

Republic of the Philippines
Department of Trade and Industry

Republic of the Philippines
The Study on Potential Industry and
Further Economic Development for
Central Luzon and CALABARZON
Area

Final Report

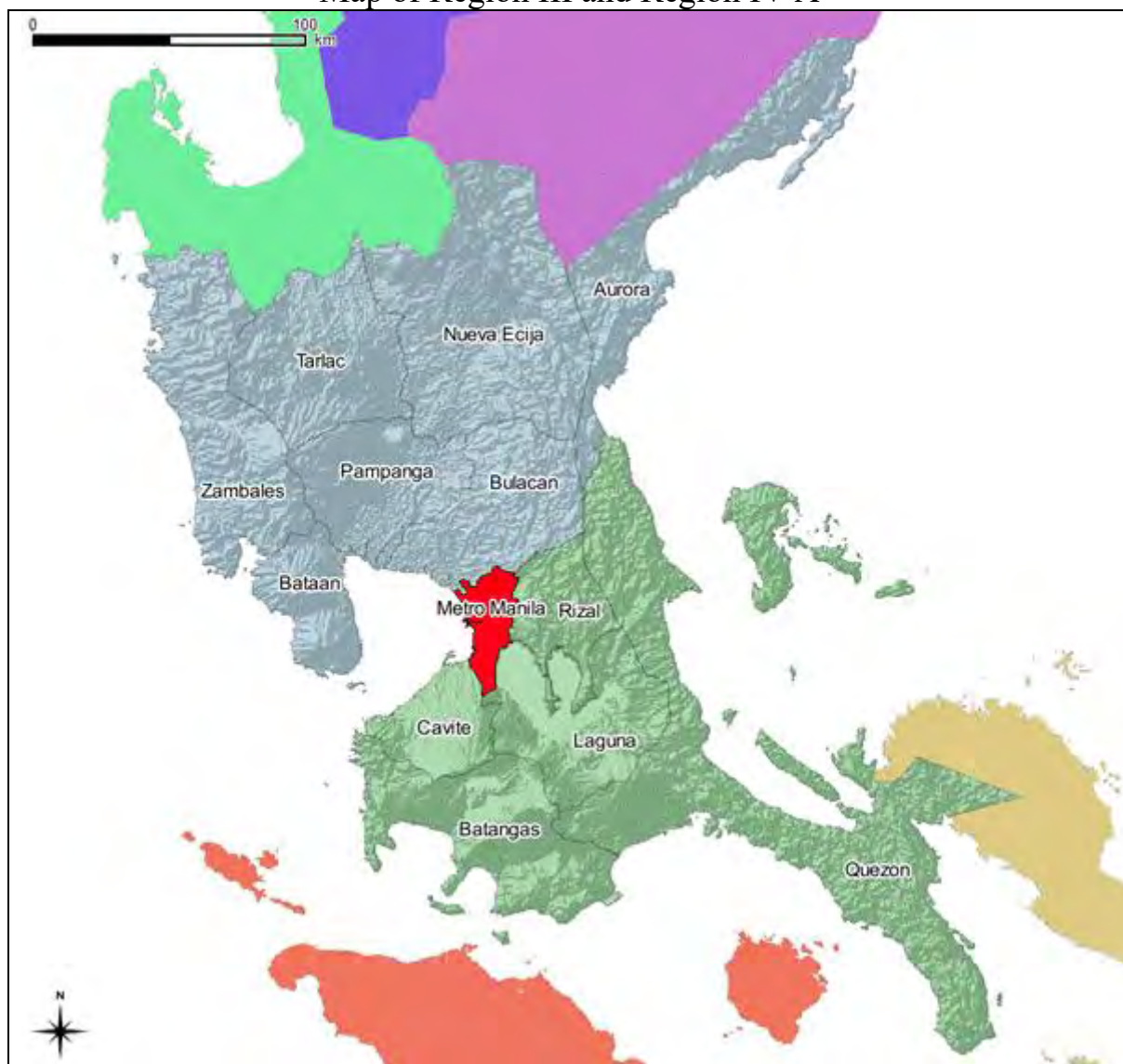
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Map of Region III and Region IV-A



Region III Central Luzon		
Province	Population (2015)	Area (km ²)
Aurora	214,336	3,147
Bataan	760,650	1,373
Bulacan	3,292,071	2,796
Nueva Ecija	2,151,461	5,751
Pampanga	2,609,744	2,062
Tarlac	1,366,027	3,054
Zambales	823,888	3,831
Total	11,218,177	22,014

Region IVa Calabarzon		
Province	Population (2015)	Area (km ²)
Batangas	2,694,335	3,120
Cavite	3,678,301	1,574
Laguna	3,035,081	1,918
Quezon	2,122,830	9,150
Rizal	2,884,227	1,192
Total	14,414,774	16,954
Metro Manila (National Capital Region)		
City/ Municipality	Population(2015)	Area (km ²)
16 Cities and 1 Municipality	12,877,253	614

Source: Philippine Statistics Authority.

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Abbreviation

AASI	Aries Arraste Services Inc.
ACC	Active Cruise Control
ADAS	Advanced Driver Assistance System
AEB	Autonomous Emergency Break
AEC	ASEAN Economic Community
AFAB	Authority of Freeport Area of Bataan
AFTA	ASEAN Free Trade Area
AICO	ASEAN International Cooperation
ARMM	Autonomous Region of Muslim Mindanao
ASEAN	Association of Southeast Asian Nations
ASEAN NCAP	ASEAN New Car Assessment Program
ASENSO	Access of Small Entrepreneurs to Sound Lending Opportunities
ATI	Asian Terminals Inc.
BBC	Brand to Brand Complementation
BCDA	Philippines Bases Conversion and Development Authority
Bev	Battery Electric Vehicles
BGC	Bonifacio Global City
BIR	Bureau of Internal Revenues
BLES	Bureau of Labor and Employment Statistics
BOI	Board of Investments
BOT	Build-operate-transfer
BPM	Business Process Management
BPO	Business Process Outsourcing
BRT	Bus Rapid Transit
CAAP	Civil Aviation Authority of the Philippines
CAD	Computer Aided Drawing
CAE	Computer Aided Engineering
CAGR	Compound Annual Growth Rate
CALABARZON	Cavite, Laguna, Batangas, Rizal, Quezon Province (Region IV-A)
CALAX	Cavite-Laguna Expressway
CAM	Computer Aided Manufacturing
CAR	Cordillera Administrative Region
CARP	Comprehensive Agrarian Reform Program
CARPER	Comprehensive Agrarian Reform Program Extension with Reforms
CARS	Comprehensive Automotive Resurgence (Program)
CAT	Competency Assessment Tools
CAVITEX	Manila-Cavite Expressway
CBU	Completely Build-Up
CCTV	Closed Circuit Television
CDC	Clark Development Corporation
CDP	Comprehensive Development Plan

CEZA	Cagayan Economic Zone Authority
CFS	Container Freight Station
CGC	Clark Green City
CHED	Commission on Higher Education
CIAC	Clark International Airport Corporation
CICT	Commission on Information and Communications Technology
CKD	Complete Knock Down
CLLEX	Central Luzon Link Expressway
CLUDP	Comprehensive Land Use and Development Plan
CNC	Computer Numeric Control
CNIS	Comprehensive National Industrial Strategy
CPH	Census of Population and Housing
CRO	Contract Research Organization
CSEZ	Clark Special Economic Zone
DA	Department of Agriculture
DAO	Department Administrative Order
DAR	Department of Agrarian Reform
DBP	Development Bank of the Philippines
DECS	Department of Culture and Sports
DENR	Department of Environment and Natural Resources
DepEd	Department of Education
DILG	Department of Interior and Local Government
DMA	Diosdado Macapagal International Airport
DOH	Department of Health
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DOTr	Department of Transportation
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
DTS	Dual Training System
DWT	Deadweight Tonnage
EASA	European Aviation Safety Agency
EDA	Electric Data Automation
EDCOM	Congressional Commission on Education
EDSA	Epifanio De Los Santos Avenue
EMB	Environmental Management Bureau
EMS	Electronic Manufacturing Service
EPA	Economic Partnership Agreement
EPIRA	Electric Power Industry Reform Act
EPS	Electric Power Steering
EPZ	Export Processing Zone
ESC	Electronic Stability Control
ESO	Engineering Services Outsourcing

EU	European Union
Euro NCAP	European New Car Assessment Programme
F/S	Feasibility Study
FA	Factory Automation
FAA	Federal Aviation Administration (US)
FCL	Full Container Load
FDI	Foreign Direct Investment
FINL	Foreign Investment Negative List
FMCG	Fast Moving Consumer Goods
FRP	Fiber Reinforced Plastic
FTA	Free Trade Agreement
FTE	Full Time Employee
FTI	Food Terminal Inc.
FWA	Fixed Wireless Access
GCR	Greater Capital Region
GDH	Gifts, Decors, and Housewares
GDP	Gross Domestic Product
GFVC	Global Food Value Chain
GMP	Good Manufacturing Practices
GRDP	Gross Regional Domestic Product
GTH	Gift, Toys, and Housewares
GVC	Global Value Chain
GWh	Giga-watt hour
HACCP	Hazard Analysis and Critical Control Point
HDD	Hard Disk Drive
HEP	Household Electrification Program
HEV	Hybrid Vehicles
HLUCB	Housing and Land Use Control Board
IB	Inclusive Business
IBPAP	IT and Business Process Association of the Philippines
ICAO	International Civil Aviation Organization
ICD	Inland Container Depot
ICT	Information and Communication Technology
ICTO	Information and Communications Technology Office
ICTSI	International Container Services, Inc.
IDC	Industrial Development Council
IMF	International Monetary Fund
IoT	Internet of Things
IPA	Investment Promotion Agency
IPP	Investment Promotion Plan
IRR	Implementing Rules and Regulations
ISO	International Organization for Standardization
IT	Information Technology

IT-BPM	Information Technology - Business Process Management
JCCPII	Japanese Chamber of Commerce and Industry Philippines, Inc.
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JPEPA	Japan-Philippines Economic Partnership Agreement
JV	Joint Venture
KFS	Key Factor for Success
KOICA	Korea International Cooperation Agency
KOTRA	Korea Trade Investment Promotion Agency
LBP	Land Bank of the Philippines
LCC	Low Cost Carrier
LCL	Less Than Container Load
LCT	Land Craft Tank
LDIP	Local Development Investment Program
LDW	Lane Departure Warning
LFS	Labor Force Survey
LGC	Local Government Code
LGU	Local Government Unit
LNG	Liquefied Natural Gas
LPC	Leechiu Property Consultants
LRT	Light Rail Transit
LT	Lufthansa Technik
LWUA	Local Water Utilities Administration
MCRRS	Manila-Clark Rapid Expressway
MERALCO	Manila Electric Co.
MES	Manufacturing Execution System
MHI	Mitsubishi Heavy Industries
MIAA	Manila International Airport Authority
MICT	Manila International Container Terminal
MIP	Maritime Industrial Park
MIR	Manufacturing Industry Roadmap
MIRDC	Metal Industry Research and Development Center
MLCC	Multi-Layer Ceramic Capacitors
MNC	Multinational Corporation
MNT	Manila North Tollway
MPV	Multi-purpose Vehicle
MRJ	Mitsubishi Regional Jet
MRO	Maintenance, Repair and Operation
MRP	Manufacturing Resurgence Program
MRT	Metro Rail Transit
MRTC	Metro Rail Transit Corporation
MSEZ	Manufacturing Special Economic Zone
MSME	Micro, Small, and Medium Enterprises

MWSS	Metropolitan Waterworks and Sewerage System
NAFTA	North American Free Trade Agreement
NAIA	Ninoy Aquino International Airport
NBP	New Bilibid Prison
NCR	National Capital Region
NEDA	National Economic and Development Authority
NEDA RDC	National Economic and Development Authority Regional Development Council
NERBAC	National Economic Research and Business Assistance Center
NFEx	North Food Exchange
NGO	Non-Government Organization
NLEX	North Luzon Expressway
NLTE	North Luzon Tollway Extension
NSCR	North-South Commuter Railway
NSJBI	New San Jose Builders Inc
NSSMP	National Sewage Septage Management Program
NTC	National Telecommunications Commission
NWC	Next Wave Cities
NWRB	National Water Resources Board
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
OJT	On-the-Job Training
OTC	Over the Counter
PBR	Philippine Business Registry
PD	Presidential Decree
PDM	Project Design Matrix
PDP	Philippine Development Plan
PDPFP	Provincial Development and Physical Frame Plan
PDS	Philippine Digital Strategy Plan
PEP	Philippine Energy Plan
PEZA	Philippine Economic Zone Authority
PHEV	Plug-in Hybrid Vehicles
PIPP	Philippine Investment Promotion Plan
PNP	Philippine National Police
PNR	Philippine National Railway
PPP	Public Private Partnership
PPV	Passenger Pick Up Vehicle
PSA	Philippine Statistics Authority
PTPA	Public Telecommunication Policy Act
PTTQF	Philippine TVET Trainers Qualification Framework
R&D	Research and Development
RA	Republic Act
RCEP	Regional Comprehensive Economic Partnership

RDC	Regional Development Council
RDF	Refuse Derived Fuel
RDP	Regional Development Plan
RJ	Regional Jet
RORO	Roll-On, Roll-Off
SBITC	Subic Bay International Terminal Corp.
SBMA	Subic Bay Metropolitan Authority
SBSR	Shipbuilding and Ship Repair
SCLTF	Supply Chain and Logistics Task Force
SEC	Securities and Exchange Commission
SEF	Special Education Fund
SEIPI	Semiconductors and Electronics Industries in the Philippines
SEZ	Special Economic Zone
SLEX	South Luzon Expressway
SMHC	San Miguel Holdings Corporation
SNMH	Strong National Maritime Highway
SONA	State of the Nation Address
SSD	Solid State Drive
SSF	Shared Service Facility
STA	Singapore Technologies Aerospace Ltd.
TABS	Terminal Appointment Booking System
TESDA	Technical Education and Skills Development Authority
TEU	Twenty Foot Equivalent Unit
TIEZA	Tourism Infrastructure and Enterprise Zone Authority
TM	Trainer's Methodology
TPP	Trans-Pacific Strategic Economic Partnership Agreement
TR	Training Regulations
TUP	Technological University of the Philippines
TUV	Toyota's Utility Vehicle
TVET	Technical Vocational Education and Training
TVI	Technical-Vocational Institution
TWSP	Training for Work Scholarship Program
USAID	United States Agency for International Development
USFIA	US Fashion Industry Association
VAT	Value Added Tax
VC	Value Chain
WB	World Bank
WQMA	Water Quality Management Area
WTO	World Trade Organization
WTO TRIM	World Trade Organization Trade Related Investment Measures

Chapter 1 Overview of the Study

1.1 Background of study

The Metropolitan Manila, or Metro Manila, takes 13% of total population of the Philippines, and contributes to 36% of the country's GDP. However, Metro Manila has been experiencing challenges in congestion resulting to some economic losses. This implies the need to improve the region's traffic liquidity, public transportation systems, and suburban traffic networks. Given this situation, it is important to develop the Central Luzon Region, which adjoins to the north of Metro Manila are, and the CALABARZON Region, which adjoins to the east and south of the area.

From the viewpoint of industrial location, the development of the manufacturing industry in the Philippines is relatively low among Asian countries due to the political turmoil in the 1980s, security problems, and delay in carrying out policies. In addition, supporting industries have not gathered sufficiently. For example, according to the 2010 Study on the Supply Chain of the Philippine Electronics Industry, which JICA commissioned to Nomura Research Institute, the electronics industry of the Philippines is an important contributor to local employment, and accounts for about 44.2% (2015) of the country's total export. Despite such contribution, the size of the Philippine electronics industry is still not necessarily large compared with other countries.

The ASEAN Economic Community (AEC) was founded at the end of 2015 and has been promoting the conclusion of FTAs between ASEAN members and neighboring countries. With the AEC, international division of labor and industrial location strategies have been changing. Because of its firm economic development, the Philippines can now be considered as a strategic candidate for Japan and other Asian countries in industrial investments. One opportunity is seen in the Philippine manufacturing industry.

Considered to be an employment generator, the Philippine manufacturing industry is expected to attract more investments due to the existing business environment. The large logistics infrastructure expected to be used for manufacturing includes Clark International Airport and Subic Port in Central Luzon, as well as the Batangas Port in CALABARZON. Industrial estates have also been developed in Central Luzon and CALABARZON. The question now is the utilization of these infrastructure, since there are challenges in the traffic and connectivity of these regions to Metro Manila.

To improve this situation, it is necessary to take measures in attracting and promoting industries in Central Luzon and CALABARZON. This includes planning the overall layout of industries in

these regions and developing the existing infrastructure to enhance traffic and logistics between these two regions and Metro Manila.

This study will first present the collected information and its analyses on the local development trends in Central Luzon and CALABARZON as well as the desirable direction for their development. Second, the study will discuss the potential industries based on the changes in industrial structure and the analysis of international division of labor. Based on the results, a concept of measures to promote these potential industries will be presented to relevant government agencies. The study will also analyze the needs and problems of the systems and infrastructure to promote and realize the concept.

1.2 Objectives of the study

For this study, the collection and confirmation of information has the following purposes:

- A) Check the location of the target areas for the Philippine government's mid- and long-term measures for economic development; comprehensively collect and analyze information on the basic systems, industrial conditions, and current status of infrastructure for development promotion; and, arrange and confirm the direction of development based on the existing measures. The target year is 2030.
- B) For industrial attraction and promotion, the study will extract two or more industries possible to become core industries in the target areas through the analysis of the system for international division of labor.
- C) Based on the results of B), present a concept for the future promotion of industrial attraction and development. In addition, analyze the needs and problems of systems and infrastructures to realize the concept, utilizing the contents of and lessons from Japan's economic cooperation projects in the Philippines and other countries.

1.3 Target areas

Regions of Central Luzon and CALABARZON

1.4 Stakeholders of the study

The Philippines' implementing agency is DTI (Department of Trade and Industry).

The steering committee to be established will consist of BOI (Board of Investment), NEDA (National Economic and Development Authority), NEDA RDC (Regional Development Council), DOLE (Department of Labor and Employment), DOST (Department of Science and Technology),

PEZA (Philippine Economic Zone Authority), BCDA (Philippines Bases Conversion and Development Authority), DOTr (Department of Transportation) , (DPWH: Department of Public Works and Highways) and Associations of locators.

Chapter 2 Policy and Regulations on Development Planning and Industrial Development

2.1 Development Planning Administration

2.1.1 Development Plans

2.1.1.1 Overview

The development planning administration system in the Philippines has a long history. It is not until the Corazon Aquino administration that the current planning system was formed through the reorganization of the National Economic and Development Authority (NEDA) in 1987. It has following characteristics:

- Parallel system of physical plans and socio-economic plans,
- Synchronization with the presidential term (5 years),
- Clear level separation between national and local government units (LGUs),
- 18 regional division and establishment of Regional Development Councils (RDCs),
- Clarification of LGU's autonomy and authorization by higher level, and
- Long term physical plan at national level and middle/ short term socio-economic plans.

Accordingly, the planning system consists of the following plans.

Table 1 Hierarchy of Development Plans

Level	Spatial Plan	Socio-Economic Plan
National	National Framework of Physical Plan, NFPP)2001-30 Revising Version: National Physical Framework Plan 2016-2045	Philippine Development Plan 2011-2016
Region [No government]	Regional Physical Framework Plan 200X-2030	Regional Development Plan 2011-2016 Monitoring, Update, Public Investment Plan
Province	Provincial Development and Physical Frame Plan (Five-year mid-term)	
City, Municipality	Comprehensive Land Use and Development Plan(Mid-term)	Comprehensive Development Plan (Mid-term)

Source: JICA Study Team

2.1.1.2 Socio-Economic Development Plans

At national level, NEDA prepared “Philippine Development Plan (PDP) 2011~2016” as the comprehensive socio-economic plan in May 2011. The main theme of the Plan is “Inclusive Growth”, which extends employment creation to the poor and reduces poverty through inclusion. The PDP focused on improving transparency and accountability in governance, strengthening the macroeconomy, boosting the competitiveness of our industries, facilitating infrastructure development, strengthening the financial sector and capital mobilization, improving access to quality social services, enhancing peace and security for development, and ensuring ecological integrity.

The PDP adopted the following five strategies:

1. Increase competitiveness of every sector for massive job creation
2. Financial access reform for various needs of people
3. Massive investment in infrastructure
4. Promotion of transparent governance
5. Human resource development through improved social services and protection

In addition, results matrices are attached in order to monitor the progress. These are based on the Project Design Matrix (PDM) based logical framework and enabled the monitoring process transparent and simple.

NEDA Regional Offices prepare each Regional Development Plans as regional version of PDP. These plans are also synchronized with planning period of PDP, which is same with the presidential term. Accordingly, the Regional Development Plans describe socio-economic regional targets derived from PDP.

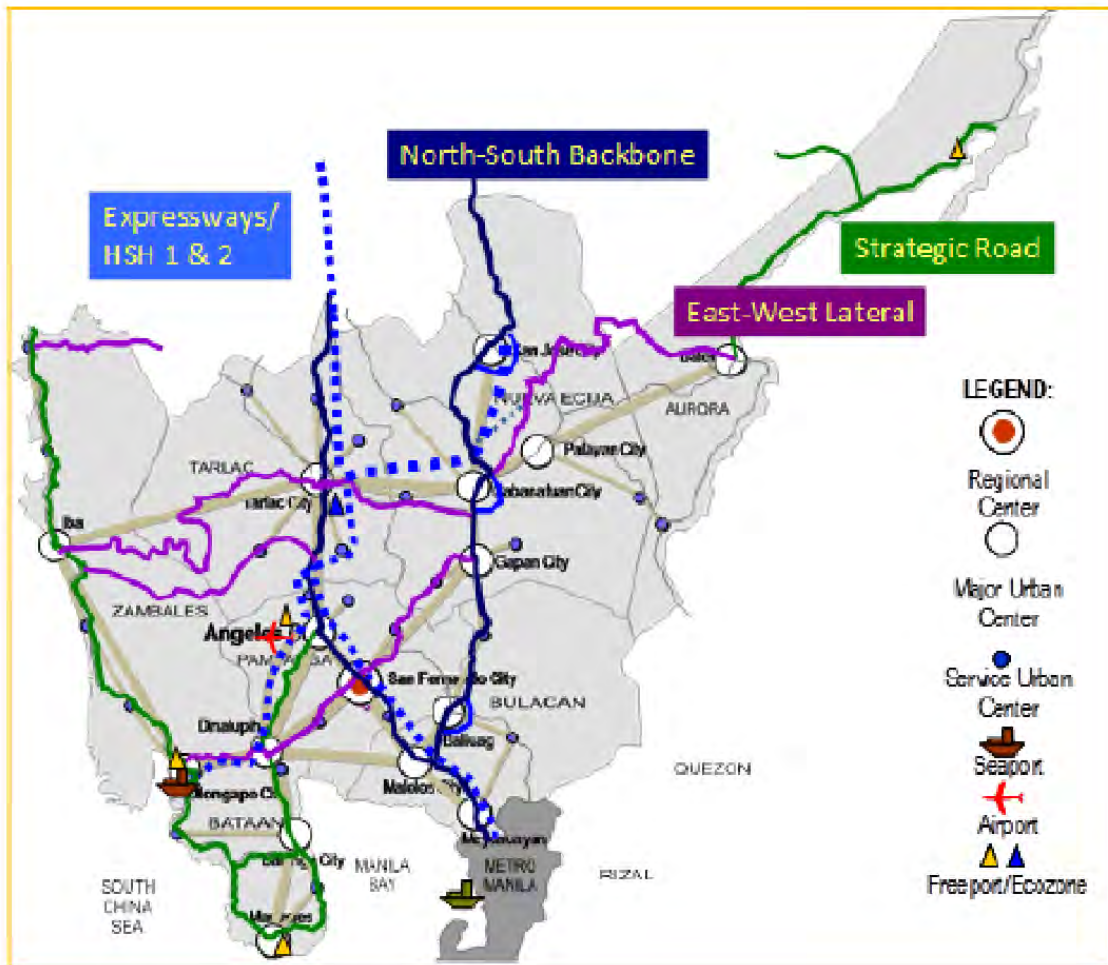
Region III and Region IV-A consider their future as “Sustainable and Caring Gateway” and “Global Business Hub”, respectively. Table 2 shows the outline of PDP and two Regional Development Plans.

Table 2 PDP and Two Regional Development Plans

Level	National	Region III	Region IV-A
Plan	Philippine Development Plan 2011-2016	Central Luzon Development Plan 2011-2016 (Mid-term Update)	Calabarzon Regional Development Plan 2011-2016
Planning Organization	NEDA	Regional Development Council III NEDA Region III	Regional Development Council IVa NEDA Region IVa
Authorized by	Same as above	Same as above.	Same as above
Concept/Vision	Inclusive Growth	Sustainable and Caring Gateway	Global Business Hub
Strategy	Increase competitiveness of every sector for massive job creation Financial access reform for various needs of people Massive investment in infrastructure Promotion of transparent governance Human resource development through improved social services and protection	Increase competitiveness Improve access to financing Attract investment that would generate the jobs and thereby reduce poverty	A. Harmonization of Regional Development Objectives and Environmental Protection B. Enhancing Calabarzon's Competitiveness as a Global Business Hub C. Adoption of Knowledge-Based Industries and Information Exchange D. Reduction of Socio-Economic Disparity E. Tying up Human Resource Development, Industry and Research and Development Priorities and Concerns F. Sustaining Capacities in Local Governance
Industrial Policy	Vision: Globally Competitive and Innovative Industry and Service Sector Contributing to Inclusive Growth and Employment Creation	Competitive and Innovative Industry and Service Sector	Among strategies above. B. Enhancing Calabarzon's Competitiveness as a Global Business Hub C. Adoption of Knowledge-Based Industries and Information Exchange E. Tying up Human Resource Development, Industry and Research and Development Priorities and Concerns
Industrial Program/Project/Activity	Strategies and Action Plans: -Improve Governance -Strengthen Economic Zones -Strengthen National Brand/ Identity Awareness -Intensify the Culture of Competitiveness -Focus interventions in Key Industry Area -Enhance Firm-level Support to MSMEs -Expand Industry Cluster Development -Increase Market Access -Encourage Consumer Products and Services Satisfaction -Improve Supply Chains of Basic and Prime Commodities	Strengthening the Economic Zones -Aurora Pacific Economic Zone (APECO) Facilities development -Establishment of NE Agri-Industrial Center -Bulacan Mineral Processing Zone -Bulacan Science and Technology Hub -Nueva Ecija Information Technology Theme Park and Business Hub -Bulacan Agri-Processing Center Improving market access and connectivity -North Food Exchange (NFEx) in Balagtas, Bulacan -Central Luzon Freeport One Stop Processing Bagsakan Project -Establishment of a Cold Storage Chain in the Region -Establishment of Nueva Ecija Trading/Business Center in Dingalan, Aurora -Establishment of Online Trading and Commodity Exchange etc.	Immediate Actions: Under B. -Advocacy and investment promotion program -Economic Zones Development Program -Promotion of Batangas International Seaport as alternative Port of Manila -Incentives for establishments and businesses that employ locals as majority of their staff Under C. -Knowledge and Technology Development Program -Knowledge Management Program -Knowledge Sharing and Best Practices Under E. -Market Development and Promotion Program -Product Development and Packaging Program -Trade Policy Negotiation, Facilitation, and Promotion Program -Industry Development and Investment Facilitation and Promotion Program etc.

Source: PDP and RDPs.

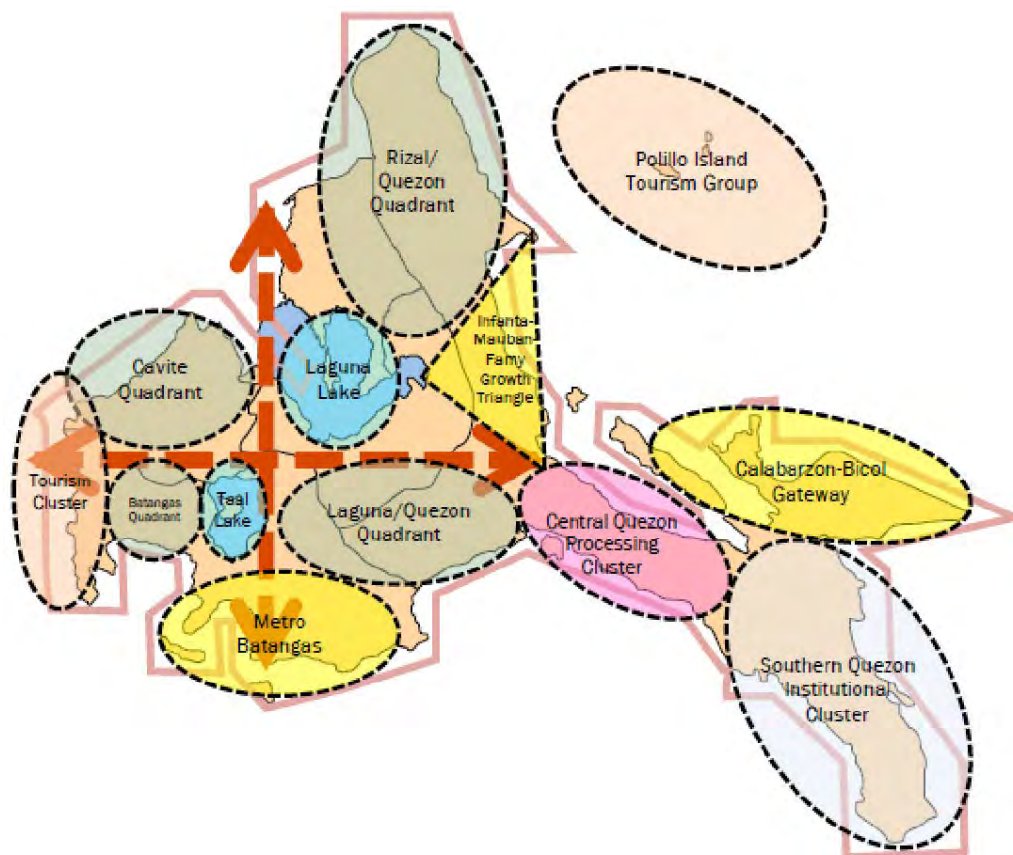
In addition, these RDPs draw regional spatial frameworks. Figure 1 shows the “W” –shaped regional spatial framework of Region III. This centered Angeles/ San Fernando and positioned Olongapo and Meycauayan as major urban centers. Existing expressways are seen in these W shape and future transport network also follows this.



Source : Regional 3 Development Plan.

Figure 1 Spatial Framework of Region III

Region IV-A Development Plan indicated the Quadrangle development axis as spatial framework. It means that the existing vertical development axis (Manila ~ Batangas) to be extended to the horizontal axis from Cavite to southern lakeside of Laguna. Remote areas from these axes are identified as more independently clustered area such as tourism.



Source: Region IV-A Development Plan.

Figure 2 Spatial Framework of Region IV-A

2.1.1.3 Spatial Plan

Among these, National Framework of Physical Plan covered overall policy and orientation of land and infrastructure development. It aimed at the promotion of human settlement and infrastructure development by increasing land productivity and resource sustainability. This is the plan with the longest term, and to be implemented beyond Presidential term of five years. Currently, NEDA is revising it to a new framework plan.

The National Framework of Physical Plan envisages “sustainable development and growth with social equity” and classify the national land into human settlement, production (primary and secondary industry) and protection. Each objective and guideline are also presented. However, there is no specific numeric target on land use indicated.

Its regional version, Regional Physical Framework Plans similarly classify the land into three and shows corresponding projects and programs.

Table 3 shows the outline of Regional Physical Frameworks of Region III and 4A.

Table 3 Outline of National and Regional Physical Frameworks

Level	National	Regional III	Region IV-A
Plan	National Framework for Physical Planning 2001-2030 (2002)	Regional Physical Framework Plan: 2005-2030 Region III (March 2006)	Regional Physical Framework Plan: 2004-2030 Region IVa (December 2006)
Planning Organization	National Land Use Committee and NEDA	Regional Land Use Committee	Regional Land Use Committee
Approved by	National Land Use Committee and NEDA	Regional Development Council	Regional Development Council
Vision	Sustainable development and growth with social equity	To have globally competitive human resources, a highly productive and profitable agricultural sector, self-propelling LGUs ably supported by the national government, seamless and integrated physical access and, a transshipment and logistics hub in the Asia-Pacific Region, a favored international convention center and tourist destination, a developed industrial heartland in Southeast Asia and a model of sustainable utilization and management of forest and mineral resources	CALABARZON is a rich vibrant area of economic diversity and vitality with progressive, well-planned town clusters internationally known for its modern structures interspersed with parks and greenbelts in highly urbanized areas. It is global economic hub, with minimum poverty, amidst a clean and balanced urban-rural environment ecosystem.
Principles	<ul style="list-style-type: none"> -Food security -Environment stability and ecological integrity -Rational urban development -Spatial integration -Equitable access to physical and natural resources -Private - public sector partnership -People empowerment -Recognition of the rights of indigenous people -Market orientation 	To be utilized by the national line agencies and the local government units as guide in the determination of more concrete programs of action at their end	(Basic Guidelines) <ul style="list-style-type: none"> -Securing a more sustainable pattern of development throughout the region -Maintaining competitiveness of the regional economy -Strengthening urban and rural relationships and forging linkages with neighboring regions -Adopting a wider participation of stakeholders and promoting good governance -Facilitating access to basic services/ amenities -Integrating various development plans and concerns at the regional level
Scope	Current situation, physical planning issues and concerns and policy options/guidelines in <ul style="list-style-type: none"> -Settlement development -Production land use -Protection land -Infrastructure development (No specific description on projects.)	The manual to guide decisions on how land and natural resources may be put to best possible use for the populace and. at the same time, indicates how such resources may be handled and conserved for the benefit of future generations	To serve as the "blueprint" to guide public and private invest decisions on the physical development of CALABARZON.
Basic Concept of Spatial Structure	None	Enhanced "W" Growth Corridor	Two development zones or clusters based on physical and socio-economic characteristics and interactions
Sectors			
Land Use			
Human Settlement	Formulate local plans within the context of national hierarchical network of settlements. Etc.	Programs and Projects <ul style="list-style-type: none"> -Delineation, Titling of Ancestral Domains/Lands -Community-based Housing Programs and Resettlement of Squatters -Urban Renewal Program 	Major Projects (Flood Control) <ul style="list-style-type: none"> -Metro Manila Flood Control Project -Flood Mitigation for Cavite Lowland -Rehabilitation of Wawa Dam (Water Supply) -Improvement of Ground Water Quality in 31 Small Water Districts -Local Government Support for Regional Water Supply
Production (Primary and second industries)	Productive activities to meet the country's requirements for economic growth. Strategic Agriculture and Fisheries Development Zones (SAFDZs) Competitive and strategic industrialization	Programs and Projects <ul style="list-style-type: none"> -Agricultural Production Support Program -Bulacan North Food Terminal Complex -Luzon Sea Coastal Resources Management -Community-based Forest Management -Mining Industry Revitalization 	Major Projects <ul style="list-style-type: none"> -Comprehensive Agrarian Reform Program (CARP) -Construction of Irrigation Facilities -Construction of Farm to Market Roads and Bridges -Productivity Enhancement Program -Coconut & Copra-related Programs -Tagaytay Highlands and Taal Agri-tourism Dev. Program -High Value Commercial Crops -Coconut Oil Manufacturing etc.
Protection	To achieve environmental stability and ecological integrity; ensure balance between resource use and the preservation of some educational, cultural and historical significance and protect people and man made structures from the ill effects of natural hazards. They cover the following protected areas: NIPAS(National Integrated Protected Areas System), non-NIPAS and hazard-prone areas.	Programs and Projects <ul style="list-style-type: none"> -Localization Initiatives in Forest Protection and Upland Management -Forestry Sector Program -Pampanga River Basin Project -Sierra Madre Reforestation Program -Arayat National Park Development Project -Watershed Community Development Program -Landslide and Flashflood Hazard and Risk Mapping in Central Luzon -Pasig-Potrero River Diking System -Widening of Gapan-San Fernando-Olongapo (GSO) Road and Emergency Dredging Project -Ancestral Domain Development Program -Manila Bay Operational Plan 	Major Projects <ul style="list-style-type: none"> -Reforestation-related Programs -Land-related Programs -Protected Areas and Wildlife Resources Dev. Program -Biodiversity Conservation Program -Management of Coastal and Marine Resources Program -Ecosystem Research and Development Program -Delineation and demarcation of forestland into protection areas -Urban Forestry Project -Capacity Building Program for DENR and NCIP
Infrastructure	Transportation, communications, energy, water resources, and social infrastructure. <ul style="list-style-type: none"> -Support the policy of national dispersal through regional concentration -Promote inter-modal transportation -Increased access to basic and social and other development services -Compatibility with local land use and development plans -Protect infrastructure right-of-way 	Programs and Projects (Roads and Bridges) <ul style="list-style-type: none"> -Manila North Road (MacArthur Highway) -Cagayan Valley Road (Daan Maharlika) -Tarlac Iba Road -Bongabon-Baler Road -Cabanatuan - Pantabangan- Baler Road -Aurora - La Union Road (Cabarroguis- Dinalungan Section) -Palayan City - Dinagalun Road etc. (Expressway) -Manila North Tollway (MNT) -North Luzon Tollway Extension (NLTE) -Subic-Clark-Tarlac Expressway (SCTEP) -Tipo-Subic Toll Road (Railway) -Manila-Clark Rapid Expressway (MCRRS) a.k.a. North Rail Project (Airport) -Diosdad Macapagal International Airport (DMIA), current Clark International Airport, upgrading -Feeder Airports Development (Baler and Iba) -Subic Port Project 	Major Projects <ul style="list-style-type: none"> -Southern Tagalog Access Road (Lipa-Batangas) -SLEX Extension (Calamba-Sto. Tomas) -Manila-Cavite Toll Express Extension (Noveleta) -SLEX Extension (Sto. Tomas- Lucena City) -North-South Toll Road (CALA) -Marikina Infanta Road -Widening Governor's Drive and Traffic Corridor Mgt. -CALA East West Roads (Daang Hari-SLEX) -Lipa-Alaminos, San Pablo City Road -Ternate -Nasugbu Road -San Juan (Laiya)-Lobo Road -Batangas Port Dev. Project Phase II -Calatagan Port Dev. Project -LRT Line 1 Extension (Baclaran-Bacoar) -MRT 8 (Sta. Mesa -Angono) -North-South Rail Linkage Proj. Phase II (Alabang-Calamba) -Main Line South Extension Phase I (Calamba-Lucena) etc.

Source: NEDA, NFPP and Regional Physical Framework Plans.

2.1.1.4 Transportation Infrastructure Plan

The transport infrastructure plan in Philippine has been developed by the international agency and donors, e.g., JICA, KOICA, WB, etc., in the past.

The transport infrastructure in the Philippine has been developed based on the plan, and there has not been the comprehensive national transport master plan until now.

In 2010 the Aquino administration adopted the basic policy of infrastructure development through PPP scheme, especially for the transport sector under constraints of public financial condition.

The National Economic and Development Authority approved “Transportation Roadmap for Sustainable Development of Metro Manila” as the official master plan in June 2014. The roadmap covered Metro Manila, Central Luzon and CALABARZON. The roadmap also formulated a project list of transportation sector for short, medium and long term implementation, considering the current and future issues and challenges. The study team has reviewed the progress of a central focus of the logistics infrastructure in the roadmap.

The new government policy for transport infrastructure development and wide area transport development are shown as follows.

(1) Direction of the Development

Metro Manila has been the center for growth and it is assumed to continue its role as the major area for development. Meanwhile, regional growth development should be expanded to North (Clark - Subic - Tarlac) and South (Batangas - Lipa - Lucena) Luzon to become alternative growth centers independent from Metro Manila.

The Clark Green City (CGC) has become a center of the regional cluster development in the central and northern Luzon with its competitive international gateway port and airport. Its urban development and industrial development will be the key to success. The CGC will function as an independent city, and it will be directly connected to the international growth centers. On the other hand, Batangas - Lipa - Lucena cluster will be developed as a national gateway that connects Visayas, Mindanao and the Metro Manila.

