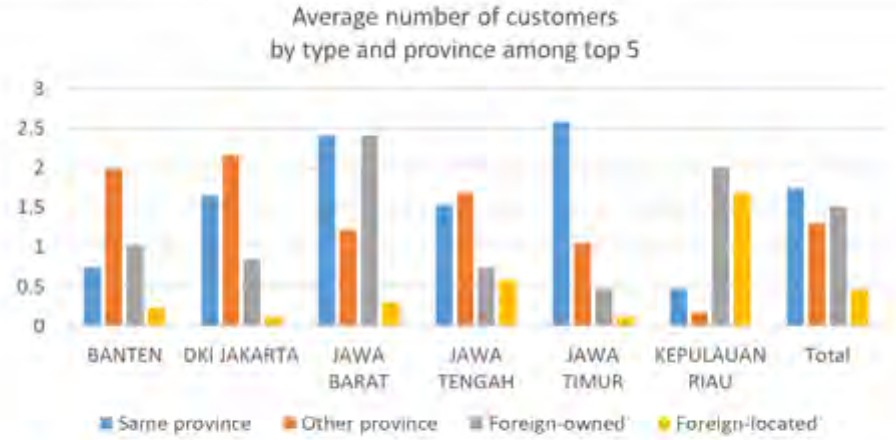






11

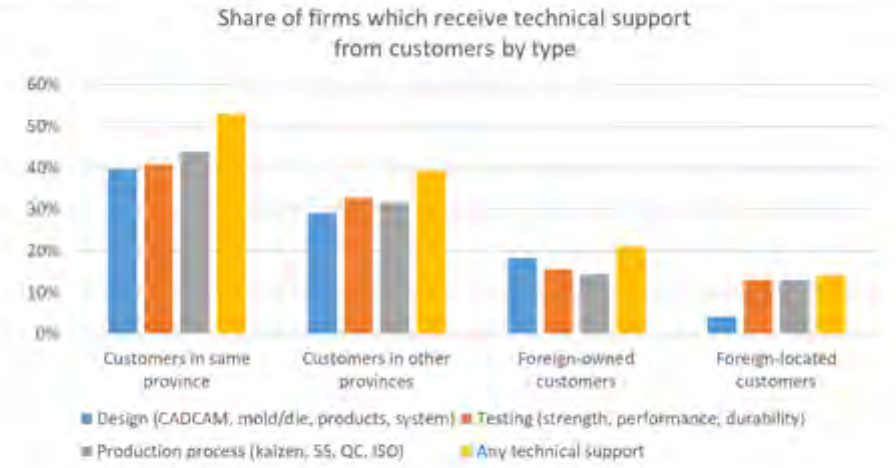
of customers: Provincial differences



- Firms in Jawa Timur are mostly linked with firms in the same province.
- Firms in Jawa Barat are well connected with foreign-owned firms.
- Firms in Kepulauan Riau are well connected with foreign-owned/located firms.

12

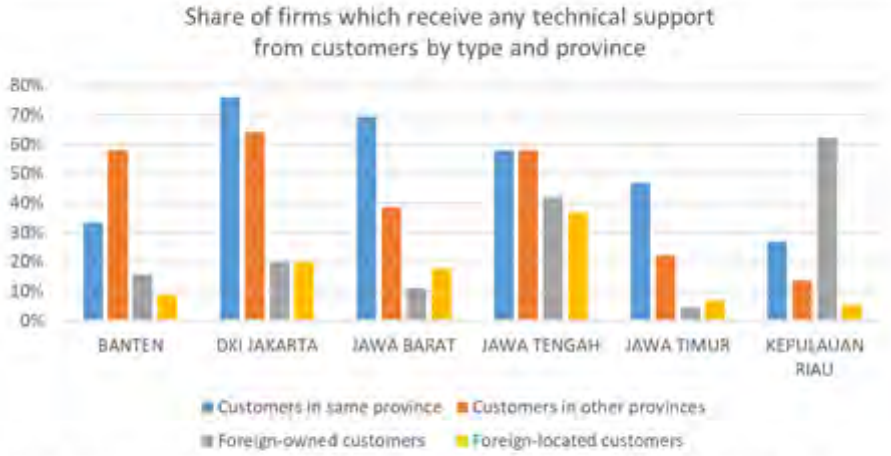
Technical support from customers



- Customers are a major channel of technology transfer.
- But, not much support from foreign-owned/located customers.

13

Technical support from customers: Provincial differences



- Firms in Jawa Barat are well connected with foreign-owned firms (p. 12) but do not receive much technical support from them.
- Firms in Kepulauan Riau receive much support from foreign-owned firms.

14

Technical support from customers: Sectoral differences

- The electric machinery and electronics industry benefits most from foreign-owned customers.
- The supporting industries and transportation machinery industry mostly rely on domestic firms as sources of technology.

15

Customers and suppliers

	Same province	Other provinces	Foreign-owned	Foreign-located
# of customers among top 5	1.74	1.29	1.51	0.45
Share of customers providing technical support	0.53	0.39	0.21	0.14
# of suppliers among top 5	1.56	0.87	1.06	0.53
Share of suppliers providing technical support	0.33	0.24	0.20	0.12

- Customers are more important channel of technology transfer than suppliers.

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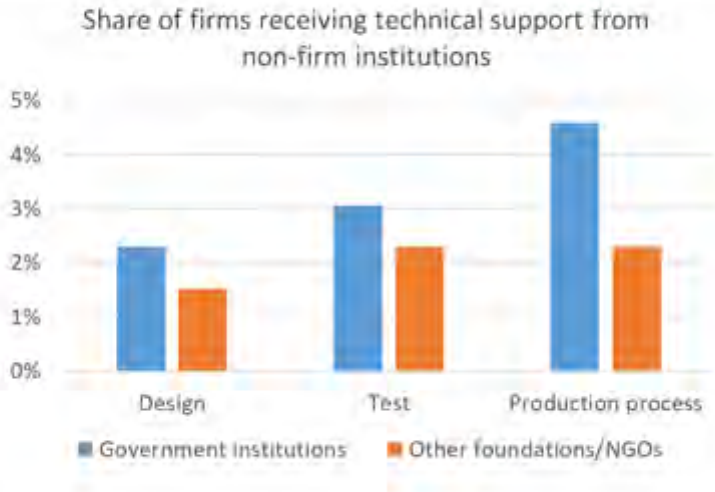
Other channels of technology transfer



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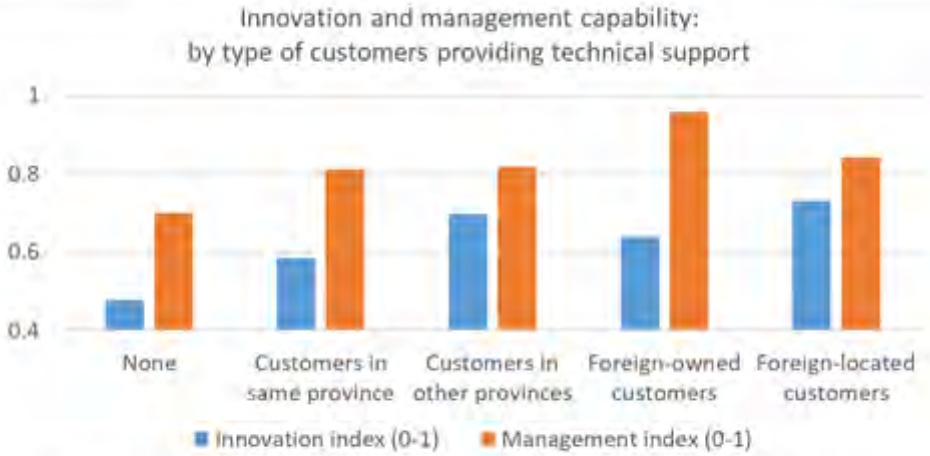
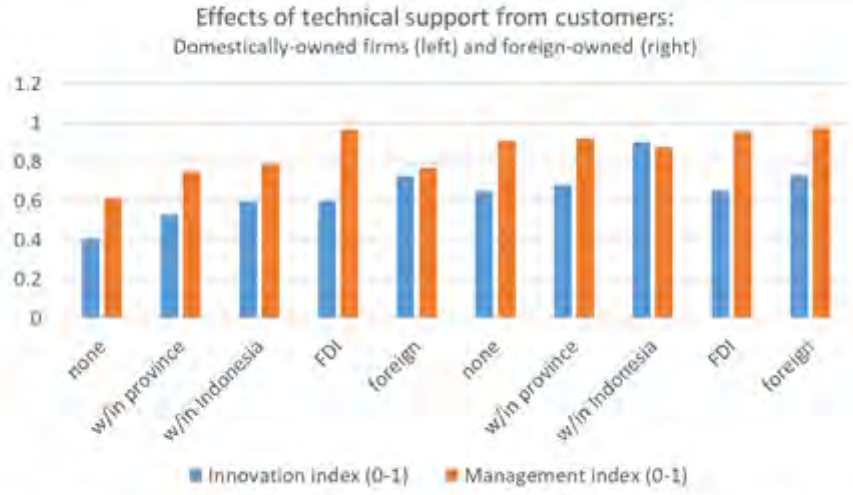
Effects of Technical Support from Customers



- Overall, technical support from distant customers is more effective.
- But, foreign-owned firms do not necessarily promote innovation of their suppliers.

18

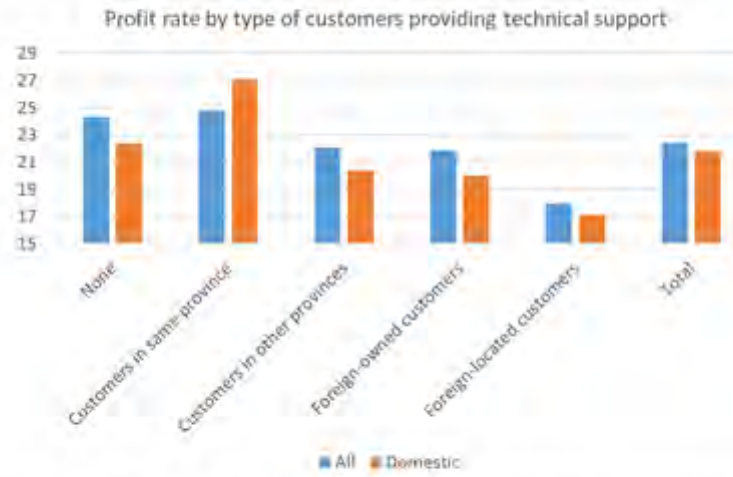
Effects on Domestic Firms



- Domestically-owned suppliers benefit from foreign-owned customers.

19

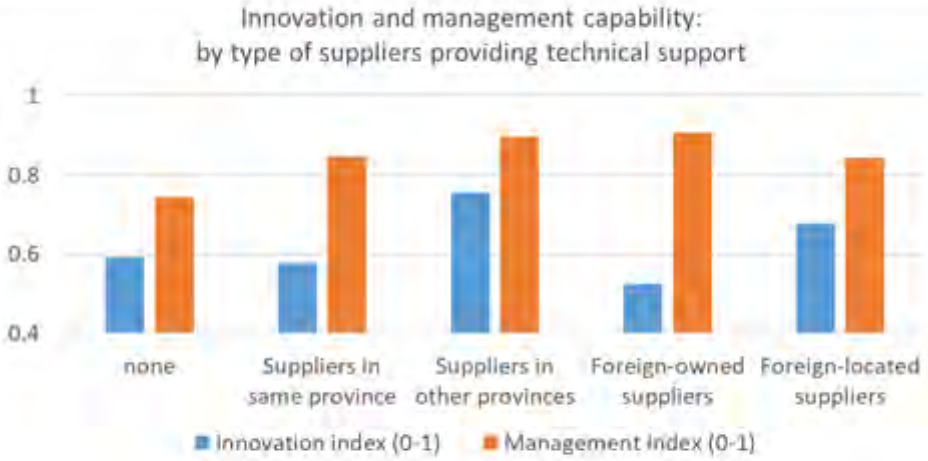
Effects on Profit Rate



- Surprisingly, the profit rate is lower for firms with foreign-owned/located customers.

20

Effects of Suppliers



- Technical support from domestic customers in other provinces is effective.
- But, support from foreign-owned/located firms is less effective.

21

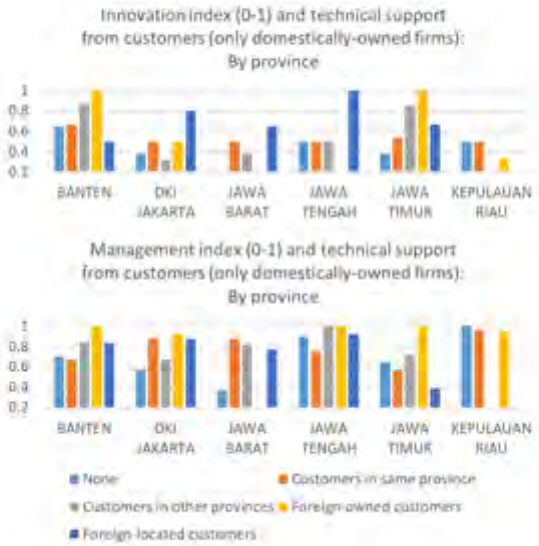
Effects on Domestic Firms

22

Provincial differences

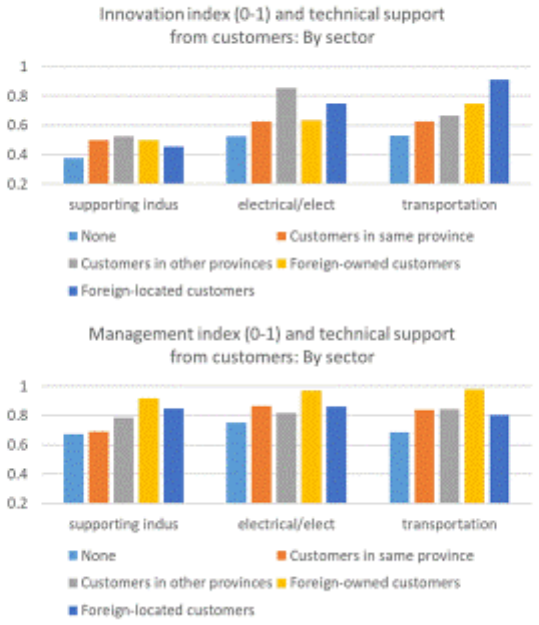
23

Provincial differences (domestic firms)