Table 4 Investment program in the short and mid-term

Project Name		Total Cost	Public	Private	2014	2015	2016	Unit: MILPH
A	Road	64,843	47,063	17,880	20,532	25,031	19,380	
1	O3 Missing Link (South Area); 3 Packages	a	696	696	696			
2	BGO-Ortigas Link Road	b	8,120		2,030	4,060	2,030	
3	Skyway/FTI/OSLink	c	17,880	17,880	5,860	5,860	5,860	
4	O3 Missing-Link (San Juan-Makati-Santa Ana)	a	24,000	24,000	4,800	9,600	9,600	
5	Rehabilitation of EDSA	c	3,744	3,744	3,744			
6	Plaridel Bypass, Package 3&4	c	3,341	3,341	2,227	1,114		
7	Flyover (EDSA-TaR)	c	3,033	3,033	455	1,820	758	
8	Interchange/Flyover in Manila Metropolitan; Package 6	c	4,128	4,128	620	2,477	1,032	
B	Expressway	164,662	38,578	126,084	32,433	72,741	49,848	
1	Danhari-SLEX rinked toll road	c	2,010		2,010			
2	Connector of NLEX-SLEX							
a	Rink of Expressway	c	25,556	25,556		12,778	12,778	
b	Skyway (3 Legs)	c	26,500	26,500	6,600	13,250	6,650	
c	Segment 3&18 and Connecting Road to R10	c	8,600	8,600	4,300	4,300		
3	NAA Expressway, Phase 2	c	15,520	15,520	6,208	6,208	3,104	
4	DALA Expressway, Stage 1&2	c	35,420	17,710	17,710	7,084	14,168	14,168
5	DILEx (La Paz, Tarlac-Dabanatuan)	d	14,936	7,468	7,468	4,481	6,416	1,825
6	Expressway (Columba-Los Banos)	c	8,210	4,105	4,105	4,105	4,105	
7	D6 Expansion-Lakeside Bund Road	d	18,590	9,295	9,295	7,436	3,718	
8	NLEX Segment 8.2-Commonwealth st.	c	7,000	7,000		3,500	3,500	
9	STAR Stage II (Bardangus-Lipa)	c	2,320		2,320	1,740	580	
O	Other Road	75,860	75,860	-	21,347	29,377	25,136	
1	Sub-Main Road Development Package	b	23,000	23,000	7,667	7,667	7,666	
2	Technical Assistance for Sub-Main Roads Development		500	500	250	250		
3	Other Roads Development Package in Region 3	c	16,000	16,000	3,330	7,330	5,340	
4	Other Roads Development Package in Region 4A	c	36,360	36,360	10,100	14,130	12,130	
D	Railway	178,823	75,854	102,968	25,308	42,459	39,956	
1	Line 1 - Cavite Expansion	d	63,550	25,000	38,550	10,000	10,000	10,000
2	Line 2 - East Expansion	c	9,758	9,758		4,879	4,879	
3	Capacity Expansion of Line 3	c	8,633	8,633		2,158	4,317	2,158
4	Stage I of Line 7 (Quezon-Commonwealth st.)	d	62,698		62,698		15,675	15,675
5	Common Ticket System of AFOS	c	1,720		1,720	688	688	344
6	Improvement of Line 1 System	c	6,067	6,067		6,067		
7	South North Commuter Line in Mega Manila	c	24,800	24,800		6,200	6,200	6,200
8	Study on Transit System in OED in Manila Metropolitan	c	75	75		75		
9	New Transport System (Alabang - Sapote)	c	120	120				
10	F/S on New Transport System	c	1,400	1,400			700	700
E	LRT	8,340	4,200	4,140	6,287	2,053	-	
1	Integrated Inter-Region Bus Terminal System (3 Terminals)	d	5,080	2,540	2,540	5,080		
2	Study on Public LRT Improvement	c	60	60		40	20	
3	BRT System I	b	3,200	1,600	1,600	1,167	2,033	
F	Traffic Management	4,359	4,359	-	1,550	2,000	809	
1	Improvement of Traffic Signal System	c	3,308	3,308		1,500	1,500	308
2	Systematical Traffic Safety Measure	c	1,000	1,000			500	500
3	Study on Comprehensive Traffic Management	c	50	50		50		
G	Airport	11,368	8,248	3,121	5,240	3,773	2,357	
1	Improvement Project of NAA-Some Packages	c	4,248	4,248		2,833	1,416	
2	Improvement project of Clark Airport-Some Packages	c	7,070	3,849	3,121	2,357	2,357	2,357
3	F/S on New NAA	c	50	50		50		
H	Seaport	12,085	75	12,010	2,812	3,537	4,137	
1	Manila North Port Project	c	6,000		6,000	2,000	2,000	2,000
2	Manila East Port Project	c	1,000		1,000	400	400	200
3	Manila International Container Terminal	c	4,000		4,000		800	1,600
4	F/S on Manila North Port Re-Development	c	75	75		75		
5	Other Seaport	c	1,010		1,010	337	337	337
Total Amount		520,440	254,237	266,203	115,509	180,971	141,723	
→ Committed or Approved Projects for Implementation								
■ Local Capital Financing Project								
b Not completed F/S and D/D, available for bid tender before 2016, but depending on the financing resource								
c Necessity of preparation survey, and postpone the project depending on financing resources								
d Some parts of the projects were used by the financing resources before 2014 and will be used by those after 2016								

Source: Roadmap for Transport Infrastructure Development for Metro Manila and Its Surrounding Areas, 2014, JICA

Table 5 Investment program in the long-term

	Project Name	Distance (km)	Cost (Mil. PHP)	Remarks
A	Expressways		225,488	
1	2017-2022	333.1	140,600	10 projects
2	2022-2030	206.0	84,888	6 projects
B	National highway		205,854	201,000 pesos except preparatory survey
1	9 road packages (2017-2022) of GCR	353.2	78,040	
2	5 road packages (2023-2030) of GCR	145.4	33,040	
3	Other road packages of region 4A		60,000	The prerequisite is road network analysis beforehand.
4	Other road packages of region 3		30,000	The prerequisite is road network analysis beforehand.
5	preparatory investigation		4,774	
C	mass transit system	323.1	935,188	1,020,940 pesos except F/S cost in total
1	Main railway lines (2017-2022)	78.2	452,680	
2	Main railway lines (2023-2030)	60.7	294,160	
3	follows the main important railways of the Manila	39.8	76,600	
4	follows the main important railways of the Manila	20.6	25,640	
5	Suburbs railways, phase 2 (Makolas - Tel rack)	81.1	28,800	The premise is the extension of the airport rapid transit railway
6	Suburbs railways, southern part upgrading	47.7	18,800	Important crossing roads are elevated
7	Railroad preparations investigation		38,508	Project costs of railway F/S
D	Public surface traffic		98,500	
1	Bus restructuring and the modernization		25,000	Old jeepney change for new modern bus as an ITS project
2	The jeepney modernization		30,000	Old jeepney change for new modern jeepney as an ITS project
3	BRT (2 routes)		3,500	The prerequisite was success of BRT1 line project
E	TEAMS		5,250	Expansion of the computer system
	Traffic light, phase 6		3,500	
	ITS: Traffic management		1,000	Using ITS for traffic management
	ITS: Public transport		750	Central management system of a bus and the jeepney
F	Airport / harbor		515,900	
	New NAIA Airport		435,900	The prerequisite is success of prior F/S.
	Clark passenger terminal 2		40,000	New international passenger terminal
	Manila north port redevelopment		40,000	The prerequisite was shift of a domestic ship to Batangas
	total		1,877,672	

Source: Roadmap for Transport Infrastructure Development for Metro Manila and Its Surrounding Areas, 2014, JICA

2.1.2 Significant Development Programs under Previous Administration

This section describes some existing major development programs prepared by the previous Benigno Aquino III Administration. There are related to this Study.

2.1.2.1. Mid-term Public Investment Program

Based on the above PDP, NEDA prepared Mid-term Public Investment Program, which organized necessary public investment amount. However, the annual government budget did not completely follow the Program.

2.1.2.2. Comprehensive Integrated Infrastructure Program 2009-2013

In order to supplement the National Framework of Physical Plan, NEDA also publicized Comprehensive Integrated Infrastructure Program. This Program emphasized the necessity of PPP (Public Private Partnership) in addition to public investment for the infrastructure development.

In order to promote PPP, the President Aquino in his State of the Nation Address (SONA) on July 2010 expressed his policy to develop various infrastructure by PPP scheme because of national financial difficulty.

In September 2010, the President also issued the Executive Order 8 to establish PPP Center under NEDA. The PPP Center was reorganized from the former BOT Center under DTI, and started its operation since early 2011. By these policies, beneficial or profitable infrastructure are encouraged to develop through PPP.

2.1.3 Development Orientation under Duterte Administration

When the Duterte Administration started in July 2016, NEDA has been preparing the new PDP and National Physical Framework Plan. Many planning elements are to continue supposedly from the previous plans, and President Duterte announced the following development orientation.

2.1.3.1. Socio-economic Ten Point Agenda

President Duterte announced 10-point agenda on 20 June 2016, just before his inauguration¹.

1: Continue and maintain current macroeconomic policies, including fiscal, monetary, and trade policies.

2: Institute progressive tax reform and more effective tax collection, indexing taxes to inflation.

3: Increase competitiveness and the ease of doing business.

4: Accelerate annual infrastructure spending to account for 5% of GDP, with Public-Private Partnerships playing a key role.

5: Promote rural and value chain development toward increasing agricultural and rural enterprise productivity and rural tourism.

6: Ensure security of land tenure to encourage investments, and address bottlenecks in land management and titling agencies.

7: Invest in human capital development, including health and education systems, and match skills and training.

8: Promote science, technology, and the creative arts to enhance innovation and creative capacity.

9: Improve social protection programs, including the government's Conditional Cash Transfer program.

10: Strengthen implementation of the Responsible Parenthood and Reproductive Health Law.

¹ Source: gmanetwork(<http://www.gmanetwork.com/news/story/570703/money/economy/duterte-s-economic-team-reveals-10-point-socioeconomic-agenda>).

2.1.3.2. SONA

Just after Presidential Inauguration, July 25th, President Duterte's SONA² at the Congress includes the following elements related to the scope and target area of this Study.

- To continue and maintain current macroeconomic policies, and even do better
- To make more investments to come and to develop labor-intensive industries such as manufacturing, agriculture and tourism
- To enhance local business environment by addressing bottlenecks in business registration and processing, streamlining investment application process and integration of services of various government offices
- To accelerate infrastructure spending by improving national roads and bridges and implementing the Mindanao Logistics Infrastructure Network and other road network master plans
- To pursue rail projects in Metro Manila and the major key-points in the country including the Mindanao Rail Project
- To go to Clark from Manila by a fast train. It will be approximately 30 minutes.

These points imply the policy continuation from previous Administration. Especially, the basic policy of inclusive growth and infrastructure development by PPP has been held in new administration. However, some aspects of infrastructure development by PPP do not have concrete perspective. PPP projects can realize profitable infrastructure projects, such as those for railways and highways in large urban areas; however, other regional infrastructures, such as inter-urban expressways, are not so attractive for PPP program.

2.1.3.3. Philippine Development Plan 2017-2022

NEDA is currently preparing PDP 2017-2022. NEDA plans to publish the draft version to request for public comments in January 2017. All draft contents have not been disclosed yet, but the following parts are related to this Study.

Linkage with Long Term Vision

Existing PDPs do not have a term longer than five years, which is only reflection of the planning period of each PDP. While being based on the socio-economic agenda of President Duterte, the new PDP is also anchored on the long-term vision, Ambisyon Nation 2040.

² Source:Philstar(<http://www.philstar.com/headlines/2016/07/25/1606702/full-text-dutertes-2016-state-nation-address>)

Identification of Regional Centers

Based on National Spatial Strategy, new PDP clarifies (1) Three Metropolitan Centers (namely, Metro NCR, Metro Cebu and Metro Davao), and (2) Regional Centers. Regional Centers function as the urban hierarchy next to Metropolitan Centers. It lists Cabanatuan City, Tarlac City, Subic-Olongapo City, Balanga City, Clark (Angeles City, San Fernando City, Mabalacat, Porac and Bacolor), Baliuag, and Malolos City as Regional Centers in Central Luzon. It also lists Dasmariñas City, Antipolo City, Calamba City, and Batangas City as Regional Centers in CALABARZON.

However, these cities do not practically follow Metropolitan Centers. These cities hold around 200,000 population, and are rather next to or equal to each provincial capitals. Only Clark is relevant to the category, because it has more than one million population.

Industry and Service Sector Development

The description on industry and service sectors (Chapter 9 and 10) of the new PDP is different from the PDP 2011-2016. Although the PDP 2011-2016 noted that CALABARZON produced 32% of industrial output of the total country and growth rapidly, it did not show the priority industry by region.

The new PDP picks following subsectors to develop and promote a diversified set of industry and services requiring various skills levels, strongly-linked with agriculture:

1. Electric manufacturing services and semiconductor manufacturing service (integrated circuit design)
2. Automotive and auto parts
3. Aerospace parts manufacturing & Aircraft Maintenance, Repair, & Overhaul
4. Chemicals
5. Shipbuilding & Ship-repair : roll-on roll-off (RORO) as well as small- and medium-sized vessels
6. Furniture, garments, GDH (Gifts, Decors and Housewares)
7. Tool and die (manufacturing and design)
8. Agri-business. Food and resource-based processing
9. Construction
10. IT-BPM
11. Transport and Logistics
12. Tourism, Creative Industries, E-Commerce

2.1.3.4 New Policy of New Administration

This study also targets the development of international and inter-city logistics in Central Luzon and CALABARZON.

With the continual traffic congestion in Metro Manila, the Duterte administration tries to minimize the traffic problem in the area as one of its major policies. The new plan for President Duterte's 3-year emergency power from the DOTr, which includes the countermeasure projects against traffic congestion in Metro Manila, was submitted to the Congress in September 2016.

Table 6 Plans for Duterte's 3-year emergency power to solve traffic problem (Road)

Project Name	Contents	Cost	Timeline
Metro Bus Rapid Transit Line1	12.3-km line from Manila-Quezon City	P4.7 billion	2016-2019
Metro Bus Rapid Transit Line2	48.6-km line covering EDSA, Ayala, Ortigas-BGC	P39.44billion	2016-2018
Integrated Transport System Southwest	n.a.	P3.15billion	Start of operation: June 2018
Integrated Transport System South Terminal, FTI Compound	n.a.	P2.23billion	Start of operation: June 2018
Improvement of existing national road	n.a.	P1.59billion	2016-2017

Source: Plans for Duterte's 3-year emergency power to solve traffic problem, Sep. 2016

Other than road sector projects in the above table, the projects in the rail and airport sector are listed. However, their descriptions such as project contents, costs, and timelines are not specified. The project lists of rail and airport in the plan are shown below:

(Project list of Rail Sector)

- LRT Line 1 extension to Cavite
- LRT Line 2 extension to Masinag, Antipolo
- LRT Line 2 extension to Pier 4
- Increase of MRT 3 capacity to include procurement of new carts and general overhaul
- Construction of Line 4 from Taytay, Rizal to Pureza
- Construction of Line 5a from Makati CBD utilizing existing tunnel
- Construction of Line 5-subway connecting existing business districts
- Construction of Line 6 from Niyog, Cavite to Dasmariñas, Cavite via Aguinaldo Highway
- Construction of Line 7 from North EDSA to San Jose Del Monte, Bulacan via

Commonwealth Ave

- Extension of PNR North Commuter from Tutuban to Malolos, Bulacan to Clark, Pampanga
- Construction of Mindanao Rail, Cebu Rail, and Central Philippines Rail

(Project list of airport sector)

- Airport improvement including construction of exit taxiways, runway overlay and additional CCTV's
- Improvement in domestic airports to allow night-time flights
- Decongest NAIA traffic. Legislation is needed to allow the government to redistribute air traffic while promoting air connectivity in other alternative gateways

For the realization of the above projects,” Traffic and Congestion Crisis Act of 2016” was submitted to the congress at the same time. The Act included the posting of “Traffic Crisis Manager” with strong directives, the formulation of the “Decongestion and Transportation Network Reform Plan” (or a “Transport Management Plan”), and a roadmap and list of projects for the national and local intermodal transport system aimed at decongesting Greater Metro Manila and other highly urbanized cities.

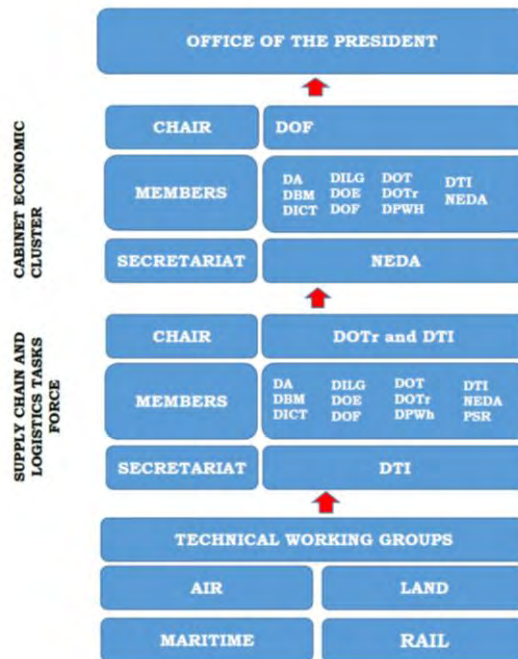
2.1.4 Organization Reform for Logistics Development

The National Logistics Master Plan as part of the ‘Trade Logistics Reform’ program was developed with the support from the World Bank in December 2015. At the same time, the related workshop was taken place in Subic/Clark, Iloilo, and other cities.

After the World Bank support, USAID has continuously taken over the development of the National Logistics Master Plan as a blue print of the national logistics policy. The plan indicates the holistic objectives: ‘Enhance Connectivity’, ‘Enhance Trade and Investment’, ‘Enhance Regional Development’ and ‘Enhance Logistics Resiliency’. The purpose is to strengthen the logistics sector by developing an efficient logistics system and to realize endogenous economic growth by improving industrial competitiveness.

Based on the above proposal, the government is making effort to establish an organization such as Supply Chain and Logistics Task Force (SCLTF) in September 2016. The government is proposing SCLTF as the cross-department organization to oversee the improvement of logistics condition.

However, the Master Plan lacks harmony with the existing and on-going development projects, the implementation plan considering budgetary constraints and development scheme, the human resource development of cross-department implementation body, and the development of integrated logistics database, among others.



Source: DTI presentation material, September 20, 2016, Philippine International Convention Center

Figure 4 Inter-Department structure for transport infrastructure development by DTI

2.1.5 Local Plans

2.1.5.1 Local Government Units

There are three layers of an LGU. All LGUs have their respective heads and assemblies elected by people. The top layer is the Provincial Government with jurisdiction over the province, followed by municipal government (middle layer) for municipalities or cities and the barangays (bottom layer). In general, Barangays consist of 50-100 households and the closest to people.

Some large-scale cities are ranked as Highly Urbanized Cities and Independent Component Cities. These are classified as the same level as the provinces. Highly Urbanized Cities are required to hold at least 200,000 population and annual revenue of PHP 50 million.

Figure 5 shows the outline of hierarchy of national and local governments.

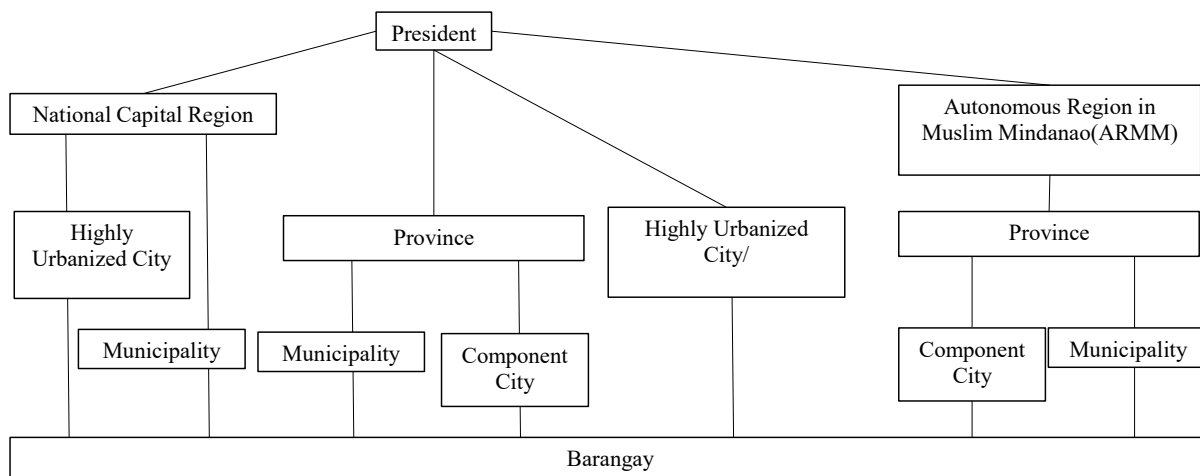


Figure 5 Hierarchy of National and Local Government

The Study Area has the following LGUs.

Table 7 LGUs in the Study Area

Region	Province	Highly Urbanized City	Other Cities	Municipality	Barangay	
Region III Central Luzon	Aurora			8	151	
	Bataan		1	11	237	
	Bulacan		3	21	569	
	Nueva Ecija		5	27	849	
	Pampanga		2	19	505	
		Angeles				33
		Tarlac		1	17	511
		Zambales		0	13	230
		Olongapo			17	
Subtotal	7	2	12	116	3,102	
Region IV-A CALABARZON	Batangas		3	31	1,078	
	Cavite		6	17	829	
	Laguna		6	24	674	
	Quezon		1	39	1,209	
		Lucena				33
	Rizal		1	13	188	
Subtotal	5	1	17	124	4,011	
Other Regions	69	112		1,250	34,916	
Total	81	144		1,490	42,029	

Source: PSA. 2015 Philippine Statistical Yearbook. p.19.

2.1.5.2 Province

NEDA leads the preparation of regional plans, and there is consistency between national and regional plans. On the other hand, local plans at provincial, city and municipal plans are prepared by bottom-up process and endorsed by respective upper LGUs. Land conditions and

population forecast are based on national statistical data, which are precise. However, these plans do not completely correspond with one another because of differences in planning terms and demarcation.

Considering both the infrastructure and socio-economic fields, provincial development plans are organized as Provincial Development and Physical Frame Plan (PDPFP), spanning a term of twenty years.

Industrial development plans, programs and projects depend on the national plans. However, LGUs' function is weak in this area, and provincial plans are sometimes inconsistent with national plans.

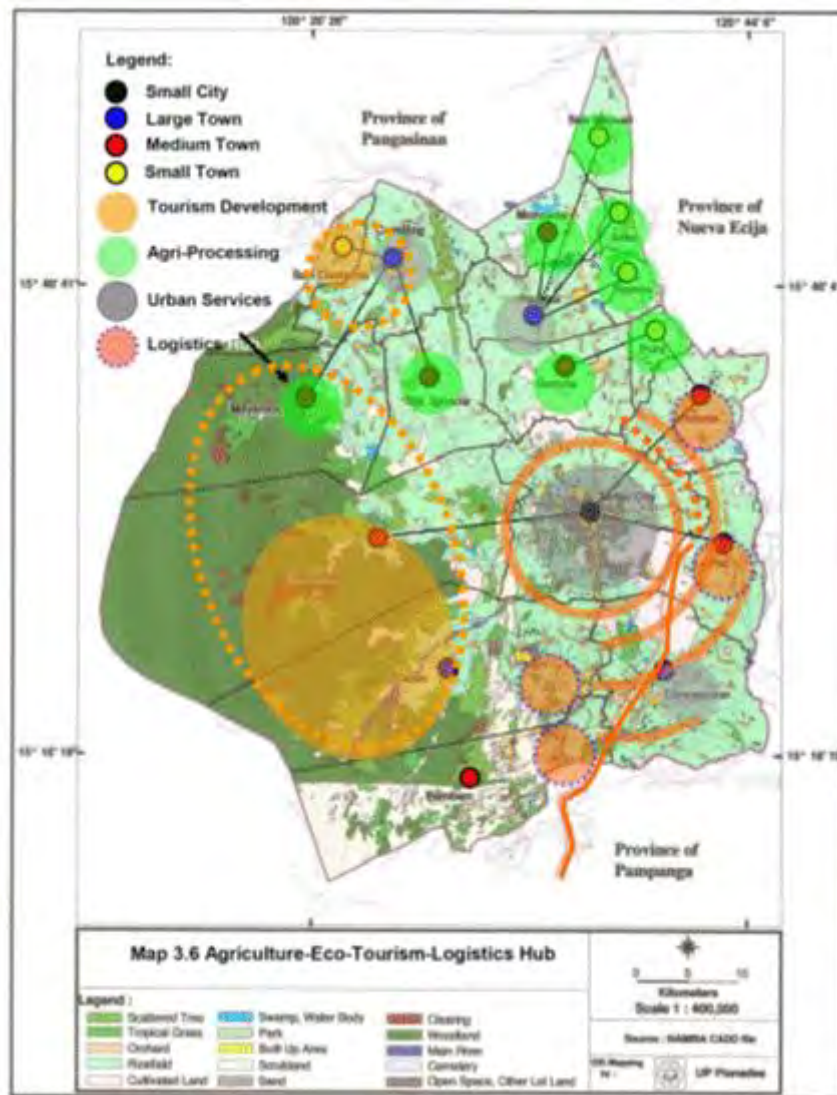


Figure 6 Integrated Plan of Tarlac Province

In case of Tarlac PDPFP, industrial (tourism, agri-processing, urban services, and logistics) layout was prepared based on land use assessment and human settlement pattern.

Another case of PDPFP, Bulacan Province, shows the typical structure of contents as follows.

Chapter 1 Introduction

Chapter 2 Vision, Mission and Development Agenda

Chapter 3 Planning Environment

Chapter 4 Development Issues, Goals, Objectives and Targets

Chapter 5 Land Use and Physical Framework

Chapter 6 Strategies and PPAs (Programs, Projects and Activities)

Land use section of Bulacan's PDPFP describes the potentially hazardous area affected by flood and earthquakes and protected areas such as forest. On the other hand, there is little description in industrial development necessary for economic growth.

PDPFP are to be approved by Provincial Development Council (PDC), and later on submitted to Regional Development Council (RDC) for authorization.

2.1.5.3 City and Municipality

Cities and municipalities separate land use plans and socio-economic plans. Comprehensive Land Use and Development Plans (CLUDP) have significant role in land use control including urban areas. These are described in Section 2.2.1 and later.

Based on Local Government Code (LGC) of 1991 and Executive Order 72 of 1993, cities and municipalities are responsible in formulating the CLUDP. Housing and Land Use Control Board (HLUCB) at national level supports LGUs in the preparation of land use plans and in making the planning guide book.

These land use plans are generally effective for 10 years and are revised after each period. Revised plans are submitted to the respective Provincial Boards for authorization. Upon authorization, the plan becomes effective.

In the case of Bulacan Province, its provincial government monitors the progress of CLUDPs of LGUs. As of August 2016, four among 24 CLUDP have been approved by Province, six are

waiting Provincial action to approve, twelve are being updated, and two under conceptualization and formulation.³

LGUs at city and municipality levels prepare Comprehensive Development Plans (CDPs). CDPs clarify the development orientation in social development, economic development, environmental management, infrastructure development, and institution development. They also indicates respective projects and goals in order to achieve the goals and targets. Along with them, LGUs prepare Local Development Investment Programs (LDIPs) to estimate necessary recurrent and investment cost both private and public. Among these, budgeted projects are to be implemented.

For example, Angeles City mayor serves for three years and the current mayor had taken office in 2010 and reelected in 2013. Under the mayor's term, CLUDP had ten year planning period (2010-2020) and CDP and LDIP had six year planning period (2010-2016). Thus, CDP and LDIP had two times longer than a mayor's term and CLUDP had much longer than it.

However, in general, not only CDP and LDIP, CLUDP is also subject to change by the change of LGU leaders.

CDPs are sandwiched between Provinces and Barangays and should hold consistency with them. Nonetheless, the CDPs are referring to the upper plans such as provincial plans but not subordinate to them.

2.2 Land Use Plans

2.2.1 Institution for Industrial Estate Development

Land use reclassification from agriculture to non-agriculture is a nationwide sensitive matter since agricultural land is a base for national food security.

Generally, in developing industrial estates, developers undergo the following process prior to construction.

- 1) Submit application of land conversion to the Department of Agrarian Reform (DAR) and Department of Agriculture (DA)

³ Four LGUs with approved CLUDP: Balagtas, Calmpit, Marilao and Plaridel.

Six LGUs with CLUDPs waiting for approval: Bulacan, Doña Remedios Trinidad, Hagonoy, Norzagaray, Paombong, and City of San Jose Del Monte.

12 updating LGUs: Angat, Baliwag, Bustos, Guiguinto, Malolos City, Meycauayan City, Pandi, Pulilan, San Ildefonso, San Miguel, San Rafael, and Santa Maria.

2 formulating LGUs: Bocaue and Obando.

- 2) Submit application for tax holidays to PEZA and BOI
- 3) Submit application for land development and reclassification of land use to LGU (city or municipality)
- 4) Secure construction permits from LGU
- 5) Secure local clearance from barangays (not formal procedure)

For number 3) above, LGU requires formal procedure or hearing process to reclassify the land use within each planning term. The Presidential Memorandum Circular 54 (1993) defines the following procedure and guideline for such reclassification.

- (a) After a certain hearing process, LGU may reclassify agricultural land for other use based on the following cases;
 - (1) When the land ceases to be economically feasible and sound for agricultural purposes as determined by the DA, in accordance with the standards and guidelines prescribed for the purpose; or
 - (2) Where the land shall have substantially greater economic value for residential, commercial, or industrial purposes as determined and such reclassification shall be limited to a maximum of the following percentage of the total agricultural land of each LGU:
 - Highly Urbanized City and Independent Component City 15%
 - Component City, First ~third Class Municipality 10%
 - Fourth ~ sixth class municipality 5%

Reclassification for land distributed by Comprehensive Agrarian Reform Law (Republic Act 6657) follows the Article 65 of the Law instead of the above rule.

- (b) Presidential Memorandum Circular No. 54 (1993) stipulates that the President may, when public interest so requires and upon recommendation of NEDA, authorize a city or municipality to reclassify lands to exceed the percentage limits of agricultural land use mentioned above.

These rules suggest that the highly classified LGUs have the larger limit of reclassification. This implies that there are advantages for LGUs to be classified to upper level.

2.2.2 Industrial Location

Philippines's economy and population are so concentrated in Metro Manila that the "Primacy Phenomenon" occurs. Thus, the decentralization of economic activities has been a central theme for regional policy since 1970s.

In December 1973, Marcos Administration banned new factory location and factory equipment within 50km from Manila and in 1976 the Administration also prepared national industrial location program. Later in 1979, the Government announced eleven large projects to foster heavy and chemical industries. In 1980, the Government proclaimed twelve Export Processing Zone (EPZ) but it stopped construction by Cavite EPZ (Established in 1980. Started in 1986.).

Next, Corazon Aquino Administration stopped construction of EPZ by government. Consequently, remote area, such as Bataan EPZ and Baguio EPZ, could not attract factories but Cavite EPZ, close to Manila, remained. This resulted in the opposite outcome to original purpose.

The Ramos Administration tried to expand industries outside of Manila Area and declared "Industrial Estates should be developed outside of Metro Manila, Laguna, and Cavite", in 1997 Investment Priority Plan. Practically, however, Cavite and Laguna Provinces encouraged lager industrial estate location by FDI and requested minimum area of 50 hectares whereas other areas did minimum of 25 hectares⁴.

The 1995 Special Economic Zone Act (R.A. 7916) organized then existing private and public EPZs into "Economic Zone" or "EcoZone". These EcoZones are not only for product exporters but also involved service-export type or BPM (Business Process Management) industries such as call centers to earn foreign currency. The BPM industries require office floors, high-grade IT environment and relatively high leveled human resources around the clock, and did not generate hazardous smoke or water. Consequently, it becomes sometimes difficult to prepare such environment in the local provinces. With this PEZA approved BPMs location in Metro Manila (Table in Section 2.2.6).

As this massive trend of BPM is considered to continue, and infrastructure is to be developed by PPP, it seems difficult to decentralize industrial location to the local areas outside Metro Manila.

⁴ Source: Oda, Hirokazu. Locational Policy and Regional Development Plan in the Philippines. 1999. Bulletin of Ohkagakuen Univesity Faculty of Humanities (1) p.149-176.

Since 2009, DOST and other partners have nominated “Next Wave Cities (NWC),” which suit IT-BPM sector outside of established IT-BPM hubs such as Metro Manila, Metro Cebu, Metro Clark and Bacolod City.

DOST Information and Communications Technology Office (ICTO), IT Business Process Association of the Philippines (IBPAP) and Leechiu Property Consultants (LPC) announced Top 10 NWC 2016 (see Table 8) based on assessment in 2015. The assessment includes talent, infrastructure, cost, and business environment.

Table 8 Next Wave City 2016

City	Province	Region
Baguio City	Benguet	CAR
Cagayan de Oro City	Misamis Oriental	Northern Mindanao
Dagupan City	Pangasinan	Ilocos
Dasmaringas City	Cavite	CALABARZON
Dumaguete City	Negros Oriental	Negros Island
Lipa City	Batangas	CALABARZON
Malolos City	Bulacan	Central Luzon
Naga City	Cebu	Central Visayas
Sta. Rosa City	Laguna	CALABARZON
Taytay	Rizal	CALABARZON

Source: IBPAP HP.

Six cities out of the ten NWC belong to this study’s target areas. These six cities are situated along South Luzon Expressway (SLEX). This NWC program shows the potential of larger cities as alternative locations next to the existing major IT-BPM hubs. It presumably intends to diversify the current IT-BPM concentration to local cities.

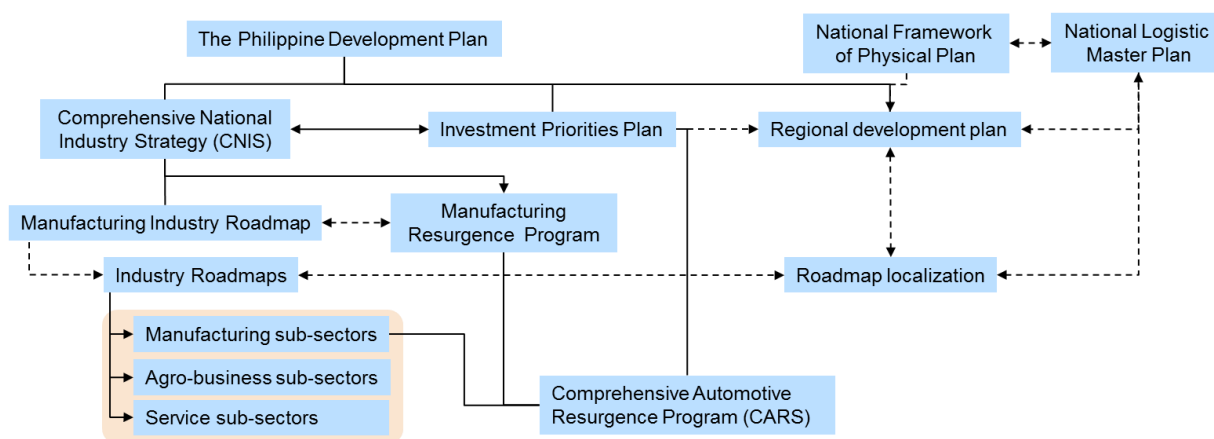
2.3 Industry policy and plans

2.3.1 System of Industry policy, plan and roadmaps

The Comprehensive National Industrial Strategy (CNIS) is the main industrial policy of the Philippines.

Specifically, the manufacturing sector has its “Manufacturing Industry Roadmap” and “Manufacturing Resurgence Program”, which considered the separate roadmaps of sub-sectors of manufacturing, agribusiness, and services. Specifically for the automotive sector, the

Comprehensive Automotive Resurgence (CARS) Program was developed, containing the incentives on investment and policy programs for automotive. The Investment Priorities Plan 2014-2016 is also coherent with the PDP and CNIS.



Source: Systematically organized by study team

Figure 7 System of industrial policy, plan and roadmaps

For regional level, Roadmap localization has been prepared for each region. However, the localization was conducted some years after Regional Development Plans (RDPs) had been formulated. Thus, industrial development plan of a region may not be necessarily coherent with roadmap localization and RDP. For example, table below shows focus sectors of Central Luzon and CALABARZON designated in RDP, NFPP and Roadmap Localization. Focus sectors of Central Luzon in the Roadmap Localization are aerospace, furniture, petrochemical and processed meat whereas agriculture, tourism and mining n RDP and bamboo and logistics in NFPP. They are not coherent.

Table 9 Focus sectors in different plans of Central Luzon and CALABARZON

	Roadmap Localization	Regional development plan (2011-2016)	National Framework of Physical Plan (2000-2030)
Central Luzon	Aerospace, furniture, petrochemical and processed meat	Agriculture, tourism and mining	Bamboo and logistics
CALABARZON	Automotive, electronics, petrochemical and IT/BPM	Tourism, agriculture, IT/BPO, creative	ICT, ICT enabler and logistics

2.3.2 Comprehensive National Industrial Strategy (CNIS)

CNIS is an industrial strategy to achieve inclusive growth, the main goal of PDP. Based on the examination of external and internal conditions, the strategy indicates three major concepts, namely;

- Globally competitive industries, strong domestic and global linkages;
- Three major channels: Competition, Innovation and Productivity; and
- Cluster-based industrial strategy to build strong and competitive regional economies



Source: CNIS

Figure 8 Main concept of CNIS

The key concept of the strategy is to make linkages among industries, particularly to the manufacturing sector. Although there are plenty of local agricultural or mining products, they are not well utilized by the manufacturing sector in the country. Even though there are higher value added services such as IT service, they are not connected closely with the manufacturing sector. Sub sectors such as electronics and garments are exporting their products and are integrated in a global value chain. However, for other sectors to be included in such value chain, making a linkage between sectors is important.

Cluster-based industrial strategy is also an important idea. There are many large PEZA-approved companies in the country, but industrial sectors have not been developed as a “cluster”. If the country can establish industrial clusters in certain places, then the agglomeration will lead to further concentration of companies and relevant organizations in a virtuous circle.

The advantage of CNIS is that this strategy is formulated considering both external and internal circumstances. The orientation of the strategy is relevant to the goal of inclusive growth in global and local context. However, this is a conceptual strategy and does not include concrete measures to achieve the goal.

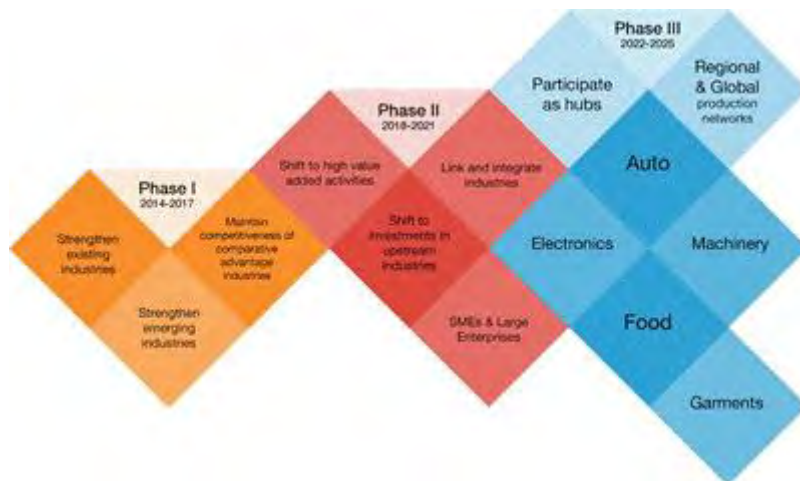
The other concern of CNIS is that there is no lead agency to implement the strategy. In CNIS, the government is supposed to be only a coordinator or facilitator. However, upgrading the industry of the Philippines needs a great deal of efforts and initiatives from both industry and government are also required. In fact, the CARS Program, is making progress because both sides have taken good initiatives so far.

The Investment Priorities Plan 2014-2016 identified specific sub-sectors that are subject of the fiscal incentives. Incentives are given only to the listed sectors. Based on the understanding of target industrial sectors, the plan specified in detail exactly which sub-sectors are the missing links and prioritized to attract investments. The list is still long and not focused, but having the plan is already an advancement. However, the policy measure for investment promotion is solely fiscal incentives. Fiscal incentive is not the only factor for location selection of investors. A holistic approach to promote investment, such as building up an industrial cluster, will be effective. “Cluster-based” is one of the main pillars of CNIS, and investment promotion plan should be designed to contribute to build such clusters.

2.3.3 Manufacturing Industry Roadmap (MIR)

Manufacturing Industry Roadmap (MIR) shows long-term roadmap for the development of the sector. MIR serves as blueprint for the Manufacturing Resurgence Program (discussed in the next section). Targets of MIR are to increase gross value added of manufacturing up to 30% and employment to 15% by 2025. MIR can be achieved by addressing horizontal issues (smuggling, high cost and lack of reliability for power, high cost of transport and logistics) and resolving vertical issues (supply chain gaps, market share expansion, human resource development, integration of SMEs, and innovation), by providing a coordination mechanism for inter-agency collaboration.

The final target year of MIR is 2025. Current phase is Phase I where there are existing resources to be enhanced. In the final phase (2022 to 2025), regional and global hubs should be established for target sectors such as Auto, Electronics, Food, Machinery and Garments.



Source: MIR

Figure 9 Roadmap for manufacturing industry

All the necessary measures are indicated in the roadmap, ranging from human resource development to competitive exchange rate.



Source: MIR

Figure 10 Strategic Actions and Complementary Measures

2.3.4 Manufacturing Resurgence Program (MRP)

Manufacturing Resurgence Program (MRP).is a priority program of the government aimed at rebuilding existing capacity of industries, strengthening new ones, and maintaining competitiveness of industries with comparative advantage. MIR consists of projects and sub-programs that will enhance the competitiveness of the Manufacturing Industry

Lead Implementing Agency is DTI and participating Agencies are DOST, DOLE, DOLE-TESDA, CHED, DOE, DA, NPC, NEA, and PCA.

Projects and programs of MRP are listed in the following table. Each project is relevant to industry but the relevance among projects is not quite clear. Ideally these projects and programs should be aligned to the same targeted goal.

Table 10 Major Projects and Programs of MRP

Agency	Project/Program
DTI	<ul style="list-style-type: none"> – Design and development of plans, programs and policies for industry development – Promotion and development of small and medium industries – Establishment of Negosyo Centers – Comprehensive Automotive Resurgence (CARS) Program – Industry Development Program
DOST	<ul style="list-style-type: none"> – R&D on Copper, Nickel, Iron and Chromite for Industrial and Emerging Applications – Small Enterprise Technology Upgrading Program
DOLE	<ul style="list-style-type: none"> – Labor Law Compliance System – Single Entry Approach – DOLE Integrated Livelihood Program – Labor Market Information – Two-Tiered Wage System
TESDA	<ul style="list-style-type: none"> – Training for Work Scholarship Program
DOE	<ul style="list-style-type: none"> – Detailed Wind Resource Assessment Project – Household Electrification Program (HEP) in Off-Grid Areas using Renewable Energy Systems
PCA	<ul style="list-style-type: none"> – Coconut-Kasaganaan sa Niyugan ay Kaunlaran ng Bayan Enterprise Development Program
DA	<ul style="list-style-type: none"> – Philippine Rural Development Program – SOCSKARGEN Integrated Food Security Program & CASECNAN
NEA	<ul style="list-style-type: none"> – Sitio Electrification Program
NPC	<ul style="list-style-type: none"> – Supply of Electricity in Missionary Areas: Capacity Addition/Construction of Power Facilities and Genset Rental and Transmission Line Expansion/Addition
DOTC	<ul style="list-style-type: none"> – Municipal Ports and Social Ports
DPWH	<ul style="list-style-type: none"> – Transport Infrastructure Development Program and Disaster Mitigation

Source: DTI

2.3.5 Comprehensive Automotive Resurgence Programs (CARS)

While MRP is a comprehensive program for the entire manufacturing sector, the CARS program is drafted as the industry-specific program for the automotive sector.

CARS is different from conventional policy measures in the Philippines, since it is a “comprehensive” program specifically designed for the automotive sector. Fiscal incentive is not the only inducing factor for investments. For some sectors, human resource development with sector-specific skills will be critically important. For other sectors, the domestic market size will be the most important criteria for location selection. It is important to design investment promotion programs based on the location selection factors of targeted sectors. In this sense, CARS is an advanced case of a holistic industrial policy.

2.3.6 Industry Roadmaps for Sub-sectors

There are also industry roadmaps for 19 manufacturing sub-sectors, six agribusiness sub-sectors and two service sub-sectors. For manufacturing, the programs of its three sub-sectors are approved by the executive orders and seven sub-sectors have set some programs. Nevertheless, programs of the remaining sub-sectors are still under discussion. For agribusiness, all the subsectors are under discussion of the programs. For service sub-sectors, Housing has already set programs, while those for IT/BPM are still under discussion.

Manufacturing sub-sectors roadmaps have been developed by relevant industry associations in the country with support from BOI. BOI has designated industry champion and technical staff for each sector for better understanding of the sector and support for sector development.

Table 11 List of sub-sector roadmaps, programs and champions of each sector

Manufacturing (19)		
Sub Sector	Program	Champion
Aerospace	Some programs	BOI Aerospace Industries Association of the Philippines (AIAP)
Automotive	E.O.	BOI Federation of Automotive Industries of the Philippines
Auto Parts	E.O.	BOI Philippine Parts Makers Association
Biodiesel	Under discussion	BOI The Philippine Biodiesel Association (TPBA)
Ceramic Tiles	Under discussion	BOI Ceramic Tiles Manufacturers Association
Chemicals	Under discussion	BOI Samahan sa Pilipinas ng mga Industriyang Kimika (SPIK)
Copper	Under discussion	BOI Philippine Associated Smelting and Refining Corp. (PASAR)
E-Vehicles	Some programs	BOI Electric Vehicle Association of the Philippines (EVAP)
Electronics	Some programs	BOI Semiconductors and Electronics Industries in the Philippines, Inc. (SEIPI)
Furniture	Some programs	BOI Chamber of Furniture Industries of the Philippines
Iron and Steel	Under discussion	BOI Philippine Iron and Steel Institute (PISI)
Metalcasting	Some programs	BOI Philippine Metalcasting Association Incorporated
Motorcycle	E.O.	BOI Motorcycle Development Program Participants Association, Inc. (MDPPA)
Natural Health Products	Some programs	BOI Chamber of Herbal Industries of the Philippines, Inc.
Petrochemicals	Under discussion	BOI Association of Petrochemical Manufacturers of the Philippines (APMP)
Plastics	Under discussion	BOI Philippine Plastics Industry Association (PPIA)
Paper	Under discussion	BOI Philippine Paper Manufacturers Association, Inc. (PPMAI)
Rubber	Under discussion	BOI Philippine Rubber Industries Association (PRIA), Inc.
Tool and Die	Some programs	BOI Philippine Die and Mold Association (PDMA)
Agribusiness (6)		
Sub Sector	Program	Champion
Cacao / Tablea	Under discussion	None
Carrageenan	Under discussion	BOI
Condiments	Under discussion	BOI
Processed Fruit	Under discussion	BOI
Processed Meat	Under discussion	BOI
Processed Shrimp	Under discussion	BOI
Services (2)		
Sub Sector	Program	Champion
IT-BPM	Under discussion	BOI Information Technology and Business Process Association of the Philippines
Housing	Some programs	BOI Subdivision and Housing Developers Association, Inc. (SHDA)

Source: Sub-sector roadmaps

Even though the CNIS is aimed to make linkages among sectors, those sub-sector roadmaps have been formulated sector by sector. Thus, in those sub-sector roadmaps, inter-sector linkage is not well focused.

2.3.7 Roadmaps Localization

Under the roadmap localization efforts, all regions have their own roadmaps. However, these are based on local resources and are not necessarily coherent with the sub-sector roadmaps. For

example, roadmap for Central Luzon (Region III) includes aerospace sector as one of targeted sectors, but the roadmap for aerospace sub-sector designated Cordillera Administrative Region (CAR) as the industrial cluster for aerospace. The aerospace roadmap does not mention about the viability of Central Luzon for the industry and the possible inter-regional linkages.

The differences in the time frame of roadmap localization and regional development plans may be a possible reason for the inconsistency between the two. It will be important to seek for alignment between these two.

It should also be noted that those focused industries in localized roadmaps are resource-based. Those sub-sectors may not necessarily be globally competitive. Some of the sectors are rather facing threats of global competition.

Table 12 Localized roadmaps for each region

Region	Name of the Region (major city)	Focused industry sub-sectors
Region I	Ilocos Region (La Union)	Cacao, coffee, processed fruits, and processed meat
Region II	Cagayan Valley (Tuguegarao)	Processed food, processed cacao, processed meat, coffee and furniture industries
Region III	Central Luzon (Clark)	Aerospace, furniture, petrochemicals, and processed meat
Region IV-A	CALABARZON (Tagaytay)	Automotive, electronics, petrochemicals, and IT-BPM
Region IV-B	MIMAROPA (Puerto Princesa)	Coco coir, carrageenan, rubber, and processed cacao
Region V	Bicol Region (Naga)	Coco coir, metalcasting, and healthcare services
Region VI	Western Visayas (Iloilo)	Processed meat and processed shrimp
Region VII	Central Visayas (Cebu)	Carrageenan/seaweed, processed fruit (dried mangoes), furniture, and IT-BPM
Region XI	Davao Region (Davao)	Processed meat, seaweeds/carrageenan, and cacao/tablea
Cordillera Administrative Region (CAR)	(Baguio)	Processed vegetables, coffee, and aerospace

Source: Roadmap localization

2.3.8 Industrial Promotion Programs by DTI

DTI's support for the industry includes actions for improvement of the business environment, improvements in financial access for businesses, market development support, and enhancement of productivity and efficiency.

<Improving the overall business environment>

In terms of its mandate to help in improving the overall business environment, DTI along with other government agencies pursues openness to the feedback of other relevant organizations. For

instance, DTI, SEC, BIR, DILG, and local governments have discussions with the private sector and receive proposals from international organizations. Such collaboration has led to simpler company registration procedures and the establishment of a one-stop shop for the private sector. DTI has also established a Philippine business registration system, and is working to simplify participation in various business registration and government procurement.

Moreover, DTI established the National Economic Research and Business Assistance Center (NERBAC) in order to support the corporate accounting, and intellectual property acquisition among others for venture companies. This was established in 1991 and was continually revised in 1997, 2008 and 2014 (RA 6977, RA 8289, RA 9501, RA 10644, respectively). This law has realized improvements to the business environment, improvement of access to funds, provision of appropriate business support information, skills training for workers, collaboration between small and medium enterprises and large companies, and support for building cooperative relationships with the private sector. Today, this NERBAC has been replaced by Negosyo Centers. Major functions of Negosyo Centers are, Business Registration Assistance, Business Advisory Services, Business Information and Advocacy, and Monitoring and Evaluation (of business process etc.).

DTI also expanded the function of the SME center. This center can provide information and advice on productivity improvement, technology improvement, product and market development, financing, and others. This SME support is not only coming from DTI but also from some LGUs.

<Access to Finance>

Small Business Corporation (attached agency of DTI) is in charge of addressing finance issues of MSMEs. As for improving financial access, DTI has developed a loan support program for SMEs with financial institutions such as Land Bank of Philippine (LBP), Development Bank of the Philippines (DBP), and other financial institutions. Together with DOST, DTI also worked on technical development and loan for inventions.

For example, in the ASENSO (Access of Small Entrepreneurs to Sound Lending Opportunities) program, DTI established a wide range of financing systems, including lower borrowing costs and expansion of short-term and long-term loans. DTI also supported in standardizing and simplifying lending procedures.

With the oversight of DTI, the implementation of the Go Negosyo Act in 2014 also aids in enhancing financial access to MSMEs in priority sectors through a provision of a start-up fund.

<Market development support>

For market development support, DTI and the Bureau of Customs held seminars at various locations about FTAs, and provided support for companies to expand their business by using FTAs. DTI and LGUs work together to provide trade fair information in major partner countries and hold the international trade fairs in Philippines. In addition, for product development, DTI also provides advice and consulting services including the industrial standards and systems.

<Productivity and efficiency improvement support>

With regard to productivity and efficiency improvement support, DTI implemented Shared Service Facilities (SSFs). These SSFs aims to improve the competitiveness of MSMEs through providing machineries, equipment, tools, systems, skills and knowledge under a “shared system” model. MSMEs can freely access the SSFs located within their respective regions. DTI is also holding seminars on creating business plans and strategies, providing advice, and forming regional clusters.

Table 13 Main support by DTI

Field	Main support
Improving the business environment	<ul style="list-style-type: none"> - Streamlining and simplifying procedures such as business registration in collaboration with related organizations - Simplification of project registration by PBR (Philippine Business Registry) and participation in government procurement - Establishment of the NERBAC - Legislation for supporting SMEs (Magna Carta for Micro, Small and Medium Enterprises) - Expansion of SME center
Improving financial access	<ul style="list-style-type: none"> - Lending support for small and medium enterprises - Lending support for technology development and inventions - Improvement of credit guarantee system
Market development	<ul style="list-style-type: none"> - Seminar on FTAs - Provide trade fair information in major countries - International trade fairs - Advice on industrial standards and institutions
Productivity and efficiency improvement	<ul style="list-style-type: none"> - Implemented SSFs (support for production facilities) - Management seminars, advice - Regional cluster support

Source: Study team

2.4 Tax System

2.4.1 Taxation

2.4.1.1 Corporate Income Tax

Domestic and resident foreign corporations are subject to either of the following, whichever is higher:

- a. Regular corporate income tax of 30% of their taxable income (gross income less allowable deductions)
- b. Minimum corporate income tax equivalent to 2% of gross income

Foreign corporations are taxed only on their Philippine-sourced income.

Certain types of income of resident foreign corporations are subject to special tax rates as follows:

- International carriers doing business in the Philippines: 2.5% of gross Philippine billings
- Interest income derived by offshore banking units from foreign currency loan transactions with residents: 10%
- Branch profit remittances to head office: 15%
- Regional operating headquarters of multinational companies: 10%
- Interests from deposits and yield or any other monetary benefit from deposit substitutes and from trust funds and similar arrangements, and royalties from Philippine sources: 20%
- Dividends received from domestic corporations: exempted
- Net capital gains from sale of shares of stocks not traded in the stock exchange: 5% on the first Php100,000, 10% on the excess

As tax reform is among the priority economic agenda in the Duterte administration, the review of the corporate income tax has been on-going.

2.4.1.2 Value Added Tax (VAT)

A 12% VAT is imposed on the sale, barter, exchange or lease of goods and properties, importation of goods and sale of performance of services within the Philippines. "Goods and properties" include all types of property, whether personal (tangible and intangible) or real property. Zero percent VAT generally applies to exports. Tax payers engaged in zero-rated transactions are entitled to refunds or tax credits for VAT paid (input tax) on their purchases of goods, properties and services.

2.4.1.3 Personal Income Tax

Progressive rates are imposed on the taxable income of citizens, resident aliens, and non-resident aliens doing business in the Philippines. Tax rate is as follows:

Table 14 Personal income tax rate

Taxable income (Php/ year)		Tax Due	Plus	Of the excess
over	But not over			
-	10,000	5%	-	-
10,000	30,000	P500	10%	10,000
30,000	70,000	P2,500	15%	30,000
70,000	140,000	P8,500	20%	70,000
140,000	250,000	P22,500	25%	140,000
250,000	500,000	P50,000	30%	250,000
500,000	-	P125,000	32%	500,000

Source: BIR

Tax ratio of personal income is being reviewed in the tax reform agenda of the Duterte administration.

2.4.1.4 Property Tax

LGUs impose real property taxes. The base of the real property tax is only a percentage of the assessed market value of the land. Assessment levels may depend on the land use (e.g., residential, agricultural, commercial, and others).

Based on the local government code, LGUs can set a minimum real property tax of 0.25% for provinces and 0.5% for cities; maximum rates are 1% and 2% for provinces and cities (including Metro Manila), respectively.

Other land-based taxes include the Special Education Fund (SEF) tax and ad valorem tax on idle lands. The SEF tax is imposed on the same base and has a rate of 1%. The proceeds from SEF taxes are allocated for the public education. Meanwhile, ad valorem tax on idle lands has a rate of 5%. This tax aims to further the use and purposeful development of lands.

2.4.1.5 Local Government Tax

Based on the constitution, local taxes may be imposed to each LGU since it has the power to create its own sources of revenues. However, LGUs may not impose some taxes such as income tax, documentary stamp and so on⁵.

⁵ <http://www.bir.gov.ph/index.php/rulings-and-legal-matters/guide-to-philippines-tax-law-research.html>

Rates can be determined by each LGU with a ceiling.

2.4.1.6 Transfer Pricing

Related companies must transact on an arm's length basis in compliance with the transfer pricing regulations issued in 2013.

2.4.1.7 Tax Treaty/ Double Taxation Agreement

Philippines and Japan have Tax Treaty agreed in 1980, and amended in 2006 for the avoidance of double taxation and the prevention of fiscal evasion with respect to taxes on income⁶.

2.4.2 Tax Incentives for Investment

Philippines has 13 Investment Promotion Agencies (IPAs) which are shown in the Table 15. Each agency has its own set of incentives provided to the investors. The BOI provides incentives according to the priority area/industry, while the rest of the agencies are based on the Special Economic Zone (SEZ).

2.4.2.1 Board of Investments (BOI)

BOI, an attached agency of DTI, is the lead government agency responsible for the promotion of investments in the Philippines. It provides fiscal and non-fiscal incentives to both Filipino and foreign investors based on the "Investment Priorities Plan (IPP)", which is developed every three years. Latest IPP was created in 2014 for the year 2014-2016 and contained the four priority investment areas⁷;

1. Preferred activities that include four broad sectors (manufacturing, agribusiness and fishery, services, and infrastructure and logistics) and four specific activities (energy, housing, hospitals and PPP projects);
2. Export activities that cover the production and manufacturing of export products, services exports and activities in support of exporters;
3. Activities with Special Laws that provide for either the mandatory inclusion of the activity in the IPP and/or the grant of incentives under E.O. 226; and
4. ARMM List, which encompasses priority investment areas that have been determined by the Regional Board of Investments of the Autonomous Region in Muslim Mindanao.

⁶ http://www.bir.gov.ph/images/bir_files/international_tax_affairs/Japan%20overriding%20protocol.pdf

⁷ <http://www.boi.gov.ph/files/2014%20IPP.pdf>

2.4.2.2 Special Economic Zone (SEZ)

Investment Promotion Agencies such as PEZA, SBMA and CDC are responsible to promote investments in export-oriented business and supporting service business inside selected areas.

Generally, the Philippine provides competitive tax incentives compared with neighboring ASEAN countries. The following are the major tax incentives enjoyed by investors:

- a. Corporate tax exemption: 4-6 years, maximum extension allowed up to 8 years.
- b. Special tax after corporate tax exemption end: exemption of national tax and local tax. Impose 5% of the gross income tax instead.
- c. Special tax: exemption of national tax and local tax. Impose 5% of the gross income instead.
- d. Exemption of tariff and VAT etc.

Table 15 Investment Promotion Agencies (IPAs) and Tax Incentives Regime

Investment Promotion Agencies (IPAs)	Target Area	a. Corporate tax exemption	b. Special tax after corporate tax exemption end	c. Special tax	e. Tariff, VAT exemption etc.
Board of Investments: BOI	nationwide	✓			✓
Philippine Economic Zone Authority: PEZA	Nationwide	✓	✓		✓
Aurora Pacific Economic Zone and Freeport Authority	Aurora (Eastern side of Luzon Island)	✓	✓		✓
Authority of the Freeport Area of Bataan	Bataan (Central Luzon)	✓	✓		✓
Bases Conversion and Development Authority: BCDA	U.S Bases site			✓	✓
Clark Development Corporation	Clark (Central Luzon)			✓	✓
Subic Bay Metropolitan Authority: SBMA	Subic (Central Luzon)			✓	✓
PHIVIDEC Industrial Authority	Nationwide				✓
Tourism Infrastructure and Enterprise Zone Authority: TIEZA	Nationwide				
Philippine Retirement Authority	Nationwide				
Cagayan Economic Zone Authority: CEZA	Cagayan (Northern Luzon)	✓			✓
Regional Board of Investments - ARMM	ARMM (Mindanao)	✓			✓
Zamboanga City Special Economic Zone Authority	Zamboanga (Mindanao)	✓		✓	✓

Source: <http://investphilippines.gov.ph/>

One perceived problem related to tax incentives is difficulty for potential investors to decide which IPA to register with. They need to study and compare the tax incentives of different IPAs before they decide. Compared with other ASEAN countries wherein there is a single investment promotion agency, current set-up seems to be complicated for many investors.

To solve this problem, rationalization of the incentives has continuously been discussed for more than 10 years. In the previous administration, seven rationalization bills (four bills from Congress and three from Senate) had been submitted, but hadn't reached to the approval.

With the new administration, DTI is drafting a concept of "modernization of tax incentive". The contents of the idea reported are as follow.⁸

- Special tax after the period of corporate tax exemption (exemption of national tax and local tax. Impose 5% of the gross income tax instead) which is enjoyed by the Philippine Economic Zone Authority (PEZA) companies, has indefinite term at present. It is proposed to either limit this to a maximum of 25 years, or completely abolish. This will be applied to only new investors (not retroactive).
- Provide a new incentive to a corporate with "Inclusive Business model" which sources supply from a DTI-accredited SMEs or those companies which conduct R&D project.
- Climate change incentives for sustainable development

This plan is for export-oriented companies. However, there is an on-going discussion to consider providing incentives to domestic-oriented business in SEZ, such as "domestic PEZA".

2.5 Regulations on Foreign Ownership in the Target Industry

Foreign ownership in the Philippines is regulated by the Foreign Investments Act in 1991 (Republic Act No. 7042 of 1991, as amended by Republic Act No. 8179 of 1996). There are no restrictions on extent of foreign ownership of export enterprises. However, for domestic market enterprises, there are some restrictions on foreign ownership. Restrictions for foreign ownership in the Philippines is specified in the Foreign Investment Negative List (FINL). The FINL is divided into A and B;

⁸ <http://www.mb.com.ph/dti-crafts-extra-perks-to-investors/>

- List A: covers areas of activities reserved to Philippine nationals by mandate of the Constitution and specific laws.
- List B: covers the areas of activities and enterprises regulated pursuant to law for reasons of security, defense, risk to public health and morals and protection of small-and medium-scale enterprise

Latest version is the 10th FINL, which was published in June 2015 (Presidential Decree No. 184)⁹.

Table 16 shows the restrictions related to the target industry in this study.

Table 16 Restriction of foreign ownership for the target industry

Target industry in this study	Restrictions of foreign ownership	Law
Manufacturing -Export oriented (more than 70% of revenue)	None	-
Manufacturing -Domestic oriented	Up to 40% if a) paid-in equity capital is less than the equivalent of US\$200,000, or b) involve advanced technology or employ at least 50 direct employees with paid-in equity capital is less than US\$100,000	RA7042 as amended by RA8179
Retail (Automobile, Auto parts, Home appliances, etc.)	Full foreign participation is allowed if a) paid-up capital is US\$2,500,000 or more and investments for establishing a store is not less than US\$830,000; or b) specializing in high end or luxury products, with the paid-up capital per store is not less than US\$250,000.	Sec.5 of RA 8762
Agriculture	Up to 40% for culture, production, milling, processing, trading except retailing, of rice and corn and acquiring, by barter, purchase or otherwise, rice and corn and the by-products thereof.	Sect.5 of PD 194
All industries	Up to 40% of ownership of private lands. 100% ownership of land inside SEZ is allowed.	Art XII, Sec.7 of the Constitution, Sec.4 of RA 9182

Source: 10th FINL

⁹ <http://www.gov.ph/downloads/2015/05may/20150529-EO-0184-BSA.pdf>

The new administration raised “Reinforcement of International Competitiveness and Investment Environment” as one of the ten points in the socio-economic agenda. Relaxation of restrictions on foreign investment (exempt land ownership) has become a priority issue. The specific plan has not been published as of end of October 2016.

2.6 Industrial Human Resource Development

2.6.1 Education System Framework in terms of Industrial Human Resource Development

2.6.1.1 Trifocal Education System in the Philippines

The Congressional Commission on Education (EDCOM) report of 1991 recommended the division of Department of Education, Culture and Sports (DECS) into three parts. On May 18, 1994, Congress passed Republic Act 7722, the Higher Education Act of 1994, creating the Commission on Higher Education (CHED), which assumed the functions of the Bureau of Higher Education, and supervises tertiary degree programs. On August 25, 1994, Congress passed Republic Act 7796, the Technical Education and Skills Development Act of 1994, creating the Technical Education and Skills Development Authority (TESDA), which absorbed the Bureau of Technical-Vocational Education and the National Manpower and Youth Council, and supervises non-degree technical-vocational programs. DECS retained responsibility for all elementary and secondary education. This threefold division became known as the trifocal system of education in the Philippines.

In August 2001, Republic Act No. 9155, otherwise called the Governance of Basic Education Act, was passed renaming DECS to the Department of Education (DepEd) and redefining the role of field offices, which include regional offices, division offices, district offices, and schools. Thus, three agencies, CHED, TESDA, and DepEd, have been in charge of higher education, technical vocational education, and basic education respectively.

2.6.1.2 A Mismatch between graduates of trifocal education system and those in demand among employers

In the Philippines, it is recognized that there are skills gap and skills mismatch between graduates of basic education, higher education and technical-vocational education system and those in demand among industries.

According to the Labor Force Survey¹⁰ of the Philippine Statistics Authority, the average unemployment rate of the Philippines from 1994 to 2016 was 8.63 percent. About 30% of the unemployed persons are high school graduates, while half of the unemployed persons were aged 15 to 24 years old through the period. The unemployed rate in October 2016 was estimated as 4.7% and the number of unemployed people was 2.04 million. Of the total unemployed, the age group 15 to 24 years comprised 47.6%, while the age group of 25 to 34 years took 30.1%. By educational attainment, 20.5% of the unemployed were college graduates, 13.8% were college undergraduates, 32.9% were high school graduates, and 10.5% were high school undergraduates. Other studies find that there are over 500,000 college graduates every year and only 40% will land a job a year after graduation¹¹. Only around 10% of science graduates and postgraduates find jobs in the manufacturing sector, while almost half end up working in trade, real estate, and other service subsectors which are less related to their fields of study¹².

The 2013/2014 Integrated Survey on Labor and Employment¹³ of the Philippine Statistics Authority finds that the bulk of job vacancies which the establishments found difficulties in recruiting were from the group of professionals (systems analysts and designers; college, university and higher education teaching professionals; accountants and auditors; civil engineers; personnel and human resource development professionals), technicians and associate professionals (technical and commercial sales representatives; administrative secretaries and related associate professionals; safety, health and quality inspectors; mechanical engineering technicians; computer equipment operators), and clerks (customer service representative or commonly known as call center agents; accounting and bookkeeping clerks; receptionists and information clerks).

Numerous studies on skills gap and skills mismatch in the Philippines have been conducted by prominent domestic and foreign organizations¹⁴. Commonly cited reasons why fresh graduates of high schools, colleges, universities and Technical-Vocational Institutions (TVIs) end up unemployed are the following:

- A mismatch between graduate skills and those required by the potential employers
- Lack of academic competencies of an average graduate

¹⁰ Philippine Statistics Authority, Labor Force Survey, October 2016.

¹¹ Philippine Institute for Development Studies, "Are Higher Education Institutions Responsive to Changes in the Labor Market?", Discussion Paper Series No. 2016-08.

¹² World Bank, "Philippine Development Report 2013".

¹³ Philippine Statistics Authority, "Job Vacancies: 2013-2014...hard-to-fill occupations in focus (Second of a three-part series)", LABSTAT Updates, March 2016.

¹⁴ For example, Department of Labor and Employment, "JOBSFIT Final Report". World Bank, "Skills for the Labor Market in the Philippines", 2010. Philippine Institute for Development Studies, "Are Higher Education Institutions Responsive to Changes in the Labor Market?", Discussion Paper Series No. 2016-08.

- Lack of technical/specialized skills of an average graduate
- An oversupply of graduates in several fields and/or a shortage of employment opportunities in their field of specialization
- Lack of information for both job seekers and employers
- Entry-level position may pay wages lower than what the graduates are expecting
- Job vacancies are not suitable for the graduate competencies (Some of the domestic industries are not fully developed yet.)
- High school students (of 10-year basic education) were 16 years old at their graduation, which do not reach to the legal age of an adult in the Philippines, i.e., 18 years old. This 2-year gap was the biggest cause of high unemployment rate among high school graduates who did not go to universities or TVET.¹⁵

In order to deal with these issues, CHED, TEDA and DepEd tried to enhance quality of the graduates through having an Outcomes-based Education, developing the Philippine Qualifications Framework, preparing for the implementation of ASEAN Qualification Reference Framework, and introducing the K to 12 program. However, these efforts are still underway and industries are not satisfied with the results yet.

2.6.2 Higher Education

According to the 2010 Census of Population and Housing (2010 CPH), the educational attainment of the population in the country had improved since year 2000. The proportions of graduates of both secondary and tertiary (college) levels had increased from 2000 to 2010. In 2010, high school graduates accounted for 19.1% compared to only 12.9% in 2000. College graduates increased from 4.3% in 2000 to 10.1% in 2010. On the other hand, the proportion of those with no grade completed had decreased from 8.3% to 4.0%.

Academic programs on business and on education have consistently been the most popular among college students in the last two decades. Among college graduates under the age of 40 years, 23.5% had a degree on Business and Administration, 16.8% were graduates of Teacher Training and Education Sciences programs, and 13.6% were graduates of Health programs. On the other hand, among those college graduates aged 40 years and above, 32.5% finished a degree on

¹⁵ The eligible age in the Philippines is 15 years old. However, there were many incidents in the past where malignant employers were indicted because of their exploitation of child labor, taking advantage of their poverty, and now companies are rather reluctant to employ the youngsters from 15 to 17 years old. The labor at the factories could be regarded as physically dangerous, though it is acceptable to work for agriculture or self-employed under the permission and supervise by the family. Youngsters under 18 years old cannot be self-employed because one of the conditions for self-employment permission is that the applicant is older than 18 years old.

Business and Administration, 23.5% graduated with a degree on Teacher Training and Education Sciences, and 15.8% were graduates of Engineering and Engineering Trades programs.

The most popular academic field for males was Engineering and Engineering Trades, with graduates of this program comprising 25.9% of the total male college graduates. On the other hand, the most common field for females was Business and Administration with 31.3% of the total female college graduates having a degree on this field.

The trend has been changing, as shown in Table 17. The number of graduates of Medical and Allied (Health programs including Nursing) is decreasing. On the other hand, Service Trades is rapidly getting popular.

Table 17 Higher Education Institution Graduates by Discipline Group

Discipline Group	SY 2010-2011	SY 2011-2012	SY 2012-2013	SY 2013-2014	SY 2014-2015 (Estimated)	Increase from 2010 Graduates (%)
Total	496,949	522,570	564,769	585,288	648,752	34.8
Business Administration and Related Courses	125,840	141,327	164,541	169,846	187,036	59.3
Education and Teacher Training	62,715	69,738	86,903	98,277	107,181	90.0
Information Technology Related Discipline	54,225	66,672	72,879	72,976	81,084	62.9
Medical and Allied	103,582	80,800	57,427	50,513	65,671	-43.6
Engineering and Technology	57,439	56,690	59,399	63,539	65,660	33.0
Maritime Education	14,430	19,515	23,506	23,401	27,156	88.1
Social and Behavioral Science	13,168	13,816	15,953	18,831	19,250	51.3
Service Trades	6,184	6,244	8,629	10,630	11,537	127.7
Mass Communication and Documentation	5,334	5,463	6,475	7,246	7,368	40.5
Natural Science	3,910	4,330	6,626	6,094	7,224	82.9
Other Disciplines	50,122	57,975	62,431	63,935	69,585	37.6

Source: 2015 Philippine Statistical Yearbook

2.6.3 Technical Vocational Education

TESDA has been mandated through Republic Act No. 7796 or the TESDA Act of 1994 “to provide relevant, accessible, high quality and efficient technical education and skills development in support of the development of high quality Filipino middle level manpower responsive to and in accordance with the Philippine development goals and priorities.”

Under the law, TESDA is tasked to perform the following functions:

- 1) Developing of national TESD plan;
- 2) Research on TVET;
- 3) Providing information on the supply and demand for middle-level skills;
- 4) Certification of skilled workers;
- 5) Registration and accreditation of training establishments (TESDA's mandate does not include the provision of direct training);
- 6) Development of industry based standards;
- 7) Training of trainers;
- 8) Advocacy to all clientele including enterprises; and
- 9) Capacity building

With the over-all implementation of quality management system for continuous improvement and quality assurance in the delivery of its programs and services, TESDA acquired nationwide ISO 9001:2008 in 2014. Industry-led Training Regulations (TRs) and competency assessment tools (CATs) are reviewed every three years. The TESDA Board has promulgated 112 out of 258 TRs during the last six years. Thirty two qualifications with low utilization of TRs and CATs, in terms of registered programs and assessed workers/graduates, were referred to concerned industry sectors for updating or amendment if necessary. With this, 35 TRs and CATS were amended or updated, while new TRs and CATs were developed for nine qualifications.

Among the 258 qualifications, the following were identified as the top 10 most utilized qualifications: 1) Food and Beverages Services NC II, 2) Computer Hardware Servicing NC II, 3) Housekeeping NC II, 4) Commercial Cooking NC II, 5) Shielded Metal Arc Welding NC II, 6) Consumers Electronics Servicing NC II, 7) Bartending NC II, 8) Programming NC II, 9) Contact Center Services NC II, and 10) Automotive Servicing NC II.

As of May 2016, a total of 18,075 TVET programs were registered. TVET delivery is private sector-dominated as more than 90% are privately managed. As of June 2016, a total of 4,315 TVET providers (3,886 private and 429 public institutions) are offering TESDA-registered programs through various delivery modes such as institution-based, enterprise-based, community-based and online programs. The most number of TVET providers are located in NCR (22%), Region IV-A (14%) and Region III (11%).

Figures in assessment and certification doubled in six years. From 716,220 assessed in 2010, it

increased to 1,424,814 in 2015. The certification rate had also risen from 83% in 2010 to 90.7% in May 2016. In total, 6,800,930 individuals were assessed while 6,002,843 individuals were certified from 2010 to May 2016. In a span of six years, the certification rate averaged to 88.3%.

In addition, the employment rate of TVET graduates is rising steadily. From 48.5% recorded in 2005, it reached 65.4% in 2014. The key employment generating sectors include: Agri-Fishery; Construction; Processed Foods and Beverages; Decorative Crafts; Metals and Engineering; and IT-BPM. The positive results were seen particularly for Training for Work Scholarship Program (TWSP) graduates. About 71.9% employment rate was achieved among the TWSP scholars in 2014, the highest in its history. IT-BPM industry graduates had an employment rate of 70.9% while the electronics and semiconductor program recorded 91.4% employment rate. Many college graduates and career shifters go to TVET. A sizable number of TVET graduates were college undergraduates and college graduates with 13.8% and 16%, respectively (2014 TESDA Impact Evaluation Study).

As for trainers, the creation of the Philippine TVET Trainers Qualification Framework (PTTQF) set a four-level framework which establishes a structure that will ensure the systematic and purposeful development of TVET Trainers. Both public and private TVET trainers underwent training programs from 147 registered training providers of Trainers Methodology (TM) Level 1. From 2011 to 2015 there were 29,318 graduates of TM Level 1.

TESDA partners with more than 600 organizations, including industry associations and private companies. Aside from standards development, the partnerships cover training delivery, apprenticeship, learnership program, dual training system, and assessment and certification. A directory of TESDA partners has been compiled and is regularly monitored not in national, regional and provincial levels.

2.6.4 Industry-Academia Collaboration

In the Philippines, addressing the jobs-skills mismatch situation has been a persisting issue. One of the key countermeasures is to align industry needs with education outcomes and increase industry-academia partnerships.

2.6.4.1 TVET

TESDA partners with companies across the country in the implementation of enterprise-based programs. A total of 422,700 graduates were produced from 2010 to May 2016. TESDA also accredited 708 companies under the Dual Training System (DTS). The general and occupation-

related theoretical instruction provided by the school is complemented by on-the-job training in the workplace. Trainees under the DTS spend at least 40 percent of the training/learning time in school and 60 percent for practical training in the company. Through DTS, students are given hands-on training and actual work exposure to improve the level of their skills and their employability. The DTS subsidy shall be 75% of the current minimum wage per day of duty mandated by law.

TESDA-Industry collaboration is seen in the improvement of the training facilities. A few examples are as follows. Isuzu Philippines Corp. donated over a hundred million pesos for the establishment and operation of the Automotive Training Center in Tacloban, Leyte, offering Automotive Servicing NC I to IV. The training center graduated and certified 135 technicians in seven batches, of which 131 were employed. Samsung Electronics Philippines Cop. donated equipment and allocated funds amounting to PHP12.43 million for the training of women in Consumer Electronics Servicing. There were 413 new apprenticeship and learnership programs registered nationwide, while 319 were registered in 2015.

In addition to TESDA, the Metal Industry Research and Development Center (MIRDC), one of the research and development institutes of the DOST, carries out various technical training for companies and universities. There are two types of training: one is regular and customized training with fees, and the other is free regional training.

In regular training (with fees), MIRDC provides training programs on regulations concerning the international standard ISO 9001 for quality control and industrial measurement technology etc. Customized training (with fees) designs and offers training programs according to individual needs of companies and universities. Regional training (without fees) mainly focuses on various kinds of welding and technical training of Computer Numeric Control (CNC) with the aim of training master trainers in each region. Besides this, MIRDC is currently implementing a scholarship program for mold design (6 months) to train mold technicians. To date, 100 scholars (20 scholars per training) have completed the training. At the training, 42 researchers of MIRDC teach their specialized fields as lecturers. In recent years, MIRDC was able to purchase a number of CNC machines through JICA's and other donors' support. It is a challenge to acquire advanced technical capability since the technical capabilities of researchers are still not enough.

Table 18 Number of Trainees at DOST-MIRDC

	2013	2014	2015
Regular Training (with fees)	432	268	391
Special Training (with fees)	731	441	988
Regional Training (without fees)	1,051	2,107	405
Total	2,214	2,548	1,794

Source: MIRDC

2.6.4.2 Higher Education

One of the key countermeasures is to align industry needs with education outcomes and increase industry-academia partnerships.

Among the industry-academia linkage activities involving undergraduate students are: on-the-job training (OJT), summer student apprenticeships, plant visits, industry scholarship grants to students, career talks, job fairs, student leadership camps, industry-sponsored design contests. Academe and industry collaborate in the formulation of undergraduate curricula, which occurs at two levels.

At the inter-sector level, this linkage happens through industry representation in CHED's Technical Panels and at the level of dialogue between industry sector organizations and school associations. At the individual school-level there could be school committees, which may be known by various names such as visiting committees or advisory committees. Through these committees, industry leaders, mostly alumni, are invited to give advice on curricular matters. Usually the needs of industry are incorporated through the customization of the 12-credit-unit free electives provided for in the government-mandated curricula. These 12 units are designed as tracks that cater to industry needs and sometimes even to specific vendor-company needs, as is common in the IT sector. Some linkage activities involve senior-year and graduate students along with faculty members.

Industry may put up training laboratories in schools to have their own personnel trained by faculty members and to have students trained for eventual hiring by the company. These training laboratories may receive donations for improvements. The exchange of personnel is a form of knowledge transfer between industry and academe. It may be implemented through faculty immersion or internship programs, usually over the summer months, and by related professorship programs. Loan of faculty members to industry is also a mode of personnel exchange.

Schools can also sell products that contain technologies they have developed. Academe can also offer testing services to industry. Schools can also offer consultancy services institutionally or through individual faculty members.

In addition to CHED, DOST is also working to strengthen industry-university collaboration. DOST founded The Philippine Institute for Integrated Circuits (PIIC) with the objective of nurturing human resources needed by Integrated Circuits (IC) design industry in the Philippines. PIIC provides a training program for students, and a corporate training program for teachers. The training program for students is designed to allow trainees to learn all processes from IC analysis, simulation, custom design and verification, and is a practical training module using semiconductor tools at par with those of the private companies.

For the corporate training of teachers from the company or research institute, they will acquire practical experiences, skills and knowledge on IC design-related projects and research activities. The training is designed as such that teachers can acquire the ability to more effectively draft, teach, and improve classes of electronic engineering and IC design. At the same time, for companies, it is an opportunity to identify issues related to microelectronics programs with university researchers.

Chapter 3 Current status of the target regions

3.1 Macro economy

3.1.1 Region III (Central Luzon)

3.1.1.1 Population

Table 19 shows the population statistics of Central Luzon and its provinces. Central Luzon has a total population count of 11.22 million in 2015, or 11.11% of the total population, making it the third most populous region in the Philippines. This demographic characteristic may indicate a sizeable labor pool for various industries. Bulacan is the most populous province in Central Luzon, reaching 3.29 million people. Pampanga follows, with 2.6 million people. Aurora remains as the least populous province in the region, with only 214,000 people.