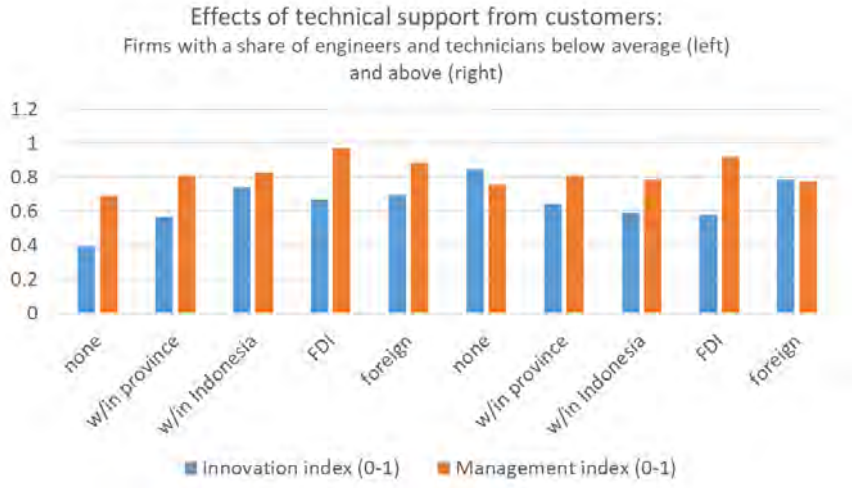
24

Sectoral differences



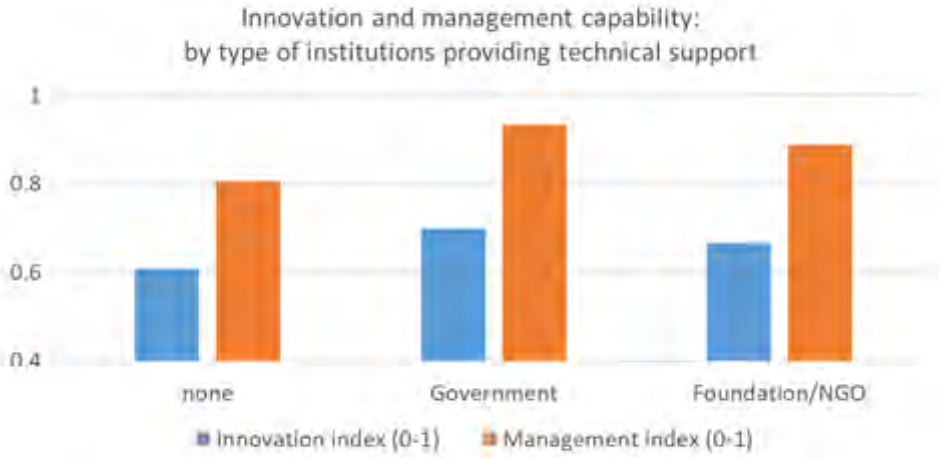
25

Differences by skill levels



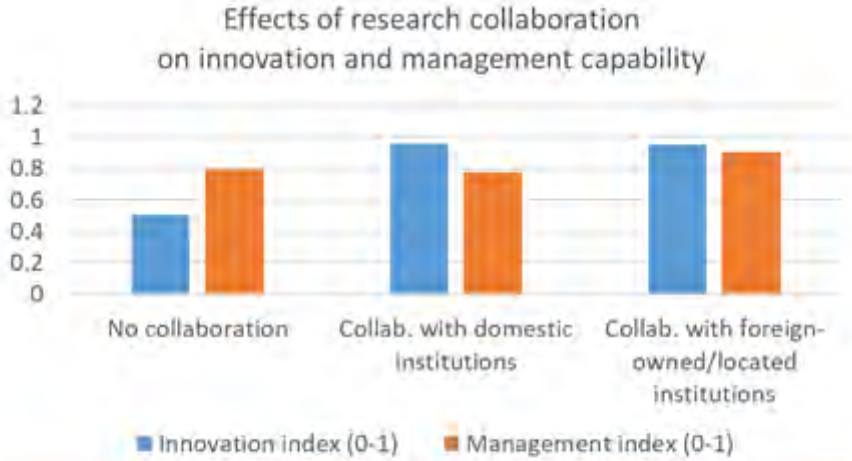
26

Effects of Technical Support from Non-firm Instutuions



- Technical support from government and other non-firm institutions is effective.
- But, such support is not sufficient (p. 13).

27



	Research collab.	with domestic institution	with foreign-owned/located institutions
Share of firms	0.24	0.13	0.16

- Research collaboration is effective but not much conducted.

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	Total	To universities	To government institutions	To private firms
Share of firms	0.5	0.09	0.18	0.24

- External training is effective.

29

SME survey in Tegal, Jawa Tengah

- 510 SMEs in the metal industry

District	#	%
ADIWERNA	207	41
TALANG	237	46
Others	66	13

	#
Not individually owned	16
Receive foreign capital	1

Industry (2 digit)	#	%
Manufacture of fabricated metal products	237	46
Manufacture of electrical equipment	80	16
Manufacture of machinery and equipment	78	15
Manufacture of other transport equipment	89	17

	Mean	Median	Min	Max
# employees	9.6	7	0	181
Share of high-school graduates	0.06	0	0	1
Share of exports	0.05	0	0	1

30

Innovation and management capability

	Innovation index	Management index
Average in nationwide data	0.613	0.812

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Quality of machines

Machines for production, such as drilling, welding, griding, cutting, and lathing

	Mean	Median	Min	Max
# of machines	15.8	12	2	120
Share of machines imported from developed countries	0.317	0.222	0	1
Share of machines purchased after 2008	0.598	0.678	0	1

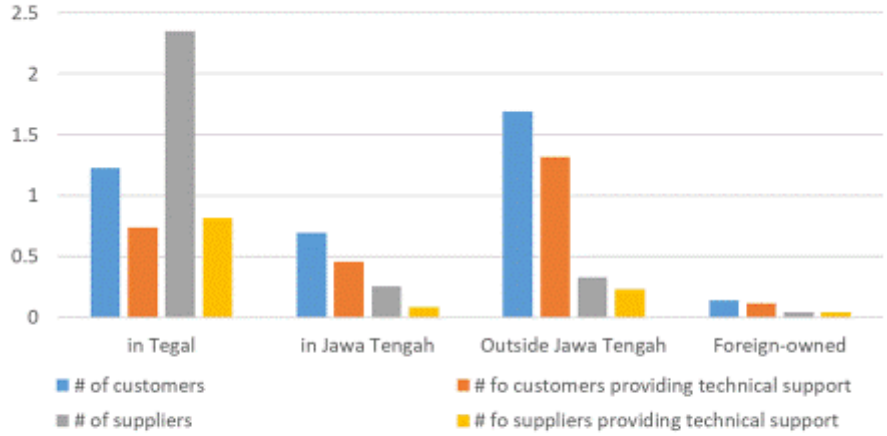
32

External training

- Very few uses external training.

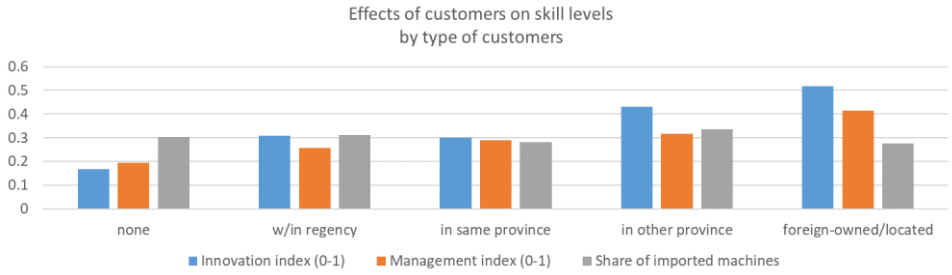
33

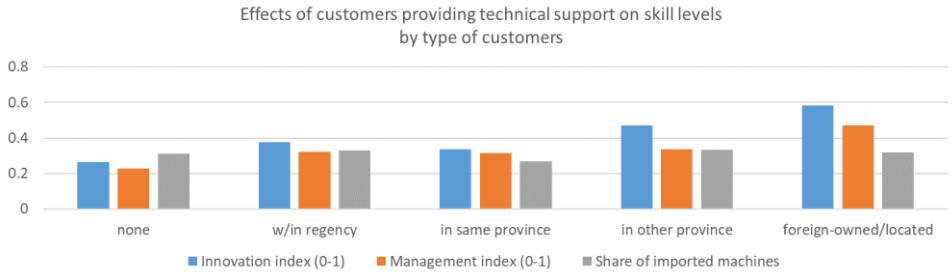
Supply chains



- Suppliers are mostly in Tegal, while some customers are outside Tegal.
- Still few transact with foreign-owned firms.

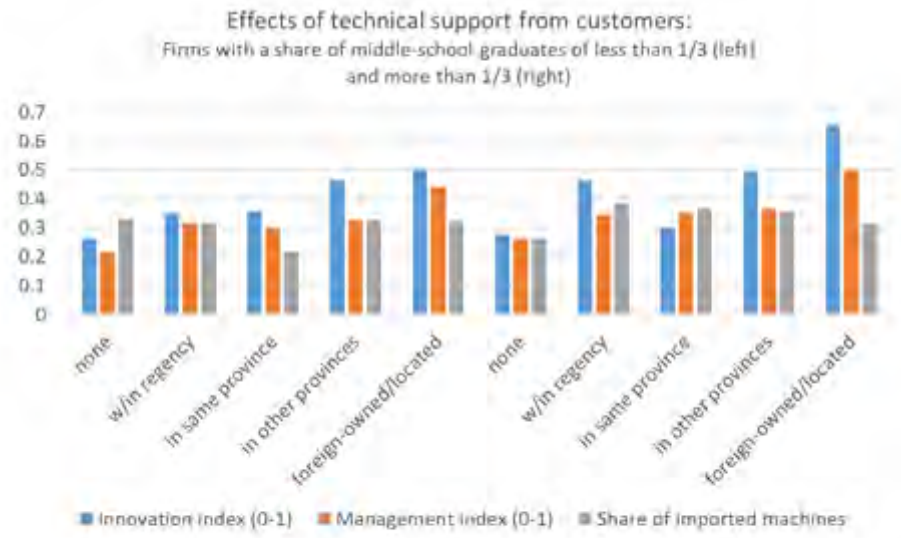
34





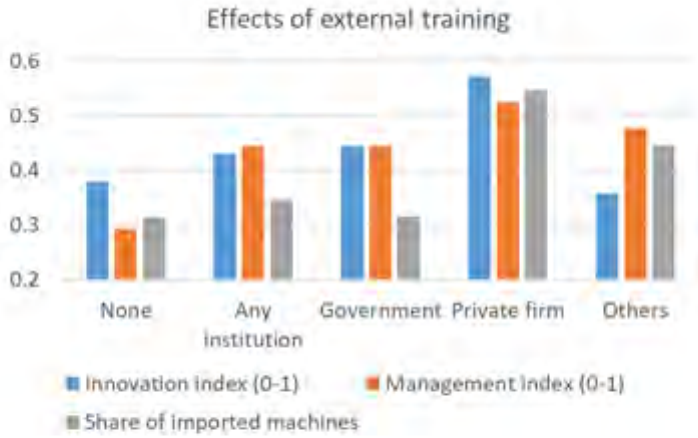
- Firms benefit more from distant partners.

35



- Firms with higher human capital benefit more from customers.

36



- External training, particularly given by private firms, is helpful.

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Summary and policy implications

Technology transfer through networks

- Either large firms or SMEs do not fully utilize benefits from knowledge diffusion through supply chains, external training, or research collaboration.

Policy needed

- To promote effective technology transfer through supply chains: human resource development, infrastructure development + networking
- To promote research collaboration among firms, universities, and foreign institutions: role of governments as brokers

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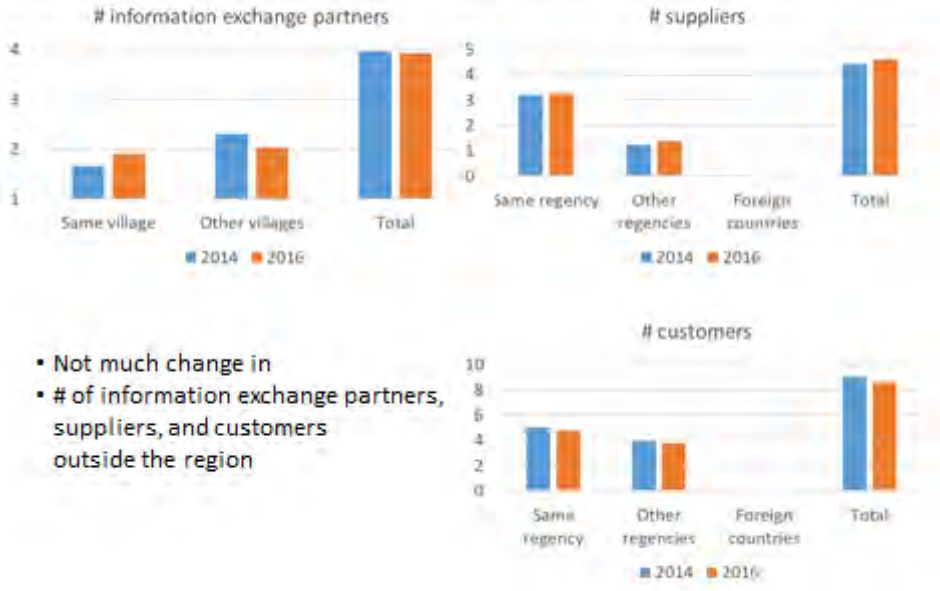
Effects of the highway to Tegal on firm networks



- Not much change in
- # of information exchange partners, suppliers, and customers outside the region

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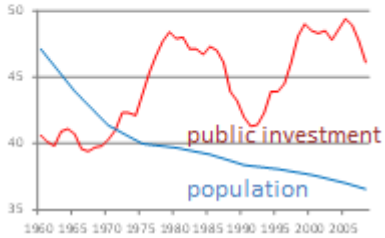
Role of infrastructure: Empirical results

Negative

- Public investment in infrastructure through fiscal transfer in Japan did not necessarily help regional development. (Otsuka et al. 2010)

Share of rural regions in Japan



Positive

- Construction of Shinkansen (high-speed train) in Kyushu (western edge of Japan) promoted supply-chain ties between firms in urban and rural areas. (Bernard et al. 2018)
- Construction of Shinkansen in Nagano (less developed region in central Japan) promoted research collaboration between firms in Nagano and Tokyo. (Inoue et al. 2017)

Implication

- Networking policies in addition to infrastructure needed

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13.2. Agenda of Industrial Dialogue

13.2.1. Meeting Agenda of 1st Industrial Dialogue

1st Industrial Dialogue for

The study on Promotion for Globally Competitive Industry

Date: Monday, 15th May, 2017

Time: 03:00 PM to 05:30 PM

Location: SG4 Conference Room in BAPPENAS

15:00	Welcome and introductions		Mr. Leonardo A.A. Teguh Sambodo, Director of Industry, Tourism and Creative Economy BAPPENAS
15:05	Opening Message		Dr. Leonard V.H. Tampubolon, Deputy Minister for Economic Affairs BAPPENAS
15:10	Message from JICA		Mr.Keiji Katai Senior Deputy Director, Industrial Development and Public Policy Department JICA Headquarter
15:15	1	Presentation: Introduction of the Survey Outline	JICA Survey Team Nomura Research Institute
16:00	2	Presentation: *How can Indonesia escape from a middle-income trap?*	Yasuyuki Todo, Ph.D. Waseda University and Research Institute of Economy, Trade and Industry
16:45	Discussion		
17:30	Closing Message		Mr. Naoki Ando Chief Representative JICA Indonesia Office

13.2.2. Meeting Agenda of 2nd Industrial Dialogue

2nd Industrial Dialogue for

The Study on Promotion for Globally Competitive Industry

Date: Friday, 11th August, 2017

Time: 8:00 – 11:30

Location: The Gallery, Pullman Hotel, 2nd Floor

Time schedule of Industrial Dialogue (Grand Session)

Time	Agenda	Speaker
8:00-8:30	Registration	N/A
8:30-8:35	Opening remarks	Dr. Leonard V.H. Tampubolon, Deputy Minister of Economic Affairs, BAPPENAS
8:35-8:50	Keynote speech	Dr. Yuri Sato, JETRO
8:50-9:10	Industrial Development Plan	Leonardo A.A. Teguh Sambodo, Ph.D, Director of Industry, Tourism, and Creative Economy, BAPPENAS
9:10-10:10	Future Visions of Selected Industries -Background and purpose of the Study -Transportation Machinery Industry -Electrical and Electronic Industry -Food Processing Industry	Survey Team
10:10-10:25	Break	N/A
10:25-11:25	Discussion	All participants
11:25-11:30	Closing remarks	Haris Munandar, Ph.D, Secretary General, Ministry of Industry