Table 19 Central Luzon – Population, by census years¹⁶

Province ¹⁷	1995	2000	2007	2010	2015	Share to R-III Population (2015)	CAGR ('95-'15)
Bulacan	1,784,441	2,234,088	2822216	2,924,433	3,292,071	29.35%	3.11%
Pampanga	1,635,767	1,882,730	2229349	2,340,355	2,609,744	23.26%	2.36%
Nueva Ecija	1,505,827	1,659,883	1843853	1,955,373	2,151,461	19.18%	1.80%
Tarlac	945,810	1,068,783	1243449	1,273,240	1,366,027	12.18%	1.86%
Zambales	569,266	627,802	720355	755,621	823,888	7.34%	1.87%
Bataan	491,459	557,659	662153	687,482	760,650	6.78%	2.21%
Aurora	159,621	173,797	187802	201,233	214,336	1.19%	
R-III Total	7,092,191	8,204,742	9,709,177	10,137,737	11,218,117	100%	2.32%
Philippines	68,616,536	76,506,928	88,566,732	92,337,852	100,981,437	-	1.95%
% Share of R-III to Total Population	10.34%	10.72%	10.96%	10.98%	11.11%	-	-

Source: PSA

With 3.11% CAGR (1995-2015), Bulacan leads the region in population growth. Pampanga has the second highest growth at 2.36%. Both provinces exceeded the region's growth of 2.32%. A contributing factor to this trend is the movement of informal settlers from Metro Manila to peripheral areas such as Bulacan and Pampanga. These provinces have the basic infrastructure to support mobility to Metro Manila.

¹⁶ Data for 2015 Population is presented as thousands in the online release of POPCEN 2015 of PSA. Accessed through <<<https://psa.gov.ph/content/population-region-iii-central-luzon-based-2015-census-population>>>

¹⁷ Population for Angeles City is included in Pampanga; population for Olongapo City is included in Zambales.

Average total fertility rate in Central Luzon has been declining from average of 3.0 children per woman in 2000-2005 to 2.6 in 2010-2015. This may be an indication that there is a relative improvement in the opportunities within the region. Aurora and Bataan has higher rate at 3.57 children per woman. Bulacan has the lowest rate, however its population increase rate is higher than other provinces. This means population in Bulacan migrated from other provinces or regions.

Table 20 Central Luzon –Total Fertility Rate, per province

Province	Total Fertility Rate (Number of Children Per Woman)		
	2000-2005	2005-2010	2010-2015
Aurora	4.11	3.83	3.57
Bataan	4.11	3.83	3.57
Bulacan	2.95	2.75	2.56
Nueva Ecija	3.00	2.80	2.60
Pampanga	3.00	2.80	2.60
Tarlac	3.10	2.89	2.69
Zambales	3.06	2.85	2.65
Central Luzon	3.00	2.80	2.60

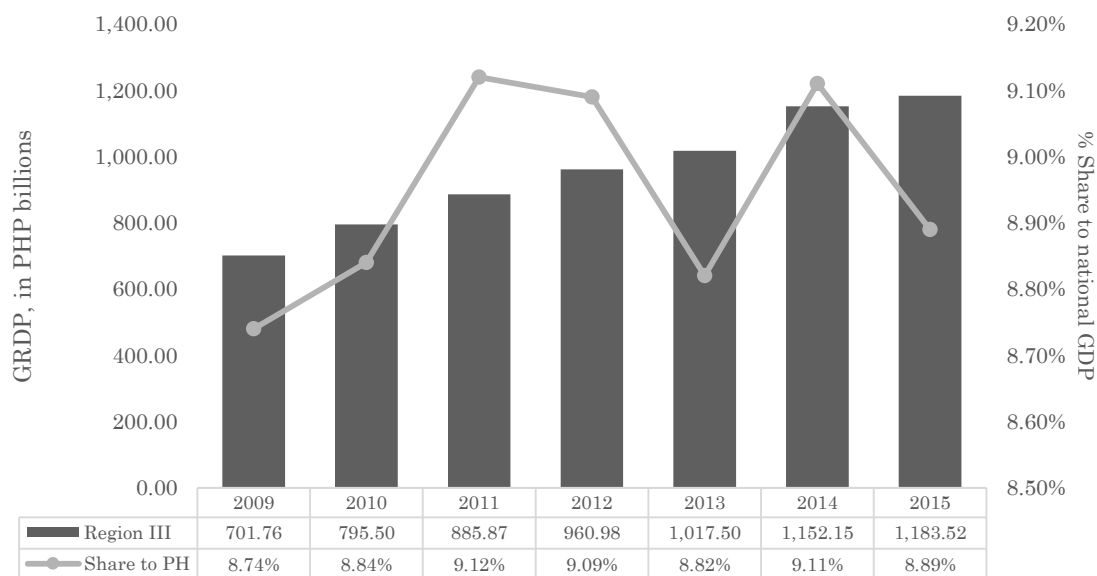
Source: PSA QuickStat on Region III (as of October 2016)

3.1.1.2 Gross Regional Domestic Product (GRDP) ¹⁸

Central Luzon is recognized as an important growth area in the Philippines. Having seven provinces, Central Luzon is among the largest regions in the country. In 2015, Central Luzon’s GRDP reached PHP1,188.52 billion based in current prices, or 8.89% of the total Philippine GDP. Using GRDP figures from 2009 to 2015¹⁹, Central Luzon’s real growth rate reached 7.19%, which is significantly higher than the national growth rate of 6.19% (CAGR, 2009-2015).

¹⁸ Reference years for the data are as follows: Data from 2006 to 2012 is as of July 2014. Data from 2013 to 2015 is from GRDP update as of July 2016.

¹⁹ Calculated by NRI. Based on constant prices (base year is 2000). The scope of years for real GDP growth rates was from 2009 to 2015, since the base year prior to 2009 was 1985.



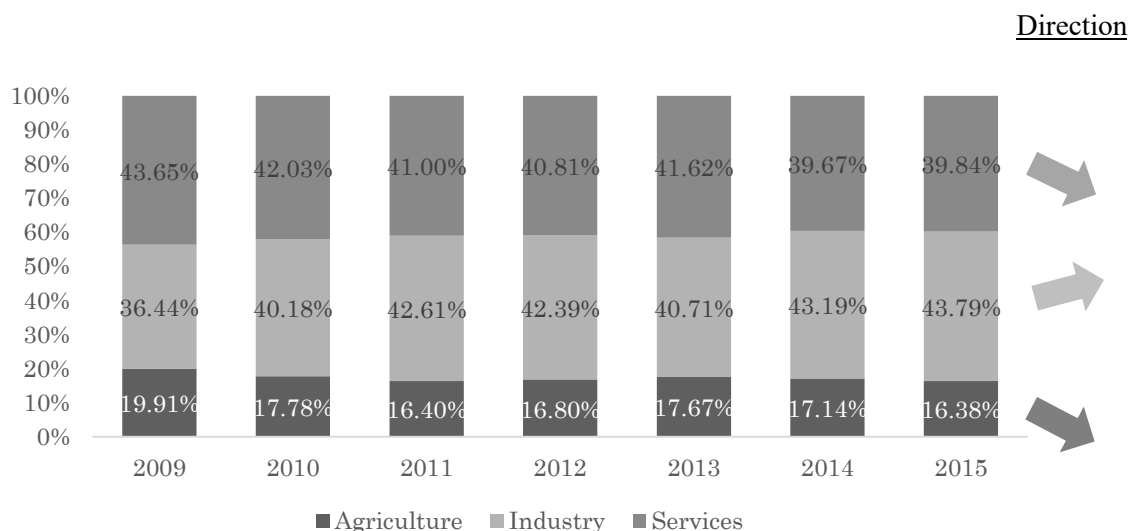
Source: Philippine Statistics Authority (PSA)

Figure 11 Central Luzon – Gross Regional Domestic Product, in current prices

In terms of the contribution to GRDP per segment, Figure 12 presents two notable characteristics in Central Luzon’s economy. First, Agriculture has been a significant contributor in the region’s economy, accounting for 16.38% of RGDP in 2015. This rate is significantly higher than the total contribution of Agriculture sector to the national economy, which stood at 9.48% in the same year. Central Luzon’s Agriculture sector focuses on the production of palay, okra, sugarcane, cashew, tomato, garlic, eggplant, peanut, mungo and camote. For fisheries, Central Luzon has strengths in breeding of tilapia, tiger prawn, and shrimp. For livestock and poultry, Central Luzon leads in hog and chicken production.²⁰

However, most of the agricultural produce of Central Luzon goes to domestic consumption; the region has yet to explore exports opportunities for its produce. The Regional Development Plan 2011-2016 of Central Luzon recognized the need to meet export-quality standards for region’s produce. One example mentioned was the need of its mango industry for packinghouses and Extended Water Treatment Facility to prolong product shelf life and to conform to phytosanitary standards.

²⁰ From Central Luzon Development Plan 2011-2016 Midterm Update With Results Matrices. (File as of 06 June 2016).



Source: PSA

Figure 12 Central Luzon – Distribution of GDP across Sectors (constant prices)

Second, contribution of Industry sector has already surpassed the contribution of Services sector in 2011. Although Industry sector’s contribution took a dip in 2013, it regained its pace and reached a higher share in 2015 at 43.79%. This could indicate a gradual strengthening of the linkage between Agriculture and Industry sectors—an improvement in the value chain to have higher contribution in food manufacturing. For instance, Royale Cold Storage North Inc. invested in a PHP476.5 million facility in Marilao, Bulacan in order to provide cold storage and blast freezing services to agriculture, marine, and processed food companies in the immediate area of Bulacan as well as in other nearby provinces.²¹

It could also indicate that the region has been improving its performance in other components of the Industry sector, such as those in Mining and Quarrying (13.65% CAGR, 2009-2015) Manufacturing (11.33% CAGR) and Construction (7.95% CAGR). For instance, Clark and Subic have been establishing their capabilities to foster semiconductor and electronics manufacturing companies, while Bataan is reviving its light manufacturing industries. Real estate developers have also been looking into various land properties in Central Luzon for commercial and residential development projects.

²¹ Board of Investments, Philippines. “Php476 million cold storage facility to service Luzon agri-marine food processing firms”. Accessed through << <http://investphilippines.gov.ph/garments-firms-to-export-to-us-and-australia/>

3.1.1.3 Export

In Table 21, Central Luzon has been contributing approximately 8% to 12% of the total merchandise exports of the Philippines. Notable export-oriented provinces are Pampanga, Bataan, and to some extent Zambales and Tarlac. Between 2006 and 2015, Central Luzon recorded its highest exports in 2015, at USD6.46 billion worth of exports.

Table 21 Central Luzon – Merchandise Exports (in USD million), per province, 2006-2015

	Bataan	Pampanga	Tarlac	Zambales	Total, Region III ²²	Philippine Merchandise Exports	Share to PH Merchandise Exports
2006	999.16	1,831.13	292.44	787.93	3,910.66	47,410.12	8%
2007	1,051.12	999.26	295.69	1,005.25	3,351.28	50,465.72	7%
2008	1,116.16	1,076.71	249.02	1,076.78	3,518.67	49,077.54	7%
2009	522.62	1,170.76	208.18	1,057.68	2,959.23	38,435.81	8%
2010	921.01	2,579.48	371.01	1,052.19	4,923.68	51,497.51	10%
2011	979.99	2,161.11	367.04	1,279.65	4,787.79	48,304.93	10%
2012	731.69	3,686.99	353.88	1,236.97	6,009.53	52,099.52	12%
2013	862.31	2,276.41	412.76	815.88	4,367.36	56,697.86	8%
2014	684.27	3,029.07	327.67	1,236.35	5,304.35	62,101.62	9%
2015	509.22	3,877.63	278.53	1,798.18	6,463.56	58,827.24	11%
(ratio)	8%	60%	4%	28%	100%	-	-
CAGR (’06-15)	-7%	9%	-1%	10%	6%	2%	-

Source: PSA, 2016

Note: Data for Zambales includes Olongapo City.

For Bataan, key exports are those in product groups of chemicals, ignition wiring sets, and petroleum products. Top exports of Zambales-Olongapo area are primarily in the product group of machinery and transport equipment, and to lesser extent those in product group of electronic data processing and chemicals. Bulk of Tarlac’s exports are ignition wiring sets since a major locator in the area is the International Wiring Systems (Phils.) Corp., a company engaged in the manufacture of automotive wiring harness.

Semiconductors and electronics industry propelled the vitality of Pampanga’s exports, as well as the entire exports of Central Luzon. Some of the locators in the province are located in Clark, such as Nanox Philippines, H3 Technology Philippines, Inc., Meisei Electric (Phils.) Corporation,

²² Details may not add up due to rounding off. No data was recorded for the provinces of Aurora, Nueva Ecija, and Bulacan.

and Sambon P&E Phils., Corp., among others. This shows the positioning of the Pampanga as a potential investment destination for electronics companies.

Although the data may not reflect the values for Bulacan, the province has been thriving on the garments industry. Bulacan has over 200 registered garment manufacturers involved in direct exports and subcontracting work.²³ In 2013, I2 Industries Manufacturing Inc., invested in a garment factory (~PHP4.1 million) in San Ildefonso, Bulacan. The factory has an annual capacity of 25,000 dozens of children’s dresses exported to US and Australia.²⁴

3.1.1.4 Business Establishments

To understand the investment trends in Central Luzon, it will be important to look into the activity in small businesses and in corporations.

For small businesses, one way is to look into the Business Name Registration (businesses under sole proprietorship). Presented in Table 22 the region’s business name registration steadily increased from 38,366 in 2013 to 43,373 in 2015. Figures for 2016 seemed to be very positive, since during the first semester business name registration reached to 29,067, which was already 67% of the total registered businesses in 2015. This may indicate that business environment for domestic entrepreneurship in the region has been improving. Individual business owners also see the potential of the region to foster new investments.

Table 22 Central Luzon – Business Name Registration, 2013-2016 first semester

Province	2013	2014	2015	CAGR('13-15)
Aurora	719	950	903	12%
Bataan	3,042	3,534	3,755	11%
Bulacan	10,054	11,182	12,063	10%
Nueva Ecija	5,092	6,075	6,421	12%
Pampanga	10,461	11,416	11,501	5%
Tarlac	4,129	4,517	4,155	0.3%
Zambales	4,869	4,944	4,575	-3%
Total, Region III	38,366	42,618	43,373	6%

Source: DTI Region III, 2016

²³ Province of Bulacan. “Garments: Industry Overview” Accessed through <<<http://www.bulacan.gov.ph/business/garments.php>>>

²⁴ Board of Investments, Philippines. “Garments firms to export to US and Australia”. Accessed through << <http://investphilippines.gov.ph/garments-firms-to-export-to-us-and-australia/>>>

However, such trends are not reflective of the actual operations of SMEs in the region. Though with no exact figures, some of the registered businesses may not pursue actual operations based on empirical observations. Since business registrations are in effect for five years, it will be important for the region to reach out to the needs of the small businesses (for example, financing for a start-up business).

Based on the registration with Japanese Chamber of Commerce and Industry Philippines, Inc. (JCCIPI), there are 16 Japanese companies in Central Luzon in 2016. About 80% are engaged in manufacturing, whole more than half specialized in Electrical Machineries.

Table 23 Number of Japanese companies in Central Luzon

Industry		# of companies	Ratio (%)
Agriculture		0	0%
Mining and Quarrying		0	0%
Construction		0	0%
Manufacturing	Basic Metal Products	0	0%
	Beverages	0	0%
	Chemical & Chemical Products	2	13%
	Electrical Machinery, Apparatus, Appliance	7	44%
	Food	0	0%
	Footwear & Other Wearing Apparel	0	0%
	Metal Products	0	0%
	Miscellaneous Manufacturing	4	25%
	Non-Electric Machinery	0	0%
	Paper & Paper Products	0	0%
	Printing, Publishing & Allied Products	0	0%
	Rubber Products	0	0%
	Textiles, Accessories	0	0%
	Transport Equipment	0	0%
Manufacturing Total		13	81%
Commerce	Export-Import	1	6%
	Real Estate	1	6%
	Wholesale & Retail	0	0%
	Commerce Total		2
Bank, Insurance, Securities		0	0%
Services		1	6%
Transport, Storage and Communication		0	0%
Others		0	0%
Grand Total		16	100%

Source: JCCIPI

3.1.1.5 FDI

FDI approved amount in 2015 in Central Luzon was approximately 22.7 billion pesos, which is 9% of overall Philippines.

Table 24 FDI approved amount in Central Luzon

	2014		2015		2016Q1-2	
	approved amount (Php millions)	(ratio of foreign/Filipino)	approved amount (Php millions)	(ratio of foreign/Filipino)	approved amount (Php millions)	(ratio of foreign/Filipino)
Foreign Nationals	25,615	18%	22,715	38%	7,154	12%
Filipino Nationals	119,490	82%	37,273	62%	50,470	88%
Total	145,104	100%	59,988	100%	57,623	100%
(Ratio of Central Luzon to overall Philippines)	14%		9%		11%	

Source: PSA

To facilitate investment promotion, the three investment promotion agencies (IPAs), namely Authority of Freeport Area of Bataan (AFAB), Clark Development Corporation (CDC), and Subic Bay Metropolitan Authority (SBMA), are present in the region. Table 25 presents the description of the IPAs. The three investment promotion agencies—SBMA, CDC, and AFAB—approved an accumulated value of PHP142.53 billion worth of foreign investments from 2008 to 2015. In the case of AFAB, it only recorded approved investments starting 2011 because of the organizational transition from Bataan Export Processing Zone under the Republic Act 9728 (Freeport Area of Bataan).

Table 25 Central Luzon – Description of Investment Promotion Agencies

	Number of Locators (as of 2015)	Number of Total Employment (as of 2015)	Total amount of investment (2008-2015) (billion pesos)	Focus Areas	Target Industries	Select Locators in the Areas
AFAB	114 ²⁵	25,803	3.5	Freeport Area of Bataan	Textiles (Garments) Power Generation IT and BPO Petrochemicals	Mitsumi Phils, Inc. Ko Ree Plastic Corp Dunlop Slazenger Philippines, Inc.
CDC	824	82,382	84	Clark Freeport Zone	Automotive Electronics Semiconductors Logistics IT-BPO	Texas Instruments Philippines Nanox Philippines, Inc. Yokohama Tire Philippines, Inc. Foton Motor Philippines Royal Cargo Stream Global Services

²⁵ Mercurio, Richmond. "More Jobs at Bataan Freeport". The Philippine Star. 31 January 2016. Accessed through << <http://www.philstar.com/business/2016/01/31/1547975/more-jobs-bataan-freeport>>>

	Number of Locators (as of 2015)	Number of Total Employment (as of 2015)	Total amount of investment (2008-2015) (billion pesos)	Focus Areas	Target Industries	Select Locators in the Areas
SBMA	1,536 ²⁶	101,651	55	Subic	Automotive Shipbuilding Electric Machineries Appliances and Electric Wares Logistics Petroleum	Hanjin Heavy Industries Philippine Coastal Storage and Pipeline Corp. Sanyo Denki Phils. Inc. Tong Lung Philippines Metal Industry Co. Inc. Subic Bay International Terminal Corp.

Source: Websites of AFAB, CDC, and SBMA; Enterprise Directories of IPAs; News Releases; NRI Research, 2016

These Freeport Zones are also locations for exports business. In fact, exports markets of enterprises located in the Bataan Freeport Zone include USA, Japan, Europe, South Korea and ASEAN countries.²⁷ Significant locators in Subic and Clark are also targeting overseas markets such as USA and Japan.

Both domestic enterprises and foreign companies contribute to the level of investments in Central Luzon. Existing locators are already a good testament to the qualities of Bataan, Clark and Subic for new investments. In the short run, one important aspect to consider is to improve their respective physical infrastructure. For example, better connectivity to and from Metro Manila will be important to facilitate the movement of goods and labor. In the long term, it will be crucial to develop the connectivity within Central Luzon—across Clark, Subic, Bataan, and extending to Bulacan and Nueva Ecija.

Based on the information from CDC, as of the third quarter of 2016, there are already 870 companies located in Clark Freeport Zone. As of the same period, total committed investments of all the companies reached PHP119.83 billion.²⁸ About 34% of these investments came from South Korean companies, 24% from Japanese companies, and 23% from Filipino companies. Other countries of origin of investors in the Clark Freeport Zone are from Singapore and Taiwan.

²⁶ Mercurio, Richmond. “SBMA names Top 15 Locators”. The Philippine Star. 20 December 2015. Accessed through << <http://www.philstar.com/business/2015/12/20/1534424/sbma-names-top-15-locators>>>

²⁷ Based on the AFAB Enterprise Directory CY 2010. Accessed through < <http://bataan.gov.ph/home/article-list/1200-afab-authority-of-freeport-area-of-bataan.html>>

²⁸ No data disclosed for the actual (realized) investments of the locators in the Clark Freeport Zone

Table 26 Central Luzon - Investment Profile in Clark Freeport Zone, by Nationality

Rank	Country	Number of Companies	Value of Committed Investments (in PHP millions)	Share to Total Investments
1	South Korea	89	41,194.50	34%
2	Japan	39	28,416.57	24%
3	Philippines	512	27,807.70	23%
4	Singapore	12	7,565.26	6%
5	Taiwan	14	2,687.52	2%
	Others	204	12,157.61	10%
	Total	870	119,829.17	100%

Source: CDC, 2016

Between 2010 and October 2016, BOI approved the registration of 212 projects in Central Luzon, amounting to total committed investment of PHP393.90 billion and possible employment opportunity of 38,707 jobs. About 52% of the total committed investments in Central Luzon is allocated for the sector “Electricity, Gas, Steam & Air-conditioning Supply” and 32% for “Transportation and Storage”.

Table 27 Central Luzon – BOI-approved projects from 2010 to October 2016

	Number of Projects	Projected Employment	Committed Investment Amount (Php millions)	Share to Total Committed Investments in Central Luzon
Agriculture, Forestry and Fishing	14	2,593	4,679.95	1.19%
Mining & Quarrying	1	125	802.435	0.20%
Manufacturing	59	14,097	17,498.90	4.44%
Electricity, Gas, Steam & Air-conditioning Supply	33	1,471	204,394.29	51.89%
Transportation & Storage	12	1,572	124,257.78	31.55%
Water Supply; Sewerage, Waste Management & Remediation Activities	2	1,141	8,380.37	2.13%
Real Estate Activities	82	17,151	31,768.34	8.07%
Accommodation and Food Service Activities	7	336	1,682.91	0.43%
Administration and Support Service Activities	1	40	5.80	0.00%
Human Health & Social Work Activities	1	181	430.00	0.11%
Total	212	38,707	393,900.77	100%

Note: Details may not add up to total due to rounding off.

Source: BOI, October 2016

3.1.1.6 Employment

In 2015, Central Luzon had 4.48 million people in labor force. As seen in Table 28, from 2006 to 2015, Central Luzon has shown improvements in its employment situation. In 2006, employment rate stood at 89.4% and increased to 92.2% in 2015. Underemployment remains a challenge in the region. From 13.8% in 2006, underemployment rate decreased to 7.8% in 2009; however, it increased to 13.5% in 2015, which was nearly the same level in 2006. Another challenge is the higher unemployment rates in Central Luzon compared to the national average throughout the period. This is probably because workers from other regions are migrating to urban areas such as Central Luzon and CALABARZON where there seem to be more job opportunities. It is important to create jobs in those regions.

Looking at the labor force participation rate, it increased to 62.2% in 2015 from 60.5% in 2006, which was unlike the national average showing declining rates (from 64.2% in 2006 to 63.7% in 2015). This shows that unlike other regions in the Philippines, Central Luzon is a potential source of necessary workforce.

Table 28 Central Luzon – Labor Force, in thousands, and percentage share to Philippine labor force

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Labor Force in Central Luzon	3,685	3,786	3,840	3,956	4,089	4,188	4,261	4,370	4,484	4,476
Labor Force of Philippines	35,458	36,202	36,791	37,892	38,920	40,005	40,426	41,022	41,379	41,343
Percentage Share of Central Luzon	10%	10%	10%	10%	11%	10%	11%	11%	11%	11%

Source: PSA

Table 29 Central Luzon – Summary of Labor Indicators, 2006-2015

Employment Status		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Household Population 15 Yrs old & over (in thousands)	R-III	6,091	6,227	6,368	6,531	6,682	6,829	6,911	7,046	7,164	7,281
	PH	55,230	56,565	57,848	59,237	60,717	61,883	62,985	64,173	64,033	64,936
Labor Force Participation Rate (in %)	R-III	60.5	60.8	60.3	60.6	61.2	61.3	61.7	62.0	62.6	62.2
	PH	64.2	64.0	63.6	64.0	64.1	64.6	64.2	63.9	64.6	63.7
Employment Rate (in %)	R-III	89.4	90.0	90.8	90.8	91.3	91.5	91.0	91.3	91.9	92.2
	PH	92.0	92.7	92.6	92.5	92.7	93.0	93.0	92.9	93.4	93.7
Under-employment Rate (in %) ²⁹	R-III	13.8	10.3	8.7	7.8	9.1	11.1	13.0	14.5	14.3	13.5
	PH	22.6	20.1	19.3	19.1	18.7	19.3	20.0	19.3	18.4	18.5
Un-employment Rate (in %)	R-III	10.6	10.0	9.2	9.2	8.7	8.5	9.0	8.7	8.1	7.8
	PH	8.0	7.3	7.4	7.5	7.3	7.0	7.0	7.1	6.6	6.3

Sources: PSA, 2016 (annual figures are average estimates of four Labor Force Surveys rounds per year)

One imperative for Central Luzon is to understand how to match the characteristics of its labor supply with potential jobs in the region. Central Luzon has a growing workforce, which can be a good value proposition for locators with high headcount requirements. Central Luzon has to work on the employability of the large labor pool by improving their skills sets.

3.1.1.7 Labor issues

The trends in strikes and lockouts will be important to understand the current situation in the industries with presence of unions, such as manufacturing and mining. Between 2009 and 2015, number of strikes and lockout notices in Central Luzon reached its highest in 2010, at 42. This declined to 24 in 2013, and to 18 in 2015

Table 30 also presents the number of new strikes/lockout notices filed in the region. It generally decreased during the 2009 to 2015 period. From 27 new cases filed in 2009, it decreased to 15 in 2015. This could be a possible indication a general improvement in the labor relations in Central Luzon. It is possible that workers in Central Luzon is respecting the terms of their agreement with their employers.

²⁹ The Philippine Labor Force Survey provided the definition for underemployed. Underemployed “refers to those employed persons who express the desire to have the additional hours of work in their present job or an additional job, or have a new job with longer working hours”.

Table 30 Central Luzon – Summary of Notices of Strikes/Lockouts Handled, Filed and Disposed, 2009-2015³⁰

			2009	2010	2011	2012	2013	2014	2015
a	Total Strike/Lockout Notices Handled	R-III	31	42	34	20	24	32	18
		PH	327	325	274	222	177	191	226
b	New Strike/Lockout Notices Filed	R-III	27	37	30	20	22	29	15
		PH	286	276	240	184	149	159	194
c	Cases Disposed ³¹	R-III	26	38	34	18	21	29	16
		PH	278	291	236	194	145	159	188
c.1.	Cases Materialized into Actual Strike/Lockout	R-III	-	-	1	-	-	-	-
		PH	4	5	1	3	1	2	4
e	Settlement Rate ³²	R-III	74.2%	78.6%	88.2%	75.0%	83.3%	90.63%	88.89%
		PH	73.7%	80.0%	78.5%	78.8%	78.5%	81.68%	79.65%
f	Disposition Rate ³³	R-III	83.9%	90.5%	100.0%	90.0%	87.5%	90.63%	88.89%
		PH	85.0%	89.5%	86.1%	87.4%	81.9%	83.25%	83.19%
g	Number of Workers Involved	R-III	6,624	8,804	7,171	9,248	7,782	4,400	1,654
		PH	60,573	59,750	51,001	40,861	31,526	43,195	36,972

Source: Yearbook of Labor Statistics, 2015 (for data covering 2009 to 2012); National Conciliation and Mediation Board, 2016 (for data covering 2013 to 2015)

This improvement in the labor environment is also observed in the overall increase of disposition and settlement ratios. This could mean a more efficient process implemented by the government, labor unions, and private companies in dealing with labor disputes. This is another indication of one government support for industrial companies in the region.

Of all the strikes and lockouts handled in Central Luzon from 2009 to 2013, only one had materialized (see Table 30). The union of Supreme Steel Pipe Corporation in Bulacan declared a strike because of unfair labor practice, particularly non-implementation of its collective bargaining agreement with the company's management. Only 128 workers were involved in the strike. The strike only had one median day duration, and normalized within the year (2011).

³⁰ Data is taken from the online database of Yearbook of Labor Statistics 2015, Table 21.2 – Strike/Lockout Notices Handled, Filed, Disposed, Disposition Rate and Workers Involved by Region, Philippines: 2009-2013

³¹ Cases disposed are the total number of strikes prevented and those that materialized into actual strikes/lockouts.

³² Settlement Ratio is calculated by the National Conciliation and Mediation Board of the Philippines.

³³ Formula for Disposition Rate is c/a (or ratio of cases disposed to strike/lockout notices handled). Disposition rate is formally defined as “the proportion (in percent) of the total cases disposed to the total number of cases handled”.

3.1.2 Region IV-A (CALABARZON)

3.1.2.1 Population

CALABARZON reached a population count of 14.41 million in 2015, which is already about 14.27% of the Philippine population. Over the years, CALABAZON's population has been growing that between 1995 and 2015, it increased by 3.15% CAGR. The provinces of Cavite and Rizal witnessed a higher population growth than the regional rate, at 4.22% and 4.02% respectively.

Table 31 CALABARZON – Number of Population, by census years

Province	1995	2000	2007	2010	2015	Share to R-IVA Population (2015)	CAGR ('95-'15)
Cavite	1,610,324	2,063,161	2,856,765	3,090,691	3,678,301	25.52%	4.22%
Laguna	1,631,082	1,965,872	2,473,530	2,669,847	3,035,081	21.06%	3.15%
Rizal	1,312,489	1,707,218	2,298,691	2,484,840	2,884,227	20.01%	4.02%
Batangas	1,658,567	1,905,348	2,245,869	2,377,395	2,694,335	18.69%	2.46%
Quezon Province	1,537,742	1,679,030	1,882,900	1,987,030	2,122,830	14.73%	1.63%
R-IVA Total	7,750,204	9,320,629	11,757,755	12,609,803	14,414,774	100%	3.15%
Philippines	68,616,536	76,506,928	88,566,732	92,337,852	100,981,437	-	1.95%
% Share of R-IVA to Total Population	11.29%	12.18%	13.28%	13.66%	14.27%	-	-

Source: Regional Social and Economic Trends, PSA (Retrieved from NEDA Region IV-A, 2016)

There are two possible reasons for higher population growth rates in Cavite and Rizal. Cavite and Rizal have become attractive alternative residential locations to Metro Manila considering their proximity. In the case of Cavite, another reason for a very high population growth is its increasing number of businesses, further prompting an inward labor migration to the province.

In terms of total fertility rate, the entire region of CALABARZON showed a general decline from 3.0 in 2000-2005 to 2.6 in 2010-2015. Quezon and Batangas show higher rate, while Laguna and Cavite have lower rate.

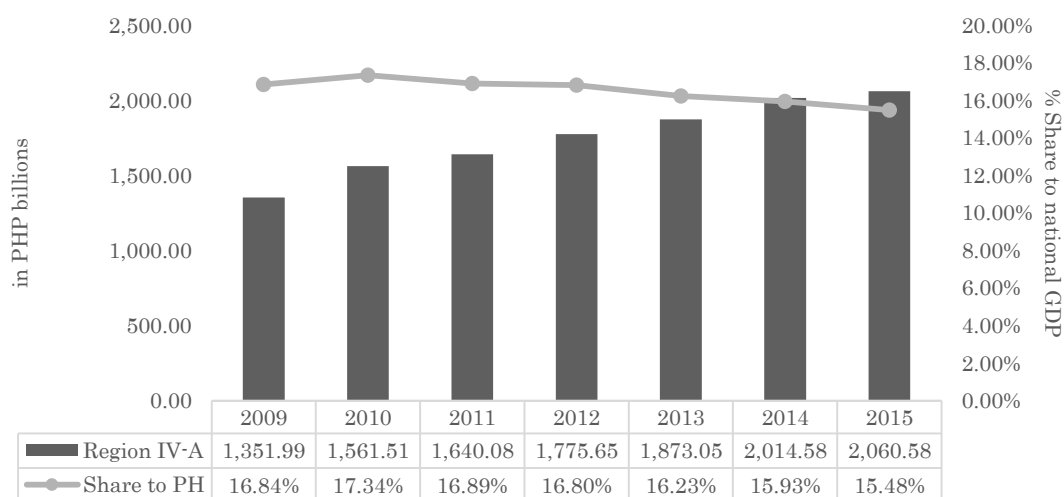
Table 32 CALABARZON – Total Fertility Rates (number of children per woman), per province

Province	2000-2005	2005-2010	2010-2015
Cavite	2.79	2.60	2.42
Laguna	2.71	2.53	2.35
Batangas	3.13	2.91	2.71
Rizal	2.97	2.77	2.58
Quezon	3.66	3.40	3.17
CALABARZON	3.00	2.80	2.60

Source: PSA QuickStat on Region IV-A (as of October 2016)

3.1.2.2 Gross Regional Domestic Product (GRDP)

Over the past decade, Region IV-A (CALABARZON) has become one of the most economically improved regions in the Philippines. In 2015, CALABARZON contributed PHP2,060.50 billion to the national GDP (current prices, as presented in Chart 6). The region’s share to Philippine GDP was 15.48% in 2015. In terms of real growth figures, from 2009 to 2015, CALABARZON’s GDP grew by 6.29% (CAGR), marginally higher than the Philippine GDP at 6.19% (CAGR).³⁴

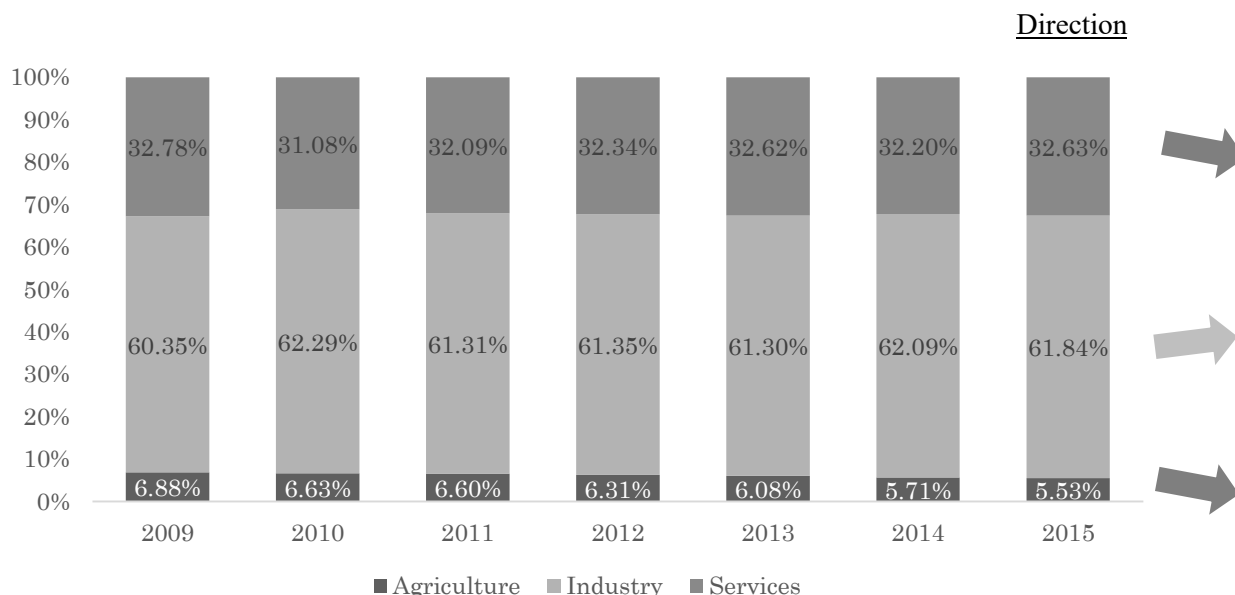


Source: PSA

Figure 13 CALABARZON – Gross Regional Domestic Product, in current prices

³⁴ Calculated by NRI. Based on constant prices (base year is 2000). The scope of years for real GDP growth rates was from 2009 to 2015, since the base year prior to 2009 was 1985.

As illustrated in Figure 14, CALABARZON is the frontrunner for the development of the Industry sector in the country. Contribution of the Industry sector accounted for 61.84% of its total regional GDP in 2015. Industry sector's contribution rose from 60.35% in 2009. On the other hand, Agriculture's contribution declined from 6.88% in 2009 to 5.53% share in 2015.



Source: PSA

Figure 14 CALABARZON – Distribution of GDP across Sectors (based on constant prices)

The key driver for the development of CALABARZON's Industry sector is Manufacturing. In particular, the provinces of Cavite, Laguna and Batangas have hosted a number of manufacturing companies. Having a sizeable number of specialized and dedicated zones accelerated the business environment of the three provinces for manufacturing. These economic zones have been instrumental for the region to gain recognition as a cradle for manufacturing companies.

3.1.2.3 Export

The region has recently experienced a spike in its exports value since 2013. Between 2012 and 2013, CALABARZON's exports increased by more than two folds—from USD9.93 billion in 2012 to USD22.06 billion in 2013. In 2015, the country experienced an overall decline in merchandise exports; however, CALABARZON still remained as the major contributor in exports by taking 41% share in total merchandise exports of the country. In fact, CALABARZON showed a general increase in its exports share in the country, with only 26% in 2006 to 41% in 2012.

Table 33 CALABARZON – Merchandise Exports (in USD million), per province, 2005-2015³⁵

	Cavite	Laguna	Batangas	Quezon	Total, Region IV-A	Philippine Merchandise Exports	Share to PH Merchandise Exports
2006	4,064.23	6,975.67	1,239.84	0.50	12,280.24	47,410.12	26%
2007	4,286.76	6,820.02	1,403.33	15.46	12,525.57	50,465.72	25%
2008	4,156.68	6,891.87	1,581.72	2.94	12,633.20	49,077.54	26%
2009	2,973.58	5,864.91	1,093.22	0.47	9,932.18	38,435.81	26%
2010	3,671.21	7,619.03	1,179.42	0.29	12,469.96	51,497.51	24%
2011	4,716.97	6,087.30	1,568.47	1.00	12,373.74	48,304.93	26%
2012	4,469.46	3,529.55	1,518.16	0.79	9,517.97	52,099.52	18%
2013	9,586.44	10,994.29	1,474.82	8.84	22,064.38	56,697.86	39%
2014	10,104.04	13,248.28	1,003.82	4.48	24,360.63	62,101.62	39%
2015	10,837.44	11,845.17	1,415.40	0.96	24,098.97	58,827.24	41%

Source: PSA, 2016

As seen in Table 33, Cavite and Laguna are the major export-oriented provinces in CALABARZON, with Batangas trying to catch up. Major export commodities of Cavite and Laguna are under the product group of Components/Devices (Semiconductors). The combined exports of these two provinces for semiconductor products reached USD13.30 billion in 2015, or 23% of total merchandise exports of the Philippines. On the other hand, Batangas is showing its potential for Electronic Data Processing (with exports value of USD351.65 million), Chemicals (USD181.97 million), and Ignition Wiring Sets (USD143.67 million).

3.1.2.4 Business Establishments

Based on the recent data of the SEC, there are 69,918 registered general partnerships and corporations in CALABARZON and MIMAROPA³⁶. This is 10.63% of the total registered partnerships and corporations in the Philippines.

Business Name Registration is one indicator of the investment activity in a location, particularly for sole proprietorships. Presented in the Table 34 is the historical figures of approved business name registration of Region IV-A. From the figures, the province of Cavite recorded the highest number of approved business name registrations, followed by the province of Rizal and Batangas.

Table 34 shows that CALABARZON recorded the highest investment value in 2008, reaching Php32.68 billion. About 52% of the investment for 2008 went to Laguna, while Cavite received

³⁵ No exports figures were recorded from Rizal.

³⁶ At present, the SEC has not yet segmented the information on number of registered general partnerships and corporations in Region IV (CALABARZON and MIMAROPA).

another 25% of the investment. The proximity of the two provinces aided in creating positive image and sharing of value propositions in business environment.

Table 34 CALABARZON – Business Name Registration (Approved), 2013-2015

Province	2013	2014	2015
Regional Office	9,998	10,416	11,274
Cavite	14,007	14,214	18,418
Laguna	3,558	4,313	4,451
Batangas	11,522	11,856	11,179
Rizal	10,901	12,334	12,645
Quezon	4,746	5,737	5,041
Total, Region IV-A	54,732	58,870	63,008

Source: DTI Region IV-A, 2016

Based on JCCIPI, there are 240 Japanese companies in CALABARZON (2016). About 80% of them are manufacturing, such as Electrical Machinery, Metal Products and Transport Equipment.

Table 35 Number of Japanese companies in CALABARZON

Industry		# of companies	Ratio (%)
Agriculture		0	0%
Mining and Quarrying		0	0%
Construction		1	0%
Manufacturing	Basic Metal Products	10	4%
	Beverages	3	1%
	Chemical & Chemical Products	18	8%
	Electrical Machinery, Apparatus, Appliance	56	23%
	Food	1	0%
	Footwear & Other Wearing Apparel	1	0%
	Metal Products	32	13%
	Miscellaneous Manufacturing	33	14%
	Non-Electric Machinery	3	1%
	Paper & Paper Products	1	0%
	Printing, Publishing & Allied Products	5	2%
	Rubber Products	7	3%
	Textiles, Accessories	1	0%
Transport Equipment	26	11%	
Manufacturing Total		197	82%
Commerce	Export-Import	15	6%
	Real Estate	0	0%
	Wholesale & Retail	6	3%
	Commerce Total		21
Bank, Insurance, Securities		0	0%
Services		7	3%
Transport, Storage and Communication		4	2%
Others		10	4%
Grand Total		240	100%

Source: JCCIPI

3.1.2.5 FDI

For approved investments, CALABARZON remained as a strong investment destination for investments. For instance, the region took 47% share of the total approved investments in the Philippines in 2014 and 2015. Total approved amount of FDI in 2015 in the region was 115.6 billion pesos. Most of these investments were intended for two industries, namely (1) manufacturing, (2) electricity, gas, steam and air conditioning supply.

Table 36 Total approved FDI amount in CALABARZON

	2014		2015		2016Q1-2	
	approved amount (Php millions)	(ratio of foreign/Filipino)	approved amount (Php millions)	(ratio of foreign/Filipino)	approved amount (Php millions)	(ratio of foreign/Filipino)
Foreign Nationals	87,190	39%	115,648	43%	23,408	44%
Filipino Nationals	136,779	61%	155,615	57%	29,692	56%
Total	223,969	100%	271,263	100%	53,100	100%
(Ratio of CALABARZON to overall Philippines)	47%		47%		39%	

Source: Source: PSA, quarterly releases of Approved Foreign Investments

Table 37 Number of economic zone, locator and employment in CALABARZON, per province

Province		2010	2011	2012	2013	2014	2015
Batangas	# of economic zone	10	10	11	12	14	14
	# of locator	127	140	167	226	242	273
	# of employment	32,875	41,114	53,027	73,095	81,581	98,459
Cavite	# of economic zone	9	9	9	10	11	11
	# of locator	533	580	606	622	648	680
	# of employment	106,795	116,330	125,326	137,706	150,510	148,707
Laguna	# of economic zone	18	18	19	19	19	19
	# of locator	632	673	710	780	806	837
	# of employment	173,207	174,709	180,755	182,819	201,134	201,629
Quezon	# of economic zone	-	-	-	-	1	1
	# of locator	-	-	-	-	1	1
	# of employment	-	-	-	-	2,212	2,049
Rizal	# of economic zone	2	2	2	3	3	3
	# of locator	1	2	2	3	3	3
	# of employment	2,280	2,105	2,606	3,963	4,767	2,993
Total	# of economic zone	39	39	41	44	48	48
	# of locator	1,293	1,395	1,485	1,631	1,700	1,794
	# of employment	315,157	334,258	361,714	397,583	440,204	453,837

One example to note is the approved investments from BOI. From 2010 to 3Q2016, the BOI approved 475 projects in CALABARZON, amounting to PHP592.08 billion. Most of the investments were intended for the Electricity, Gas, Steam & Air-conditioning Supply sector,

which comprised 58.99% of total approved investments in CALABARZON during the said period. This is followed by committed investments in the Manufacturing sector (at 15.10% of the total committed investments in the region) and the Real Estate Activities (at 13.26%).

Table 38 CALABARZON – BOI-approved projects from 2010 to October 2016

	Number of Projects	Projected Employment	Committed Investment Amount (Php millions)	Share to Total Committed Investments in Central Luzon
Agriculture, Forestry and Fishing	4	250	170.91	0.03%
Mining & Quarrying	1	40	413.61	0.07%
Manufacturing	102	23,201	89,376.03	15.10%
Electricity, Gas, Steam & Air-conditioning Supply	39	3,385	349,253.41	58.99%
Transportation & Storage	26	1,168	71,579.34	12.09%
Water Supply; Sewerage, Waste Management & Remediation Activities	2	28	507.34	0.09%
Real Estate Activities	290	46,572	78,527.59	13.26%
Accommodation and Food Service Activities	6	403	1,379.52	0.23%
Administration and Support Service Activities	4	4,454	443.13	0.07%
Human Health & Social Work Activities	1	124	430.00	0.07%
Total	475	79,625	592,080.87	100.00%

Source: BOI, October 2016

Note: Details may not add up to total due to rounding off.

Notable investments in CALABARZON came from both foreign enterprises and domestic companies. As presented in Table 38, in Electricity, Gas, Steam and Air-Conditioning Supply sector one high-investment project would be the hydroelectric energy development project of a Filipino company, Olympia Violago Water & Power, Inc., worth PHP69.13 billion. On the other hand, in the Transportation and Storage sector, Shell Gas and Energy Philippines Corporation committed PHP46.87 billion investments for an LNG import facility in Batangas. For the manufacturing sector, it can be seen that Toyota Motors Philippines Corp. and Mitsubishi Motors Philippines Corporation have registered projects as participants to the CARS program of the government. Their committed investments are PHP3.25 billion and PHP4.39 billion, respectively.

Aside from BOI, PEZA also records the number of approved investments in CALABARZON. As presented in Table 39, from 2010 to 2015, PEZA approved a total of PHP622,320.96 million worth of investments. Taking 98.07% of the total approved investments in the region, the cluster

of Cavite-Laguna-Batangas was the main recipient locations. The province of Laguna led the region in welcoming such investments, since it received 47.32% of the total investments in the region. This is followed by Batangas at 30.01%, and Cavite at 20.74%.

Table 39 CALABARZON – PEZA-Approved Investments in Region IV-A (in PHP millions)

Province	2010	2011	2012	2013	2014	2015	Total (2010-2015)	Percent to total
Laguna	56,655.45	33,520.18	61,101.30	37,561.54	50,719.84	54,947.13	294,505.44	47.32%
Batangas	25,306.03	51,091.51	21,613.45	21,682.35	32,519.48	34,543.62	186,756.44	30.01%
Cavite	16,060.29	22,605.42	36,946.14	17,050.88	19,839.52	16,559.62	129,061.87	20.74%
Quezon	-	1,833.66	-	4,102.48	-	276.51	6,212.65	1.00%
Rizal	-	3,800.00	710.95	556.89	770.66	-	5,838.50	0.94%
Total	98,021.82	112,850.77	120,371.84	80,900.14	103,849.50	106,326.89	622,320.96	100%

Source: PEZA, 2016

Overall, the trends in economic activity and investments in CALABARZON presents the following implications.

- In terms of industry development, CALABARZON should consider targeted industry promotion per cluster. It is evident that the cluster of Cavite-Laguna-Batangas is under a good position for Manufacturing. To maintain equitable regional development, Rizal and Quezon Province should be able to identify which industries to target.
- CALABARZON should not be complacent in attracting more investors. Enabling business infrastructure such as economic zones and industrial estates serve as a catalyst to increase the viability of the provinces to receive investments.
- High employment generation should also translate to high labor productivity. CALABARZON should address issues in underemployment to utilize more labor for productive industries.

3.1.2.6 Employment

Labor force in CALABARZON in 2015 is about 5.5 million, which is 13% of overall Philippines. Table 40 shows the overall progression of employment situation from 2006 to 2015. It also shows the share of CALABARZON's labor force to the Philippines, which has been consistent at 13%. Nevertheless, labor force participation showed an increase from 63.5% in 2006 to 64.5% in 2015—indicating there are increasing number of people joining the labor force. The steady increase in the employment rate, which reached 92% in 2015, was a testament to the utilization of the labor force in the region.

Table 40 CALABARZON – Labor Force, in thousands, and percentage share to Philippine labor force

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Labor Force in CALABARZON	4,478	4,578	4,620	4,803	4,967	5,167	5,218	5,331	5,542	5,528
Labor Force of Philippines	35,458	36,202	36,791	37,892	38,920	40,005	40,426	41,022	41,379	41,343
Percentage Share of CALABARZON	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%

Source: PSA

Table 41 CALABARZON – Summary of Labor Indicators, 2009-2014

Employment Status		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Household Population 15 Yrs old & over (in thousands)	R-IVA	7,052	7,233	7,415	7,596	7,808	7,988	8,100	8,269	8,463	8,576
	PH	55,230	56,565	57,848	59,237	60,717	61,883	62,985	64,173	64,033	64,936
Labor Force Participation Rate (in %)	R-IVA	63.5	63.3	62.3	63.2	63.6	64.7	64.4	64.5	65.5	64.5
	PH	64.2	64.0	63.6	64.0	64.1	64.6	64.2	63.9	64.6	63.7
Employment Rate (in %)	R-IVA	90.0	90.8	90.0	89.6	90.5	90.3	91.1	90.8	92.0	92.0
	PH	92.0	92.7	92.6	92.5	92.7	93.0	93.0	92.9	93.4	93.7
Under-employment Rate (in %) ³⁷	R-IVA	18.1	15.6	16.1	16.5	17.4	17.9	17.9	17.9	18.60	18.19
	PH	22.6	20.1	19.3	19.1	18.7	19.3	20.0	19.3	18.4	18.5
Un-employment Rate (in %)	R-IVA	10.0	9.2	10.0	10.4	9.5	9.7	8.9	9.2	8.0	8.0
	PH	8.0	7.3	7.4	7.5	7.3	7.0	7.0	7.1	6.6	6.3

Sources: PSA, 2016 (annual figures are average estimates of four Labor Force Surveys rounds per year; figures for 2015 are preliminary)

However, CALABARZON should be able to address possible underemployment issues. Though lower than the national average from 2009 to 2013, underemployment rate of the region remained unchanged from 2011 to 2013 at 17.9%. Moreover, CALABARZON's underemployment rate exceeded the national average in 2014 and 2015, and peaked at 18.60% in 2014. This could indicate that some of the workforce are engaged in various low productivity employment opportunities. As seen in the Table 42, sub-sectors such as Mining and Quarrying, Manufacturing, Construction, Wholesale and Retail Trade continued to take in more people. These industries are recognized to practice labor contractualization.

³⁷ The Philippine Labor Force Survey provided the definition for underemployed. Underemployed "refers to those employed persons who express the desire to have the additional hours of work in their present job or an additional job, or have a new job with longer working hours".

Table 42 Employment Distribution in CALABARZON

Employment Status	2012	2013	2014	2015
	Number (in thousands)			
Employed People	4,753	4,842	5,097	5085
	In Percentage			
Agriculture	15.17	13.80	14.20	10.90
Agriculture, Hunting and Forestry	12.67	11.70	12.0	10.7
Fishing	2.50	2.10	2.2	2
Industry	25.26	26.00	26.20	26.30
Mining and Quarrying	0.06	0.10	0.1	0.1
Manufacturing	17.13	17.60	17.7	17.8
Electricity, gas, steam and air conditioning supply	0.30	0.30	0.3	0.3
Water supply; sewerage, waste management and remediation activities	0.30	0.20	0.2	0.2
Construction	7.47	7.80	7.9	7.9
Services	53.80	60.20	59.70	61.10
Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles	19.08	19.40	19.0	19.1
Transport and Storage	8.06	8.20	8.0	8.4
Accommodation and Food Service Activities	5.78	5.90	6.1	5.9
Information and Communication	1.18	1.30	1.1	1.4
Financial and Insurance Activities	1.51	1.40	1.7	1.6
Real Estate Activities	0.95	0.90	0.9	0.9
Professional, Scientific and Technical Activities	0.78	0.70	0.7	0.7
Administrative and Support Service Activities	3.53	3.50	3.6	4.1
Public Administration and Defense, Compulsory Social Services	4.59	4.80	4.7	4.8
Education	3.05	3.00	3.2	3.3
Human Health and Social Work Activities	1.54	1.50	1.4	1.6
Arts, Entertainment and Recreation	1.62	1.70	1.6	1.7
Other Service Activities	6.19	6.40	6.5	6.9
Activities of Households as Employers; Undifferentiated Goods and Services Producing Activities of Households for Own Use	1.73	1.50	1.2	0.7
Activities of Extra-territorial Organization and Bodies	0.00	No data available	No data available	0

Source: Regional Social and Economic Trends, PSA

3.1.2.7 Labor issues

Number of cases on strikes and lockouts in CALABARZON recorded an overall decrease from 2009 to 2015. In terms of number of strikes/lockout notices handled, it dropped from 64 in 2009

to 41 in 2015. The number of new strikes/lockouts notices filed also decreased from 52 in 2009 to 34 in 2016.

Table 43 CALABARZON – Summary of Notices of Strikes/Lockouts Handled, Filed and Disposed³⁸

			2009	2010	2011	2012	2013*
a	Strike/Lockout Notices Handled	CALABARZON	64	70	60	49	37
		Philippines	327	325	274	222	177
b	New Strike/Lockout Notices Filed	CALABARZON	52	56	49	35	34
		Philippines	286	276	240	184	149
c	Cases Disposed ³⁹	CALABARZON	50	59	46	46	29
		Philippines	278	291	236	194	145
c.1.	Cases Materialized into Actual Strike/Lockout	CALABARZON	1	1	-	-	1
		Philippines	4	5	1	3	1
e	Settlement Rate ⁴⁰	CALABARZON	71.9%	78.6%	66.7%	87.8%	73.0%
		Philippines	73.7%	80.0%	78.5%	78.8%	78.5%
f	Disposition Rate ⁴¹	CALABARZON	78.1%	84.3%	76.7%	93.9%	78.4%
		Philippines	85.0%	89.5%	86.1%	87.4%	81.9%
g	Number of Workers Involved	CALABARZON	14,040	8,186	6,672	7,525	5,308
		Philippines	60,573	59,750	51,001	40,861	31,526

Source: Yearbook of Labor Statistics, 2015 (for data covering 2009 to 2012); National Conciliation and Mediation Board, 2016 (for data covering 2013 to 2015)

3.2 Regional Development

3.2.1 Land Use

3.2.1.1 Central Luzon

Land use in Region III faces a number of constraints due to its topography and natural risk profile. Both mountainous and low areas have difficulties for agricultural use. To some extent, the eruption of Mt. Pinatubo in 1991 had significantly brought damages in select areas in Region III.

³⁸ Data for 2013 is preliminary.

³⁹ Cases disposed are the total number of strikes prevented and those that materialized into actual strikes/lockouts.

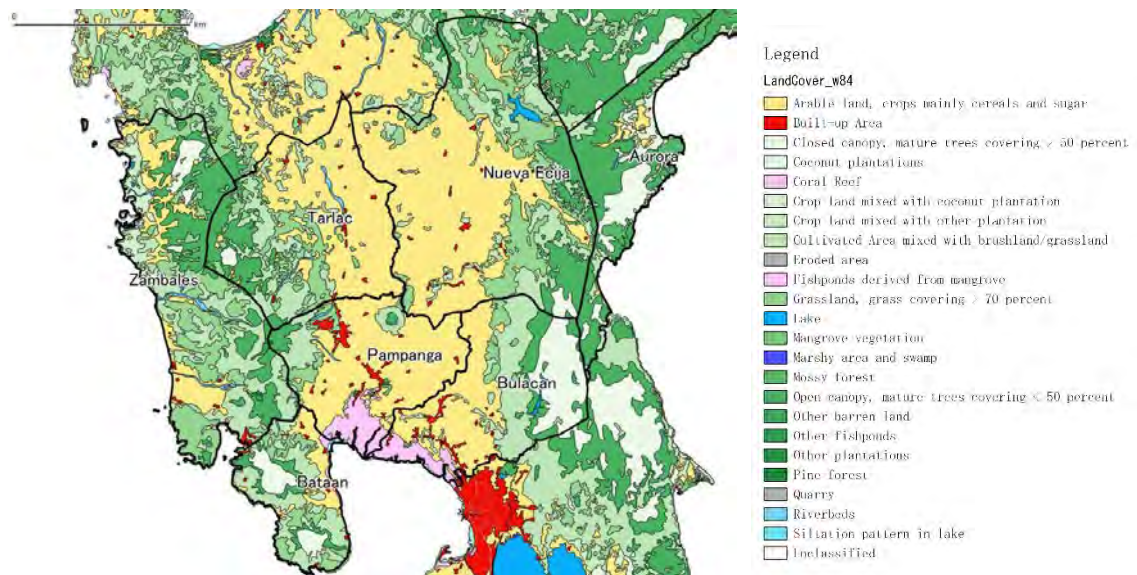
⁴⁰ Settlement Ratio is calculated by the National Conciliation and Mediation Board of the Philippines.

⁴¹ Formula for Disposition Rate is c/a (or ratio of cases disposed to strike/lockout notices handled). Disposition rate is formally defined as “the proportion (in percent) of the total cases disposed to the total number of cases handled”.

Known as the Central Luzon Plain, Region III is bounded by the Zambales Mountain Range in the west and the Cordillera Central Mountain Range in the east. The region's land is generally suitable for both agricultural and urban use.

In terms of coastal areas, Bulacan's and Pampanga's are but too low for agricultural use, but are used for fisheries. On the other hand, some coastal areas in Zambales and Bataan have deep sea and used for port in Subic and eastern side of Bataan peninsula.

Urban agglomerations are centered in Angeles City (highly urbanized city), followed by Olongapo City. Southwestern part of Bulacan substantially near to Metro Manila; this proximity aids in its suburbanization.



Source: PhilGIS. Composed by JICA Study Team.

Figure 15 Land Use Outline in Central Luzon

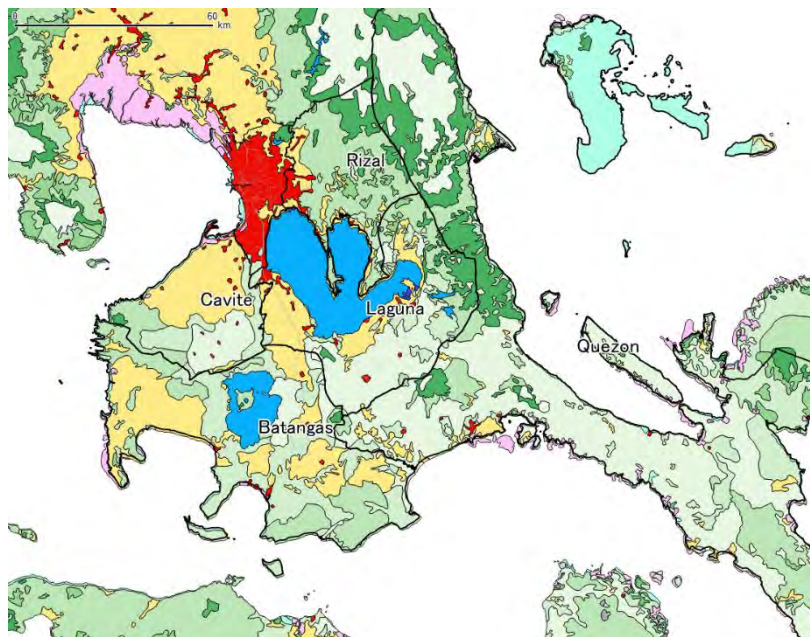
3.2.1.2 CALABARZON

Figure 16 shows the outline of land use in Region IV-A. The agricultural areas in this Region is more limited than in Region III, since these are only found in the coastal areas to several parts in Cavite, southern part of Laguna Lakeside, and western part of Batangas.

In terms of industrial and infrastructure development, industrial estates are located from the coastal area of Cavite and near the area of Laguna Lake. The development is advancing to the center of Cavite province. With this, it will be important to promote mobility through expressways within the region. Established locators have requested for new road developments, particularly to

connect to SLEX. Lastly, having a deep-sea area, Batangas has developed its own port in the southern coastal side.

On the other hand, the eastern side of Laguna Lake and all of Quezon Province do not necessarily have good road connectivity nor any other infrastructure to make them feasible locations for investors.



Source: PhilGIS. Composed by JICA Study Team. Legend is same with Region III.

Figure 16 Land Use Outline in Region IV-A

3.2.2 Natural Disaster Risks for Industrial Locations

Population and economic activities are concentrated in the limited plain area. However, the area is just only 5 meters above the sea level, which is considered to be subject to flooding risks and vulnerable to sea level rise.

The Philippines is a typhoon prone area and several typhoons make landfall in the country every year. Typhoons may cause landslides and floods. According to Swiss Re global publication, *Mind the Risk*⁴², Manila is ranked second (only next to Tokyo-Yokohama) to be at risk of catastrophic floods, earthquake, storm rages and others. The following sections describe each disaster risk.

⁴² Swiss Re. *Mind the Risk -A global ranking of cities under threat from natural disasters*. 2014.

3.2.2.1 Earthquake

Earthquakes caused by plate movement occur in east and west of the island especially in the Northern Luzon (as shown in Figure 17). In terms of earthquake risk, Pampanga, Tarlac and Nueva Ejjica Provinces in the study area are ranked high. Over the last 100 years, the study area experienced the Luzon Earthquake (In 1990. Magnitude 7.8. Casualty 1,621. Epicenter: Nueva Ecija) and the Casiguran Earthquake (In 1968. Magnitude 7.6 Casualty 270. Epicenter: Aurora). Figure 17 also shows the earthquake risk evaluated with Tsunami and landslides shows high risk for Zambales and Bataan Provinces.

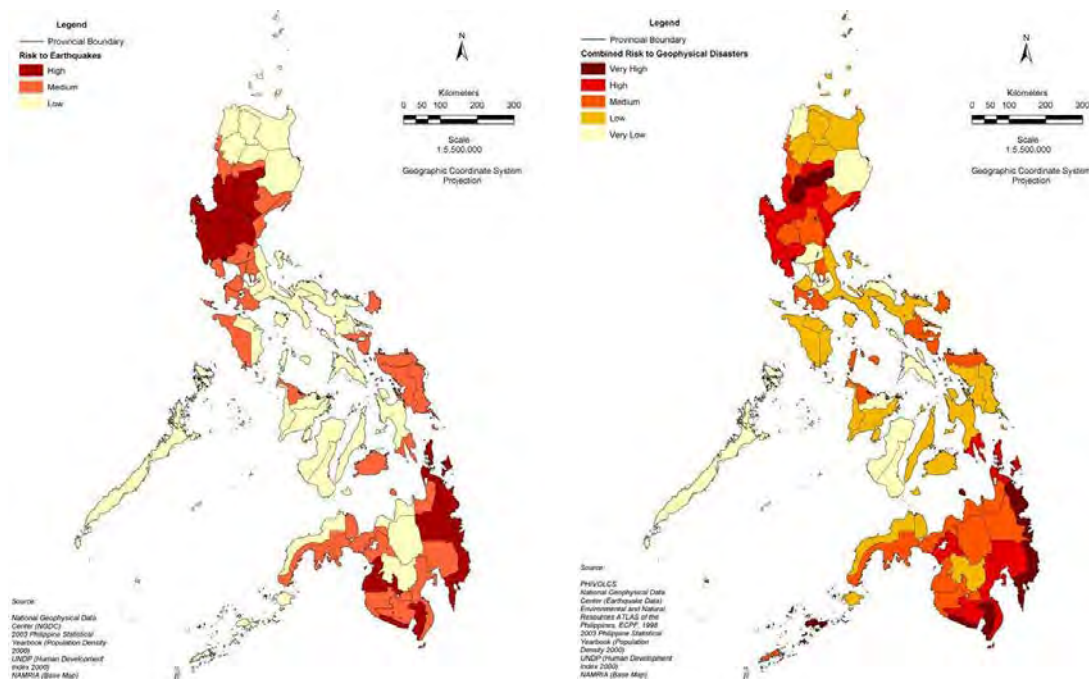


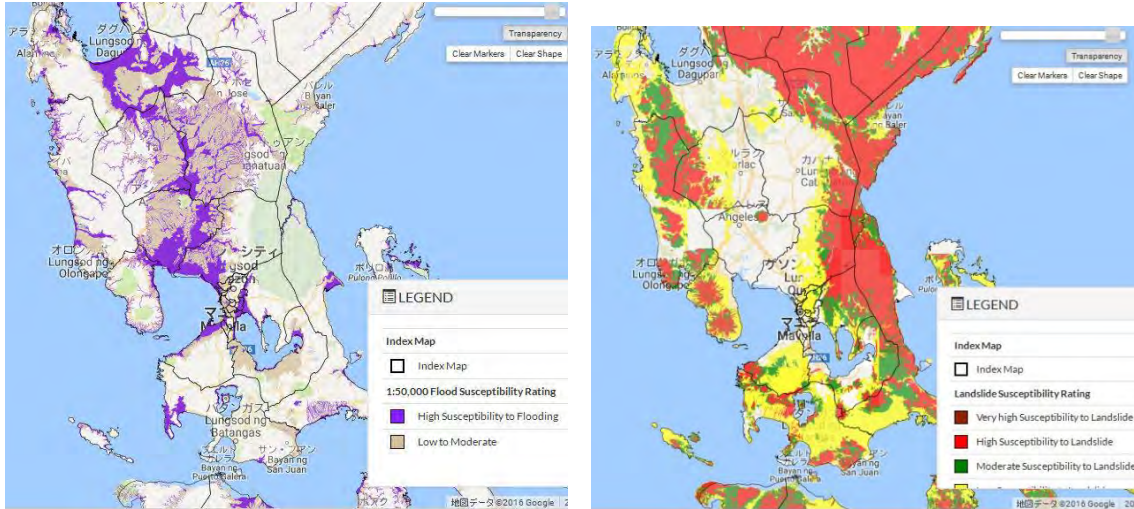
Figure 17 Seismic and Seismic Related Hazard Risk

3.2.2.2 Floods

As described above, the lower land has the higher risk against high tide and the Manila Bay area is exposed to the risk. In addition, the sea level risen by Climate Change also affect the area. The left image in Figure 18 shows the flood risk in the study area. The coastal area of Bulacan has little economic activity. Conversely, the coastal area of Cavite is so densely populated that the damage will be significant once a disaster happens.

3.2.2.3 Landslide

Both mountainous and sloped areas are subject to landslide risk. With this, existing industrial estates have avoided areas prone to landslide. Apparently, low risk areas are suitable location (yellow areas Figure 18).



Source: Mines and Geoscience Bureau, Department of Environment and Natural Resources (: MGB, DENR).

Figure 18 Flood Risk (Left) and Landslide Risk (Right)

3.2.3 Location of Industrial Estates

The following table lists the major industrial estates in the study area by established year.

Table 44 Major Industrial Estates

Name	Province	Established	Area(ha)	Management	Note	No. of Japanese Locators	Lot or RBF
Cavite Economic Zone	Cavite	1980	279	PEZA		105	Available
TECO Industrial Park	Pampanga	1987	190	Private		0	Available
Gateway Business Park	Cavite	1989	110	Private		5	Available
Laguna Technopark	Laguna	1989	460	Private	SEZ	109	Available
First Cavite Industrial Estate	Cavite	1991	72	Private		47	Available
Carmelray Industrial Park 1	Laguna	1992	111	Private		17	Available
Laguna International Industrial Park	Laguna	1993	35	Private		9	Available
Luisita Industrial Park	Tarlac	1993	120	Private		3	Available
Subic Bay Gateway Park	Zambales	1994	300	Private	SBFZ	4	Available
Golden Gate Business Park	Cavite	1995	47	Private		0	Available
Light Industry and Science Park I	Laguna	1995	72	Private		21	Available
Philexcel Business Park	Pampanga	1995	44	Private	CSEZ	3	Available
Daiichi Industrial Park	Cavite	1996	55	Private		8	Available
Dasmarinas Technopark	Cavite	1996	38	Private		0	Available
Subic Technopark	Zambales	1996	70	Private	SBFZ	7	Available
Light Industry and Science Park II	Laguna	1997	68	Private		17	Available
First Philippine Industrial Park	Batangas	1997	322	Private		41	Available
Lima Technology Center	Batangas	1997	280	Private		22	Available
Greenfield Auto Park	Laguna	1998	66	Private		11	Available
Sterling Technopark	Cavite	1999	100	Private		0	Available
Calamba Premiere International Park	Laguna	1999	42	Private		7	Available
Carmelray Industrial Park 2	Laguna	1999	143	Private		8	Available
Berthaphil Industrial Park	Pampanga	1999	54	Private	CSEZ	6	Occupied
Cavite Light Industrial Park	Cavite	2000	37	Private		0	Occupied
People's Technology Complex	Cavite	2000	59	Private		15	Available
Light Industry and Science Park III	Batangas	2001	110	Private		8	Available
Hermosa Ecozone Industrial Park	Bataan	2001	165	Private		1	Available
Golden Mile Business Park	Cavite	2002	45	Private		1	Available
Boton Light and Science Park	Zambales	2003	15	Private	SBFZ	2	Occupied
Filinvest Technology Park	Laguna	2005	52	Private		3	Available
Philtown Industrial Estate	Batangas	2006	67	Private		2	Available
Suntrust Ecotown Tanza	Cavite	2014	111	Private		5	Available

Note: SBFZ: Subic Free Zone, CSEZ: Clark Special Economic Zone
SEZ: Special Economic Zone, RFB: Ready Built Factory

Source: JETRO Manila Office Report (February 2015) and JICA Study Team.

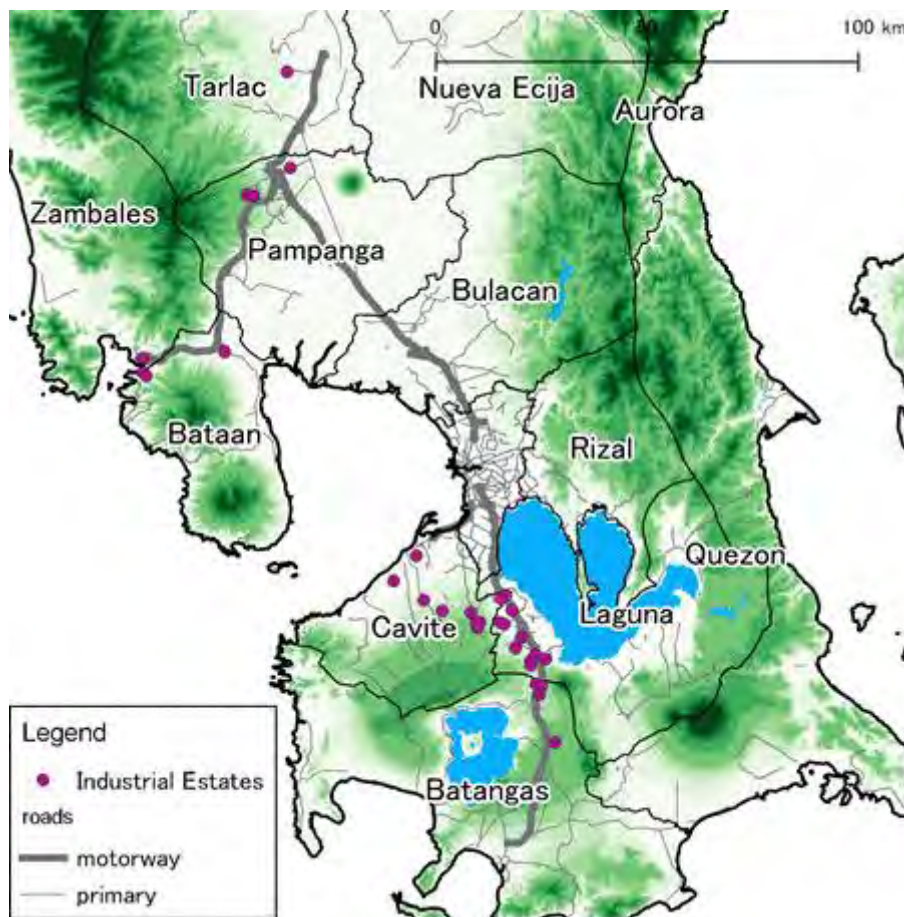
Since 1980, the industrial estates have been developed in the Study's target areas. The peak of the development is between 1995 and 2005. After 2006, only a few industrial estates were developed. There is still new development, such as Cavite Technopark, which is under construction.

As shown in Table 44, some lots in the established industrial estates remain vacant, and it is estimated that there will be only a few, new supply of industrial estates in the future.

In the last decade, the filling of vacant lots of existing industrial estates had been supposedly prioritized, while the development of new industrial estates had not been promoted. Given this,

most industrial estates are located in Cavite and Laguna provinces. Industrial estates in Region III are mostly in the free economic zones in Subic and Clark. This trend of concentration of industrial estates in Laguna, Cavite and Batangas seems to remain in the future.

The determining factors of investors in choosing industrial locations are utilities, labor force, and proximity to Manila. In addition, low risk areas in terms of occurrence of natural disasters are preferred. By these factors, these locations are limited to Subic and Clark in Region III and road side area of SLEX in CALABARZON. With SLEX, the development of industrial locations is advancing southward.



Source: JETRO Manila Office Report (February 2015) and JICA Study Team.

Figure 19 Location of Industrial Estates in Study Area and Expressways

3.2.4 Location of Business Process Outsourcing (BPO)

Furthermore, as described in Chapter 2.1.4, the location of BPO or BPM has been promoted to the industrial estate. It means that the existing industrial estates accommodate not only

conventional manufacturing sector but also service sector or tertiary industry with PEZA accreditation.

However, BPO companies need more skilled workforce and round-the-clock operation, and such locators require industrial estates with standards different from the past. BPO can employ more skilled labor forces in the urban area; given this, PEZA-accredited BPO are now operating in Metro Manila, especially Bonifacio Global City (BGC). Given this, manufacturing companies would tend to locate outside Metro Manila, while BPO locators in the PEZA-locations in Metro Manila (Table 45).

Table 45 PEZA Proclaimed Economic Zones in Preparation

Region/Province	Manufacturing	IT Parks/Centers
Region III		
Bataan	2	
Bulacan	1	3
Pampanga	1	2
Tarlac		2
Nueva Ecija		1
NCR	1	43
Region IV-A		
Batangas	3	3
Cavite	3	4
Rizal		1

Source: PEZA HP.

3.3 Industry Promotion

The main role of DTI Regional Offices is to promote the industries of their respective regions, but they cannot deal with cross-cutting issues. Their main tasks are MSME development support programs, such as the SSF program. DTI regional office is processing application for SSF from provincial director, for example. Although not within their mandate, DTI still extends support to large enterprises and industrial parks by entertaining some requests from them.

In relation to this, other support measures include the handling of complaints from industrial park tenants. Industrial park management organizations such as PEZA and CDC handles these. In this way, when considering the development of regional industries, it is actually the case that there is no organization to consider local industry promotion from the viewpoint of the entire region.

3.3.1 Central Luzon

The Central Luzon region is a region mainly focused on agriculture and agricultural crop processing. In major agricultural products, there are coffee, bamboo, Coco Coir, fruits, nuts, and others. The region is focusing on developing clusters concerning production and processing of each agricultural products. Among them, bamboo is also used for furniture and the like, but in recent years the supply of bamboo has been reduced as a raw material.

There are about 30 industrial parks in the whole area, 11 of which are PEZA certified economic zones. Industrial parks are located in the areas of Pampanga (Clark, Angeles), Subic, and a few in Bataan. Clark has large production bases such as Yokohama Tire (head office in Japan, tire), TI (headquarters in the US, semiconductor), and Luen Thai (headquartered in Hong Kong, apparel), among others. Notably, through the promotion of DTI, Yokohama Tire is sourcing rubber materials from Mindanao, reaching about 30% of the company's rubber procurement. In Bataan Freeport Area, one notable company is MITSUMI (headquartered in Japan and specializes in the production of semiconductors and related materials).

Table 46 Economic zones in Central Luzon

	NAME OF ECOZONE	Location	Area(ha)	City/Province	Nature
1	Angeles Industrial Park	Calibutbut, Bacolor, Pampanga	32.0	Pampanga	MSEZ
2	Central Technopark	San Miguel, Tarlac	300.0	Tarlac	MSEZ
3	Clark Special Economic Zone	Angeles City, Municipalities of Mabalacat and Porac, Pampanga and the Municipalities of Capas and Bamban, Tarlac	29,365.0	Pampanga	MSEZ
4	Clark TI Special Economic Zone	Clark Freeport Zone located at Angeles City and the Municipality of Mabalacat, Pampanga	32.0	Pampanga	MSEZ
5	eNTEC Building	Teresa Ave. cor. Don Juan Ave., Nepo Mart Commercial Complex, Angeles City, Pampanga	0.2	Pampanga	IT Center
6	Hermosa Ecozone Industrial Park	Hermosa, Bataan	142.0	Bataan	MSEZ
7	Luisita Industrial Park	San Miguel, Tarlac	29.4	Tarlac	MSEZ
8	Pampanga Economic Zone	Barangay Pulong Maragul, Angeles City, Pampanga	34.8	Pampanga	MSEZ
9	PDC Information Techno Park	Barangay Tambubong, San Rafael, Bulacan	8.8	Bulacan	IT Park
10	Plastic Processing Center SEZ	Alion and Cabcaban, Mariveles, Bataan	26.0	Bataan	MSEZ
11	Robinsons Luisita	McArthur Highway, San Miguel, Tarlac City, Tarlac	1.3	Tarlac	IT Center
12	SM City Clark IT Park	M. A. Roxas Highway, Malabanas, Angeles City	22.0	Pampanga	IT Park
13	SM City Pampanga	City of San Fernando and Municipality of Mexico, Pampanga	31.6	Pampanga	IT Center
14	Sta. Maria Industrial Park	Bulac, Sta. Maria, Bulacan	62.8	Bulacan	MSEZ
15	Subic Shipyard Special Economic Zone	Cabangaan Point, Subic, Zambales	76.6	Zambales	MSEZ
16	Supima eCircle	Malhacan Road, Malhacan, Mecauayan, Bulacan	14.0	Bulacan	IT Park
17	Tarlac Provincial Information Technology Park II	Brgy. Tibag, Tarlac City	4.5	Tarlac	IT Park
18	TECO Industrial Park	Bundagul and Paralayunan, Mabalacat, Pampanga	206.2	Pampanga	MSEZ

Note: MSEZ (Manufacturing Special Economic Zone)

Source: PEZA

SSF, an important program of the MSME development support program of DTI, has carried out about 200 projects in Central Luzon. About 80% of projects are of agricultural processing machinery.

There are seven provinces in the region, and their characteristics are as follows.

Pampanga Province is the core area of Central Luzon. It is a major production area of sugarcane and other special products (such as gravel stone and other mineral products which came from the eruption of Mt. Pinatubo). Because of the proximity of Mt. Pinatubo, tourism is also flourishing.

Bulacan Province's major industries are cement, marble, rice and vegetables.

Bataan Province has major industries in petrochemicals, small boats (leisure boat or rescue boat made of FRP (Fiber Reinforced Plastic)), fibers, shoes and tennis balls.

In **Zambales Province**, the Subic Bay Freeport Zone is located. The Subic Bay Freeport Zone has an industrial estate, wherein many foreign-affiliated companies (such as those in the semiconductor industry) are located. In addition, Hanjin's large shipbuilding factory is located within the area. In addition, export-oriented mango cultivation is also popular, and there are also mineral resources.

Tarlac Province has a lot of production of sugarcane, corn, sweet potato, okra (which is exported to Japanese companies, including Watari). Luisita Industrial Park is also located in Tarlac.

Nueva Ecija Province has a lot of rice, vegetables (mainly lowland vegetables), fruit production. In addition, the province has hydroelectric power from Pantabangan dam.

Aurora Province is a rice production area. Tourism industries, such as surfing, are developing.

3.3.2 CALABARZON

DTI designates five industries, namely, automobile, steel, petrochemical, IT/BPO and electric and electronic, as the main industries in CALABARZON, and will formulate industrial policy and regional development plan based on these five industries. The Regional Development Plan was formulated for 2012 - 2016, and now is being revised to capture the term for 2017-2022. At present, DTI's regional office in CALABARZON is working on the creation of a company database located in the area, while studying the actual state of industrial activities in the area.

Due to a number of relevant stakeholders in the region (PEZA, foreign companies, SMEs, and DTI Regional Office), it will be important to ensure their cooperation with each other, for example when formulating industrial policies and regional development plans in the near future. DTI Regional Office can also look into expanding its relation with foreign-affiliated companies located

in PEZA and other stakeholders, aside from rendering seminars and exhibits to SMEs in the region. In line with this, cooperation between large enterprises (mostly foreign companies) and SMEs should also be realized.

There are five provinces in CALABARZON, with the following characteristics.

Cavite has been industrializing. Cavite has been hosting to all kinds of manufacturing industries, from light industries to heavy manufacturing. As mentioned in the preceding sections, Cavite's advantage for manufacturing investors is its proximity to Metro Manila—emphasizing its proposition of good logistics. Complementing this advantage, Cavite will be benefiting from major infrastructure projects such as the CALA Expressway, Daang Hari Road, and LRT-1 Extension Project.