13.2.3. Meeting Agenda of 3rd Industrial Dialogue

3rd Industrial Dialogue Grand Session for
The Study on Promotion for Globally Competitive Industry
Date: Wednesday, 17th January, 2018
Time: 9:00 – 11:30
Location: MALUKU, Shangri-La Hotel, Grand Floor

Time schedule of Industrial Dialogue

Time	Agenda	Speaker
8:30:9:00	Registration	N/A
9:00-9:05	Opening remarks	Leonard V.H. Tampubolon, Deputy Minister of Economic Affairs, BAPPENAS Shinichi Tanaka, Director Team 1, Private Sector Development Group, Industrial Development and Public Policy Department, JICA
9:05-10:00	Presentation Recommendation on Policy Measures and Policy Package	Survey Team
10:00-10:15	Coffee break	N/A
10:15-11:25	Discussion	All participants
11:25-11:30	Closing remarks	Leonardo A.A. Teguh Sambodo, Ph.D, Director of Industry, Tourism, and Creative Economy, BAPPENAS Shunsuke Takatoi, Senior Representative, JICA Indonesia Office
11:30 – 13.00	Lunch	All participants

13.2.4. Meeting Agenda of 4th Industrial Dialogue

4rd Industrial Dialogue Grand Session for

The Study on Promotion for Globally Competitive Industry

Date: Tuesday, 17th April, 2018

Time: 8:30 – 15:00

Location: Ballroom C, Shangri-La Hotel, Jakarta (2nd Floor (lobby floor))

Time	Agenda	Speaker
8:30:9:00	Registration	N/A
9:00-9:30	Opening remarks	Leonard V.H. Tampubolon, Deputy Minister of Economic Affairs, BAPPENAS Kawanishi, Hiroyuki Senior Deputy Director General Group Director for Private Sector Development Industrial Development and Public Policy Department, JICA
9:30-10:00	Keynote speech	Bambang Brodjonegoro Minister of BAPPENAS
10:00-10:30	Keynote speech	Airlangga Hartarto Minister of Industry
10:30-10:45	Keynote Speech	Kozo Honsei Minister / Deputy Chief of Mission, Embassy of Japan , Indonesia
10:45-11:00	Coffee break	N/A
11:00-11:40	Presentation: JICA study result	JICA study team
11:40-12:00	Discussion	All participants
12:00-13.00	Lunch	All participants
13:00-13:30	Presentation: Case Study	JICA study team
13:30-14:00	Presentation: Committee Plan	Leonardo A.A. Teguh Sambodo Director of Industry, Tourism, and Creative Economy, BAPPENAS
14:00-14:45	Discussion	All participants
14:45-15:00	Closing remarks	Leonard V.H. Tampubolon, Deputy Minister of Economic Affairs, BAPPENAS

13.3. Micro data survey

13.3.1. List of Nationwide Survey

Target establishments by industrial sectors -1-

Division (2桁分類)	Groups (3桁分類)	ISIC Code	Description	Value (thousand Rp)	輸送機器 (事業所数) Transportation machinery	電気電子 (事業所数) Electrical and electronic	共通1(狭い) (事業所数) Base in common:type 1	共通2(幅広) (事業所数) Base in common:type 2	共通3(2桁幅広)(事業所数) Base in common:type 3
Manufacture of chemicals and chemical products 化学品及び化学製品製造業	Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms 基礎化学品、肥料及び窒素化合物、プラスチック及び合成ゴム素材製造業	20111	Manufacture of Basic Inorganic Chemicals Chloride and Alkali	39,246,908,527	0	0	0	0	24
		20112	Manufacture of Basic Inorganic Chemicals Industrial Gas	80,835,543,610	0	0	0	0	49
		20113	Manufacture of Basic Inorganic Chemicals Pigment	3,217,822,326	0	0	0	0	11
		20114	Manufacture of Basic Inorganic Chemicals Others	1,384,040,221	0	0	0	0	27
		20115	Manufacture of Basic Organic Chemicals Sourced FromAgricultural	4,418,946,615	0	0	0	0	26
		20116	Basic Organic Chemicals For Coloring	10,837,566,323	0	0	0	0	28
		20117	Manufacture of Basic Organic Chemicals	46,896,302,598	0	0	0	0	11
		20118	Manufacture of Basic Organic Chemicals Resulting Special	26,545,210,519	0	0	0	0	62
		20119	Manufacture of Other Basic Organic Chemicals	17,806,165,832	0	0	0	0	40
		20121	Manufacture of Natural Fertilizer/Non-Synthetic Macro Hara Primary	5,146,171,978	0	0	0	0	67
		20122	Manufacture of Single Artificial Fertilizer Macro Nutrients Primary	6,979,848,705	0	0	0	0	10
		20123	Manufacture of Compound Artificial Fertilizer Macro Nutrients Primary	22,704,734,234	0	0	0	0	7
		20124	Manufacture of mixture artificial fertilizer macro Nutrients primary	1,664,838,481	0	0	0	0	8
		20129	Manufacture of Fertilizer	1,327,731,490	0	0	0	0	18
		20131	Manufacture of Plastic Raw Materials and Synthetic Resin	11,806,903,747	0	0	0	0	65
		20132	Manufacture of Synthetic Rubber	1,279,894,868	0	0	0	0	15
	Manufacture of other chemical products その他の化学製品製造業	20211	Manufacture of Pesticides Raw Materials (Active Ingredients)	1,575,105,757	0	0	0	0	7
		20212	Manufacture of Pesticeides (Formulation)	9,639,506,432	0	0	0	0	35
		20221	Manufacture of Paints and Printing Ink	8,959,335,982	0	0	0	0	134
		20222	Manufacture of Varnishes and Mastics	130,916,837	0	0	0	0	3
		20223	Manufacture of Lak (Similar Coatings)	235,824,845	0	0	0	0	5
		20231	Manufacture of Soap and Detergents, Cleaning and Polishing Preparations	18,501,296,023	0	0	0	0	68
		20232	Manufacture of Cosmetic Materials and Cosmetic Including Tooth Paste	19,607,636,235	0	0	0	0	85
		20291	Manufacture of Adhesive/Glue	4,201,144,675	0	0	0	0	50
		20292	Manufacture of Explosives and Ammunition	22,095,513	0	0	0	0	6
		20293	Manufaxture of Ink	583,556,033	0	0	0	0	16
		20294	Manufacture of Essential Oil	2,719,727,014	0	0	0	0	33
		20295	Manufacture of Matches	637,716,266	0	0	0	0	7
		20299	Manufacture of Other Chemical Products, N.E.C	15,888,978,523	0	0	48	48	48
	Manufacture of man-made fibres 人造繊維製造業	20301	Artificial filament fibre	9,000,253,724	0	0	0	20	20
		20302	Manufacture of Artificial Staple Fibre	9,485,883,593	0	0	0	14	14

Source: Compiled from BPS-Statistics Indonesia “Manufacturing Industrial Statistics 2014”

Target establishments by industrial sectors -2-

Division （2桁分類）	Groups （3桁分類）	ISIC Code	Description	Value (thousand Rp)	輸送機器（事業所数）Transportation machinery	電気電子（事業所数）Electrical and electronic	共通1（狭い）（事業所数）Base in common:type 1	共通2（幅広）（事業所数）Base in common:type 2	共通3（2桁幅広）（事業所数）Base in common:type 3
Manufacture of rubber and plastics products ゴム及びプラスチック製品製造業	Manufacture of rubber products ゴム製品製造業	22111	Tire and Tubes Industry	77,184,059,273	0	0	24	24	24
		22112	Manufacture of Vulcanized Tire	255,914,864	0	0	0	31	31
		22121	Manufactrure of Smoked Rubber	1,859,419,839	0	0	0	52	52
		22122	Manufacture of Remilled Rubber	22,695,903,799	0	0	0	46	46
		22123	Manufactrure of Crumb Rubber	70,180,476,243	0	0	0	204	204
		22191	Products of Rubber For Household Purposes	1,536,726,238	0	0	0	0	31
		22192	Products of Rubber for Industrial Purposes	2,492,782,977	0	0	42	42	42
		22199	Products of Rubber N.E.C	2,117,144,040	0	0	0	69	69
	Manufacture of plastics products プラスチック製品製造業	22210	Manufacture of Builders Plastic Wares	1,318,927,866	0	0	0	0	36
		22220	Manufacture of Plastics Articles for the Packaging Goods	39,323,645,824	0	0	0	0	551
		22230	Manufacture of Finished Plastic Products	5,957,477,448	0	0	0	0	64
		22291	Manufacture of Plastic Sheet Products	18,681,185,311	0	0	0	94	94
		22292	Manufacture of Household Ware (Excluding Furniture)	4,056,969,382	0	0	0	0	172
		22293	Products of Plastics For Technical/Industrial Purposes	7,791,398,159	0	0	120	120	120
		22299	Manufacture of Plastic Products N.E.C	15,057,549,230	0	0	0	258	258
Manufacture of other non-metallic mineral products その他の非金属鉱物製品製造業	Manufacture of glass and glass products ガラス及びガラス製品製造業	23111	Manufacture of Sheet Glass	1,517,953,403	0	0	0	13	13
		23112	Manufacture of Safety Glass	887,966,736	0	0	5	5	5
		23119	Manufacture of Other Glass	77,982,943	0	0	0	8	8
		23121	Manufacture of Glass Products For Household Purposes	1,654,248,482	0	0	0	0	23
		23122	Manufacture of Glass Products For Laboratory, Pharmacy and Medical Equipments	399,293,582	0	0	0	0	6
		23123	Manufacture of Glass Containers	245,495,785	0	0	0	0	7
		23129	Manufacture of Glass Products N.E.C	1,205,888,886	0	0	0	0	19
	Manufacture of non-metallic mineral products n.e.c 他に分類されない非金属鉱物製品製造業	23911	Manufacture of Bricks, Mortar and Cement Fire Resistant	549,114,854	0	0	0	0	15
		23922	Manufacture of Clay Roof Tile/Ceramic	1,727,606,426	0	0	0	0	561
		23923	Manufacture of Sanitary Equipment Made From Porcelain	8,469,361,820	0	0	0	0	12
		23929	Building Materials Industry of Clay/Ceramics Not Bricks and Tiles	10,513,210,718	0	0	0	0	66
		23931	Manufacture of Household Wares Made From Porcelain	3,470,436,389	0	0	0	0	22
		23932	M anufacture of Home Appliances From Clay / Ceramics	213,215,204	0	0	0	0	31
		23939	Manufacture of Clay/Ceramics Products and Porcelain Not Other Building Materials	420,090,412	0	0	0	9	9
		23941	Manufacture of Cement	58,044,212,937	0	0	0	0	20
		23942	manufacture of Lime	633,458,684	0	0	0	0	73
		23943	manufacture of Plaster	3,681,549,866	0	0	0	0	11
		23951	Manufacture of Articles Made From Cement	771,307,518	0	0	0	0	36
		23952	Manufacture of Articles made from Lime	110,944,830	0	0	0	0	14
		23953	Manufacture of Articles Made From Cement and Lime For Construction	8,290,471,400	0	0	0	0	188
		23954	M anufacture of Gypsum Products for Construction	49,209,326	0	0	0	0	4
		23955	Manufacture of Articles Made From Asbestos Material For Building Purposes	2,154,033,089	0	0	0	0	17
		23957	Manufacture of Ready Mix Concrete or Mortar	4,920,812,932	0	0	0	0	57
		23959	Manufacture of Articles Made From Cement, Lime, Gypsum andOther Asbestos	594,538,498	0	0	0	0	11
		23961	Manufacture of Marble and Granite Products for Household Appliances and Displays	73,119,445	0	0	0	0	10
		23962	Manufacture of Marble and Granite Products ForBuilding Materials Purposes	1,202,910,802	0	0	0	0	41
		23963	Manufacture of Stone Products For Household Appliances and Displays	726,129,551	0	0	0	0	72
		23969	Manufacture of Marble, Granite and Other Stone Products	302,534,316	0	0	0	0	67
		23990	Manufacture of Other NonÕÇæMetallic Mineral Products N.E.C.	1,067,114,564	0	0	0	0	62

Target establishments by industrial sectors -3-

Division （2桁分類）	Groups （3桁分類）	ISIC Code	Description	Value (thousand Rp)	輸送機器 （事業所数） Transportation machinery	電気電子 （事業所数） Electrical and electronic	共通1（狭い） （事業所数） Base in common:type 1	共通2（幅広） （事業所数） Base in common:type 2	共通3（2桁幅広）（事業所数） Base in common:type 3
Manufacture of basic metals 第一次金属製造業	Manufacture of basic iron and steel 第一次鉄鋼製造業	24101	Manufacture of Basic Iron and Steel	47,622,269,074	0	0	0	70	70
		24102	Manufacture of Steel Rolling	12,263,158,435	0	0	0	36	36
		24103	Manufacture of Metal Pipe and Pipe Fitting of Steel and Iron	19,254,825,155	0	0	0	52	52
	Manufacture of basic precious and other non-ferrous metals 第一次貴金属・その他非鉄金属製造業	24201	Manufacture of Basic Precious and Other Non ferrous Metals	2,466,402,733	0	0	14	14	14
		24202	Manufacture of Preparation of Base Metal Not Iron	23,650,900,871	0	0	0	58	58
		24203	Non-Ferrous Metal Rolling Industrues	27,339,571,618	0	0	0	30	30
		24204	Non-Ferrous Metal Extrusiin Industry	3,862,248,680	0	0	0	9	9
		24205	Pipes Non-Ferro Metal Industry	123,284,130	0	0	0	6	6
	Casting of metals 金属鋳造業	24310	Casting of Iron and Steel Industry	2,691,244,844	0	0	34	34	34
		24320	Casting of Non-Ferrous Metals Industry	17,294,435,734	0	0	14	14	14
Manufacture of fabricated metal products, except machinery and equipment 金属製品製造業（機械器具を除く）	Manufacture of structural metal products, tanks, reservoirs and steam generators 構造用金属製品、タンク、貯槽及び蒸気発生装置製造業	25111	Manufacture of Fabricated Structural Metal Products Other Than Aluminium	4,763,027,830	0	0	0	79	79
		25112	Manufacture of Fabricated Structural Aluminium Products	11,487,540,916	0	0	0	60	60
		25113	Manufacture of Fabricated Structural Steel Products	8,330,989,719	0	0	0	51	51
		25119	Manufacture of Fabricated Metal Products N.E.C	100,161,145	0	0	0	35	35
		25120	Manufacture of Tanks, Reservoirs and Containers of Metal	2,561,232,211	0	0	0	53	53
		25130	Manufacture of Steam Generator other than Boiler	36,134,245	0	0	0	5	5
	Manufacture of weapons and ammunition 武器及び弾薬製造業	25200	manufaxture of weapns and ammunition	245,645,185	0	0	0	0	4
	Manufacture of other fabricated metal products; metalworking service activities その他の金属製品製造業、金属加工サービス活動	25910	Forging, Pressing, Stamping and Roll Forming of Metal, Powder Metallurgy Industry	3,592,615,498	0	0	52	52	52
		25920	Machining, Treatment and Coating of Metals Industry	2,329,683,392	0	0	92	92	92
		25931	Manufacture of Cutlery, Hand Tools For Agricultural	88,493,225	0	0	0	0	10
		25932	Manufacture of Cutlery, Hand Tools For Carpentry Cut	101,066,516	0	0	0	0	18
		25933	Manufacture of Cutlery and Hand Tools UsedIn Household	723,052,161	0	0	0	0	30
		25934	Manufacture of general Hardware	5,134,457,171	0	0	0	51	51
		25940	Manufacture of Pails, Cans, Drums and Similar Containers of Metal	11,292,334,980	0	0	0	0	63
		25951	Manufaxture of Wire Products	18,082,589,357	0	0	0	44	44
		25952	Manufacture of Chain, Springs and Screw	5,995,978,988	0	0	73	73	73
		25991	Manufacture of Safety Deposit Box, Goods of Filling The office and Kinds	295,028,256	0	0	0	0	19
		25992	Manufacture of Kitchen Appliances and Equipment of Table Metals	4,248,874,986	0	0	0	0	85
		25993	M anufacture of Metal Home Appliance not Kitchent Appliances and equipment table	1,705,102,663	0	0	0	0	26
		25994	Manufacture of Making Profiles	155,481,137	0	0	0	3	3
		25995	Manufacture of Meral Lamp	121,152,716	0	0	0	0	12
		25999	Manufacture of Other Metal Products N.E.C	3,007,946,371	0	0	0	86	86

Target establishments by industrial sectors -4-

Division （2桁分類）	Groups （3桁分類）	ISIC Code	Description	Value (thousand Rp)	輸送機器（事業所数）Transportation machinery	電気電子（事業所数）Electrical and electronic	共通1（狭い）（事業所数）Base in common:type 1	共通2（幅広）（事業所数）Base in common:type 2	共通3（2桁幅広）（事業所数）Base in common:type 3
Manufacture of computer, electronic and optical products コンピュータ、電子製品、光学製品製造業	Manufacture of electronic components and boards 電子部品及び基板製造業	26110	Manufacture of Electric Valves and Tubes	28,002,136,274	0	68	0	0	0
		26120	Manufacture of Semi-Conductor Devices and Other ElectronicComponents	9,300,927,673	0	120	0	0	0
	Manufacture of computers and peripheral equipment コンピュータ及び周辺装置製造業	26210	Manufacture Computer And/Or Assembly of Electronic Computers	598,489,886	0	9	0	0	0
		26220	Manufacture of Computer Peripheral Equipment	195,734,851	0	4	0	0	0
	Manufacture of communication equipment 通信装置製造業	26310	Manufacture of telephone and Facsimile Equipment	1,414,790,744	0	7	0	0	0
		26390	Manufacture of Other Communications Equipment	105,935,139	0	10	0	0	0
	Manufacture of consumer electronics 家庭用電子機器製造業	26410	Manufacture of Television And/Or Assembly of Televisions	26,627,792,276	0	30	0	0	0
		26420	Manufacture of Audio and Visual Recording, Receiving and Duplicating Equipment (Except Televisions)	140,189,122	0	4	0	0	0
		26490	Manufacture of Audio and Video Equipment Other Electronics	3,108,656,121	0	35	0	0	0
	Manufacture of measuring, testing, navigating and control equipment; watches and clocks 測定、試験、操縦及び制御装置製造業；時計製造業	26511	Manufacture of Measurement and Test Equipment Manual	165,567,773	0	5	0	0	0
		26512	Manufacture of Measurement and Test Equipment Electrical	750,130,509	0	5	0	0	0
		26520	Manufacture of Watches and Clocks	92,103,712	0	16	0	0	0
	Manufacture of irradiation, electromedical and electrotherapeutic equipment 照射、電気医療及び電気療法装置製造業	26601	Manufacture of irradiation/X-ray and the like	178,214,937	0	3	0	0	0
		26602	Manufacture of Electromedical and Electrotherapeutic Equipment	284,214,044	0	9	0	0	0
	Manufacture of magnetic and optical media 磁気及び光媒体製造業	26800	Manufacture of Magnetic and Optical Media	982,327,537	0	8	0	0	0
Manufacture of electrical equipment 電気機器製造業	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus 電動機、発電機、変圧器、配電及び制御装置製造業	27112	Manufacture of Generator Machines	818,835,923	0	6	0	0	0
		27113	Manufacture of Transformers, Rectifiers and Electric	5,732,767,232	0	26	0	0	0
		27120	Manufacture of Electricity Distribution and Controller Equipments	6,395,578,868	0	43	0	0	0
	Manufacture of batteries and accumulators 電池及び蓄電池製造業	27201	Manufacture of Batteries (Dry Call Battery)	17,598,502,303	0	13	0	0	0
		27202	Manufacture of Electric Accumulators (Secondary Battery)	46,877,098,215	0	17	0	0	0
	Manufacture of wiring and wiring devices 配線及び配線装置製造業	27310	Manufacture of Fibre Optic Cables	14,092,112,646	0	50	0	0	0
		27320	Manufacture of Other Electronic and Electric Wires and Cables	10,099,015,143	0	39	0	0	0
		27330	Manufacture of Wiring Devices	10,943,256,758	0	7	0	0	0
	Manufacture of electric lighting equipment 電気照明器具製造業	27401	Manufacture of Light Bulb, Centralized Lighting and Ultra Violet Lamp	2,785,083,333	0	15	0	0	0
		27402	Tube gas lamp	211,311,377	0	4	0	0	0
		27403	Manufacture of Lighting Equipment For Transportation	7,658,512,843	0	14	0	0	0
		27409	Manufacture of Other Lighting Equipment	1,124,263,835	0	10	0	0	0
	Manufacture of domestic appliances 民生用機械器具製造業	27510	Manufacture of Domestic Electric Appliances	4,005,960,544	0	30	0	0	0
		27520	Manufacture of Domestic Electrothermic Appliances	3,325,859,832	0	21	0	0	0
		27530	Manufacture of Domestic Non Electric Cooking and Heating Equipment	2,721,574,000	0	28	0	0	0
	Manufacture of other electrical equipment その他の電気機器製造業	27900	manufacture of Other Electrocal Equipment	10,484,364,394	0	12	0	0	0

Target establishments by industrial sectors -5-

Division （2桁分類）	Groups （3桁分類）	ISIC Code	Description	Value (thousand Rp)	輸送機器（事業所数）Transportation machinery	電気電子（事業所数）Electrical and electronic	共通1（狭い）（事業所数）Base in common:type 1	共通2（幅広）（事業所数）Base in common:type 2	共通3（2桁幅広）（事業所数）Base in common:type 3
Manufacture of machinery and equipment n.e.c. 他に分類されない機械器具製造業	Manufacture of general-purpose machinery 一般機械製造業	28111	Manufacture of Steam Engine, Turbine and Windmil	144,364,155	0	0	0	8	8
		28112	Manufacture of Internal Combustion Engine	689,992,291	0	0	0	0	4
		28113	Manufacture of Components and Parts of Machine and Turbine	14,867,291,441	0	0	67	67	67
		28120	Manufacture of Fluid Power Equipment	2,305,104,762	0	0	10	10	10
		28130	Manufacture of Others Pumps, Compressors, Tabs and Valves	3,338,881,872	0	0	0	17	17
		28140	Manufacture of Bearings, Gears, and Driving Elements	4,031,172,881	0	0	18	18	18
		28151	Manufacture of ovens, furnaces and furnace Burners not used electrical Flow	66,846,932	0	0	0	4	4
		28160	Manufacture of Lifting and Handling Equipment	1,108,347,149	0	0	0	18	18
		28179	Machinery and other office equipment	19,609,025	0	3	0	3	3
		28191	Manufacture of Packing, Bottling, and Canning Machine	438,772,246	0	0	0	19	19
		28192	Manufacture of Weighing machine	188,864,782	0	0	0	10	10
		28193	Manufacture of Refriagerator machine	1,289,032,436	0	20	0	20	20
		28199	Manufacture of Other General Purpose Machine	417,842,011	0	0	0	0	26
	Manufacture of special-purpose machinery 特殊産業用機械製造業	28210	Manufacture of Agricultural and Forestry Machine	950,211,782	0	0	0	0	19
		28221	Manufacture of Machine and Tools For Metal-Working	9,402,600,450	0	0	24	24	24
		28222	Machine tools for wood working	10,459,592	0	0	0	0	3
		28223	Manufacture of Machine and Tools For Other	234,876,085	0	0	0	9	9
		28240	Manufacture of Machinery For Mining, Quarrying and Construction	2,936,285,472	0	0	0	0	15
		28250	Manufacture of Machinery For Food, Beverage and Tobacco Processing	104,957,099	0	0	0	0	11
		28262	Manufacture of Sewing, Washing and Dryer	13,586,268	0	0	0	0	3
		28263	Manufacture of Textile Machinery	24,203,031	0	0	0	0	12
		28264	Manufacture of Sewing Machine	1,754,621	0	0	0	0	5
		28291	manufacture of Printing machine	3,086,427,810	0	0	0	6	6
		28292	Machine for paper industry	123,845,009	0	0	0	0	3
		28299	Manufacture of Other Special Purposes Machinery	3,395,447,758	0	0	0	34	34
Manufacture of motor vehicles, trailers and semi-trailers 自動車、トレーラ及びセミトレーラ製造業	Manufacture of motor vehicles 自動車製造業	29100	Automotive Industry of Four or More Wheels	54,055,323,998	23	0	0	0	0
	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers 自動車車体製造（設計）業、トレーラ及びセミトレーラ製造業	29200	Manufacture of Bodies (Coachwork) For Motor Vehicles and Manufacture Of semi motor vehicles	3,346,057,546	87	0	0	0	0
	Manufacture of parts and accessories for motor vehicles 自動車部品及び付属品製造業	29300	Manufacture of Parts and Accessories For Motor Vehicles	133,334,442,859	270	0	0	0	0
Manufacture of other transport equipment その他の輸送用機械器具製造業	Building of ships and boats 船舶製造業	30111	Manufacture of Ships and Boats	13,767,385,016	0	0	0	0	0
		30113	Manufacture of Equipment, Supplies and Parts Ship	197,188,049	0	0	0	0	0
	Manufacture of transport equipment n.e.c. 他に分類されない輸送用機械器具製造業	30911	Manufaxture of Motorcycles Two and Three Wheels	54,071,292,819	17	0	0	0	0
		30912	Manufacture of Components and Supplies Motorcycles of Two and Three Wheels	23,193,785,371	183	0	0	0	0
		30921	Manufacture of Bicycle and Wheelchair Included Pedicab	329,491,872	0	0	0	0	0
		30922	Manufacture of Bicycles Equipment and Wheelchair IncludedPedicab	227,005,633	0	0	0	0	0
		30990	Manufacture of Other Transport Equipment n.e.c	178,967,320	0	0	0	0	0
Total				3,154,271,979,390	580	691	637	2,331	5,915

13.3.2. List of Tegal Survey

Target establishments by industry and location

Description of ISIC	talang	adiwerna	Balapulang	dukuhturi	Dukuhturi	Dukuhwaru	Kedungbanteng	kramat	Lebaksiu	Margasari	Pagerbarang	Pangkah	Slawi	Suradadi	surodadi	Talang	Tarub	Warureja	Total
Casting of Iron and Steel Industry		17						1								3	2		23
Casting of Non-Ferrous Metals Industry		19			3			2								49			73
M anufacture of Metal Home Appliance not Kitchent Appliances and equipment table		1														3		1	5
Machining, Treatment and Coating of Metals Industry		89	1	3	12			45	5	5	5	17		12		109	2	1	306
Manufacture of Agricultural and Forestry Machine	1	14						3				2				88			108
Manufacture of Bicycles Equipment and Wheelchair IncludedPedicab		1			1											6			8
Manufacture of Bodies (Coachwork) For Motor Vehicles and Manufacture Of semi motor vehicles		3						3								1	2		9
Manufacture of Chain, Springs and Screw		6			1			1				8				16			32
Manufacture of Components and Supplies Motorcycles of Two and Three Wheels		39			2			3	1			2	1			98	7		153
Manufacture of Cutlery, Hand Tools For Agricultural		20				2						3				22			47
Manufacture of Cutlery, Hand Tools For Carpentry Cut		1																	1
Manufacture of Domestic Electric Appliances		1														2			3
Manufacture of Domestic Non Electric Cooking and Heating Equipment		9														19			28
Manufacture of Equipment, Supplies and Parts Ship		3						2				1				86			92
Manufacture of Fabricated Structural Metal Products Other Than Aluminium		52	8	2	9	6		17	7	5	2	29	7	1		81	6		232
Manufacture of Furniture For Operations, Mediccal and Dental		1						2								1			4
Manufacture of general Hardware		14	1		1				2			4				38	2		62
Manufacture of General Printing			7						8		10			8		5			38
Manufacture of Goods Jewelry of Precious Metals for Personal Purposes		2								34						40			76
Manufacture of Kitchen Appliances and Equipment of Table Metals		25														8			33
Manufacture of Machine and Tools For Metal-Working		5			1			3								1			10
Manufacture of Machinery For Food, Beverage and Tobacco Processing												1				2	1		4
Manufacture of Machinery For Mining, Quarrying and Construction		3						3								17			23
Manufacture of Metal Furniture		10						1				4	1			10			26
manufacture of Other Electrocal Equipment		25			2			2				2				38	17		86
Manufacture of Other General Purpose Machine		1			2			2	18			2				89			114
Manufacture of Other Lighting Equipment		1						1								3			5
Manufacture of Other Metal Products N.E.C		13	1		1	3		1				3				100			122
Manufacture of Others Pumps, Compressors, Tabs and Valves		7										1				89	1		98
Manufacture of Pails, Cans, Drums and Similar Containers of Metal		5																	5
Manufacture of Parts and Accessories For Motor Vehicles		3														2	1		6
Manufacture of Preparation of Base Metal Not Iron		18			7											25			50
Manufacture of Refriagerator machine		3						1											4
Manufacture of Safety Deposit Box, Goods of Filling The office and Kinds					1														1
Manufacture of Sewing, Washing and Dryer		1																	1
Manufacture of Weighing machine		2														8			10
Manufacture of Wiring Devices		1																	1
Non-Ferrous Metal Extrusiin Industry																1			1
Pipes Non-Ferro Metal Industry		2																	2
Products of Plastics For Technical/Industrial Purposes															1	1			2
Manufacture of Fabricated Structural Aluminium Products		1														3			4
Manufacture of Fabricated Structural Steel Products								1								1			2
Manufacture of Tanks, Reservoirs and Containers of Metal		2																	2
manufaxture of weapns and ammunition																5			5
Locomotive Industry and Railway Car		1														2	1		4
Car Repair								3		5						7			15
Repair And Care Of Motorcycles		14	5		3	1		3	1	15	1	43	7			32	21	3	149
Computer Repair Services and Equipments		1			1					2			1			1			6
Communication Equipment Repair Service		18			15		3	11		1		7	11			16	3	2	87
Repair Services Consumer Electronic Equipment		3			2			1		2			2			2	2		14
Total	**1**	**457**	**23**	**5**	**64**	**12**	**3**	**112**	**42**	**69**	**18**	**129**	**30**	**21**	**1**	**1,130**	**68**	**7**	**2,192**

13.3.3. Questionnaire of Nationwide Survey

Lembaga Penyelidikan Ekonomi dan Masyarakat
Fakultas Ekonomi Universitas Indonesia

ID Responden				

SURVEY JARINGAN USAHA DAN RANTAI PASOKAN PADA INDUSTRI ALAT TRANSPORTASI, ELEKTRONIK DAN PENDUKUNGNYA DI INDONESIA/*SURVEY FOR PRODUCTION NETWORK AND SUPPLY CHAIN IN TRANSPORTATION, ELECTRONICS AND ITS SUPPORTING INDUSTRY IN INDONESIA*

Latar Belakang dan Tujuan Singkat/*Background*

Integrasi ekonomi global melalui industri memiliki beberapa komponen yaitu adanya rantai nilai dan jaringan produksi, skala rantai nilai dan jaringan produksi, aktor produksi dan manajamen organisasi. Setiap tingkatan pada komponen ini menentukan tingkat integrasi industri dengan ekonomi global. Industri alat transportasi, listrik, dan elektronik dan industri pendukungnya merupakan salah satu industri prioritas dalam Kebijakan Industri Nasional. Survey ini bertujuan untuk mengetahui tingkat integrasi global ketiga industri tersebut. Secara spesifik, integrasi ini dilihat melalui struktur permodalan, pembiayaan dan investasi, suplai bahan baku dan distributor dan konsumen, dan pengalaman riset, inovasi dan teknologi yang dilakukan oleh perusahaan.