Laguna has been successful in developing an ecosystem for manufacturing. As previously discussed, it has been the go-to location for potential locators, since it has a number of economic zones which can host both manufacturing and logistics businesses.

Batangas balances its manufacturing and tourism industries. Batangas hosts a number of manufacturing companies which are expanding from Laguna and Cavite provinces. Aside from this, Batangas also has tourist spots, marked by a number of cultural and heritage sites.

Rizal is an adjacent province to Metro Manila. Despite being proximate to Metro Manila, Rizal maintains its agricultural economy. Rizal has a good livestock production, since it hosts to Foremost Farm which is a notable local hog producer in the Philippines and to a number of backyard piggeries and poultry farms. In addition, the province's rice and high value crops production is supported by its fertile soil. Rizal also has some textile, garments, and leather goods production.⁴³

Quezon Province has a big potential to be a tourist destination, located at the easternmost side of the Philippines (coastline area to the Pacific Ocean). Currently, given the natural topography of the province, it can host to a number of agricultural activities. The agricultural land area of Quezon Province takes about 59% of the total land area of CALABARZON.⁴⁴

⁴³ From the website of the Provincial Government of Rizal.

⁴⁴ From the website of the Provincial Government of Quezon.

3.4 Industrial Human Resource Development

3.4.1 Current Status of Industrial Human Resource Development in Central Luzon

3.4.1.1 Higher Education

With a total of 197 schools (27 national public universities and 170 private universities), Central Luzon has the third largest number of tertiary institutions in the Philippines next to the Metro Manila and CALABARZON.

Looking at the trends in the number of graduates of higher education institutions in Central Luzon, management science is the most popular and followed by IT. On the other hand, the number of medical graduates including nursing has decreased by half in 2014/15 compared to 2011/12 due to the drop of overseas demand for nursing professionals. Regarding engineering, although the number of graduates in 2014/15 has doubled compared to 2011/12, the total number is less than 900 people.

Table 47 Number of Graduates of Higher Education in the Central Luzon (by Discipline)

Discipline	2011/12	2012/13	2013/14	2014/15
Architecture	52	92	64	63
Business Education	10,491	15,455	16,945	17,621
Criminology	162	225	201	1,009
Education	717	823	775	2,570
Engineering	437	633	658	869
Graduate Education	0	10	16	63
Health-Related Education	4,745	4,001	2,469	2,590
HuSoCom	304	379	444	819
Information Technology	1,646	2,311	2,473	4,477
Maritime	404	473	590	593
Midwifery	166	176	185	121
Total	19,124	24,578	24,820	30,795

Source: CHED-Region 3

In Clark, number of higher education institutions is increasing. The University of the Philippines Diliman established the UP Extension Program within Clark Free Port Zone in 1999. Technological University of the Philippines (TUP), which has its main campus in Manila City, signed a memorandum of understanding with BCDA in January 2016 to build a new campus in Clark Green City. The new campus of TUP will offer 15 programs of engineering and industrial technology, including automotive engineering, electronics engineering, mold engineering.

3.4.1.2 Technical and Vocational Education

The number of graduates of technical vocational training institutions in Central Luzon is high in the provinces of Bulacan, Pampanga, and Nueva Ecija.

Table 48 Number of Graduates of Technical Vocational Institutions in Central Luzon (by Province)

Province	2011	2012	2013	2014	2015	2016	Total
Total	139,943	167,095	173,629	232,391	305,270	224,482	1,242,810
Aurora	2,054	1,950	2,865	4,892	5,024	2,435	19,220
Bataan	8,974	11,080	13,713	17,828	22,792	19,917	94,304
Bulacan	40,352	51,709	47,851	62,790	82,395	58,609	343,706
Nueva Ecija	20,635	19,265	32,171	39,285	50,804	41,244	203,404
Pampanga	30,024	35,588	38,362	53,095	87,047	62,841	306,957
Tarlac	19,571	23,392	22,233	27,965	36,879	25,813	155,853
Zambales	18,333	24,111	16,434	26,536	20,329	13,623	119,366

Source : TESDA-Region 3

3.4.2 Current Status of Human Resource Development in CALABARZON

3.4.2.1 Higher Education

CALABARZON also has a number of higher education institutions. There are 277 universities in the region, out of which are 19 public universities and 258 private universities.

Looking at the trends in the number of graduates of higher education institutions in CALABARZON, the number of graduates in IT and engineering graduates is increasing, following business administration and education science.

Table 49 Number of Graduates of Higher Education Institutions in Calabarzon (by Discipline)

D iscipline Group	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Agriculture, Forestry, Fisheries	789	975	969	1,296	1,351	1,484
Architecture and Town Planning	127	96	90	124	170	157
Business Administration and Related	14,583	15,459	16,647	19,980	21,965	24,378
Education Science and Teacher Training	5,085	5,581	6,601	8,422	8,988	10,320
Engineering and Tech	6,185	6,215	6,554	7,538	8,345	8,958
Fine and Applied Arts	56	49	48	42	90	266
General	99	55	78	53	40	38
Home Economics	151	10	123	139	142	139
Humanities	222	191	153	215	248	295
IT-Related Disciplines	6,741	7,803	9,190	10,996	11,057	10,607
Law and Jurisprudence	41	48	90	60	74	107
Maritime	278	259	131	373	466	447
Mass Communication and Documentation	575	605	508	640	784	1,005
Mathematics	342	178	318	340	282	339
Medical and Allied	9,849	8,314	5,831	3,878	3,912	3,184
Natural Science	412	281	441	510	495	595
Other Disciplines	1,115	1,332	1,714	1,860	2,220	2,443
Religion and Theology	222	464	413	382	514	465
Service Trades	470	773	932	1,590	1,498	1,696
Social and Behavioral Sciences	1,397	1,377	1,540	1,758	2,157	2,503
Trade, Craft and Industrial	228	265	289	-	13	
Grand Total	48,967	50,330	52,660	60,196	64,811	69,426

Source: CHED-Region IV-A

3.4.2.2 Industry-Academia Collaboration

Under the RDC of CALABARZON, the "Academe and Industry Linkage Committee" is organized to strengthen industry-academia collaboration. Members of this committee are DOLE, DTI, TESDA, CHED, DepEd, State Universities, Chamber of Commerce and Industry, Industry Organizations, and private companies in CALABARZON. The first meeting was held in October 2016, with an attendance of 370 people. In this meeting, the manifesto was announced by the stakeholders, and an action plan was created. The committee will also have quarterly meetings. Though this is a new initiative, it is expected that this will bring forth an active public and private partnership for human resource development.

The University of the Philippines Diliman is planning to build a new campus in Dasmariñas, Cavite, aiming to be a hub of knowledge accumulation (research and development) like Singapore National University or the University of California. In this planned campus, an innovation zone, which is open for corporate sponsorship, will be set up. Seminars and lectures by companies will

be conducted. There will also be a “School of Technopreneurship”, which will offer undergraduate elective subjects on technopreneurship and design engineering.

3.5 Infrastructure

3.5.1 Definition of Logistics in the Philippines

In this section, the existing transport infrastructure are analyzed from the perspective of industrial development. It can be seen that having inter-regional and intercity transport infrastructure is important.

From the viewpoint of logistics, transport infrastructure can be classified according to international logistics, inter-regional logistics, and intercity logistics. For international logistics, it will be better for the Philippines to target the development of seaports and airports, similar to other island countries like Japan. For inter-regional logistics, development areas include seaports, railway, road, and airports (to a lesser extent) can be targeted. For inter-city logistics, only road and railway development can be targeted.

The main theme for the development of international logistics in the target areas is to improve their accessibility to international gateways through containerization, computerization of ports, and open skies policies for airports, among others. The development of efficient intermodal transport system and logistics facilities (e.g., ICD, truck terminals, etc.) are the main themes for the development of inter-regional logistics. Lastly, the main themes for inter-city logistics will be the implementation of truck ban and the development of joint delivery system. Such inter-city themes will be specifically necessary for Metro Manila.

It is also necessary to consider an integrated urban transport, since the development of inter-city logistics and passenger services have overlapping issues. For example, the establishment of a public transport system (such as for buses, city railways, and others) in the city should be considered simultaneously with the development of a joint delivery system, truck inflow regulation, development of a beltway, and promotion of carriage of goods.

Each logistics infrastructure will have its own issue. For instance, the issue of international logistics is its connectivity to overseas gateways, while the issue of inter-regional logistics is the establishment of efficient logistics system. Lastly, inter-city logistics has to consider mitigation strategies for any traffic congestion. Consequently, countermeasures will also be different across the three infrastructures.

Table 50 Definition of logistics countermeasure in Philippines

	Main mode	Key issues	The example of countermeasure
International logistics	Seaport, Airport	The node to international network	Port EDI (Seaport) Containerization (Seaport, Inland port) Open air policy (Airport), Others
Inter-regional logistics	Road, Railroad, Seaport, Airport	Efficient logistics system establish	Inter-modal transportation system development Nodal point development (ICD, a truck terminal, etc.), Others
Inter-city logistics	Road, Railroad	Mitigation of Traffic congestion	Traffic demand management, development of a beltway, promotion of cargo transport by rail, Track ban regulation, joint delivery system introduction, others
(Urban transport)	Road, Railroad, LRT, bus system, others	Mitigation of Traffic congestion	Bus system introduction, LRT development, sidewalk development, street development, others

Source: JICA Study Team

3.5.2 Overview of the Transportation Development

3.5.2.1 Road network

The broad trunk road network and access road to the logistics points, e.g., ports, airport, etc., out of the road network are indicated with the point of the industrial contribution view.

(1) Inter-city transport network as logistics network

While the development of highways (toll motorways) is in progress in Metro Manila towards south and north direction, only 200km has been developed and the overall highway construction has been delayed.

DPWH makes the road and expressway development plan, and then the plan is transferred to the DOTr. The DOTr manages the development and the management of the planned infrastructure. NEDA takes charge of establishment of the National Plan of transportation and tourism sector through the collection of the plan by the related departments.

Currently, many of trunk roads between cities are improved and managed though PPP scheme. PPP projects are evaluated against and prioritized according to its financial feasibility. PPP schemes as privatization method can be efficient countermeasure of the infrastructure development in Metro Manila, due to its high population density and better financial returns that those projects in rural areas. Despite having financial viabilities, PPP projects may still seem to

have challenges, such as lack of cooperation across related projects, different development timings, maintenance problems, and safety concerns.

On the other hand, the pavement, repair, maintenance and management of national roads are performed by the DPWH, which is subject to budget allocation.

The DPWH takes charge of the feasibility study of the trunk road, while the design is based on the master plan which was previously developed through the technical assistance from international donor organizations.

The DOTr implements road development projects under PPP scheme. For instance, the road projects without the related private development project, e.g., residence, shopping mall, industrial zone, etc., are not proceeded according the plan supposed by DPWH. For instance, the detailed design of the CLLEX project has already finished by the DPWH; however, the project has not yet started.

The progresses of the road development projects in the “The Infrastructure Roadmap” approved by NEDA are shown as following table.

Table 51 Progress of Infrastructure Roadmap (Road)

	Name of Project		Project Status	Finance
Roads	1. Missing Links of C5	a. Flyover on CP Garcia in Sucat	Not started	n.a.
		b. Coastal Rd/C5 Extn. South Flyover	Not started	PPP (Part of CAVITEX Concession)
		c. C5 South Extn. Flyover at SLEX	Not started	PPP (Part of SLEX Concession)
	2. Global City-Ortigas Link Road		Not started	local funds
	3. Skyway/FTI/C5 Link		Not started	PPP (Part of Skyway Concession)
	4. C3 Missing Links (S. Juan to Makati (Sta Ana oval))		Not started	local funds
	5. EDSA Rehabilitation		Not started	local funds
	6. Plaridel Bypass, Packages 3 & 4		Ongoing	Japan ODA
	7. EDSA – Taft Flyover		Not started	local funds
8. Metro Manila Interchanges Construction Phase IV: 7 Packages		Not started	Japan ODA	
Expressways	9. Daang Hari-SLEX Link Tollroad		Completed	PPP
	10. NLEX-SLEX Connectors	a. Link Expressway (MNTC)	Ongoing	PPP
		b. Skyway 3 Section (Citra)	Ongoing	PPP
		c. Seg. 9&10, and Connection to R10	Ongoing	PPP
	11. NAIA Expressway, Phase 2		Completed	PPP
	12. CALA Expressway, Stages 1 and 2		Not started	PPP
	13. CLLEX Phase I (La Paz, Tarlac – Cabanatuan)		Ongoing	Japan ODA
	14. Central Luzon Link Expressway(CLLEX) Phase II, Cabanatuan San Jose Section and Operation and Maintenance of Phases I and II Project.		Not started	PPP
	15. Calamba-Los Baños Expressway		Not started	PPP (Part of SLEX Concession)
	16. C6 extension – Lakeshore Dike Road		Not started	PPP
	17. Segment 8.2 of NLEx to Commonwealth Ave.		Not started	PPP (Part of NLEX Concession)
	18. STAR Stage II (Batangas – Lipa)		Completed	PPP (Part of SLEX Concession)
	19. Manila Bay Integrated Flood Control, Costal Defense and Expressway Project		Not started	PPP
	20. Camarines Sur Expressway Project		Not started	PPP
	21. NLEX East Expressway		Not started	PPP
22. Improvement and Operation & Maintenance of Kennon Road and Marcos Highway		Not started	PPP	
23. La mesa parkway		Not started	PPP	
24. Pasig-Marikana Expressway		Not started	PPP	
25. SLEx Extention (Sto Tomas town-Lucena city)		Ongoing	PPP	
Other Roads	26. Secondary Road Packages		n.a.	-
	27. Preparatory Studies for Several Projects		n.a.	-
	28. Other Central Luzon Road Projects		n.a.	-
	29. Other Southern Luzon Road Projects		n.a.	-

Source: Website of the PPP Center (www.ppp.gov.ph) and JICA Study Team

The current major projects in the roadmap are introduced as follows.

Central Luzon Link Expressway (CLLEX):

The detailed design of the four-lane motorway highway of approximately 31 kilometers between Tarlac and Cabanatuan has been completed, and the construction of the far west section has started in 20 June 2016. The entire project is scheduled to be completed in April 2019.

Manila-Cavite Expressway (CAVITEX):

The 14 kilometer highway from the nearby vicinity of Ninoy Aquino International Airport (or NAIA, located at the south of Roxas Boulevard) to Kawit along the Bacoor Bay was completed in July 2015.

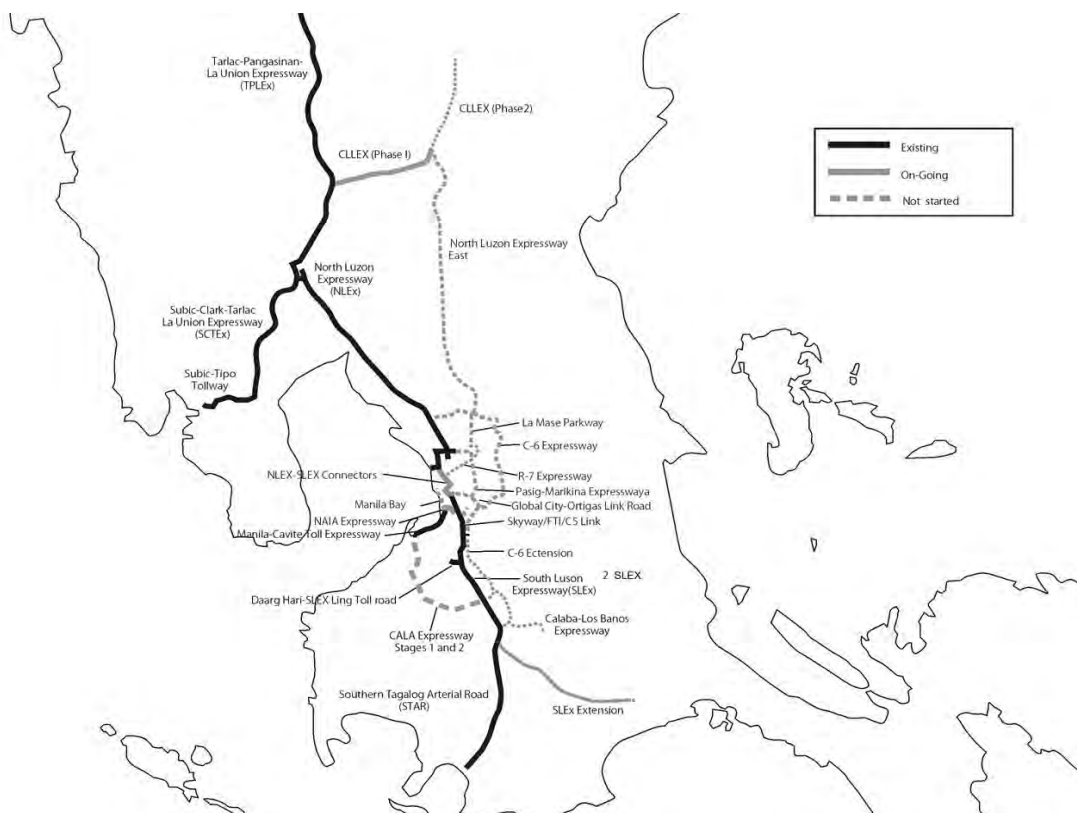


Metro Manila Skyway: The part of the section from the PNR Pasay Road Station to NLEX is currently under construction.



NAIA Expressway:

The 7.75 kilometer four-lane elevated highway as the access road to NAIA Terminals I, II and III is under construction (it includes the feeder road of 2.22 kilometers, and 90.90% has been completed by August 12, 2016). The NAIA Expressway connects between Skyway and the Manila-Cavite Toll Expressway.



Source: JICA Study Team

Figure 20 Logistics Infrastructure Project (Road)

(2) Access roads to Ports

The access roads to Subic Port and Batangas Port do not seem to have challenges in terms of the cargo handling. It will be desirable to have an expressway to connect both of the ports, with the aim of mitigating traffic congestion due to the possible increase in cargo volume in the near future. This connectivity will also establish an efficient inter-regional logistics system.

The expressway network (toll road) remains the development of the access road to the major international ports as last-one-mile. It is because the major revenue resource of the expressways was supposed to be that of the passenger. On the other hand, the revenue from cargo haulage was not supposed to be the major revenue of the expressway.



Access road between the Subic Port and SCTEX

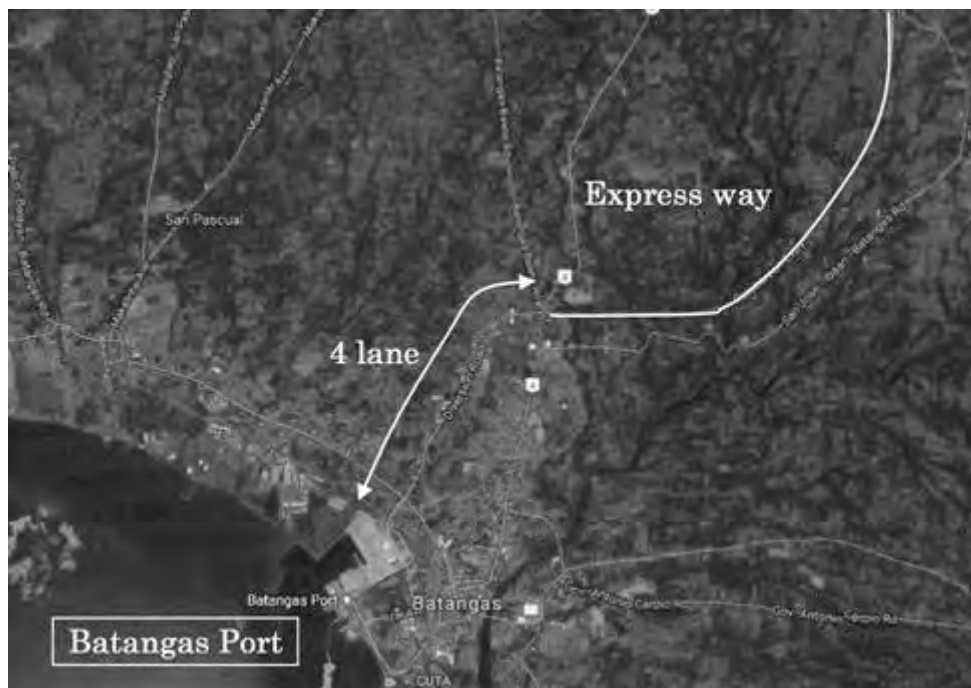


Access road to the Batangas Port from Southern Tagalog Arterial Road

The access road through the city area from SCTEX to Subic Port was already developed. The development of a bypass road connecting Subic Port and SCTEX is under the planning stages; this project aims to have another road for cargo trucks traveling into the city.



On the other hand, two-track road to the Batangas Port was developed for better management of traffic flow of cargo trucks to the city proper. This will be desirable to widen the existing access road, based on the increase of the cargo volume in near future.



3.5.2.2 Railway

(1) Current Condition

The railway transportation system of the Philippines is divided into two: the PNR, a long-distance transportation between Metro Manila and Southern Luzon, and commuting transportation lines within Metro Manila.

The commuter lines (lightweight railway system) include LRT-1, LRT-2, MRT-3, and the commuter line of PNR. In the Philippines, LRT-1 is operated by Light Rail Manila Corp. as a private concessionaire since 2014, while LRT-2 is operated by the Light Rail Transit Manila Corporation as a government agency. MRT-3 is operated by MRTC (Metro Rail Transit Corporation), a special purpose company financed by private investment, and PNR South-North Line.

All lightweight railways are electrified, while PNR is not electrified. An overview of the existing routes is presented below:

- LRT Line1 : Roosevelt-Baclaran, 19.65km
- LRT Line2 : Recto-Santolan, 13.8km
- MRT Line3: North Avenue-Taft Avenue, 16.3km
- PNR South-North Line : Tutuban-Cabuyao, 52.9km narrow-gauge

(It should be noted that the rail tracks and bridges of PNR South-North Line are damaged by the typhoon, and the current operation is available only between Tutuban- Alabang, with 23 round trips per day)

ICTSI (International Container Services, Inc.) used to operate cargo trains transporting containers from Port of Manila to Laguna using the PNR tracks from 1998; however, their cargo train operations stopped in 2003. Heeding the call from importers and exporters for efficient movement of goods, MRail (a subsidiary of Manila Electric Co. and ICTSI), submitted its proposal on railway cargo system project in 2015 to the previous administration. The project's value is around Php10 billion and is aimed to revive connectivity between the Port of Manila and ICTSI's inland container terminal facility in Laguna.

Table 52 Annual Freight Volume

Annual Freight in thousand ton	1980	1981	1982	1983	1984	1985
	142	115	77	65	72	54
	1986	1987	1988	1989	1990	1991
	64	62	57	53	32	12
	1992	1993	1994	1995	1996	1997
	5	18	12	14	-	1
	1998	1999	2000	2001	2002	2003
	3	-	-	-	-	-
	2004	2005	2006	2007	2008	2009
	-	-	-	-	-	-
	2010	2011	2012	2013	2014	2015
	-	-	-	-	-	-

Source: JICA Study Team based on The Philippines Transportation (2011.3 Ministry of Land, Infrastructure and Transportation)

Table 53 Annual Express Cargo Volume (Small lot)

Annual Express Cargo in thousand ton	1980	1981	1982	1983	1984	1985
	25	18	15	17	21	19
	1986	1987	1988	1989	1990	1991
	21	28	23	22	17	10
	1992	1993	1994	1995	1996	1997
	9	7	7	5	2	4
	1998	1999	2000	2001	2002	2003
	2	3	2	2	2	2
	2004	2005	2006	2007	2008	2009
	-	-	-	-	-	-
	2010	2011	2012	2013	2014	2015
	-	-	-	-	-	-

Source: JICA Study Team based on The Philippines Transportation (2011.3 Ministry of Land, Infrastructure and Transportation)



Near PNR Cubayao



Near PNR St Rosa



Near PNR Alabang

(2) Development Project

The railway projects being developed by the government mainly is under the PPP scheme, except those projects developed under a Yen-loan scheme. At present, the many projects will be taken through PPP scheme. These PPP projects are developed with the related private projects, resident, commercial, industrial development by the private funding.

Therefore, the individual PPP project with the related private project is prioritized rather than the connecting transport infrastructure among regions. The terminal function connecting among the projects is not proceeded smoothly because of different private sector proponents.

The LRT-1 project was initially developed under a Yen-loan scheme. Currently, the management of LRT-1 is done by a private company, while its extension project is being developed through PPP with another private sector entity (most funding coming from the private).

On the other hand, LRT-2 development was led by the by public sector (through Yen-loan), and

the extension project is also developed by the public sector proponents. The management entity of the LRT-2 is currently with public sector entities. However, the government has decided to transfer the management entity from the public to the private.

Table 54 Infrastructure Roadmap (Rail)

	Name of Project	Project Status	Finance
Railways	1. LRT1 - Cavite Extension (Niyog) and O&M	Ongoing	Japan ODA & PPP
	2. LRT2 - East Extension	Ongoing	Japan ODA & local funds
	3. MRT3 Capacity Expansion	Ongoing	China ODA
	4. MRT 7 stage1 (Quezon Ave. – Commonwealth Ave.)	Ongoing	PPP
	5. AFCS Common Ticketing System	Ongoing	PPP
	6. System Rehabilitations for LRT1 and 2	Ongoing	PPP
	7. Mega Manila North-South Commuter Railway (Tutuban-Malolos)	Ongoing	Japan ODA (D/D)
	8. Metro Manila CBD Transit System Project Study	n.a.	-
	9. Mega Manila Subway Study	Ongoing	Japan ODA (F/S)
	10. Common Station for LRT1, MRT3 and MRT7	Not started	PPP (local & private funds)
	11. North-South Railway Project- South Line (Calamba-Legaspi)	Not started	PPP

Source: JICA Study Team

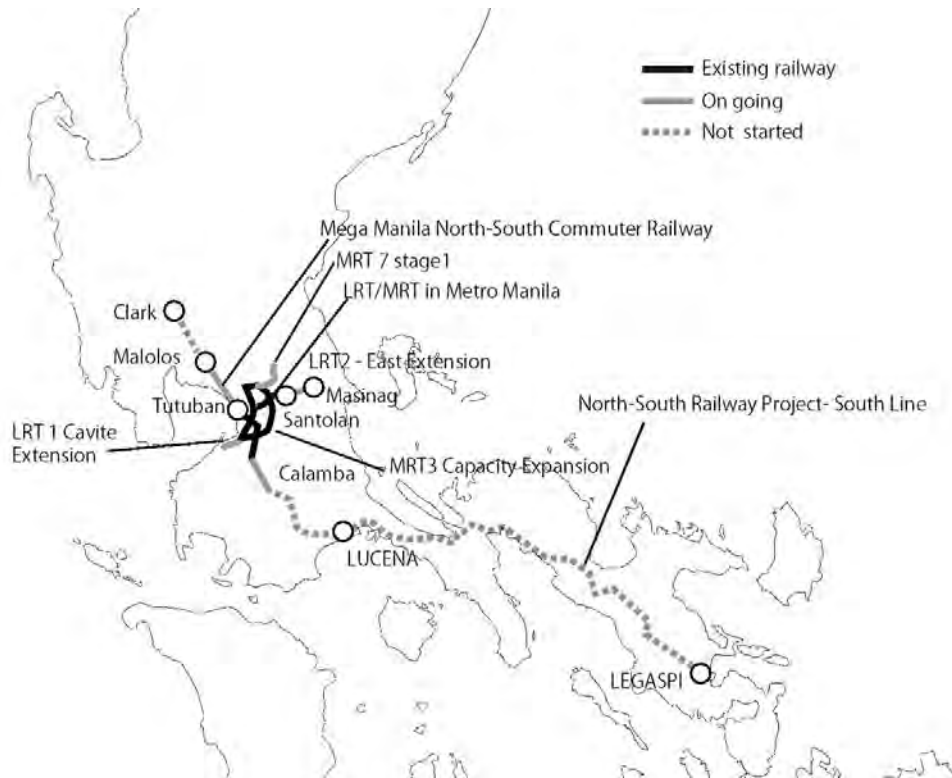
The progresses of the current major project in the roadmap showed as follows.

-North-South Commuter Railway (NSCR) Project :

The detailed design of the North-South Commuter Railway Project (Malolos-Tutuban) has been carried out with the contract period from March 2016 to September 2017. After the detailed design, a bidding for construction work will start. Its target completion will be between 2021 and 2022.

In the policy dialogue of President Duterte, the utilization of the inland railway transportation for port cargo as well as the transformation of commuter line to freight line (freight line will be under the overpass) have been suggested. The freight line (lead in) from Tutuban to the Port of Manila is under discussion.

MRT Line7: Some parts of the line such as in Commonwealth Avenue (Quezon City) are under construction.



Source: JICA Study Team

Figure 21 Logistics Infrastructure Project (Rail)

3.5.2.3 Seaport

Currently the burden with the Manila Port is soaring due to the economic concentration into the Manila Metropolitan. On the other hand, the cargo handling volume in both Subic and Batangas Port tend to increase, but the increase rate doesn't meet the cargo demand that has been supposed in the F/S study in the past. With the aim of the mitigation of the excessive concentration into the Manila Port, the decentralization of the cargo handling volume in the Manila Port is needed.

The ports in the target area have been developed by the public (Yen-loan), however, the ports management have been done by the private entities under the PPP scheme. The Batangas Port and Subic Port managed by the private under the PPP scheme faces the coordination problems with the public projects, e. g . access road development, the city planning, industrial development in suburban area.

The handling cargo in the Manila Port, law materials and intermediate goods should be better to shift from the Manila Pot to Batangas and Subic Port, and then the Manila Port should specialize in the consumption goods, which are needed by the residents in Manila Metropolitan area. The

concept mentioned before is the same as the advanced example in Thailand. In Thailand, it has been successful not only to solve the massive traffic congestion in Bangkok but also to enhance the industrial development in the eastern seaboard through the clarification of role-sharing between the existing Bangkok Port and new Laem Chabang Port.

Table 55 Progress of Infrastructure Roadmap (Seaport)

	Name of Project	Project Status	Finance
Ports*	1. Projects for North Harbor	n.a.	-
	2. Projects for South Harbor	Ongoing	PPP
	3. MICT	n.a.	-
	4. Feasibility Study of NH Redevelopment	n.a.	-
	5. Manila north port redevelopment	n.a.	PPP (Part of concession of ICTSI)
	6. Other Ports	n.a.	-

Source: JICA Study Team

The ports development in the target area have been developed by the public sector (through Yen-loan), however, the ports management have been done by the private entities under the PPP scheme.

The Batangas Port and Subic Port are managed by the private sector under the PPP scheme. These face the coordination problems with the public projects, e. g ., access road development, the city planning, industrial development in suburban area.

The terminal operation of the Manila North Port and the Subic Port are managed by the private (ICTSI), and that of the Manila South Port and Batangas Port are managed by the private (ATI). When the foreign ships call at the Manila Port, the ships need to call at each Port individually. Therefore, it takes an average of 3 or 4 days, including offshore waiting time to complete the task. With this, foreign shipping companies find the Manila Port to be an inefficient port. According to the interviews conducted by JICA study team, if the offshore waiting time was so long in the Manila Port, the foreign ships could skip the Manila Port if necessary.

<The Port of Manila>

The Port of Manila consists of three facilities; MICT (Manila International Container Terminal), Manila North Harbor and Manila South Harbor. MICT and Manila South Harbor deal with international cargo.

The terminal owned by MICT consists of 6 berths; the depth is around -10 to -12 meter, and the land lot is around 94 hectares. The annual cargo handling capacity is 2.5 million TEU, but its

current handling volume was only 1.96 million TEU in 2015. The management entity was entrusted to ICTSI since 1988.

The Manila South Harbor consists of 5 berths; the depth is around -12 meter, and the land lot is around 30 hectares. The annual cargo handling capacity is 1.2 million TEU, but the current handling volume was 0.88 million TEU in 2015. The operator is ATI (Asian Terminal Inc.). In addition, the harbor has another berth, in which the water depth is around 9 to 12 meter and handles general cargo.

Table 56 Container Volume in Manila Port

	total	M.I.C.T.	NORTH HARBOR	SOUTH HARBOR
1. No. of Containers (in TEU)	3,969,377	1,960,699	1,131,085	877,593
Domestic	1,131,085	0	1,131,085	0
Inbound	552,724	0	552,724	0
Empty	307,345	0	307,345	0
Loaded - FCL	229,579	0	229,579	0
Loaded - LCL	15,800	0	15,800	0
Outbound	578,362	0	578,362	0
Empty	36,291	0	36,291	0
Loaded - FCL	542,069	0	542,069	0
Loaded - LCL	2	0	2	0
Foreign	2,838,292	1,960,699	0	877,593
Import	1,435,648	1,035,630	0	400,018
Empty	5,218	3,258	0	1,960
Loaded - FCL	1,430,035	1,031,977	0	398,058
Loaded - LCL	395	395	0	0
Export	1,402,644	925,069	0	477,575
Empty	921,636	521,452	0	400,184
Loaded - FCL	479,805	402,414	0	77,391
Loaded - LCL	1,203	1,203	0	0
2. Containerized Cargo (in M.T.)	41,553,574	19,956,337	17,724,332	3,872,905
Domestic	17,724,332	0	17,724,332	0
Inbound	7,592,414	0	7,592,414	0
Outbound	10,131,918	0	10,131,918	0
Foreign	23,829,242	19,956,337	0	3,872,905
Import	17,923,600	14,498,250	0	3,425,350
Export	5,905,642	5,458,087	0	447,555

Source: Website of PPA Annual Port Statistics (<http://www.ppa.com.ph>)

The share of laden container handling volume of import of Port of Manila is around 30% comparing that of export. This means that the Port of Manila heavily relies on imports than exports.

In addition, the characteristic of container condition is that FCL type is significantly larger than LCL. More importantly, the current container handling volume of Port of Manila is around 15 times of the total volume of both Subic and Batangas ports.

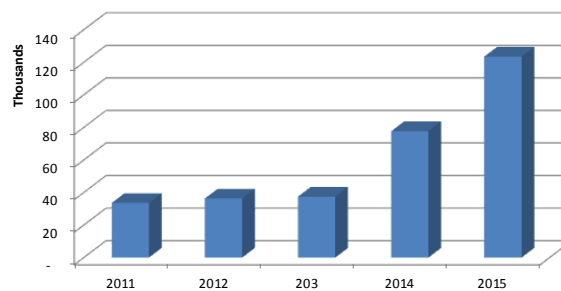
(On-going project and plan)

While large-scale investments from the Philippine Ports Authority’s private concessionaires such as ATI which operates Manila South Harbor and ICTSI which operates Manila International Container Terminal are expected, no specific projects have been in progress.

<Subic Port>

Previously as a US Navy Base, the Subic Port was designated as a free port through the Bases Conversion and Development Act enacted in 1992. The site, about 41 hectares with water depth of 15 meters, includes 15 berths and two container terminals (about 14 hectares). The annual handling capacity of the container terminal is 600,000 TEU, and it has increased steadily to 120,000 TEU in 2015 which still has spare capacity. The New International Container Terminal 1 and 2 of Subic Port is maintained and operated by SBITC (Subic Bay International Terminal Corp.), and others are managed by SBMA (Subic Bay Metropolitan Authority).

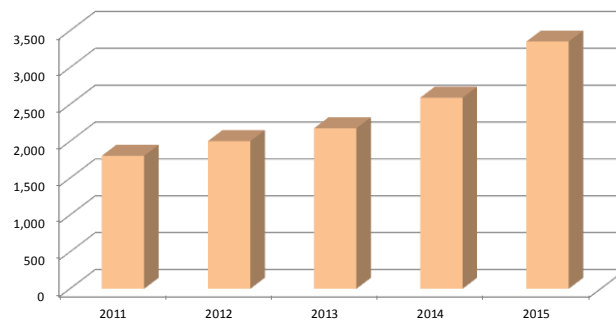
Shipment	2011	2012	2013	2014	2015
Import	17,466	19,147	20,277	42,041	58,620
Export	9,890	8,166	8,359	13,378	20,611
Transshipment	315	759	684	601	908
Empty In	936	815	311	1,324	1,314
Empty Out	4,966	7,417	7,840	20,304	40,682
Import (Unloaded from other ports)	-	-	-	-	1,257
Export (Loaded to other ports)	-	-	-	-	119
Total	33,573	36,304	37,469	77,648	123,510



Source: Subic Bay Metropolitan Authority

Figure 22 Subic Port - Comparative Containerized Cargo Volume (TEU)

Ship Calls	2011	2012	2013	2014	2015
Domestic	967	1,095	1,095	1,486	1,867
Foreign	836	908	1,082	1,105	1,486
Total	1,803	2,003	2,177	2,591	3,353



Source: Subic Bay Metropolitan Authority

Figure 23 Subic Port - Comparative Ship Calls

(On-going project and plan)

The additional third berth of the container terminal is planned to increase container-handling capacity up to 0.9 million TEU. The development scheme is proposed to be under a PPP arrangement, led by a private sector proponent.

Based on the population volume such as the example of the Hakata Port/Kita-Kyusyu Port in Kyusyu in Japan, the necessary container handling volume of the Batangas Port can be supposed to be 1.5 million TEU in the future. A supporting infrastructure, the bypass road connecting between the expressway and the Batangas Port has already been planned under the government budget.

The use of second-hand construction machineries and used cars in the container yards can be changed as part of the strengthening of the port function, e.g., cargo handling facilities, bonded warehouse, etc. in the future.



Source : Subic Bay Metropolitan Authority

Figure 24 Subic Port Development Plan

<Batangas Port>

The site of Batangas Port is about 21 hectares with 16 berths (5-10m water depth). Other than agricultural products, the main export and import items are vehicles, iron, steel, heavy products, cement, ore and etc. The annual handling capacity of the container terminal is 300,000 TEU, and it has increased steadily to 130,000 TEU in 2015 which still has spare capacity. Currently the port is managed and operated by AASI (Aries Arrastre Services Inc.) of ATI.

Table 57 Batangas Port – Comparative Containerized Cargo Volume (TEU)

Phase I	2011	2012	2013	2014	2015	Jan- May 2016
Domestic	1, 114	5,824.00	11,843.00	36,467.00	54,784.00	18,598.50
Foreign	2, 513	503.00	5.50	250.00	28.00	19.00
Total	3, 627	6,327.00	11,848.50	36,717.00	54,812.00	18,617.50
Phase II	2011	2012	2013	2014	2015	Jan-May 2016
Domestic	8, 257	2,205.5	381.00	949.00	304.00	0
Foreign	2, 245	6,251.00	11,019.50	97,361.25	132,957.75	61,009.25
Total	10, 502	8,456.5	11,400.50	98,310.25	133,261.75	61,009.25

Source: PPA Batangas port office

(On-going project and plan)

There is a 600-m extension plan for the existing container berth. There exists a spare lot area, on the opposite shore which is the same size of the existing berth. The plan will be a preparation for the increase of cargo handling volume in the future.



Source: Subic Bay Metropolitan Authority

Figure 25 Batangas Port Development Plan

3.5.2.3 Airport

The main international airport in the two regions has been developed and managed by public sector proponents. The new Manila Airport will be developed and managed by private sector proponent under PPP scheme. In addition, the new airport in Davao will also be developed by a private sector proponent under a PPP arrangement.

Table 58 Logistics Infrastructure Project (Airport)

	Name of Project		Project Status	Finance
Airports	1. NAIA	a. NAIA Improvements– airside package	Not started	–
		b. NAIA improvements – landside package	Not started	–
	2. Clark International Airport Construction of a Budget/ LCC Terminal		Not started	–
	3. Feasibility Study of a New NAIA		Not started	–
	4. New NAIA Airport		Not started	PPP
	5. Clark passenger terminal 2		Not started	PPP

Source: JICA Study Team

(1) NAIA

NAIA started operation in 1948. It has two runways of (3,410m × 60m) and (1,998m × 45m), and the shape of runway causes capacity limitation in landing or taking-off by one aircraft.

The management and operation of the airport has been carried out by MIAA (Manila International Airport Authority), under the DOTr.