Global economic integration through industries has some components i.e value chain and production network, production actor, and organization management. Each level of these components determine the level of industrial integration with global economy. The industry of transportation machinery, electricity, and electronics and their supporting industries is among priorities of National Industrial Policy. This survey is aimed to get description on the global integration of the mentioned industries. Specifically, this survey captures the industry in the aspect of investment, production input and output, exchanges of information and research and development.

Petunjuk Umum bagi Responden/*General Instructions for Respondent*

Jenis pertanyaan yang diajukan dalam kuesioner ini adalah sebagai berikut:

- Pertanyaan tertutup, dengan alternatif jawaban yang telah disediakan. Responden diharapkan Melingkari **(○)** atau *check mark* **(✓)** pada jawaban yang paling sesuai dengan kondisi dan pengalaman responden. Cara menjawab yang berlainan akan disampaikan di masing–masing pertanyaan.
- Pertanyaan terbuka, yang diharapkan dapat diisi sesuai dengan kondisi dan pengalaman responden.
- Jawaban Anda tidak akan dinilai benar atau salahnya. Silahkan menjawab sesuai dengan kondisi Perusahaan Anda dalam menjalankan bisnis. Informasi yang didapatkan dari survei ini akan dijamin kerahasiaannya dan tidak disebarluaskan.
- Sebagai bukti keabsahan jawaban responden, kami mohon responden berkenan membubuhkan cap perusahaan pada kotak yang tersedia di bawah ini.

*The type of questions in this survey is first a close ended question with Yes or No answer. Please answer the "Yes" / "No" question by providing **(1)** for Yes or (**0**) for No. An open-ended question question needs answer based on the respondent's actual condition and experience*
Information obtained from this survey will be kept confidential and no judegment on the "right" or "wrong". The information will be used only for statistical research purposes and will not be disclosed in a form in which you or your firm can be identified. As an acknowledgement of information in this questionnaire and your participation in this survey, please provide identity of your company and sign of respondent.

Tanda Tangan dan Cap Perusahaan/*sign of the respondent*

Lembaga Penyelidikan Ekonomi dan Masyarakat
Fakultas Ekonomi Universitas Indonesia

ID Responden				

Nama Supervisor :

_____

Name of supervisor

**coret yang tidak perlu*

Nama Perusahaan :

_____

Name of establishment

Alamat Perusahaan :

_____

Addess

Kecamatan :

_____

Sub-regency

Kab/Kota* :

_____

Regency/Municipality

Nama Responden :

_____

Name of respondent

Jabatan Responden :

_____

Position of respondent

Telepon Responden :

_____

Telephone

Nama Pewawancara :

_____

Name of enumerator

BLOK I: PROFIL PERUSAHAAN ***SECTION I: COMPANY PROFILE***		
(1)	(2)	(3)
1. Nama perusahaan/*Name of establishment*	.....	
2. Tahun berdiri perusahaan/*Year of establishment*	.....	
3. Status Perusahaan	1. Kantor pusat/*Holding company* 2. Cabang/ *Branch* 3. Subsidiary */Anak perusahaan* 4. Independen	☐
4. Alamat kantor / pabrik *Address of establishment/production unit*	....	
a. Alamat kantor/pabrik*/Address*	.....	
b. Desa/Kelurahan*) *Administrative vilage*	.....	
c. Kecamatan/ *Sub-regency*	.....	
d. Kota/Kabupaten*) / *Regency/Municipality*	.....	
e. Provinsi/*province*	.....	
5. Alamat kantor pusat/*head quarter information*		
a. Alamat kantor pusat / *Address of head quarter*		
b. Provinsi/*province*		
c. Kode pos/ *Postal code*		
d. Telepon/ *Telephone number*		
e. Fax/*Facsimile*		
f. Surel/*Email*		
g. Titik koordinat kantor/*GPS Coordinate (Longitude and latitude)*		

6. Status kepemilikan perusahaan/ownership ** Foreign-owned firms are defined as firms with more than 10% of shares owned by foreign investors.*	1. PMDN *(domestic)* → Lanjutkan ke no.8 2. PMA *(foreign invested)*	
7. Status kepemilikan/*Nationality of major foreign investor*	1. Amerika/US 2. Kanada/Canada 3. Jepang/Japan 4. Korea/Korea 5. Cina/China 6. Lainnya, sebutkan/ Others, specify	☐
8. Jumlah pekerja (31 Desember 2016)*/ Number of workers (per December 31, 2016)*		
a. Jumlah pekerja tetap/ *permanent workers*	.....orang/*employees*	
b.Jumlah pekerja tidak tetap/*non-permanent workers*	.....orang/*employees*	
b. Apakah perusahaan ini melakukan sendiri kegiatan teknis berikut ini? *Is your firm conducting the following technical activities by your own?*	1. Desain menggunakan CAD (Computer assisted design)/CAM (Computer assisted manufacture) data/*Design CAD/CAM* 2. Desain gambar untuk pencetakan atau pewarnaan*/Design of drawing for mold or die* 3. Desain gambar produk */Design of drawing for products* 4. Desain sistem produksi */Design of production system* 5. Lainnya, sebutkan/ *other, specify*: _____	1.Ya*/Yes* 0.Tidak*/ No* ☐ ☐ ☐ ☐ ☐
c. Apakah perusahaan ini melakukan sendiri kegiatan pengujian berikut? *Is your firm conducting the following tests by your own?*	1. Uji kekuatan/ *strength test* 2. Uji kinerja/ *performance test* 3. Uji ketahanan/*durability test* 4. Lainnya, sebutkan/ *other, specify*: _____	1.Ya*/Yes* 0.Tidak*/No* ☐ ☐ ☐ ☐
11. Apakah perusahaan ini melakukan sendiri kegiatan untuk peningkatan proses produksi ?	1. KAIZEN (aktivitas yang bersifat sistematis dimana tenaga kerja mendiskusikan masalah di lingkungan kerja (produksi dan mencari solusi)/*any systematic activity in which workers*	1.Ya*/Yes* 0.Tidak*/No* ☐

Is your firm conducting the following activities for increasing production process by your own?	*discuss problems in the workshop and try to solve them (does not need to be called "Kaizen")* 2. 5R/5K/3R/3K/*5S*: aktivitas sistematis untuk menjaga kebersihan dan kenyaman lingkungan kerja)/*any systematic activity to clean the workshop and put products and material in an orderly way* 3. K*ONTROL KUALITAS/Quality Control*: aktivitas sistematis untuk standarisa kualitas produk berrdasarkan data / *any systematic activity to standardize quality of products based on data* 4. Aktivitas lainnya untuk mandapatkan dan atau mempertahankan ISO/*Any activity to obtain or keep ISO/* 5. Lainnya, sebutkan/ *other, specify* _____		

BLOK II PERUSAHAAN PEMBELI/ *SECTION II. CUSTOMER FIRMS*

1. Sebutkan 5 perusahaan pembeli terbesar beserta nama produk yang dijual dengan nilai pembelian terbesar pada tahun 2016 !
   Please list the 5 largest customer companies by means of value of sales and 3 main products which they purchased in 2016
   [To enumerators] If the respondent does not want to disclose the names of customers, please do not stop asking but try to get information of suppliers without names.

No	Nama perusahaan pembeli *Name of customer*	Tiga produk dengan nilai pembelian terbesar *Name of goods procured*		
		Produk terbesar 1	Produk terbesar 2	Produk terbesar 3
1.				
2.				
3.				
4.				
5.				

2. Sebutkan profil 5 perusahaan pembeli dengan nilai pembelian terbesar in 2016 !
   Please give some general information about the 5 largest customers listed above

No	Nama perusahaan pembeli	Negara/Provinsi Country/Province	Kabupaten/Kota Distrcit/City	Ukuran perusahaan *Firm size* 1: Kecil (1-19 workers) 2: Sedang (20-99) 3: Besar (>100)	PMA/ *Foreign-owned firm?* 1. Ya/*Yes* 0. Tidak/ *No*	Apakah perusahaan ini memiliki modal di perusahaan tersebut?/*Does your company hold any capital ownership of the customer?* Ya(1) 1.Ya/*Yes* 0.Tidak/*No*	Apakah perusahaan tersebut memiliki modal di perusahaan ini?/*Does the customer hold any capital ownership of your company?* 1.Ya/*Yes* 0.Tidak/*No*
1.							
2.							
3.							
4.							
5.							

3. Apakah ada pemberian informasi/jasa/dukungan lainnya yang terkait dengan kemampuan teknis dari setiap perusahaan pembeli kepada perusahaan ini

pada tahun 2016?

What kind of technical information/services/supports did you receive from customers in 2016? (per each customer)
[To enumerators: These services or supports can be either free or not free. Columns 2-4, design of drawing for mold or die, products, and production system should involve training by the customer, while column 1 is only provision of data.]

No	Nama perusahaan pembeli *Name of Customer*	1. Data untuk desain menggunakan CAD (Computer assisted design)/CAM (Computer assisted manufacture) *Provisions of CAD/CAM data* 1.Ya/*Yes* 0.Tidak/*No*	2. Desain gambar untuk pencetakan atau pewarnaan *Design of drawing for mold or die* 1.Ya/*Yes* 0.Tidak/*No*	3. Desain gambar produk *Design of drawing for products* 1.Ya/*Yes* 0.Tidak/*No*	4. Desain sistem produksi *Design of production system* 1.Ya/*Yes* 0.Tidak/*No*	5. Lainnya, sebutkan *Others, specify*
1						
2						
3						
4						
5						

4. Apakah ada pemberian informasi/jasa/dukungan lainnya yang terkait dengan pengujian dari setiap perusahaan pembeli kepada perusahaan ini pada tahun 2016?
What kind of information/services/support for testing did you receive from customers in 2016? (per each customer)
[To enumerators: These services or supports can be either free or not free. They may involve training by the customer or may be only provision of testing devices.]

No	Nama perusahaan pembeli *Name of Customer*	1. Uji kekuatan *strength test* 1.Ya/*Yes* 0.Tidak/*No*	2. Uji performa *performance test* 1.Ya/*Yes* 0.Tidak/*No*	3. Uji ketahanan *durability test* 1.Ya/*Yes* 0.Tidak/*No*	4. Lainnya, sebutkan *Others, specify*
1					
2					
3					

4					
5					

5. Apakah ada pemberian informasi/jasa/dukungan lainnya yang terkait dengan perbaikan proses produksi dari setiap perusahaan pembeli kepada perusahaan ini pada tahun 2016?
   What kind of information/service/supports for production process improvement from customers in 2016? (per each customer)
   [To enumerators: These services or supports can be either free or not free.]

No	Nama perusahaan pembeli *Name of Customer*	1. KAIZEN (any systematic activity in which workers discuss problems in the workshop and try to solve them) 1.Ya/*Yes* 0.Tidak/*No*	2. 5R/5K/3R/3K/*5S* (any systematic activity to clean the workshop and put products and material in an orderly way) 1.Ya/*Yes* 0.Tidak/*No*	3. Kontrol Kualitas/ *Quality Control* (any systematic activity to standardize the quality of products based on data) 1.Ya/*Yes* 0.Tidak/*No*	4. ISO (any systematic activity to obtain or keep ISO) 1.Ya/*Yes* 0.Tidak/*No*	5.Lainnya, sebutkan/ *Others, specify*
1						
2						
3						
4						
5						

6. Selain 5 (lima) perusahaan pembeli terbesar yang sudah disebutkan di atas, apakah perusahaan ini menerima informasi/jasa/dukungan lainnya dari perusahaa pembeli lainnya pada tahun 2016?
   Besides the top 5 customers mentioned above, did you receive any information/service/supports from other customers in 2016 ?

Jenis informasi / jasa *Information/services*	1.Ya/*Yes* 0.Tidak/*No*	Perusahaan Domestik *Indonesian-owned company*			Perusahaan Milik Asing (PMA) *Foreign-owned company*			
		Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Luar negeri *Abroad*
		1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*
1. Informasi bisnis *Business-related information*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
2. Kemampuan teknis *Technical services*								
a) Data untuk desain menggunakan CAD/CAM/*CAM/CAD data*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
b) Desain gambar untuk pencetakan atau pewarnaan/*design of mold and die*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
c) Desain gambar produk/*Design of products*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
d) *Desain sistem produksi*/Design of *production system*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
3. Pengujian *Testing services (strength, performance, durability)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
4. Peningkatan produktivitas *Productivity improvement services (Kaizen, 5R/5K/3R/3K, QC, ISO)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							

BLOK III. PERUSAHAAN PEMASOK/*SECTION III.SUPPLIERS*

1. Sebutkan 5 perusahaan pemasok terbesar beserta nama bahan baku yang dibeli dengan nilai pembelian terbesar pada tahun 2016!

Please list the 5 largest suppliers by means of value of purchase/procurement and their top 3 products in 2016 !
[To enumerators] If the respondent does not want to disclose the names of suppliers, please do not stop asking but try to get information of suppliers without names.

No	Nama perusahaan pemasok *Name of supplier*	Tiga bahan baku terbesar yang dibeli *Name of goods procured*		
		Produk bahan baku terbesar 1	Produk bahan baku terbesar 2	Produk bahan baku terbesar 3
1				
2				
3				
4				
5				

2. Sebutkan profil 5 perusahaan pemasok dengan nilai pembelian terbesar *in 2016*!
Please provide some general information about the 5 largest suppliers listed above

No	Nama perusahaan pemasok *Name of supplier*	Negara/Provinsi	Kabupaten/Kota	Skala / *Firm size* 1: Kecil (1-19 workers) 2: Sedang (20-99) 3: Besar (>100)	PMA/ *Foreign-owned firm?* 1. Ya/*Yes* 0. Tidak/ *No*	Apakah perusahaan Anda memiliki modal di perusahaan tersebut? *Does your company hold any capital ownership of the customer?* 1.Ya/*Yes* 0.Tidak/*No*	Apakah perusahaan tersebut memiliki modal di perusahaan Anda? *Does the customer hold any capital ownership of your company?* 1.Ya/*Yes* 0.Tidak/*No*
1.							
2.							
3.							
4.							
5.							

3. Apakah ada pemberian informasi/jasa/dukungan lainnya yang terkait dengan kemampuan teknis dari setiap perusahaan pemasok kepada perusahaan ini pada tahun 2016? *What kind of technical information/services/supports did you receive from your suppliers in 2016? (per each supplier)*
[To enumerators: These services or supports can be either free or not free. Columns 2-4, design of drawing for mold or die, products, and production system should involve training by the supplier, while column 1 is only provision of data.]

No	Nama perusahaan pemasok *Name of suppliers*	1. Data untuk desain menggunakan CAD (Computer assisted design)/CAM (Computer assisted manufacture) *Provision of CAD/CAM data* 1.Ya/Yes 0.Tidak/No	2. Desain gambar untuk pencetakan atau pewaarnaan *Design of drawing for Mold or Die* 1.Ya/Yes 0.Tidak/No	3. Desain gambar produk *Design of drawing for products* 1.Ya/Yes 0.Tidak/No	4. Desain sistem produksi *Design of production system* 1.Ya/Yes 0.Tidak/No	5. Lainnya, sebutkan *Others, specify*
1						
2						
3						
4						
5						

4. Apakah ada pemberian informasi/jasa/dukungan lainnya yang terkait dengan pengujian dari setiap perusahaan pemasok kepada perusahaan ini pada tahun 2016?
   What kind of information/services/supports for testing did you receive from your suppliers in 2016? (per each supplier)
   [To enumerators: These services or supports can be either free or not free. They may involve training by the supplier or may be only provision of testing devices.]

No	Nama perusahaan pemasok *Name of suppliers*	1. Uji kekuatan *strength test* 1.Ya/*Yes* 0.Tidak/*No*	2. Uji performa/kinerja *performance test* 1.Ya/*Yes* 0.Tidak/*No*	3. Uji ketahanan *durability test* 1.Ya/*Yes* 0.Tidak/*No*	4. Lainnya, sebutkan *Others, specify*
1					.....
2					.....
3					
4					.....
5					.....

5. Apakah ada pemberian informasi/jasa/dukungan lainnya untuk perbaikan proses produksi yang diterima perusahaan ini dari setiap perusahaan pemasok kepada perusahaan ini pada tahun 2016?

What kind of information/service/supports for production process improvement did you receive from your suppliers in 2016? (per each supplier)

[To enumerators: These services or supports can be either free or not free.]

No	Nama perusahaan pemasok *Name of suppliers*	1. KAIZEN (any systematic activity in which workers discuss problems in the workshop and try to solve them) 1.Ya/*Yes* 0.Tidak/*No*	2. 5R/5K/3R/3K (any systematic activity to clean the workshop and put products and material in an orderly way) 1.Ya/*Yes* 0.Tidak/*No*	3. Quality Control (any systematic activity to standardize the quality of products based on data) 1.Ya/*Yes* 0.Tidak/*No*	4. ISO (any systematic activity to obtain or keep ISO) 0. Tidak/No 1. Ya/Yes	5. Lainnya, sebutkan *Others, specify*
1						
2						
3						
4						
5						

6. Selain 5 (lima) perusahaan pemasok yang telah disebutkan, apakah ada pemberian informasi/jasa/dukungan lainnya seperti berikut ini perusahaan pemasok lainnya ?

   Besides the top 5 customers mentioned above, did you receive any information/service/supports from other customers in 2016?

Jenis informasi / jasa *Information/services*	1.Ya/*Yes* 0.Tidak/*No*	Perusahaan Domestik *Indonesian-owned company*			Perusahaan Milik Asing (PMA) *Foreign-owned company*			
		Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Luar negeri *Abroad*
		1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*
1. Informasi bisnis *Business-related information*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
2. Kemampuan teknis *Technical services*								
a) Data desain menggunakan CAD/CAM/*CAM/CAD data*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
b) Desain gambar untu pencetakan atau pewarnaan/*design of mold and die*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
c) Desain gambar produk/*Design of products*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
d) *Desain sistem produksi*/Design of *production system*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
3. Pengujian *Testing services (strength, performance, durability)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
4. Peningkatan produktivitas *Productivity improvement services (Kaizen, 5R/5K/3R/3K, QC, ISO)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							

BLOK IV. JASA KEUANGAN DAN BISNIS
SECTION IV FINANCIAL and BUSINESS SERVICE

1. Dari lembaga keuangan utama mana perusahaan ini menerima pinjaman pada tahun 2016? Sebutkan 3 yang utama !
   Jika "Tidak ada", lanjut ke No. 4
   What are the top 3 financial institutions that the company received credits from during the period of 2016?
   1. Perbankan komersil/swasta
      Private commercial banks
   2. Perbankan pemerintah atau lembaga keuangan pemerintah
      State-owned banks or government agency
   3. Institusi keuangan non-perbankan yang termasuk institusi keuangan mikro, koperasi simpan pinjam, serikat kredit, atau perusahaan keuangan
      Non-bank financial institutions which include microfinance intuitions, credit cooperatives, credit unions, or finance companies
   4. Lainnya, sebutkan/ *Others, specify*:
      _____

   1.Ya/*Yes*
   0.Tidak/ *No*

2. Seberapa puaskah Anda terhadap pelayanan yang diberikan oleh institusi keuangan tersebut? *How much are you satisfied with the service that financial institutions provides?*
   1.Sangat puas/ *Very satisfied*
   2.Puas/ *Satisfied*
   3.Tidak puas/ *Dissatisfied*
   4.Sangat tidak puas/ *Very dissatisfied*

   1. Perbankan komersil/swasta
      Private commercial banks — 1 2 3 4
   2. Perbankan pemerintah atau lembaga keuangan pemerintah
      State-owned banks or government agency — 1 2 3 4
   3. Institusi keuangan non-perbankan yang termasuk institusi keuangan mikro, koperasi simpan pinjam, serikat kredit, atau perusahaan keuangan
      Non-bank financial institutions which include microfinance intuitions, credit cooperatives, credit unions, or finance companies — 1 2 3 4
   4. Lainnya, sebutkan/ *Others, specify*:
      _____ — 1 2 3 4
      _____

3. Berapa jumlah kredit yang diterima perusahaan dibandingkan dengan jumlah kredit total yang diajukan pada tahun 2016 ?
   Compared with the amount of credits the company wanted to receive during the period of 2016, how much did the company actually receive?
   _____ %

4. Apakah ada jasa usaha yang dibayar oleh perusahaan Anda kepada pihak ketiga selain perusahaan pembeli dan pemasok di tahun 2016?
   What kind of business services did you receive from any company or institution in 2016?

Jasa/*Services*	1.Ya/Yes 0. Tidak/No	Jasa/Services	1.Ya/Yes 0. Tidak/No
1. Strategi bisnis/ *Business strategy*	☐	6. E-commerce /bisnis online	☐
2. Riset pasar/survey *Market research/survey*	☐	7. Forum/temu bisnis *Business matching*	☐
3. Penghitungan pajak/akuntasi *accounting/tax calculation*	☐	8. Lainnya, sebutkan *others, specify*	☐
4. Bantuan hukum dan dokumen *legal and document support*	☐		
5. Outsource pekerjaan administratif *outsource of administrative work*	☐	9. Tidak ada, *None* *Lanjut ke Blok V/Continue to Section V*	☐

5. Apakah Anda memperoleh informasi terkait pemesanan/kontrak baru dari pihak ketiga tersebut?
   Did you receive any information of new order/contract from above business/technical design/testing service partners?
   1. Ya dan mendapatkan pemesanan/kontrak baru *yes and got a new order/contract* ☐
   2. Ya, tetapi tidak ada kontrak baru yang terjadi *yes but it is was not realized*
   3. Tidak mendapatkan informasi *No*

7. Selain dari pihak ketiga yang telah disebutkan, apakah ada pemberian informasi/jasa/dukungan lainnya yang diterima perusahaan ini pada tahun 2016 ?
   Besides supports from customers and suppliers, did you receive the following information/services/supports from other companies or institutions in 2016 ? If from whom ? Other companies and institutions include companies of relative and friend, neigbours, public training and testing institutions, and foreign aid institutions.
   [To enumerators] Please make sure that supports from customers or suppliers are not included in this question .

Jenis informasi / jasa *Information/services*	1.Ya/*Yes* 0.Tidak/*No*	Perusahaan Domestik *Indonesian-owned company*			Perusahaan Milik Asing (PMA) *Foreign-owned company*			
		Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Luar negeri *Abraod*
		1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*
1. Informasi bisnis *Business-related information*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
2. Kemampuan teknis *Technical services*								
a) Data desain menggunakan CAD/CAM/*CAM/CAD data*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
b) Desain gambar untu pencetakan atau pewarnaan/*design of mold and die*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
c) Desain gambar produk/*Design of products*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
d) *Desain sistem produksi*/Design of *production system*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
3. Pengujian *Testing services (strength, performance, durability)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
4. Peningkatan produktivitas *Productivity improvement services (Kaizen, 5R/5K/3R/3K, QC, ISO)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							

Jenis informasi / jasa *Information/services* **Lembaga Penyelidikan Ekonomi dan Masyarakat** **Fakultas Ekonomi Universitas Indonesia**	1.Ya/*Yes* 0.Tidak/*No*	**** Domestik *Indonesian-managed institution*			***** Milik Asing (PMA) *Foreign-managed institution*			
		Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Provinsi yang sama *Same province*	Provinsi yang berbeda tetapi di pulau yang sama *Outside the prov. but in the same island*	Di pulau yang berbeda tetapi di Indonesia *Outside the island but in Indonesia*	Luar negeri *Abraod*
		1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*	1.Ya/*Yes* 0.Tidak/*No*
1. Informasi bisnis *Business-related information*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
2. Kemampuan teknis *Technical services*								
a) Data desain menggunakan CAD/CAM/*CAM/CAD data*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
b) Desain gambar untu pencetakan atau pewarnaan/*design of mold and die*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
c) Desain gambar produk/*Design of products*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
d) *Desain sistem produksi*/Design of *production system*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
3. Pengujian *Testing services (strength, performance, durability)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							
4. Peningkatan produktivitas *Productivity improvement services (Kaizen, 5R/5K/3R/3K, QC, ISO)*	1.Ya/*Yes* → 0.Tidak/*No* ↓							

V. PENGEMBANGAN DAN SUMBER DAYA MANUSIA
SECTION VI HUMAN RESOURCE & DEVELOPMENT

1. Apakah perusahaan ini memiliki insinyur yang memiliki tugas utama seperti berikut? Jika" Ya", berapa banyak insinyur untuk masing-masing posisi tersebut? (sebutkan jumlahnya)
Does your company has engineer who is mainly in charge of work such as listed? How many engineers for each position?(specify in bracket) If one person engages in multiple tasks, for example, both technical design and mold and jig design, please report yes to both 2 and 3 and report 1 person for both 2 and 3.

No.	Insinyur di bidang/engineers in	1.Ya/*Yes* 0.Tidak/*No*	Jika Ya, sebutkan
			jumlah
1	Penelitian dan pengembangan/ *R&D*		
2	Desain teknis/ *Technical Design*		
3	Desain bentuk dan pola/ *Mold and Jig Design*		
4	Desain produksi/ *Production design*		
5	Kendali produksi *Production control*		

2. Apakah perusahaan ini mengirimkan ahli/teknisi untuk mempelajari keahlian yang disebutkan di bawah ini ke perusahaan rekanan Anda (pelanggan, pemasok, dll.)? *Does your company send your expert/engineer as trainee to learn listed expertise to your partner company (customer, supplier, etc.)?*

No.	Ahli di bidang/Expert in	1.Ya/*Yes* 0.Tidak/*No*
1	Penelitian dan pengembangan/ *R&D*	
2	Desain teknis/ *Technical Design*	
3	Proses produksi, kendali mutu/ *Production Process, QC*	

3. Apakah perusahaan ini mengirimkan ahli/teknisi untuk mempelajari keahlian tertentu ke lembaga/tempat berikut?
Does your company send your expert/engineer as trainee to learn the expertise to other entities such as listed?

No.	Institusi	1.Ya/*Yes* 0.Tidak/*No*
1	Universitas/ *University*	
2	Lembaga pelatihan pemerintah/ *Government-owned training institutions*	
3	Lembaga pelatihan swasta/ *Private training institute*	
4	Fasilitas pelatihan lainnya/ *other training facility*	

BLOK VI INOVASI DAN MANAJEMEN
SECTION VI Innovation and Management

1. Apakah perusahaan ini melakukan inovasi produk dalam 3 tahun terakhir?
Inovasi produk merupakan pengenalan produk(barang/jasa) yang baru atau telah mengalami perubahan perbaikan yang signifikan pada karakter (spesifikasi teknis, komponen, bahan, bahan, software, kemudahan penggunaan bagi pengguna) dan fungsi karakteristik lainnya).
Have you conducted any product innovation in the last 3 years? A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. (OECD, Oslo Manual, 3rd edition)
   1. Ya/*Yes*
   0. Tidak /*No*

2. Apakah perusahaan ini melakukan kerjasama kolaborasi atau belajar dari perusahaan atau institusi lain untuk inovasi produk pada tahun 2016 ?
Did you engage in collaboration with or learning from other companies and institutions for product innovation in 2016?
   1. Ya/*Yes*
   0. Tidak /*No,* lanjut ke No.5

3. Jika "Ya", apakah perusahaan ini bekerja sama dengan perusahaan milik dalam negeri atau institusi yang dimanajeri dalam negeri?
If yes, with locally-owned companies or locally-managed institutions?
1. Ya/*Yes*
0. Tidak /*No*

4. Jika "Ya", apakah bekerja sama dengan perusahaan milik asing atau institusi yang dimanajeri oleh institusi asing?
If yes, with foreign-owned companies or foreign-managed institutions?
1. Ya/*Yes*
0. Tidak /*No*

5. Apakah Anda melakukan inovasi proses pada tahun 2016 lalu?
Sebuah inovasi proses adalah implementasi metode produksi yang baru atau perbaikan metode produksi yang signifikan. Termasuk di antaranya adalah perubahan teknik, peralatan, dan/atau software yang signifikan
Conducted any process innovation during the period of 2016? A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. (OECD, Oslo Manual, 3rd edition)
1. Ya/*Yes*
0. Tidak /*No*

6. Apakah perusahaan ini melakukan kerjasama kolaborasi atau belajar dari perusahaan atau institusi lain untuk inovasi proses pada tahun 2016 ?
Did you engage in collaboration with or learning from other companies and institutions for process innovation in 2016?
1. Ya/*Yes*
0. Tidak /*No,* lanjut ke No.5

7. Jika "Ya", apakah perusahaan ini bekerja sama dengan perusahaan milik dalam negeri atau institusi yang dimanajeri dalam negeri?
If yes, with locally-owned companies or locally-managed institutions?
1. Ya/*Yes*
0. Tidak /*No*

8. Jika "Ya", apakah bekerja sama dengan perusahaan milik asing atau institusi yang dimanajeri oleh institusi asing?
If yes, with foreign-owned companies or foreign-managed institutions?
1. Ya/*Yes*
0. Tidak /*No*

9. Apakah perusahaan Anda memiliki target produksi?
Did you have production target?
1. *Ya/* Yes
0. *Tidak/No*

10. Apakah target dan pencapaian produksi dipajang di lingkungan kerja selama tahun 2016?
Were there display boards in plant that show target or achieved production pieces in 2016?
1. Ya/*Yes*
0. Tidak /*No*

11. Seberapa sering perusahaan Anda melacak/memeriksa setiap produksi pada tahun 2016?
How frequently did you keep track of the volume of production pieces in 2016?
1. Ya, setiap hari/*Yes, daily*

2. Ya, setiap minggu/*Yes, every week*
3. Ya, 2 mingguan/*Yes, once in two week*
4. Ya, bulanan/*Yes, Monthly*
5. *Ya,* triwulanan/caturwulan/semesteran / *quarterly/four-mpnthly/ semester*
6. Ya, tidak tentu/*Yes, Irregular*
7. Tidak pernah/*Never*

12. Siapa yang memiliki akses data produksi mingguan di perusahaan Anda untuk tahun 2016? *Who got to see the production data on a weekly basis in 2016?*

No.	Jabatan/*Position*	1.Ya/*Yes* 0.Tidak/*No*
1	Direktur/*Board of Directors*	
2	Manajer/*Manager*	
3	Supervisor	
4	Staf/karyawan/*staff*	

13. Apakah perusahaan ini memberikan penilaian kinerja terhadap pekerja? *Did you assess workers' performance in 2016?* ☐
1.Ya/*Yes*
0.Tidak /*No, lanjut ke No.13*

14. Seberapa sering perusahaan ini melakukan penilaian performa di tahun 2016? *and if so in what frequency in 2016?* ☐
1. Ya, tiap bulan/*Yes monthly*
2. Ya, triwulanan/*Yes, quarterly*
3. Ya, tiap semester/Yes, every semester
4. Ya, tiap tahun/*Yes. yearly*

15. Apakah perusahaan ini memberikan bonus atau promosi atas pencapaian target tersebut?
if so do you give bonus or promotions in 2016?
1. Ya/ Yes ☐
0. Tidak/*No*

16. Apakah bahan baku yang digunakan untuk produksi diperiksa kualitasnya sebelum digunakan di tahun 2016? ☐
Was the material used for production checked for its quality before used in 2016?
1.Ya/*Yes*
0.Tidak /*No*

17. Apakah perusahaan ini melakukan pencatatan terhadap barang cacat/rusak pada tahun 2016? ☐
Did you record defects in 2016?
1.Ya/*Yes*
0.Tidak /*No*

18. Apakah perusahaan ini mempunyai ISO pada tahun 2016 ? Jika "Ya", kapan ISO tersebut diperoleh ?Did your firm have ISO in 2016? If so, when did your firm obtain it? ☐
1. Ya, tahun pertama kali mendapatkan ISO: ……../*Yes*
0. Tidak/*No*

No	Jenis ISO/ *Type of ISO*	Tahun / *Year of obtaining*

BLOK VII KINERJA KEUANGAN / *SECTION VII. FINANCIAL PERFORMANCE*

Sebutkan kondisi laporan keuangan dalam tiga tahun terakhir !