Table 59 Utilization Condition in NAIA

Year	Passenger('000)				Cargo(tons)				Aircraft Movement(flights)			
	Domestic	International	G.Aviation	Total	Domestic	International	G.Aviation	Total	Domestic	International	G.Aviation	Total
1991	3,074	4,529	205	7,809	74,565	179,680	18,471	272,716	43,133	26,143	56,578	125,854
1992	3,281	5,236	229	8,746	70,455	193,915	12,065	276,435	47,572	30,359	64,133	142,064
1993	3,531	5,671	216	9,418	79,275	212,152	13,137	304,564	45,217	32,989	59,180	137,386
1994	3,945	6,116	262	10,323	61,848	231,992	6,664	300,504	48,635	35,702	65,002	149,339
1995	4,329	6,560	304	11,193	80,009	274,849	9,782	364,640	55,096	37,311	72,640	165,047
1996	4,986	7,297	345	12,628	100,890	293,323	7,795	402,008	62,653	43,805	74,314	180,772
1997	6,137	7,726	283	14,146	107,020	377,775	8,336	493,131	72,331	49,274	76,278	197,883
1998	5,337	6,817	320	12,474	86,521	291,246	10,801	388,568	65,187	41,453	73,163	179,803
1999	5,742	7,019	251	13,011	80,663	290,414	6,445	377,521	63,714	41,207	61,336	166,257
2000	5,968	7,130	348	13,446	117,951	272,740	7,922	398,612	64,987	39,083	64,126	168,196
2001	5,401	6,531	262	12,194	120,839	235,908	8,484	365,231	73,473	42,096	57,019	172,588
2002	5,282	7,466	239	12,988	116,298	265,902	5,564	387,764	71,111	44,112	53,789	169,012
2003	5,791	7,126	221	13,139	116,924	255,249	2,596	374,770	73,952	42,300	43,456	159,708
2004	6,741	8,416	272	15,429	122,245	299,243	2,182	423,671	75,786	42,385	39,854	158,025
2005	6,972	9,222	292	16,485	116,077	296,090	2,107	414,274	83,273	47,746	40,312	171,331
2006	8,159	9,767	304	18,229	109,817	300,427	2,515	412,759	84,698	48,980	38,235	171,913
2007	9,707	10,725	262	20,694	92,620	295,634	1,872	390,125	92,648	54,643	41,506	188,797
2008	10,720	11,273	259	22,253	89,651	263,397	2,101	355,149	101,927	60,525	42,794	205,246
2009	12,680	11,203	225	24,109	97,129	237,923	2,387	337,440	121,310	64,356	37,122	222,788
2010	14,755	12,381	204	27,340	117,467	306,361	1,528	425,357	132,786	67,321	35,887	235,994
2011	16,687	12,969	227	29,883	119,872	290,505	1,521	411,898	145,353	72,390	37,411	255,154
2012	17,739	14,140	243	32,122	149,080	311,055	1,415	461,550	155,832	79,685	37,561	273,078
2013	17,689	15,177	250	33,117	164,201	293,116	978	458,296	149,421	87,629	34,416	271,466
2014	18,020	16,072	184	34,275	164,597	355,141	297	520,035	142,693	93,748	29,819	266,260

source:JICA Survey Team(based on data from CAAP and MIAA)

(On-going project and plan)

NAIA has evaluated nine candidate sites for a new airport, and identified Sangley Point in Cavite as a suitable site. The project consists of landfill of the airport (2,400ha), access roads with interchange and railway etc.

On the other hand, DOTr has decided to make a concession contract of the terminal operation and management of Ninoy Aquino International Airport aiming to be concluded by September 2019. The contract period will be 15 (or 20 years) and discussion over the relocation plan of Ninoy Aquino International Airport will be calmed down.



Source: Survey for collection and identification of information regarding new airport in Metro Manila in Philippines

Figure 26 Sangley Point Location

(2) Clark International Airport

The Clark International Airport is located inside the CSEZ (Clark Special Economic Zone). Originally built as a military airport, it started operation as Clark International Airport since 1994. It has two parallel runways of 3,200m × 45m as the first and 3,200m × 60m as the second. The management and operation of the airport has been carried out by Clark International Airport Corporation (CIAC).

Table 60 Utilization Condition in CLARK

Year	Passenger('000)				Cargo(tons)				Aircraft Movement(flights)			
	Domestic	International	G.Aviation	Total	Domestic	International	G.Aviation	Total	Domestic	International	G.Aviation	Total
2001	2	2	8	12	69	37,342	259	37,671	60	3,278	1,741	5,079
2002	9	1	17	27	323	55,889	393	56,606	296	2,564	3,801	6,661
2003	6	8	30	44	2,335	83,648	350	86,333	3,040	85	5,862	8,987
2004	9	50	39	98	3,130	105,031	311	108,472	3,030	453	5,681	9,164
2005	8	219	36	263	3,907	107,211	260	111,377	728	2,157	4,968	7,853
2006	17	464	34	515	3,774	124,981	285	129,039	716	4,053	4,331	9,100
2007	43	490	22	555	3,533	125,124	156	128,812	1,162	3,954	3,455	8,571
2008	40	490	24	553	2,780	127,008	193	129,980	1,146	4,070	3,922	9,138
2009	31	559	24	614	3,639	128,439	256	132,334	1,114	5,141	3,984	10,239
2010	47	608	52	706	648	45,090	386	46,124	744	5,332	9,054	15,130
2011	42	725	68	835	0	41,284	456	41,740	609	6,971	11,209	18,789
2012	300	1,015	167	1,483	0	41,621	974	42,595	3,501	9,313	25,854	38,668
2013	215	985	188	1,388	2,582	41,476	734	44,792	1,916	8,420	25,833	36,169
2014	91	787	121	998	1,280	46,702	195	48,176	936	5,715	19,560	26,211

source:JICA Survey Team(based on data from CAAP and CLAC)

(On-going project and plan)

Reaching the maximum passenger capacity, NAIA's extension is under construction. In addition, the second international airport near Metro Manila is demanded. The capacity of the extension terminal for low-cost carriers was planned, and this would potentially expand capacity to around 10-30 million passengers in 2016.

According to the master plan of the Clark International development, the passenger handling capacity is planned to be 60-80 million passengers. The development scheme is supposed to be implemented under a PPP scheme; however, the funding source is still unclear.



Source: Clark International Airport Corporation

Figure 27 Clark Airport Development Plan

3.5.3 Current condition of other types of Infrastructure

3.5.3.1 Power

The annual electric power generation in the Philippines in 2015 was 82,413 GWh, of which fossil fuels such as coal, natural gas, and oil accounted for more than 70% of total generation. Privatization and liberalization of electricity generation is progressing in accordance to the Electric Power Industry Reform Act (EPIRA) of 2001. At present about 80% of the government-owned generation facilities have been privatized.

In terms of fuel source, fossil fuels have the largest share at 61,450 GWh, or 74.6% of the total. The breakdown of fossil fuels is coal at 36,686 GWh (44.5%), natural gas at 18,878 GWh (22.9%), and oil at 5,886 GWh (7.1%). The remaining 25.4% is renewable energy. The breakdown of this renewable energy is hydroelectric at 8,665 GWh (10.5%), geothermal at 11,044 GWh (13.4%), and wind, solar, and biomass at 1,254 GWh (1.5%).

Table 61 Breakdown of annual electrical power generation in the Philippines according to fuel source (2015)

Type		Power (GWh)	Constitution
Fossil Fuel	Oil-based	5,886	7.1%
	Oil-thermal	80	0.1%
	Diesel	5,521	6.7%
	Gas Turbine/CC	286	0.3%
	Coal	36,686	44.5%
	Natural Gas	18,878	22.9%
Renewable	Hydro	8,665	10.5%
	Geothermal	11,044	13.4%
	Other (Wind, Solar, Biomass)	1,254	1.5%
Total		82,413	100.0%

Source: Department of Energy

Until 1987, electric power generation was only carried out by the National Power Corporation, a government-owned company. After Executive Order No. 215 in 1987 was issued, private companies were able to participate in electric power generation.

In 2001, the electric power industry was reorganized by the government in accordance with Republic Act No. 9136 and the EPIRA, under which the generating department of NPC was divided and privatized. The supply and sale of electric power to NPC by private companies was also expanded. The transmission companies were also separated, and reorganized into three main companies according to area—Luzon, Visayas, and Mindanao.

According to the interview meetings for this study, the electric sale price in Philippine is the most expensive in the ASEAN, which may bring negative influence to the industrial activity in Philippines. With the privatized power transmission operations, it can be said that there is a monopolistic situation in each region.

In 2008, the Renewable Energy Act (Republic Act No. 9513) was enacted. This Act requires the transmission companies to provide electric power using renewable energy sources, and to pay an electric charge based on the Feed in Tariff (note that the tariff rate has been frozen for 12 years). Various incentives are provided to renewable energy power generation companies.

The DOE is responsible for implementing the policy on renewable energy. The Feed in Tariff is determined by the National Renewable Energy Board that was established by this Act. Also, the Philippine Renewable Energy Board is responsible for developing the renewable energy electrical power market.

Also, the DOE formulated the Philippine Energy Plan (PEP) 2008-2030 with the enactment of this Act. The following are the targets for electric power generation (new facilities) in 2020. Based on the plan, the target values for geothermal power generation and hydroelectric power generation have already been reached as early as 2015.

Table 62 2020 Electrical Power Generation Targets (New Facilities)

Unit: GWh

	Power generation in 2008	Target (New) in 2020	Total
Geothermal	2,027	1,070	3,097
Hydro	3,367	3,400	6,767
Wind	33	515	584
Solar	5	30	35
Biomass	68	200	268
Ocean	0	120	120
Total	5,500	5,355	10,836

3.5.3.2 Telecommunication

(1) Supervisory authority

The government supervisory authorities for the communications industry are the Information and Communications Technology Office (ICTO) and the National Telecommunications Commission (NTC). Established on January 2004 through the Presidential Decree No. 269, the ICTO is a committee directly under the Office of the President. Its predecessor organization was the Commission on Information and Communications Technology (CICT). Its main duties are to formulate policies relating to ICT to promote the use of ICT in government processes, and to develop laws relating to ICT.

On the other hand, NTC was established in 1979 under Presidential Decree No. 546. It is an independent regulatory organization empowered to formulate guidelines and regulations; it is also directly under the Office of the President. Its main responsibilities in the field of electronic communication are as follows.

- Formulation of regulations and standards relating to electronic communication equipment and electronic communication services
- Setting the operational areas of electronic communication companies and setting electronic communication charges
- Management and supervision of wireless stations and electronic communication equipment
- Enforcement of regulations and rules for the import of electronic communication equipment and machinery

(2) Relevant laws and regulations

The relevant Act in the communications sector is the Public Telecommunication Policy Act (PTPA, Republic Act No. 7925), which came into force in March 1995. This Act prescribes the conditions for granting a business license, the obligations of providers, and others.

Based on this Act, electronic communication providers with electronic communication equipment are obliged to install a defined number of subscriber circuits in a defined period of time. On the other hand, the participation of value-added service providers who provide services without possessing equipment in the electronic communication market is free.

In accordance with Article 12 Item 11 of the Constitution, the upper limit of foreign ownership of communication businesses is 40%.

(3) Policy trends

1) Policy to promote competition

In 2000, the Implementing Rules and Regulations (IRR) for the Interconnection of Authorized Public Telecommunications Entities (Memorandum Circular 14-7-2000) came into force. Article 10 of this Memorandum placed an obligation of interconnection on the authorized public communications entities. In addition, in order to deal with the problem of intercommunication among telco entities, in July 2007 NTC issued the “Reference Access Offer (Memorandum Circular 10-07-2007)”, which placed an obligation on all telco entities to submit access offers to the NTC in advance, and obtain approval.

2) Information communication infrastructure development policies

The Philippine government is considering the implementation of the “Free Wi-Fi Internet Access in Public Places Project” as part of its Philippine Digital Strategy. The bill to implement this project was passed by the Upper House and the Lower House in June 2015. In 2016 the scheme to develop this Wi-Fi network in all areas of the country was planned. The annual cost is PHP1.5 billion. The scope of the free Wi-Fi access includes public facilities such as schools, hospitals, airports, parks, and others.

3) ICT policies

In June 2011, the ICTO formulated the ICT promotion plan referred to as the “The Philippine Digital Strategy Plan for 2011-2015 (PDS)”. The PDS sets the following 4 strategy areas.

- Realization of high transparency government and provision of efficient government services (electronic-based government services)

- Provision of internet connection opportunities to all citizens
- Creation of opportunities for all citizens to acquire digital literacy
- Creation of ICT industries and business innovations to contribute to the national economy

(4) Present status of the communication business

1) Mobile communications

The dominant companies in the mobile communications market are Smart Communications, a subsidiary of PLDT, and Globe Telecom Inc.—together accounting for 99.9% of the market share. In October 2011, PLDT bought Digitel, the company with the third-largest market share. The acquisition only resulted to a duopoly in the telco market.

2) Fixed line communications

Due to its geographical conditions as an island nation, the spread of fixed landline telephones is low. Besides landline telephones, Fixed Wireless Access (FWA) is widely used.

PLDT has a market share of about 60%, Globe has a market share of about 20%, and other providers take up the rest of the market share.

3) Internet

The number of subscribers to internet connections is at a low level, reflecting the insufficient development of the landline communication network. Over the recent years, wireless broadband has become popular, as represented by WiMAX.

Note that the fixed broadband market shares are about 60% for PLDT, and about 40% for Globe. This is reflective of the duopoly situation in mobile communications.

3.5.3.3 Waste Management

(1) Present status of waste processing

1) Summary of laws regarding industrial waste and recycling

a. Basic laws and regulations and Department's regulations

The basic rules for environmental management in the Philippines are provided in the Philippine Environmental Code in accordance with Presidential Decree 1152 of 1977. Under this, the national government prepares guidelines for waste management programs to be cascaded to local governments. Local government units are the main implementers of waste management programs.

Table 63 Basic laws and regulations regarding industrial waste and recycling in the Philippines

Law (year enacted)	Summary
Code on Sanitation of the Philippines, Presidential Decree 856 (December 1975)	Provides the basic regulations for public sanitation. It also prescribes regulations for industrial waste.
Philippine Environmental Code, Presidential Decree 1152 (June 1977)	Provides the basic regulations for overall environmental management and basic prescriptions for “waste management”.
Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, RA 6969	Law defining management of hazardous waste.
Ecological Solid Waste Management Act, RA9003 (January 2001)	Law concerning the management of solid waste. This law deals with non-hazardous industrial waste.
Act providing for a Comprehensive Air Pollution Control Policy and for Other Purposes, RA 8749	Article 20 prohibits incineration of urban waste emitting hazardous gases, medical waste, and hazardous waste.

Source: Report of Survey Commissioned by the Ministry of the Environment 2011 (Amended 2015)

Table 64 Main regulations of Departments relating to waste and recycling

No., Department	Content
DAO1994-28, DENR	Defines procedures for export or import of hazardous waste, scope, etc.
DAO 1998-49, DENR	Technical guidelines for disposal of solid waste
JAO DENR-DOH 2005-2	Joint regulations of the Department of Environment and Natural Resources and the Department of Health regarding collection, transport, treatment, disposal, etc. of medical waste
DAO 2013-22, DENR	A further revision of DAO 2003-36, DENR which was amended from the procedures manual DAO 1992-29 for RA 6969. Defines detailed regulations regarding the management of hazardous waste.

Source: Report of Survey Commissioned by the Ministry of the Environment of Japan 2011 (Amended 2015)

2) Ecological Solid Waste Management Act

This is one of the most important laws and regulations in the Philippines prescribing policy for 3R's and waste management, and has the objective of reducing the quantity of waste. The Act prescribes promotion of solid waste management in accordance with the management phase.

The management phase covers the whole scope of activities relating to waste management starting from reduction in quantity to final disposal. The basic approach to reduction in quantity is promotion of reusing products, improvement in durability of the products, reduction of resources used in manufacture, and reduction of consumption. Additionally, this Act prescribes that local governments have the responsibility for solid waste management, and that each local government must formulate and implement a waste management plan in accordance with this Act.

(1) Relevant administrative organizations

■ Department of Environment and Natural Resources (DENR)

The DENR is the organization with overall responsibility for environmental problems, and the Environmental Management Bureau (EMB) is responsible for management of hazardous waste, as well as water pollution, air pollution, among others. DENR has 15 regional offices that enforce pollution regulations and act as a point of contact for various notifications of waste quantities arising from those generating hazardous waste. DENR regional offices also carry out inspections of factories for their compliance to regulations.

■ Local governments

Local governments have to prepare 10-year plans for promotion of solid waste schemes, identification of strategies and activities that can be implemented, and promotion of reusing, recycling, and composting of waste arising within their respective jurisdiction.

Note that the national government provides relevant grants in accordance with the financial status of the responsible organizations of local governments, in order to support investment in solid waste management equipment, including the installation of waste recovery facilities.

■ Status of infrastructure development for solid waste processing and 3R

The following table shows the trend in the number of facilities for processing solid waste. There is a significant increase in the resource recovery facilities and sanitary landfill.

Table 65 Trend in number of facilities for processing solid waste

Facility	2007	2008	2009	2010	2011	2012	2013	2014
Open dumping	733	673	838	790	644	606	602	583
Controlled disposal facilities	280	263	394	380	380	339	321	317
Resource recovery facilities	2,186	2,428	6,151	6,957	7,312	7,713	8,486	8,656
Sanitary landfill	15	24	30	33	34	44	55	86

Source: DENR statistical data, Number of Solid Wastes Disposal Facilities by region: 2004-2014

■ Management of hazardous waste

Management of hazardous waste is carried out based on Republic Act No. 6969 (RA 6969), which together with complementary regulations forms the legal system for management of hazardous wastes in the Philippines.

RA 6969 covers a wide range of activities including importation, manufacture, processing, handling, storage, transport, sale, distribution, use, and disposal. The basic concepts are as follows.

- In the management of hazardous waste, reduction in the quantity of hazardous substances produced has first priority, followed by promotion of recycling, processing to render the substances harmless, and finally landfill.
- Producers of waste have the responsibility to properly manage hazardous waste.
- Waste producers must bear the cost of properly processing, storage, and disposal of the hazardous wastes they produce.
- Hazardous waste is the property of the waste producer until it is certified that it has been processed by a designated company, recycled, reused, or disposed of. However, domestic waste is outside the scope of these regulations.

(2) Direction of waste management

1) National Solid Waste Management Strategy

A National Solid Waste Management Strategy 2012-2016 was formulated. This strategy introduces the concept of 3R, and makes specific the following strategies.

- Adjustment of gaps in policies, and harmonization between policies
- Capacity development and spreading awareness among the public
- Financial mechanisms for sustainable solid waste management
- Creation of economic opportunities
- Support for technology and research and development
- Organizational growth and cooperation among organizations
- Monitoring and implementation of compliance
- Appropriate waste management governance, consideration for the most socially vulnerable segment of society, and reduction of disaster and climate change risk

2) Other management strategies

■ Policies to promote investment in the recycling industry

In the annual investment priority schemes of the BOI, incentives are provided from the national government for investment in the recycling industry. These incentives include tax exemption and tax relief for capital equipment, vehicles, and others.

■ Promotion of facilities to convert waste into RDF

Over the recent years, the introduction of RDF conversion facilities has been promoted in the Philippines, as part of the waste recycling policy.

■ Study of guidelines for waste electrical power generation

In the Philippines, the 3R's and the spread of sanitary final disposal facilities are promoted, but at present there is a pressing need for final disposal facilities, especially in large cities. Therefore, studies are in progress for the introduction of waste-to-electricity facilities.

3.5.3.4 Water Supply and Sewage

(1) Status of water use

The status of water use in the Philippines is as shown below. The quantity of water used by the power generation and agriculture sectors is large, and, viewed over all sectors the use of surface water greatly exceeds the use of groundwater.

Table 66 Status of water use in the Philippines

Sector	Used Amount (Mil. m ³ /Year)	Groundwater (%)	Surface water (%)
LGU	8,591	30	70
Industry	8,961	6	94
Agriculture	98,500	1	99
Power Generation	111,019	0	100
Others	1,593	15	85
Total	228,593	2	98

Source: GWI, "Global Water Market 2015"

Comparing access rates to improved water supply and sanitary facilities, it is evident that the improvement in sanitary facilities is delayed, but water supply is relatively advanced (i.e., adoption rate of water supply exceeds 50%). By 2025, the privatization rate of water supply is likely to increase to 30%, and sewage systems to 13%.

Table 67 Access rate to water supply and sanitary facilities

Items	Percentage, Year	Source
Access rate to improved water supply	92%, 2010	Unicef and WHO, progress on drinking water and sanitation
Access rate to improved sanitary facilities	74%, 2010	Unicef and WHO, progress on drinking water and sanitation
Adoption rate of water supply	53.2%, 2010	GWI, Global Water Market, 2010
Adoption rate of sewerage system	31.2%, 2010	GWI, Global Water Market, 2010
Privatization rate of water supply	13%, 2011	Pinsent Masons Water Year book, 2012
Privatization rate of sewerage system	2%, 2011	Pinsent Masons Water Year book, 2012

(2) Administration

Management of water resources in the Philippines is the responsibility of the National Water Resources Board (NWRB) under the DENR. The NWRB is responsible for setting environmental standards, issuing permits for extracting groundwater, monitoring of groundwater quality, and other related roles. Furthermore, the NWRB monitors the quantity of water intake. Water quality is monitored in Water Quality Management Areas (WQMAs), as defined by the Clean Water Act (2004).

Meanwhile, the sewage sector is another responsibility of EMB. Setting and monitoring wastewater standards is the responsibility of the EMB and its regional offices.

The Department of Health (DOH) is responsible for regulations concerning public health. In addition to regulations regarding drinking water, DOH is responsible for Philippine public health regulations requiring the installation of septic tanks.

The implementing organizations in the water supply business are basically the local government organizations and water districts. Water districts are local corporate entities established in accordance with Presidential Decree No. 198, and do not necessarily coincide with the areas of local governments. Also, in Metro Manila, as a result of privatization of the water supply business, the water supply business is under the responsibilities of The Manila Water Company, Inc., and Maynilad Water Services, Inc.

The Local Water Utilities Administration (LWUA) is a government-owned and controlled corporation that provides specialized lending support and promotes the development of water supply systems of local water supply organizations (local governments, water districts) outside Metro Manila. LWUA also makes regulations regarding water charges. LWUA also has a legal responsibility for sewage processing, but as a result of the priority placed on water supply, support for the sewage field has taken a subordinate role.

At present, the government department responsible for sewage infrastructure is the DPWH. Aside from being the government agency for the roads and bridges, DPWH is designated as the implementing organization in the Philippine National Sewage Septage Management Program (NSSMP).

Department of Interior and Local Government (DILG) *Responsible for local government administration	Department of Public Works and Highways (DPWH) * Responsible for the NSSMP	Department of Health (DOH)	Department of Environment and Natural Resources (DENR)
Local Government Unit (LGUs) * Implement water supply and sewage projects	Local Water Utilities Administration (LWUA) * Provide support for local governments		Environmental Management Bureau (EMB) * Responsible for wastewater management
	Water Districts (WDs) * Implement water supply and sewage projects		National Water Resource Board (NWEB) Responsible for management of water resources

The following are the relevant laws and regulations in the water supply and sewage sectors.

Table 68 Relevant laws and regulations in the water supply and sewage sectors

Laws and regulations	Enactment	Title of law or regulation, and content
Republic Act No. 4850	1978	Prescribes water quality management of Laguna Lake, the issuing of various permits for intake of water from the lake, charges, etc., by the Laguna Lake Development Authority.
Water Code of the Philippines	1976	Defines the scope of rights and responsibilities of users and owners of water resources, and prescribes the ownership, specification, development, and protection, etc., of water resources.
Republic Act No. 6234	1971	The charter for MWSS. Prescribes the scope of the authority of MWSS in the water supply and sewage sectors in the Metro Manila area including parts of Rizal and Cavite Provinces.
Republic Act No. 8041	1995	Prescribes specific measures to deal with water crises in order to promptly and effectively deal with water shortage crises nationwide, as well as prescribing the operation, improvement, maintenance and repair, reorganization, etc., of the water supply and sewage sectors.
Memorandum Order No. 20	2011	Prescribes sewage treatment systems and priority investment sectors such as water quality and pollution elimination technologies, etc., prescribed by the Philippine Clean Water Act.

Source: PPP infrastructure project, JICA, 2015

(3) Present status and issues

There are many water supply and sewage organizations in the Philippines (approximately 5,000 to 6,000); however, there is no mechanism or system to manage the sector as a whole. As a result, there are no reliable statistics or information regarding the status of development of water supply and sewage systems. To date the LWUA, the DILG, and the PSA have published separate statistical documents, but their figures are inconsistent with each other.

The following are the important issues that have been raised in surveys over the previous years.

■ **Strengthening of regulations and monitoring for groundwater extraction**

Salt damage and ground settlement due to excessive extraction of groundwater have become serious problems in the urban areas of the Philippines. Although there are regulations governing the extraction of groundwater, NWRB may not seem to adequately enforce the regulations. For instance, when NWRB receives an application to extract groundwater, the application is published, and a permit seems to be immediately issued, provided that there is no objection.

Monitoring of the quantity of extracted groundwater is carried out by the monitoring department of NWRB as well as the local offices of the water districts and local governments in each area. The number of staff in the headquarters monitoring department is 10, which is considered to be insufficient staff to monitor 23,000 locations nationwide. With this situation, only select locations are being monitored.

In summary, the issues are strengthening the groundwater extraction rules, applying stricter standards of examination when issuing permits for extraction, and constructing a stronger and more practical monitoring system.

■ **Promotion of the spread of sewage processing systems**

In the Philippines, the mechanisms for treatment of sewage are not widespread. Even in Metro Manila, the rate of introduction of sewage treatment systems is only about 15%; the remaining 85% uses a septic tank or direct discharge. Domestic wastewater is responsible for approximately 70% of the pollution of the water environment in the Philippines, industry is responsible for about 25%, and solid waste is responsible for 5%. This indicates that the effect of domestic wastewater is great.

For the short-term, it is said that promotion of the use of septic tanks as prescribed by the laws and regulations and construction of appropriate maintenance management mechanisms are the issues. For the medium and long-term it is essential to target the spread of effective domestic wastewater processing plant as an alternative to septic tanks, from the viewpoint of conservation of the water environment.

■ **Promotion of policies to increase the spread of sewage treatment**

Based on the NSSMP, it is mandated that 40% of the cost of relevant projects of local governments will be supported by the DPWH. However, it seems that the system of the project does not fit the

actual needs, particularly on the included scope of the plan. For instance, the septage or toilet wastewater is excluded, as well the areas outside central urban areas. In addition, the NSSMP recognized that only local governments are the implementing agencies, excluding water districts. At present, the revisions on NSSMP is underway to address these inconsistencies.

Moreover, in order to obtain an NSSMP grant, it is necessary for local governments to carry out and submit feasibility study. However, the local governments may not necessarily have the capabilities to conduct this. Thus, another issue is to improve the capacity on the local government side, securing finance, etc.

- Strengthening the system for monitoring wastewater quality standards and implementation of cleanup projects

Monitoring of wastewater quality standards is appropriately carried out by the EMB. However, depending on the area there is a shortage of staff engaged in monitoring; there are cases wherein sufficient monitoring is not carried out.

An issue for the future is the strengthening of EMB's monitoring system in cooperation with the water districts and the environmental bureaus of the local governments. This is to ensure compliance with wastewater quality standards and the promotion of septic tanks.

Chapter 4 Direction of the Development in the Target Regions

4.1 Positioning in Development Plans

4.1.1 Positioning in PDP and RDP

4.1.1.1 Central Luzon

Positioning of Central Luzon in PDP and RDP is to be a gateway connecting northern part of Luzon Island and Metro Manila. In northern part of Luzon, there exist agricultural products and tourism resources including world heritage and tier 1 supplier to Boeing. Once these resources will connect to Metro Manila via Central Luzon, or connect to foreign countries via international ports, then a robust domestic and international supply chain will be established and the regions will develop as industrial clusters.

In the PDP 2017-2022, Cabanatuan City, Tarlac City, Subic-Olongapo City, Balanga City, Clark (Angeles City, San Fernando City, mabalacat, Porac and Bacolor), Baliwag, Malolos City are listed as candidates for “regional centers”. These populous cities will be urbanized.

As for the W shaped development of the region indicated in the latest RDP, only the north-south axis from Manila to Baguio has been developed. In the future, if other parts of W shape will be developed, it will contribute to the development of the whole region.

4.1.1.2 CALABARZON

Positioning of CALABARZON in PDP and RDP is to be a gateway connecting Visayas, Mindanao and Metro Manila. The region is also connecting domestic and global market via international port. Currently, already many assembling type of manufacturing sector is accumulated in the region. They are importing and exporting material, parts and products. CALABARZON will become a node for local companies to participate in a global supply chain or to set up a sales channel to Metro Manila, one of the largest growing market in ASEAN.

In the PDP (2017-2022), Dsamarinas City, Antipolo City, Calamba City and Batangas City are listed as candidates for “regional centers”.

In the RDP, cruciate (quadrangle) shape of spatial development is indicated. Currently, only north-south axis from Manila to Batangas has been developed and some western parts in Cavite are under development. Areas where accessibility has been improved by expressway development, industrial estates have been developed. Further road network development will contribute to development of new industrial developments, which will host FDIs.

4.1.2 Relationship with Metro Manila

In the Transportation Roadmap, Bulacan of Central Luzon is included in the greater Metro Manila and will be developed in relation to the development of Metro Manila. On the other hand, Clark, Subic and Tarlac area will be developed as an independent area from Metro Manila. For CALABARZON, Cavite and Laguna are included in the greater Metro Manila but Batangas, Lipa and Lucena will be developed as an independent area from Metro Manila.

Consequently, the target areas are not designed to form independent economic zone, but to bear certain urban function sharing with Metro Manila. Thus, there is no regional center to form independent economic zone. This has both advantages and disadvantages. One advantage is the regions' proximity to Manila. These regions can utilize Manila's urban functions, such as a major port location and a primary residence for expats. These regions can also provide better location, since locating in these regions can avoid negative impacts from air pollution, congestion and waste management experienced in Manila. On the other hand, one disadvantage is that these target areas are influenced by external factors of Manila, which indicates its challenges to develop independently from Manila.

4.1.3 Focused industrial sectors in various development plans

Industrial Clusters in PDP

The PDP focused on the industrial clusters based on local products and geographical advantages, and all 18 regions identified respective industries. Region III identified bamboo and logistics. Region IV-A identified ICT, ICT-enabled industry, and logistics. ICT enabled industry includes service industry such as call center and business process outsourcing. (PDP P.96-98. Competitive Industry and Services Sectors)

In the new PDP (2017-2022), no regional industrial cluster is indicated but eleven focus sectors for whole nation is indicated.

Focus industries in roadmap localization

In the roadmap localization, focus industrial sectors for Central Luzon are Aerospace, Furniture, Petrochemical and Processed meat and for CALABARZON are Automotive, Electronics, Petrochemical and IT/BPM. Basically these are the sectors that some resources are already existing in the region and recognized as important sectors. It does not mean that these sectors have competitiveness in a global context.

New wave cities for IT/BPM

IT/BPM business is emerging not only in Metro Manila but also in regional development centers. IT & Business Process Association Philippines, industrial association, lists top ten “Next wave Cities”. Bulacan in Central Luzon, Cavite, Batangas, Laguna, Rizal in CALABARZON are in the list.

4.2 Resources for further economic growth

4.2.1 Advantageous resources of Central Luzon

4.2.1.1 Existing Industry Resources

As mentioned in Chapter 3, Central Luzon is a populous region in the Philippines. Agriculture and industry are dominant in the regional economy. In particular, agriculture shows development in supply chain from primary production to processing and selling.

As to the industry, as mentioned in Chapter 3, one advantage of Central Luzon’s key locations, Subic and Clark, is the existing airport and seaport facilities which are accessible to exporting companies in light-weight, high value added electronic parts and tire manufacturing industries. The facilities of (and adjacent areas from) Subic and Clark can also accommodate the activities of aircraft maintenance and shipbuilding.

However, in terms of existing industrial resource, accumulation and industrial cluster development is lagging behind compared with CALABARZON. Total value of foreign direct investments into the region is lower and the number of Japanese companies, for example, is also limited compared with region IV-A.

One future advantage of Central Luzon is the proposed development of Clark Green City (CGC) which will become a central business district in the region. One concept of the project is to promote green environment in the overall real estate and industry development. Aside from this, there is a plan to host a campus of the University of the Philippines and to accommodate market place for agricultural products.

4.2.1.2 Infrastructure for industry

Manufacturing and IT/BPO companies are located in a plain of stable ground with good accessibility from Metro Manila and airports and seaport of Subic and Clark. For the road network, north and south axis from Manila to Baguio has been developed, which is a part of “W”-shaped development orientation indicated in the RDP. Industry locations are concentrated in the export processing zones near airports and seaports such as Subic, Clark and Bataan.

Infrastructure development is been undertaken mostly by PPP and the projects tend to concentrate in the area near to Metro Manila. If the region is to develop “regional centers” designated in the new PDP, some of which are located far from north – south axis of road network, a different initiative for infrastructure development will be needed.

In terms of the relevance of infrastructure to industry, there will be further development of existing sectors such as agriculture and manufacturing or new business development that will fully utilize potentiality of international ports and airports in the region. Judging from existing companies, in addition to light weight and high value added sectors such as electronics parts, some heavy products that will use seaport (such as tire for vehicle) are suitable for the region.

At this moment, there is only one “Next Wave Cities” of IT/BPM in the region, but once central business district like CGC is developed, research institutions are established and good living environment is developed, there will be more potentiality for locating outsourcing services such as Engineering Service Outsourcing (ESO) or Electric Data Automation (EDA) services.

4.2.2 Advantages and challenges of CALABARZON

4.2.2.1 Existing Industry Resources

Major sectors in CALABARZON are industry and service, as discussed in Chapter 3. Industrial parks are concentrated in the region; the attraction of foreign investors especially automotive and electronics equipment and parts companies has been successful compared with other regions. Nearly 50% of FDIs into the Philippines concentrate in CALABARZON and there are many Japanese manufacturing companies. Accessibility from Metro Manila is relatively better. More importantly, there is a positive perception on the conditions for industry development in CALABARZON.

The region can be a model region for enhancing domestic and international supply chain by supporting existing industries. To this end, it will be needed to grasp local potential suppliers and their technologies and to make matching with multinational companies.

4.2.2.2 Infrastructure for industry

In this region, manufacturing and IT/BPM sector companies are located in a plain accessible from Metro Manila, such as Laguna and Cavite. They tend to locate in such area since road network has been developed mostly by PPP. If the region is to develop new regional centers further away from Metro Manila, different approach for infrastructure development will be needed.

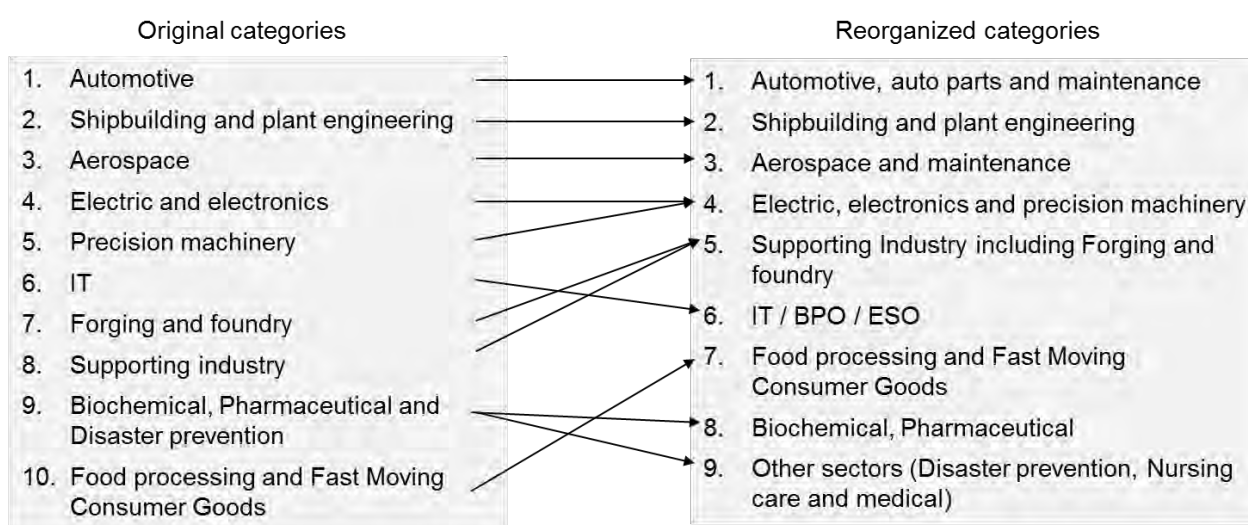
Judging from existing industry, CALABARZON is a suitable place for manufacturing because of abundant of labor and accessibility from Metro Manila. This advantage will continue for the future as well. There are many “New Wave Cities” of IT/BPM and these cities are almost the same areas to manufacturing locations. Therefore, in the near future, fusion area of “IT service” and “manufacturing” will be possible scenario. For example, as an extension of existing IT outsourcing, factory IoT, ESO or EDA can be operated in the region.

In the south part of the region, there is Batangas port. These days, handling charge has been lowered and the usage of the port is growing.

Chapter 5 Industry Analysis

5.1 Analysis Framework

The Industry Analysis chapter covers the potential industries. Target sectors have been reorganized from the original category set at the beginning of the project. “Precision machinery”, typically printers in the Philippines, can be classified into a similar category of “Electric and electronics” category. “Forging and foundry” are part of “Supporting industry”. “Disaster prevention” is not an industrial sector and cannot be included in “Biochemical or Pharmaceutical”. Nursing care has been added.



Note: these sectors may be re-organized again after examining the potentiality in the Philippines.

Figure 28 Reorganization of the target sectors (categories)

For each sector, the study will define supply chain and value chain. In principle, it is easier for a company to concentrate all processes of production and all functions of a company in one place (i.e., agglomeration or centralization). It will reduce transaction cost, such as transportation and communication costs. However, there are several reasons that a part or all of supply/value chain to locate in different places.

For example, in a context of supply chain, fragmentation of production is globally observed. If production cost is significantly cheaper than logistics cost in a specific country, then companies will move operations to a lower-cost location. In a context of value chain, if the most advanced research center is located in a specific country, then companies with functions related to those offered in the research area may establish their own research centers in the country.

This chapter will try to understand the major factors for location selection (considering both fragmentation and agglomeration types) and to identify which part of the supply chain and/or value chain has potential to be located in ASEAN or in the Philippines.

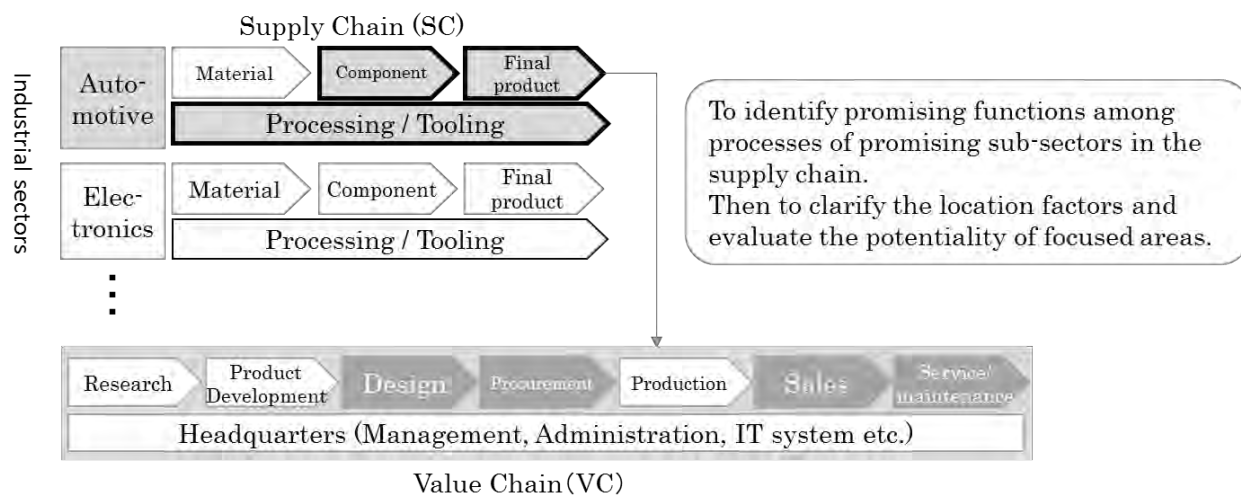


Figure 29 GVC analysis method for this study

5.2 The Trend of International Division of Labor in ASEAN

5.2.1 Trend of economic partnership over ASEAN

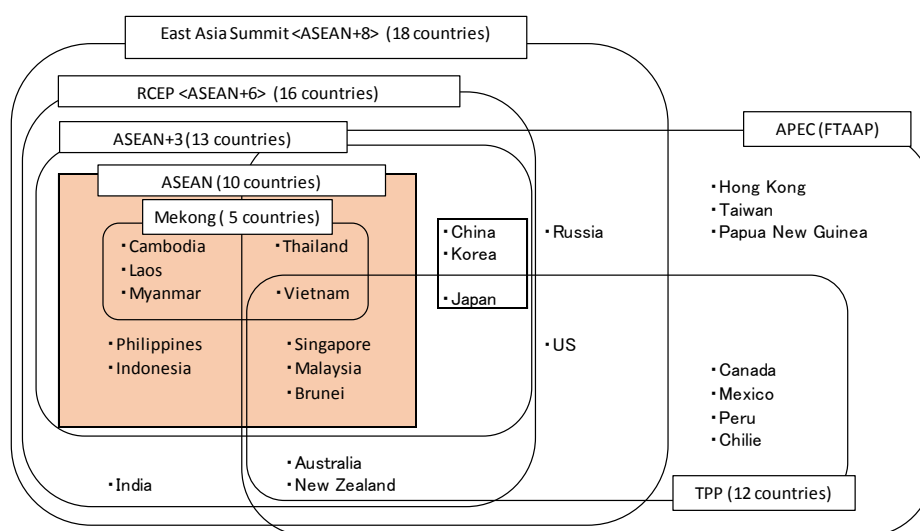
ASEAN countries have promoted import substitution industrialization around 1960s to 1970s, and are promoting expansion of local companies for domestic market by applying high tariffs on imported goods. ASEAN countries then aimed for higher economic growth by gradually shifting to export-oriented industrialization. In the latter half of 1980s to mid-1990s, many Japanese companies began to establish production bases in ASEAN countries and China to hedge against high Japanese currency. This will enable Japanese companies to export their products to Europe, the United States, Japan, and others rather than selling them in the countries where they established their respective production bases.