Please input figures about the financial statement of 2016, 2015 and 2014

		2016	2015	2014
1	Omset tahunan *Annual sales*	Rp.....	Rp.....	Rp.....
2	Laba bruto (% dari omset) *Gross profit*	.....%	.....%	.....%
3	Ekspor (% dari omset) *Exports*	..... %.	.....%	.....%

NOTES OF ENUMERATOR

13.3.4. Questionnaire of Tegal Survey

ID Kuisioner: | | | | | | | | |

R A H A S I A

SURVEI RANTAI PASOKAN DAN JARINGAN USAHA PADA INDUSTRI PENGOLAHAN BERBASIS LOGAM DI KABUPATEN TEGAL

Keberadaan rantai pasokan yang berkelanjutan dan jaringan usaha yang kuat merupakan faktor yang penting bagi perkembangan dan daya saing industri pengolahan dewasa ini. Survei rantai pasokan dan jaringan usaha ini dilakukan oleh Lembaga Penyelidikan Ekonomi dan Masyarakat, Fakultas Ekonomi dan Bisnis Universitas Indonesia (LPEM FEBUI). Survei ini bertujuan untuk melihat bagaimana rantai pasokan dan jaringan usaha dapat menularkan informasi, pengetahuan, keterampilan, teknologi dan inovasi yang pada gilirannya dapat meningkatkan kinerja perusahaan pengolahan logam di wilayah Kabupaten Tegal. Semua informasi dan data yang diperoleh dari survei ini bersifat RAHASIA dan tidak akan dipublikasikan kecuali untuk kepentingan survei dan menghasilkan informasi yang teragregasi.

BLOK I : BUSINESS LOCATION/KETERANGAN TEMPAT

(1)	(2)	(3)
1.Provinsi/ Province	.....	
2. Kabupaten/Kota*) Regency/City	.....	
3. Kecamatan/District	.....	
4. Desa/Kelurahan*)/ Administrative Village	.....	
5. Titik Koordinat GPS/ GPS Coordinate (*longitude* dan *latitude*)/(longitude and latitude)		

*) Coret yang tidak sesuai/Delete where not applicable

BLOK II: KETERANGAN PEMILIK/ INFORMATION ON OWNERS		
(1)	(2)	(3)
1. Nama pemilik/ Name of the owners	.....	
2. Jabatan dalam perusahaan/ Position in the company	.....	
3. Jenis kelamin pemilik/ Owner's gender	Laki-laki/ Male - 1 Perempuan/ Female - 0	☐
4. Umur pemilik/ Owner'sAge (*bulatkan ke bawah*)	..... Tahun/ Years	
5. Pendidikan tertinggi yang ditamatkan pemilik Owners' educational attainment	Tidak Tamat SD/ Did not finish elementary school - 1 SD dan Sederajat/ Elementary school - 2 SLTP dan Sederajat/ Junior high school - 3 SLTA dan Sederajat/ Highschool -4 SMK/ Vocational school - 5 Diploma I / II - 6 Akademi / DIII - 7 Sarjana S1/DIV/ Bachelor degree - 8 Pascasarjana S2/S3/ Postgraduate -9	☐

BLOK III : KETERANGAN PERUSAHAAN / USAHA (INFORMATION ON COMPANY/BUSINESS)

(1)	(2)	(3)
1. Nama Perusahaan/Usaha Name of the company/business	……	
1. Alamat Perusahaan/Usaha Address of the company/business (Tuliskan nama jalan, gang atau keterangan yang sejenis dan lengkapi dengan RT/RW atau dusun)	…… …… ……	
2. Nomor Telepon/Faksimili Phone number/fax	T:…… F:……	
3. e-mail/*homepage*	E:…… H:……	
4. Type of industry/Jenis usaha yang dimiliki		Kode 5 digit KBLI
5. Apakah perusahaan ini memiliki badan hukum? Does this company possess a legal form?	Ya/Yes -1 Tidak/No -0	
6. Apakah perusahaan ini dimiliki oleh perorangan/sendiri? Is this company owned privately/individually?	Ya/Yes -1 Tidak/No -0	
7. Bentuk badan usaha/ badan hukum Type of business/ legal form	CV/Persekutuan Komanditer/Limited partnership -1 Koperasi/ Co-operative -2 Firma (FA)/ General Partnership -3 UD-Usaha Dagang/Sole proprietorship -4 Perseroan Terbatas (PT)/ Limited liability company -5 Lainnya /Others ..... - 6	

8. Tahun mulai berproduksi secara komersial Starting year for commercial production	.....	
9. Tahun pertama terdaftar sebagai perusahaan Year of the company being registered formally	.....	
10. Jenis izin yang dimiliki Type of permit owned	a. Surat Ijin Usaha Perdagangan (SIUP) b. Ijin Gangguan (HO) c. Surat Keterangan Usaha (SKU) d. Tanda Daftar Perusahaan (TDP) e. Tanda Daftar Industri (TDI) f. Lainnya/Others……..	
11. Apakah pernah menerima dana dari perusahaan asing? Have you received fund from foreign company?	Ya/Yes – 1, berupa/in form Tidak/No-0 a) Modal/Capital b) Down payment c) Pinjaman/Loans d) Lainnya/others……..	
12. Apabila No. 12 jawabannya ya, pada tahun berapa dana tersebut diterima terakhir kali? If the answer for No. 12 is yes, identify the latest year was the fund received.		
13. Jenis sumber modal : Type of Source of capital:	a. Perorangan (Modal sendiri)/ Own capital ..... % b. Koperasi/ Co-operative ..... % c. Lembaga Keuangan Bukan Bank/ Non-bank financial institution ..... % d. Modal ventura/ Venture capital ..... % e. Mitra Kerja/ Business partner ..... % f. Bank KUR (government-backed) ..... %	Domestik/Local As 1 0 0 | 1 0 0

BLOK IV: KETERANGAN PEKERJA DAN BALAS JASA/ INFORMATION ON EMPLOYEES AND WAGE

Banyaknya pekerja untuk kegiatan tahun 2014 dan 2016:
The number of workers for business activities in 2014 and 2016

Uraian Description	Satuan Unit	2014	2016
a.1 Banyaknya pekerja dengan pendikan di bawah SMA/SMK Number of workers with education lower than senior high school	Person		
a.2. Banyaknya pekerja yang tamat SMA Number of workers with general high school education	Person		
a.3. Banyaknya pekerja yang tamat SMK Number of workers with technical high school education	Person		
a.4. Banyaknya pekerja yang tamat universitas/politeknik Number of workers with tertiary education	Person		
b. Rata-rata gaji pekerja per hari The average of daily wage per worker	Rp/day		

BLOK V : MANAJEMEN/MANAGEMENT

1. Bagaimana metode yang digunakan untuk pembukuan dan pencatatan di dalam perusahaan?
   Bookkeeping and record keeping method
   Tidak menggunakan pembukuan/
   Not using bookkeeping - 0
   Bentuk tulisan/Manual - 1
   Diproses dengan komputer/Computerized - 2

2. Bagaimana dengan susunan/struktur organisasi dan pembagian tugas? Apakah ada personel khusus untuk pembukuan/pencatatan?
   Organization chart/structure and task division,
   Is there any dedicated personnel for bookkeeping/record keeping?
   Ya/Yes - 1
   Tidak/No - 0

3. Seberapa sering perusahaan mengecek volume unit produksi pada tahun:

How frequently did you keep track of the volume of production pieces in :

a. 2014 ?

0. Tidak ada pengecekan/No checking

1. Tidak tentu/Irregular

2. Setiap triwulan/ Quarterly

3. Setiap bulan/Monthly

4. Setiap minggu/Weekly

5. Setiap hari/Daily

b. 2016 ?

0. Tidak ada pengecekan/No checking

1. Tidak tentu/Irregular

2. Setiap triwulan/ Quarterly

3. Setiap bulan/Monthly

4. Setiap minggu/Weekly

5. Setiap hari/Daily

4. Apakah terdapat papan pengumuman di tempat kerja/pabrik yang menunjukkan target, unit produksi yang dicapai/informsi terkait pekerja pada tahun:

Were there display boards in plant that show target or /achieved production pieces/any information regarding the employee performance in :

a. 2014? –Ya/Yes -1

Tidak/No – 0

b. 2016? –Ya/Yes -1

Tidak/No – 0

5. Siapa yang dapat melihat data produksi dalam basis regular di tahun:

Who got to see the production data on a regular basis in :

a. 2014?

Jabatan/Position	**Tidak/No = 0, Ya/Yes = 1**
Pemilik/Owner	
Manajer/Manager	
Supervisor	
Pekerja/Employee	

b. 2016?

Jabatan/Position	**Tidak/No = 0, Ya/Yes = 1**
Pemilik/Owner	
Manajer/Manager	
Supervisor	
Pekerja/Employee	

6. Apakah Anda menilai performa pekerja di tahun:

Did you assess workers' performance in :

a.1. 2014

Tidak/No – 0

Ya, tapi tidak selalu/Yes, but not always –1

Ya/Yes – 2

a.2. Dan apabila melakukan penilaian, seberapa sering:

And if so in what frequency .

1. Tidak tentu/Irregular

2. Tahunan/Yearly

3. Setiap triwulan/ Quarterly

4. Setiap bulan/Monthly

5. Setiap minggu/Weekly

6. Setiap hari/Daily

b.1. 2016

Tidak/No – 0

Ya, tapi tidak selalu/Yes, but not always –1

Ya/Yes – 2

b.2. Dan apabila melakukan penilaian, seberapa sering:

And if so in what frequency:

1. Tidak tentu/Irregular
2. Tahunan/Yearly
3. Setiap triwulan/ Quarterly
4. Setiap bulan/Monthly
5. Setiap minggu/Weekly
6. Setiap hari/Daily

7. a. Apakah Anda memiliki target produksi

Did you have any production target

a.1. 2014

Tidak/No – 0; Ya/Yes – 1

a.2. 2016

Tidak/No – 0; Ya/Yes – 1

b.Bila Ya, apakah ada bonus/promosi berdasarkan pencapaian target? Do you give bonus or promotions based on the target achievement? :

b.1. 2014?

1. Memiliki target dan memberikan bonus/promosi/ Have target and give bonus or promotion
2. Memiliki target tapi tidak memberikan bonus/promosi Have target but do not give bonus or promotion

b.2. 2016?

1. Memiliki target dan memberikan bonus/promosi/ Have target and give bonus or promotion
2. Memiliki target tapi tidak memberikan bonus/promosi Have target but do not give bonus or promotion

8. Apakah Anda mencatat produksi yang cacat di tahun:

Did you record defects in :

a.. 2014?

Tidak/No – 0

Ya, tapi tidak selalu/Yes, but not always –1

Ya/Yes – 2

b. 2016 ?

Tidak/No – 0

Ya, tapi tidak selalu/Yes, but not always –1

Ya/Yes – 2

9. Apakah Anda mengadakan pertemuan dengan pekerja tentang barang produksi yang cacat dan apabila demikian, seberapa sering di tahun:

Did you have meetings with workers on defects, and if so in

what frequency in :

a.1. 2014? Tidak/No – 0

Ya/Yes -1

a.2. Harian/Daily – 1

Mingguan/Weekly – 2

Bulanan/ Monthly – 3

Tidak tentu/Irregular - 4

b.1. 2016? Tidak/No – 0

Ya/Yes -1

b.2. Harian/Daily – 1

Mingguan/Weekly – 2

Bulanan/ Monthly – 3

Tidak tentu/Irregular - 4

10. Apakah bahan yang digunakan untuk produksi dicek kualitasnya sebelum digunakan, pada tahun:

Was the material used for production checked for its quality before used in :

a. 2014? Tidak/No – 0

Ya/Yes – 1

Ya, tapi tidak selalu/

Yes, but not always –2

b. 2016? Tidak/No – 0

Ya/Yes – 1

BLOK VI : PENGEMBANGAN SUMBER DAYA MANUSIA / HUMAN RESOURCE DEVELOPMENT

1. Apakah pemilik/pekerja mengikuti pelatihan atau workshop untuk meningkatkan keterampilan pada tahun 2016? ☐
   Any participation of owner/workers in training and *workshop* to improve skills in 2016?

   Ya/Yes - 1
   Tidak/No - 0

2. Apakah ada pelatihan dan workshop internal untuk meningkatkan keterampilan pemilik/pekerja pada tahun 2016? ☐
   Any internal training and workshop to improve skills in 2016?

   Ya/Yes - 1
   Tidak/No - 0

3. Apakah perusahaan mengirim pemilik/pekerja ke pelatihan dan workshop eksternal untuk meningkatkan keterampilan pekerja pada tahun 2016? ☐
   Send your owner/workers to external training and workshop to improve skills in 2016?

   Ya/Yes - 1
   Tidak/No - 0

4. Apabila melakukan pelatihan eksternal, sebutkan jenis bimbingan/pelatihan/penyuluhan eksternal yang pernah diikuti selama setahun lalu. Sebutkan 3 penyelenggara eksternal yang utama selama setahun lalu.
   If the answer in question was yes, name 3 main providers!

Jenis/ Type	Penyelenggara/ Institution	Lokasi/ Location	Nama Penyelenggara/ Name of Institution

Note:

Jenis : 1. Managerial & Administrasi
2. Keterampilan (skill)/teknis produksi
3. Pemasaran/marketing
4. Lainnya/others
(……)

Penyelenggara: 1. Instansi pemerintah/government agencies
2. Perusahaan swasta/private agencies
3. Yayasan/LSM/NGOs
4. Lainnya/others
(……)

Lokasi : 1. Kecamatan yang sama/same district
2. Kabupaten yang sama/same regency
3. Provinsi yang sama/same province
4. Pulau yang sama/same island
5. Pulau lain/other island
6. Luar negeri/abroad

BLOK VII : INOVASI/INNOVATION

(1)	(2)
1. Apakah perusahaan mengadakan inovasi produk di tahun 2016? Inovasi produk merupakan pengenalan produk atau layanan yang baru atau ditingkatkan secara signifikan dari karakteristik produk/layanan tersebut atau tujuan penggunaannya. Hal ini perubahan signifikan dalam spesifikasi teknis, komponen dan material, perangkat lunak yang digunakan, kemudahan operasional untuk pengguna atau karakteristik fungsional lainnya, atau membuat produk baru berdasarkan pesanan. Conducted any product innovation? A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics, or whether they can fulfill new design based on the orders. Ya/Yes - 1 Tidak/No - 0	☐
2. Apakah perusahaan berkolaborasi dengan atau belajar dari perusahaan lainnya untuk inovasi produk di tahun 2016? Engaged in collaboration with or learning from other companies for product innovation in 2016? Ya/Yes - 1 Tidak/No - 0 If yes, go to question 3 If no, go to question 4	☐

3. Jumlah perusahaan lainnya yang berkolaborasi dengan perusahaan ini dalam inovasi produk? The number of other companies that collaborated with this company in product innovation.

Nama Perusahaan/Name of company	Same Village	Same District	Same Regency	Same Province	Same Island	Different province	Abroad

4. Berapa banyak tipe produk yang mulai diproduksi pada tahun 2016 dibandingkan dengan tahun 2015? Produk baru di sini adalah desain baru atau material baru.
How many new types of products did you start to produce in 2016 compared to 2015? New products include new design or new materia/s.

al Fo

5. Apakah perusahaan melakukan inovasi proses dalam periode 2016? Inovasi proses adalah penerapan dari metode produksi atau pengiriman yang baru atau telah diperbaharui secara signifikan . Hal ini termasuk teknik, peralatan dan/atau perangkat lunak.
Conducted any process innovation during the period of 2016? A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

Ya/Yes - 1
Tidak/No - 0

Local Fo

6. Apakah perusahaan terlibat dalam kolaborasi atau proses belajar dengan perusahaan lainnya untuk inovasi proses di tahun 2016?
Engaged in collaboration with or learning from other companies for process innovation in 2016?

Ya/Yes - 1
Tidak/No - 0
If yes, go to question 7
If no, go to question 8

7. Jumlah perusahaan lainnya yang berkolaborasi dengan perusahaan ini dalam inovasi proses? The number of other companies that collaborated with this company in process innovation.

Nama Perusahaan/Name of company	Same Village	Same District	Same Regency	Same Province	Same Island	Different province	Foreign

BLOK VIII : PENJUALAN/SALES

1. Apakah perusahaan mengeksport barang ke pembeli asing atau perusahaan asing?
   Do you export to foreign buyers or to the foreign companies?

Ya/Yes -1

Tidak/No -0

Apabila ya, apakah melakukan proses eksport sendiri atau melalui perusahan perantara?

—if yes, do you do it directly or to local traders (including local based-foreign company)?

Ya/Yes -1

Tidak/No -0

2. Total penjualan di tahun:
   Total sales in :

2014 **2016**

1. % eksport/export ..... %

……..%

2. % non-eksport/non-export ..... %

……..%

Dari eksport yang dilakukan, presentase untuk/export composition:

1 . Eksport langsung/Direct export ……%

…… %

2. Eksport lewat perusahan perantara/

Export through Intermediary Company …… %

3. 5 produk dengan penjualan tertinggi di tahun 2016
   Top 5 products in sold in 2016
   6 digit HS2012

Nama Produk/ Name of product	Kode HS	% of Sales	% ekspor langsung / Direct ekspor	% eksport idak langsung/ Indirect export %	Using Imported supply ? Yes/no

BLOK IX : BIAYA/COST	
(1)	(2)
1. Total pembelian mesin dan peralatan di tahun 2016 Total value of purchases of machineries and equipment in 201	Rp .....
2. Total pembelian untuk material, dan komponen selama periode 2016 Total value of purchases of materials, parts and components during the period of 2016	Rp .....
3. Presentase dari pemasok domestik terhadap total nilai pembelian material di tahun 2016 Share of domestic suppliers in total purchase value of materials in 2016 (%)	.....%
4. Presentase dari pemasok asing (importer) terhadap total nilai pembelian material di tahun 2016 Share of foreign suppliers (importers) in total purchase value of materials in 2016 (%)	.....%

BLOK X : KEUANGAN/FINANCE	
1. Apakah perusahaan memiliki rekening di bank pada tahun 2016? Did you have an account in any bank in 2016? Ya/Yes - 1 Tidak/No - 0	☐
2. Apakah Anda mengajukan pinjaman di lembaga keuangan bank atau non-bank di tahun 2016? Did you apply for any loans at any banks or non-bank financial institutions in 2016? Ya/Yes - 1 Tidak/No - 0	☐

3. Apakah Anda mendapatkan pinjaman dari lembaga keuangan bank atau non-bank di tahun 2016? Did you get loans from any banks or non-bank financial institutions in 2016? Ya/Yes - 1 Tidak/No - 0	☐
4. Apakah Anda mendapatkan pinjaman dari pemerintah (KUR)? Did you get a government loan (KUR)? Yes- 1 No-0 Don't know- 2	☐
5. Berapakah jumlah yang didapat? If yes, what amount? …….. Apakah jumlah tersebut sesuai dengan angka pinjaman yang diajukan? Was the loan amount granted equal to your initial proposal? Ya/Yes - 1 Tidak/No - 0	☐

BLOK XI : PERTUKARAN INFORMASI/INFORMATION SHARING

1. Jaringan saat ini yang berada dalam satu desa (Current Insider, currently active network within the village)

ID	Name	Hubungan keluarga/ Family-Relatives Yes/No	Bagaimana anda saling mengenal? How did you meet?*	Did you already exchange information in 2014?
1				
2				
3				
4				
5				

(*)Note:

2. Kontak personal/Personal contact
3. InisiatifContact from them first
4. Website/Media
5. Other companies introduction
6. Business meetings/exhibitiion
7. Government agencies introduction
8. Village community
9. Business association

2. Jaringan lama yang berada dalam satu desa (telah berhubungan sebelum tahun 2016, sekarang sudah tidak berhubungan)
Old Insider (Network since years before 2016 within the village, but currently inactive)

ID	Name	Hubungan keluarga/ Family-Relatives Yes/No	Bagaimana anda saling mengenal? How did you meet?*
1			
2			
3			
4			
5			

(*)Note:

1. Kontak personal/Personal contact
2. InisiatifContact from them first
3. Website/Media
4. Other companies introduction
5. Business meetings/exhibitiion
6. Government agencies introduction

7. Village community
8. Business association

3. Jaringan saat ini yang berada di luar desa (Current Outsider, currently active network outside the village)

ID	Name	Hubungan keluarga/ Family-Relatives Yes/No	Bagaimana anda saling mengenal? How did you meet?*	Did you already exchange information in 2014?
1				
2				
3				
4				
5				

(*)Note:

1. Kontak personal/Personal contact
2. InisiatifContact from them first
3. Website/Media
4. Other companies introduction
5. Business meetings/exhibitiion
6. Government agencies introduction
7. Village community
8. Business association

4. Jaringan lama yang berada di luar desa (telah berhubungan sebelum tahun 2016, sekarang sudah tidak berhubungan)
Old Outsider (Network since years before 2016 outside the village, but currently inactive)

ID	Name	Hubungan keluarga/ Family-Relatives Yes/No	Bagaimana anda saling mengenal? How did you meet?*
1			
2			
3			
4			
5			

(*)Note:

1. Kontak personal/Personal contact
2. InisiatifContact from them first
3. Website/Media

4. Other companies introduction
5. Business meetings/exhibitiion
6. Government agencies introduction
7. Village community
8. Business association

BLOK XII : RANTAI PASOKAN/SUPPLY CHAIN

1. Tuliskan nama perusahan yang menjadi sumber pasokan untuk material, bagian, atau komponen di tahun 2016

   Firm name from which your firm bought materials, parts, or components in 2016

   (Sebutkan 5 Perusahaan dengan jumlah pembelian terbanyak/Top 5 in terms of amount of purchase)

No	Name of Company	Lokasi/Location	Kepemilikan/Ownership (a)	Jumlah karyawan (number of employees)	How did you get to know each other (b)	Technical services/ support received (c)	Testing services/ support received (d)	Production services/ support received (e)
1								
2								
3								
4								
5								

Note:

a. Same district/regency/province/island/abroad
b. Local/foreign/don't know
c. 100 or more/less than 100
d. Options
   - Kontak personal/Personal contact
   - InisiatifContact from them first
   - Website/Media
   - Other companies introduction
   - Business meetings/exhibitiion
   - Government agencies introduction
   - Village community
   - Business association

e. Options:

- AD/CAM data,
- Design of drawing for Mold & Die,
- Design of drawing for products,
- Design of production system,
- Others ( ),
- None

f. Options:

- strength test,
- performance test,
- durability test,
- others ( ),
- 5. None

g. Options

- KAIZEN,
- 5S,
- QC,
- Others ( ),
- None

2. Jumlah pemasok di Tegal dan luar Tegal/Number of suppliers in Tegal and outside Tegal

	Kota Tegal dan Kab. Tegal	Daerah lain di Indonesia/Other regions in Indonesia	Luar Negeri/Foreign countries
2014			
2016			

BLOK XIII : PEMBELI/BUYERS

1. Tuliskan nama perusahan yang menjadi pembeli di tahun 2016

   Firm name from which you sold your product to in 2016

   (Sebutkan 5 Perusahaan dengan jumlah penjualan terbanyak/Top 5 in terms of amount of sales)

No	Name of Company	Lokasi/Location	Kepemilikan/Ownership (a)	Jumlah karyawan (number of employees)	How did you get to know each other (b)	Technical services/ support received (c)	Testing services/ support received (d)	Testing services/ support received (e)
1								
2								
3								
4								
5								

Note:

a. Same district/regency/province/island/abroad
b. Local/foreign/don't know
c. 100 or more/less than 100
d. Options
   - Kontak personal/Personal contact
   - InisiatifContact from them first
   - Website/Media

- Other companies introduction
- Business meetings/exhibitiion
- Government agencies introduction
- Village community
- Business association

e. Options:
- AD/CAM data,
- Design of drawing for Mold & Die,
- Design of drawing for products,
- Design of production system,
- Others ( ),
- None

f. Options:
- strength test,
- performance test,
- durability test,
- others ( ),
- 5. None

g. Options
- KAIZEN,
- 5S,
- QC,
- Others ( ),
- None

2. Jumlah pembeli di Tegal dan luar Tegal/Number of buyers in Tegal and outside Tegal

	Kota Tegal dan Kab. Tegal	Daerah lain di Indonesia/Other regions in Indonesia	Luar Negeri/Foreign countries
2014			
2016			

BLOK XIV : JARINGAN BISNIS/BUSINESS NETWORK	
Berapa banyak keanggotaan yang Anda miliki untuk persatuan/serikat profesional, seperti kamar dagang dan industri serta asosiasi industri? How many memberships did you hold for any professional union/association, such as chambers of commerce and industry and industry associations?	Kamar dagang Chamber of Commerce ☐ Asosiasi pengusaha Entrepreneurs Association ☐ Asosiasi bisnis-KUB. Business Association ☐ Lainnya/Others ☐

BLOK XV : PREFERENSI MANAJER/MANAGER'S PREFERENCES

1. Berhubungan dengan pihak luar sangat bagus untuk memperoleh informasi baru.

   Connection/relationships with outsiders is a good way to access new information.

   1. Sangat setuju/ Strongly agree
   2. Setuju/Agree
   3. Tidak Setuju/Disagree
   4. Sangat tidak setuju/ Strongly disagree
   5. Tidak tahu/don't Know

2. Perdagangan bebas baik untuk bisnis saya.

   Free trade is good for my business.

   1. Sangat setuju/ Strongly agree
   2. Setuju/Agree
   3. Tidak Setuju/Disagree
   4. Sangat tidak setuju/ Strongly disagree
   5. Tidak tahu/don't Know

3. Secara umum, pemerintah harus membatasi kepemilikan asing dalam

BLOK XVI : KAPASITAS TEKNIS/TECHNICAL CAPACITY

Silahkan mengisi tabel di bawah ini.
Please fill in the table below

No	Mesin Machineries	Berapa unit yang bekerja yang dimiliki Anda? How many units in operation do you have	Apabila memiliki mesin tsb , mohon dispesifikasikan tahun pembuatan mesin yang dapat digunakan yang terbaru If you have one, please specify the year of the latest model among units in operation	Apakah mesin diimpor? Is this machine imported Yes/No	Jika diimpor, dari negara mana? If imported, from which country?
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

No	Pengujian yang dilakukan/ Testing conducted	Di mana pengujian dilakukan? Where did the test take place? (in house/ local regency/ buyers' place/ suppliers' place)	Frekuensi pengujian/ Testing frequency (irregular/annual/quarterly /monthly/weekly/daily)	Apakah menggunakan peralatan impor atau jasa asing? Did you use imported machinery/services for the test? Yes/No	Jika ya, dari negara mana? If yes, from which country?
1					
2					
3					
4					

No	Pengujian yang dilakukan/ Testing conducted	Di mana pengujian dilakukan? Where did the test take place? (in house/ local regency/ buyers' place/ suppliers' place)	Frekuensi pengujian/ Testing frequency (irregular/annual/quarterly /monthly/weekly/daily)	Apakah menggunakan peralatan impor atau jasa asing? Did you use imported machinery/services for the test? Yes/No	Jika ya, dari negara mana? If yes, from which country?
5					
6					
7					
8					
9					
10					

No	Pemeriksaan yang dilakukan/ Inspection/checking conducted	Di mana pemeriksaan dilakukan? Where did the inspection take place? (in house/ local regency/ buyers' place/ suppliers' place)	Frekuensi pemeriksaan/ Inspection frequency (irregular/annual/quarterly /monthly/weekly/daily)	Apakah menggunakan peralatan impor atau jasa asing? Did you use imported machinery/services for the inspection? Yes/No	Jika ya, dari negara mana? If yes, from which country?
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

BLOK XVII : CATATAN/ ADDITIONAL NOTES

Apabila ada hal-hal yang memerlukan keterangan lebih lanjut, tuliskan pada blok ini. Selain informasi dari responden, pencacah dan pemeriksa juga bisa menambahkan catatan untuk memperjelas masalah yang berkaitan dengan daftar isian. Seluruh Informasi tersebut akan direkam.

BLOK XVIII: KETERANGAN RESPONDEN/RESPONDENTS

1. Nama pemberi jawaban/ Name : .....

2. Jabatan/ Position : .....

3. No. Telp. / HP /Mobile : .....

4. Tanggal pengesahan/ Date : .....

.....

Tanda tangan

BLOK XIX: KETERANGAN PETUGAS/ENUMERATORS

Uraian	Pencacah	Pengawas
(1)	(2)	(3)

1. Nama petugas/ Name 2. Tanggal pelaksanaan kegiatan/ date 3. No. HP/ Mobile 4. Tanda tangan/ Signature	....	....

13.4. Reference

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