In 1995, the World Trade Organization (WTO) was established, increasing the momentum to exclude protectionism and promote free trade. Until then, various restrictions on foreign direct investment remained. For example, as a local procurement ratio regulation, many companies with overseas investments were obliged to procure intermediate input goods within a certain local content percentage from the investment destination country. However, in the WTO rules such protectionist systems had been abolished.

One example of benefitting from such circumstances, Thailand adapted an aggressive FTA policy in the first half of 2000s, overlapped with domestic industry development and improvement of access to the target market of the FTAs. With such a move, Thailand became known as the hub for the automobile industry in Asia, and consequently realized economic growth.

As a result of such a large system change along with the establishment of the European Community and the rise of China, ASEAN countries strengthened industry collaboration within the region and aimed at strengthening the competitiveness of ASEAN as a whole. Companies entering ASEAN also began to orient towards the direction of increasing export competitiveness by building efficient production systems by building a network of production bases across ASEAN countries. On the institutional side, reductions in tariff rates within the region and harmonization of various systems have been pursued through the ASEAN Industrial Cooperation (AICO) and ASEAN Free Trade Area (AFTA).

ASEAN has lowered trade barriers among member countries, and actively promoted FTAs with countries in Asia and the Pacific. ASEAN has concluded FTAs with Japan, China, Korea, India, Australia, New Zealand, and others. Currently, discussions are underway on RCEP (Regional Comprehensive Economic Partnership), which is an economic cooperation agreement that covers all these countries.



Source: METI http://www.meti.go.jp/policy/trade_policy/east_asia/activity/about.html

Figure 30 Framework of Multilateral Partnership agreements

A summary of major economic partnership agreements related to Japan and the Philippines is shown in Table 69.

Table 69 Outline of major economic partnership agreement

	Japan-Philippines Economic Partnership Agreement (JPEPA)	Regional Comprehensive Economic Partnership (RCEP)	ASEAN Economic Community (AEC)
Participating countries	Japan, Philippines	10 ASEAN countries, Japan, China, South Korea, India, Australia, New Zealand	10 ASEAN countries
Agreement Conclusion status	Agreement concluded between the two countries concerning liberalization and facilitation of trade and investment, movement of people, improvement of business environment, cooperation etc. in a wide range of fields including human resource training.	A comprehensive economic partnership initiative that bridges the five FTAs between ASEAN and the six countries (Japan, China, South Korea, India Australia and NZ). ASEAN advocated in November 2011. Formal negotiation started at the ASEAN-related summit meeting in November 2012.	<ul style="list-style-type: none"> · Liberalize movement of people, goods and money. Eliminate tariffs and promote more vigorous trade · Visas are not required for ASEAN migration within the region. Promote intra-regional movement in order of skilled workers · Expand exports to neighboring major powers by improving competitiveness and aim for further growth within the ASEAN
Time of Entry into effect	Effective on December 11, 2008	Not decided	Effective on December 31, 2015
Major features	With the Agreement, tariffs on nearly all products in the mining and manufacturing sector will be eliminated within 10 years for trade in goods. Cooperation on mutual certification / standard certification in the field of electric products.	Once RCEP is realized, a regional economic zone comprising about 3.4 billion people, USD20 trillion of GDP (about 30% of the world) and trade total of USD10 trillion (about 30% of the world) emerges.	Tariffs on goods in the region are already zero at the number of items more than 90%.

Source: JICA Study Team

5.2.2 International division of labor within ASEAN

5.2.2.1 Expansion of division of labor between processes

In East Asia and ASEAN, in the 2000s, due to the abovementioned regional trade agreements, the system change and the infrastructure development expanded rapidly to the “inter-process division of labor”, which is a characteristic phenomenon in the ASEAN region, in addition to “horizontal division of labor”.

“Horizontal division of labor” means specializing in different kinds of products in each country, and by mutually exporting the products, there will be economies of scale. A typical example is Toyota's Utility Vehicle (TUV) concept. Under the TUV concept, a utility vehicle is a multipurpose vehicle (MPV) based on a commercial vehicle—in Thailand, this is assembled as a

pickup “Hilux”, in Indonesia as an MPV called “Kijang”, in the Philippines as “Tamaraw”, and in Malaysia as “Unsell”. The models Tamaraw and Unsell are the localized versions of Indonesia’s Kijang. The power train and units used in each model is a concept to concentrate in one country for producing and complement each other by exporting among ASEAN countries. Diesel engines and body press parts are manufactured in Thailand, gasoline engines in Indonesia, steering in Malaysia, manual transmission in the Philippines. These parts are collectively produced, and preferential tariff measures are used to build a mutual complement system.

DENSO has collectively produced electric components such as starters and alternators in Thailand, compressors and spark plugs for air conditioners in Indonesia, electronic components mainly in ECUs in Malaysia, and combination meters in the Philippines by using the AICO scheme since the middle of the 1990s.

“Inter-process division of labor” means that labor-intensive parts are produced in a country with cheap labor, high-technology parts in a country with high technical capability. The final product is then assembled. For example, in the production of SLR cameras, Nikon separated labor-intensive parts assembling processes from Thai factories and transferred them to Laos, which has a lower labor cost. The parts made in Laos are exported to a factory in Thailand, assembled the final product, The final product is later on exported from there.

The amount of trade among the ASEAN countries rose sharply in the 2000s, and reached over USD600 billion in 2012, which is about 11 times than that in 1990s. It is believed that the reduction and elimination of intra-regional tariffs by the AFTA that began in 1993 and completed in six leading countries in 2010 contributed to the expansion of intra-regional trade. Meanwhile, ASEAN's intra-regional trade ratio rose gently from 17.5% in 1990, but remained between 20 and 25% since 2000, however, in terms of the trade amount, the value of intra-regional trade remained at a nearly constant level. Along with the expansion of intra-regional trade, ASEAN’s trade outside the region has also expanded. In contrast, EU’s intra-regional import ratio is high, at 62.1% in 2014, while regional export was at 63.3% in the same year⁴⁵. East Asian countries, including ASEAN, have a high degree of dependence outside the region, and it can be seen that they are open though localized. Such figures do not necessarily indicate a weak trade pattern within ASEAN, but illustrate an emerging, open trade pattern with trading partners outside the ASEAN region. It is the international production division of labor that is positioned as the core part of the regional cooperation.

⁴⁵ Source from JETRO

According to the White Paper on Trade in 2012, among the machinery industries in which inter-process division of labor is particularly observed, in addition to Malaysia and the Philippines of ASEAN, Korea and Taiwan are the carriers of intermediate goods supply in electrical machinery. In transportation machinery, Korea and Taiwan also play a similar role. As for assembly of the finished product at the end of the process, China plays an integral role in electric machinery, while Thailand plays a core role in transportation equipment. For example, Thailand's AFTA utilization rate has greatly expanded from about 10% in 2000, to 20% in 2003, and to 38.4% in 2010. Also, the AFTA utilization rate in Thailand's exports to each country in 2010 reached 61.3% in exports to Indonesia and 55.9% in exports to the Philippines. Through such regional economic cooperation, international division of labor and establishment of production network were promoted.

5.2.2.2 Changes in international division of labor in ASEAN

Due to changes in the global economy, international division of labor in ASEAN has been transforming, and there is a high possibility that it will still change in future. In 2000s, following the rise in labor costs in the coastal areas of China, a division of labor called “China plus one” emerged. Particularly, by utilizing the relatively low labor cost in northern parts of Vietnam, the division of labor in processes such as exporting the parts produced in China to Vietnam, processing, assembling and exporting final products has been seen.

In addition, during the past five years, the labor costs continued to rise sharply in ASEAN countries, especially countries with large manufacturing industries such as Thailand, Indonesia and Vietnam. Among them, Thailand, which already had a high wage level, has begun to lose its cost competitiveness in labor-intensive processes; this time, the trend could be called as “Thailand plus One” (i.e., establishing factories in Cambodia, Laos, Myanmar, and other low-cost countries, aside from having facilities in Thailand). There was also a movement to establish an interdepartmental division of labor among the processes. One such example is the case of Nikon mentioned above.

However, training of industrial human resources in Thailand and neighboring countries has just begun, and it is difficult to say that this division of labor between processes, “Thailand plus One” is continuously progressing. Meanwhile, there are increasing reports that investment for factory automation (FA) is active in many Thai factories since 2016. There are cases where factory automation equipment makers announce their business expansion due to strong orders in Thailand. The "IoT (Internet of Things)" has also begun to spread to factory production lines, and automation is progressing—not only depending on human handling but also on manufacturing.

5.2.2.3 Future prospects of international division of labor in ASEAN

The global economy is constantly changing, and it is challenging to see the direction of international division of labor in the future. However, from two perspectives, severe situations are waiting for ASEAN latecomers in the manufacturing industry. First is that the ASEAN Economic Community was formed and the tariffs in the region will be drastically reduced in 2018, resulting to companies more likely doing advance selection and concentration of locations strategies. Initially, foreign-funded enterprises put up production bases in major ASEAN countries because each country set tariffs high and international price competition was not functioning. However, in the future, such tariffs will disappear and the need to invest in each country will weaken.

Second, from a corporate perspective, it is more efficient to increase production efficiency by intensively investing in one ASEAN location, and export from there to member countries, rather than producing in each country. Regarding such products, it will become more selective to which ASEAN country to be located, and countries with higher comparative advantages will be selected.

Another factor is the movement of automating production lines. Economic growth in a country may lead to a rise in labor costs. However, for manufacturing industries with large capital expenditures, it is a challenge to transfer production bases to another country because of the soaring labor costs. Another challenge is the lack of skills improvement in human resources among developing countries. For this reason, there is a possibility of absorbing cost increases by automating the production line in countries where industrial clusters already exist and technology is accumulated in many companies and human resources.

Considering these two factors, Thailand and Vietnam, which have already formed industrial clusters, and Indonesia, where FDI inflows are continual, continue to dominate the industrial landscape. Unless other ASEAN countries take a strategic position, their respective development in the manufacturing industry may be particularly difficult. One assumption is that companies will not be able to find out the necessity of investing in other ASEAN countries if there is no conducive environment for manufacturing—a sizeable industrial human resources, national investment for R&D, presence of related supporting industries, and industrial infrastructure for specific sectors which are not really developed in other countries. It will not be entirely compelling for potential investors if a country only offers low-cost talent or incentive schemes.

5.2.2.4 Characteristics of ASEAN countries

The characteristics such as the positioning of ASEAN countries in major industries and international division of labor are summarized as follows.

(1) Singapore (Population 5,535,002⁴⁶)

Singapore's GDP per capita is the highest among ASEAN countries due to vibrant industries on finance, real estate, trade, shipping, and others. Consequently, the level of personnel expenses is also high, and new locations in the manufacturing industry are not seen much. However, light industry such as electronic parts still has benefits. The country operates investment funds, promotes development of new industries, improves world-class business environment, invites prominent researchers all over the world and conducts high value-added industrial activities such as research and development activities, sovereign wealth funds, promotion of development of new industries, improvement of world-such as research and development activities. As the population size is small, it is difficult to expect the country as a large market or as a manufacturing base. However, it is important as a market with high purchasing power.

(2) Malaysia (Population 30,331,007)

Malaysia has a good business environment, as seen in its developed infrastructure and presence of professional and technical workers. The electronics and IT industries are well clustered. The government is promoting new industries through state-owned investment funds and other mechanisms. Since key industries are already identified but domestic market is limited, successful local companies have been internationalizing (e.g., exporting to other countries). Other aspects of development aside from promoting Singapore border development include Islamic finance sector and Halal industry.

As a result of advancing domestic production of automobiles, Malaysia was able to have two domestic car brands (not really promoted for exports or international competitiveness). Also related to the automobiles, there are established local suppliers for car manufacturers, who then exports the finished car products due to limited market in Malaysia.

(3) Thailand (Population 67,959,359)

Thailand is called Detroit of Asia, since as the automobile industry is its key industry. As a result of accumulation of supporting industries, it has a positive effect on advancing electric and electronic industries, and has become a major production and export base in ASEAN. The government pursued infrastructure development (Laem Chabang Port, Eastern Sea Board, etc.)

⁴⁶ World Development Indicator 2015

systematically from the early stages of automobile manufacturing development. In addition, Thailand has created a fulfilling investment environment for Japanese companies, and many Japanese SMEs with high technology entered ventured in the country. Recently, as labor costs soared, the National Innovation Agency and other related agencies are concentrating on creating new industries. Although political confusion arises, its impact is seen to be limited on the growth of the manufacturing industry.

At present, Thailand is building a supply chain for manufacturing industries integrated with Cambodia, Lao PDR, and Myanmar.

(4) Indonesia (Population 257,563,815)

Indonesia has the world's fourth largest population. Investments in the automobile industry and other related industries are actively targeted to its large consumption-driven market defined by its more than 250 million people. Although the market is somewhat stagnant due to delays in infrastructure development and inflation, with the expansion of the middle-income group, growth expectations are perceived to be high in the long run.

The country also has abundant natural resources. From the viewpoint of local production and local consumption, manufacturing industry has some advantages in the country. With respect to automobiles, component makers are also moving forward to the field for finished car manufacturers' strong motivation for investing.

(5) Philippines (Population 100,699,385)

The Philippines has the second largest population in ASEAN. It has a population of over 100 million people indicating an abundant labor supply, and high potential as both a market and a production base. However, labor costs in the Philippines are higher than those in Vietnam and Myanmar. In addition, there is no progress in the development of large-scale industrial infrastructure, which is in contrast to comparable countries such as Thailand, Vietnam and Myanmar, and there is no wide recognition of its advantage as a manufacturing base in the region. Until now, direct foreign investment has been poured for its abundant and cheap workforce against capability strengths. However, with regard to the manufacturing industry, relative superiority to other ASEAN member states is not clear at present. Epson's factory expansion, Canon, Murata Manufacturing, and other large-scale investments came in around 2011, but after that, such momentum has stopped.

(6) Vietnam (Population 91,703,800)

Vietnam is attractive as a market with a population of about 100 million people, and still has low labor costs. Vietnam is an attractive production and export base because of infrastructure development and industrial human resources. A large number of foreign capital enterprises including those from Japan compete and invest in the country. Investments in electrical and textile and apparel industry are significant. Although labor-intensive industry is developing, it is focusing to transition to capital-intensive industry.

There is also merit in terms of logistics using the economic corridor (China in the north and Mekong region in the south). With ODA from Japan and others, initiatives such as port development that can be used for trade, the rehabilitation of the access road, the development of industrial zones along the main road, and industrial human resource development were successfully conducted.

Overall, the location's potential for the manufacturing industry continues to be high.

(7) Cambodia (Population 15,577,899)

Labor-intensive industries have been developing due to low labor costs. However, the balance between labor cost and productivity is getting worse, marked by the increases in the minimum wages. Albeit the “Thailand plus one”, there is not much progress for Cambodia to benefit from this trend.

The logistics environment improved with the North-South Economic Corridor (Bangkok - Phnom Penh - Ho Chi Minh).

(8) Laos (Population 6,802,023)

The population size is small. From the viewpoint of the manufacturing industry, although the movement of “Thailand plus One”, there is also not much progress to benefit from this trend in Laos.

Due to the small domestic market size of Laos, it is considered difficult to rely on the manufacturing industry for future economic and industrial development

(9) Myanmar (Population 53,897,154)

Myanmar has a middle-sized population comparing within the ASEAN region. Myanmar's labor costs are also cheap. In general, infrastructure is still inadequate and industrial human resource development is still underway. Therefore, it will take time to catch up with other ASEAN

countries. However, the development of industrial infrastructure, mainly in Yangon, has been progressing, and investment is also increasing due to expectations for future prospects.

(10) Brunei (Population 423,188)

In a small country, the income of the national economy is managed from resources. Brunei does not have any other apparent competitiveness for other industries.

The following table summarizes the situation of each ASEAN country. As stated in the current trend of international division of labor, the overseas location of a company is putting importance on high production efficiency, rather than decentralized location, from which the products will be exported to neighboring countries utilizing the FTAs. As a result, industrial clusters are formed in a country, where supporting industries, human resource development agencies, research and development institutions are available, or in simpler terms a country where there is already an accumulation.

Table 70 Industry characteristics of ASEAN countries

Country	Competitive industrial sectors	Characteristics
Singapore	Finance, real estate, trade, shipping, advanced services, new industry	New location for the manufacturing industry is limited. Specialized in areas with high added value.
Malaysia	Electronics, IT, Islamic Business, New Industry	Regarding the electronics industry and IT, human resources are developed and competitiveness is high.
Thailand	Automotive, electronics, machine tools, supporting industries, food processing, (new industry)	Multinational manufacturers entered to the automotive industry. Industrial policies along with the infrastructure development and human resources development led to success.
Indonesia	Automotive, daily necessities, resource related, (electronics)	Resource sector is strong. Automotive and daily items are also expanding due to growth of domestic demand.
Philippines	IT/BPO, (electronics), (maintenance engineering)	IT / BPO and engineers have strengths. The manufacturing industry is still small in size, but developing.
Vietnam	Primary products, textiles, electrical and electronic, IT	Industries are gathering due to cost competitive labor and industrial infrastructure development.
Cambodia, Laos	Tourism, service, (Manufacturing industry)	For the manufacturing industry, human resource development and infrastructure development have started, but still on the way to produce the result.
Myanmar	(Manufacturing industry)	Although the manufacturing industry is still under development, it is growing rapidly as infrastructure development progresses
Brunei	Resource related	Resource related sector is strong. The development of other industries is limited.

Note: In (), there are certain resources in that country, and although those industries are focused in recent years, it cannot say that the sector is internationally competitive.

Source: JICA Study Team

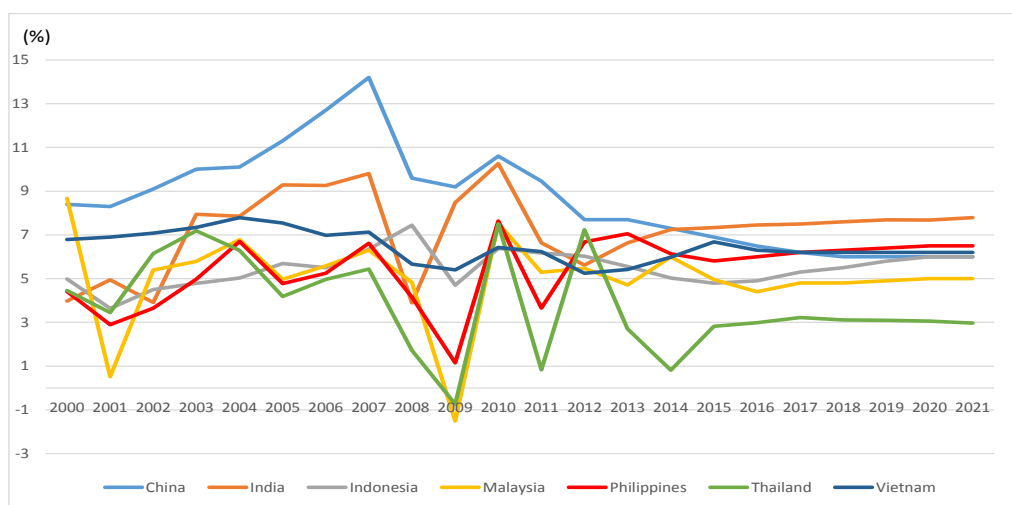
From the situation of each country above, the direction of the international division of labor in ASEAN, in particular the direction and location factors of the manufacturing network of the manufacturing industry can be summarized as follows.

- Progress in the development of industrial infrastructure in potential overseas locations has an effect of promoting direct investment (Thailand, Vietnam, Myanmar etc. have actively accepted ODA, and promoted large-scale industrial infrastructure development.)
- Low labor cost is only among the gamut of location selection factors for investors. Countries where industrial clusters are present and advanced industrial human resources are cultivated may further expand their industrial accumulation. These countries may also invest in production automation, if necessary.
- In Singapore and Malaysia, the government operates investment funds and develops new industries. In addition to accepting investment, there is the possibility that it will be one of the pillars of future growth, since each country raises strong, local business and companies through its own funds, personnel and idea.

5.3 Economic Situation of the Philippines Compared with ASEAN Countries

5.3.1 Macro Economic Situation of the Philippines

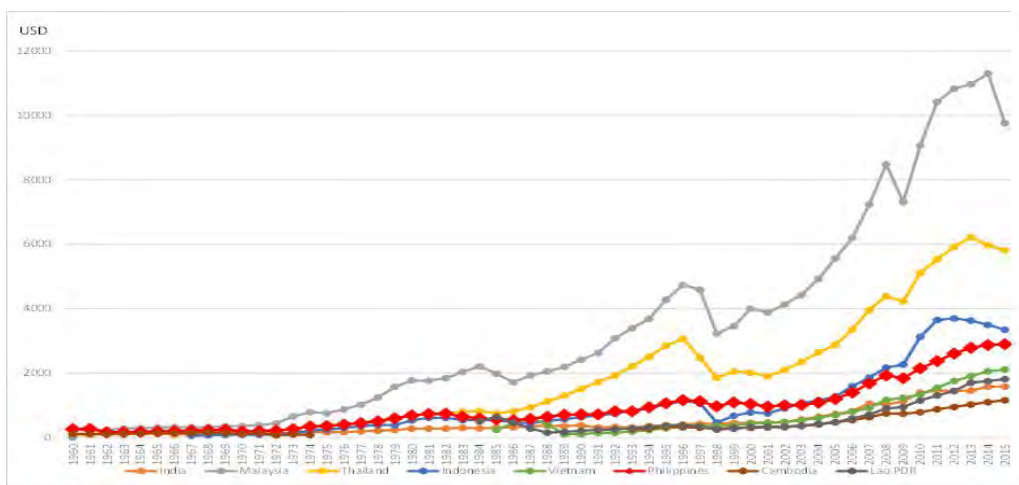
Economy of the Philippines grew firmly and has not fallen into negative economic growth for the past 15 years. In addition, according to the forecasts of IMF, it is expected that it will achieve more than 6% of high growth till 2021. This is the second highest growth rate next to India's.



Source: IMF, World Economic Outlook, April 2016.

Figure 31 GDP Growth Rate (%)

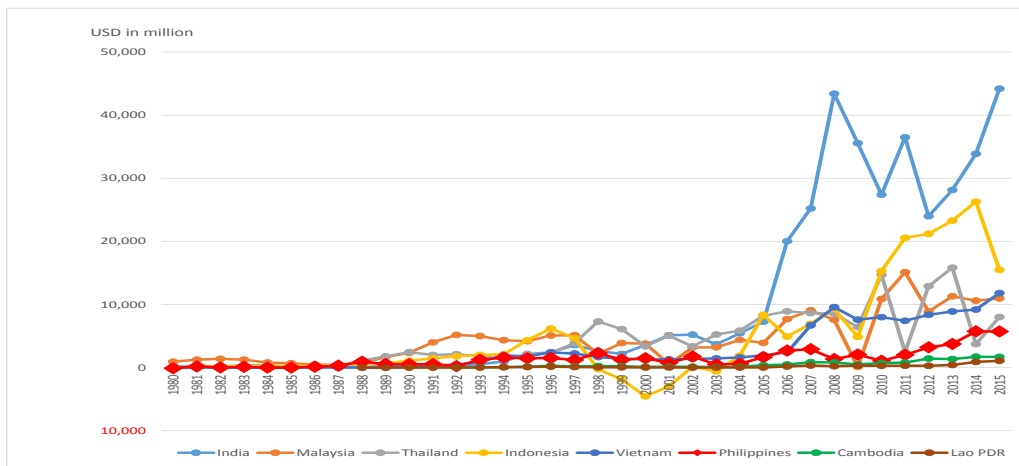
GDP per capita of the Philippines in 2015 is just beyond USD3,000. In terms of economy, it is the fifth among major ASEAN countries and India; however, there is a big difference with Singapore, Malaysia, and Thailand. Singapore is already in line with developed countries, and Malaysia, which exceeds a GDP per capita of USD10,000, is nearly at the level of developed countries. Thailand continues to progress, since its GDP per capita is nearly USD7,000. On the other hand, low-developed countries such as Vietnam and Myanmar are rapidly catching up. Among them, the Philippines, together with Indonesia, has been separated from the country going up and is being driven up by the latecomer countries.



Source: World Development Indicators, WB.

Figure 32 GDP per capita (USD)

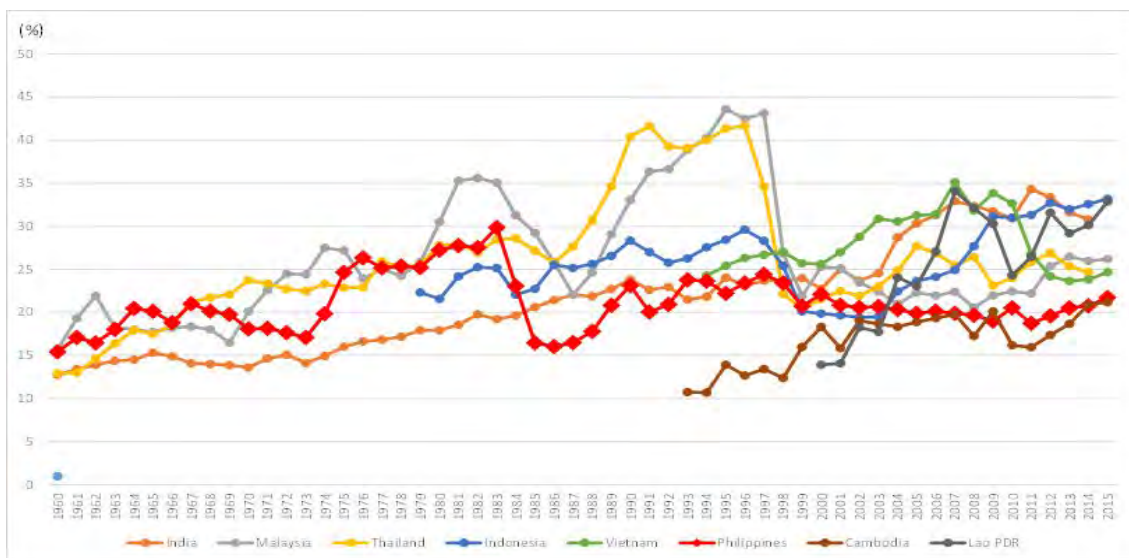
In comparison with other major ASEAN countries and India, GDP of Malaysia has started rapidly climbing up in the 1980s and GDP of Thailand has increase since the 1990s. Lately, GDP of Indonesia and India is remarkably increasing mainly because of the quick inflow of the foreign direct investment. Foreign direct investment (net inflow) of the Philippines falls behind India, Indonesia, Viet Nam, Malaysia and Thailand.



Source: World Development Indicators, WB.

Figure 33 Foreign Direct Investment (Net inflow) (USD in million)

Although the infrastructure as basis of industrial development in the Philippines has increased at a relatively high ratio from mid-1970s to mid-1980s, the ratio decreased after that and it remained in a low level from mid-1970s through mid-1980s comparing with the other ASEAN countries and India. Meanwhile, investment has concentrated in Thailand, Vietnam, etc., which had been engaging in foreign investment promotion while narrowing down the target industries by linking infrastructure development and industrial concentration. Foreign investment aimed at large-scale domestic market also flows into Indonesia. On the other hand, the Philippines is lagging behind in accepting investment.

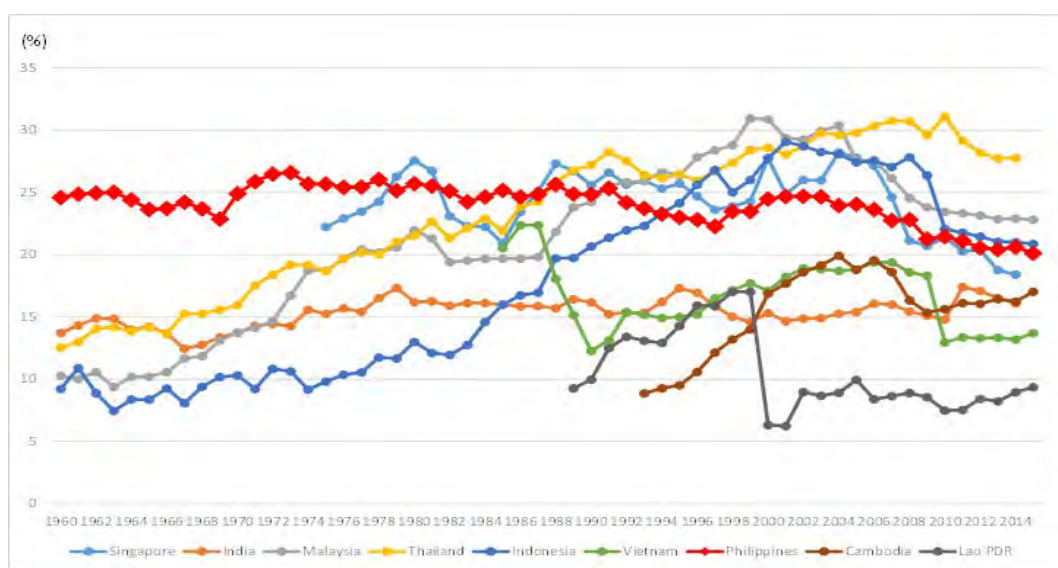


Source: World Development Indicators, WB.

Figure 34 Gross Fixed Capital Formation (% of GDP)

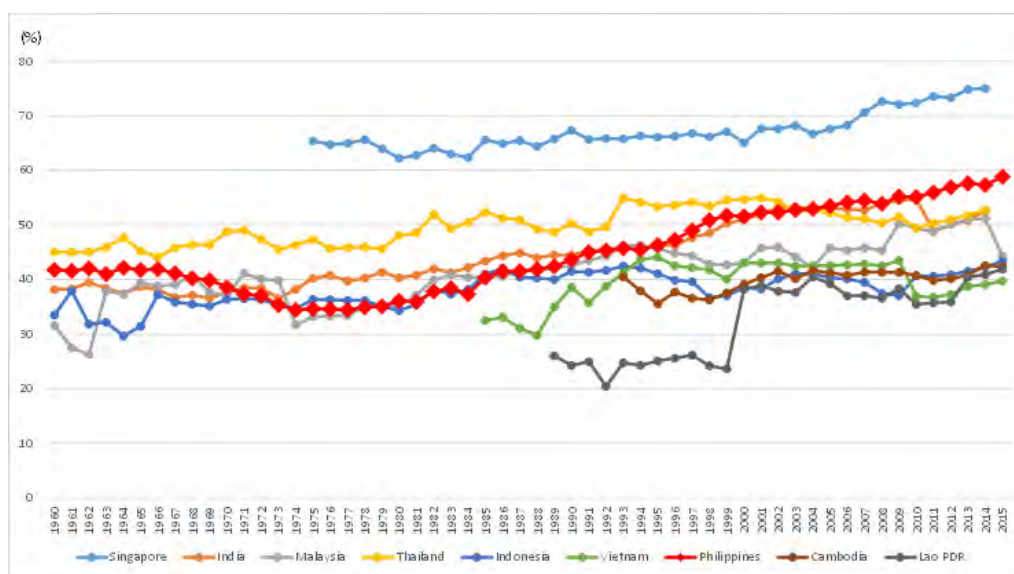
The added value (% of GDP) of the manufacturing industry of the Philippines was the highest among ASEAN countries in the 1970s; however, it was overtaken by Thailand, Malaysia, Singapore, and Indonesia in 1980s.

On the other hand, the added value (% of GDP) of the service industry of the Philippines is high next to Singapore among major ASEAN countries and India. It has already overtaken Thailand and India, and is still growing.



Source: World Development Indicators, WB

Figure 35 Manufacturing, value added (% of GDP)



Source: World Development Indicators, WB.

Figure 36 Service, value added (% of GDP)

Electronic and electrical equipment/parts and telecommunication (47.93%) and machinery and transport equipment (8.56%) occupied the highest percentage of 2014 Philippine exports. Comparing the total export amounts of 2004 and 2014, chemical products grew 57.38 times, copper concentrates 40.64 times, and wood products 24.29 times. On the other hand, during the same period, electronic apparatus grew only 1.07 times.

Table 71 Philippine Exports by Major Commodity Group

	2004	2005	2006	2008	2009	2010	2011	2012	2013	2014	% of 2014 Total	2014/2004 (Times)
Agro-Based Products	1,235	1,562	1,574	2,162	1,612	2,212	3,159	2,771	3,300	3,535	5.69%	2.86
Other Agro-Based Products	206	442	458	612	529	710	856	808	948	1,125	1.81%	5.46
Forest products	34	33	28	34	33	28	50	58	92	86	0.14%	2.53
Logs	-	-	-	-	-	-	0.1	4	3	1	0.00%	-
Lumber	11	9	13	12	10	11	25	29	59	80	0.13%	7.27
Plywood	18	18	10	19	22	15	24	11	3	2	0.00%	0.11
Veneer sheets/corestocks	-	3	4	2	1	2	0.1	0.5	1	0.4	0.00%	-
Others	5	3	1	1	-	-	1	14	26	4	0.01%	0.8
Mineral products	757	819	2,103	2,498	1,470	1,929	2,840	2,337	3,412	4,038	6.50%	5.33
Copper concentrates	14	37	84	134	150	261	337	244	443	569	0.92%	40.64
Copper metal	411	361	1,231	1,309	688	805	1,212	505	642	462	0.74%	1.12
Gold	-	25	50	116	116	128	214	108	67	34	0.05%	-
Iron ore agglomerates	83	110	153	114	92	110	63	86	113	119	0.19%	1.43
Chromium ore	6	5	5	12	11	10	8	8	15	6	0.01%	1
Nickel	-	-	0	0	-	-	-	0.001	0.1	-	-	-
Others	243	282	580	813	415	616	1,005	1,386	2,131	2,850	4.59%	11.73
Petroleum products	381	586	918	1,240	293	371	648	465	843	446	0.72%	1.17
Manufactures	33,604	36,955	39,722	40,999	33,058	44,694	39,320	44,260	47,025	51,607	83.10%	1.54
Elect. & elect'l equipment/parts & telecom	27,871	28,499	29,683	29,927	23,600	32,552	25,243	25,037	20,121	29,767	47.93%	1.07
Garments	217	2,309	2,646	1,949	1,525	1,701	1,896	1,573	1,580	1,854	2.99%	8.54
Textile yarn/fabrics	238	247	220	194	147	169	184	170	188	247	0.40%	1.04
Footwear	34	26	24	31	22	8	12	16	34	35	0.06%	1.03
Travel goods and handbags	39	20	30	95	66	71	40	60	176	266	0.43%	6.82
Wood manufactures	122	138	651	918	821	1,029	1,683	2,159	3,086	2,963	4.77%	24.29
Furniture and fixtures	294	304	276	221	138	152	165	180	251	370	0.60%	1.26
Chemicals	48	546	756	1,128	969	1,567	1,924	1,937	2,852	2,754	4.43%	57.38
Non-metallic mineral manufactures	165	171	183	211	156	162	177	145	204	327	0.53%	1.98
Machinery & transport equipment	1,603	1,835	1,715	2,113	1,945	2,568	2,806	5,310	3,763	5,318	8.56%	3.32
Processed food and beverages	768	519	583	960	851	932	1,035	1,104	1,482	1,449	2.33%	1.89
Iron and steel	58	94	242	262	119	155	200	253	159	108	0.17%	1.86
Baby carr., toys, games and sporting goods	128	131	152	143	128	168	188	239	329	291	0.47%	2.27
Basketwork, wickerwork & other articles of plaiting materials	67	58	53	42	38	43	46	43	50	49	0.08%	0.73
Misc. manufactured articles, nes	234	283	321	331	291	337	423	1,534	558	688	1.11%	2.94
Others	1,718	1,775	2,188	2,473	2,244	3,079	3,298	4,500	5,659	5,121	8.25%	2.98
SPECIAL TRANSACTIONS	1,110	858	1,663	1,532	1,440	1,553	1,432	1,401	1,077	1,265	2.04%	1.14
RE-EXPORTS	528	-	655	628	688	612	672	369	194	282	0.45%	0.53
TOTAL EXPORTS	37,326	41,255	47,410	49,078	38,436	51,498	48,305	52,100	56,698	62,102	100.00%	1.66

Source: Philippine Statistical Yearbook.

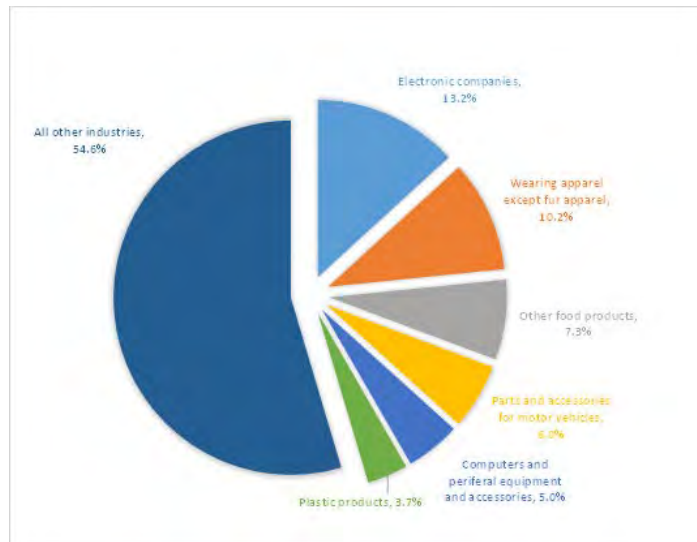
The electronic industry is the major Philippine exports. The Philippines imports semi-finished products of the electronic equipment and exports after having processed it into semiconductors etc. The export ratio of electronic apparatus has been decreasing, but still occupies 47.9% of whole in 2014.



Source: Philippine Statistical Yearbook, Philippine Statistics Authority.

Figure 37 The share of electronics industry (%)

In terms of employment, the electronics industry takes 13.2% of the all number of employees of the manufacturing industry, and is followed by wearing apparel except the fur apparel (at 10.2%), food products (7.3%), part and accessories for motor vehicles (6.0%), and computers and peripheral equipment and accessories (5.0%).



Source: Census of Philippine Business and Industry 2012, Philippine Statistics Authority.

Figure 38 Share of employees in the manufacturing sector (2012)

Electric apparatus and its parts are the Philippine's main export items; however, as for its share and ranking in world exports, the Philippine exports for these products are not high in comparison with neighborhood Asian countries.

Table 72 Value exported, annual growth, share and ranking in world exports of electronic apparatus, parts and accessories (2015)

Exporters	Trade Indicators			
	Value exported in 2015 (USD thousand)	Annual growth in value between 2011–2015 (%)	Share in world exports (%)	Ranking in world exports
World	2,322,771,392	3	100	
China	600,292,287	8	25.8	1
Hong Kong, China	249,285,497	7	10.7	2
Korea, Republic of	138,364,610	5	6	4
Singapore	118,215,652	0	5.1	6
Taipei, Chinese	116,049,718	2	5	7
Japan	95,606,834	-8	4.1	8
Viet Nam	64,506,931	38	2.8	10
Malaysia	59,642,552	0	2.6	11
Thailand	29,305,131	0	1.3	14
Philippines	27,020,288	18	1.2	17
Indonesia	8,562,227	-6	0.4	31
India	7,935,913	-9	0.3	33
Cambodia	321,291	129	0	73
Lao People's Democratic Republic	317,542	127	0	74
Myanmar	66,531	55	0	96
Brunei Darussalam	30,155	-22	0	113

Source: International Trade Center, Trade Map.

In addition, for motor vehicles and parts, the Philippines does not have high share nor ranking in world exports.

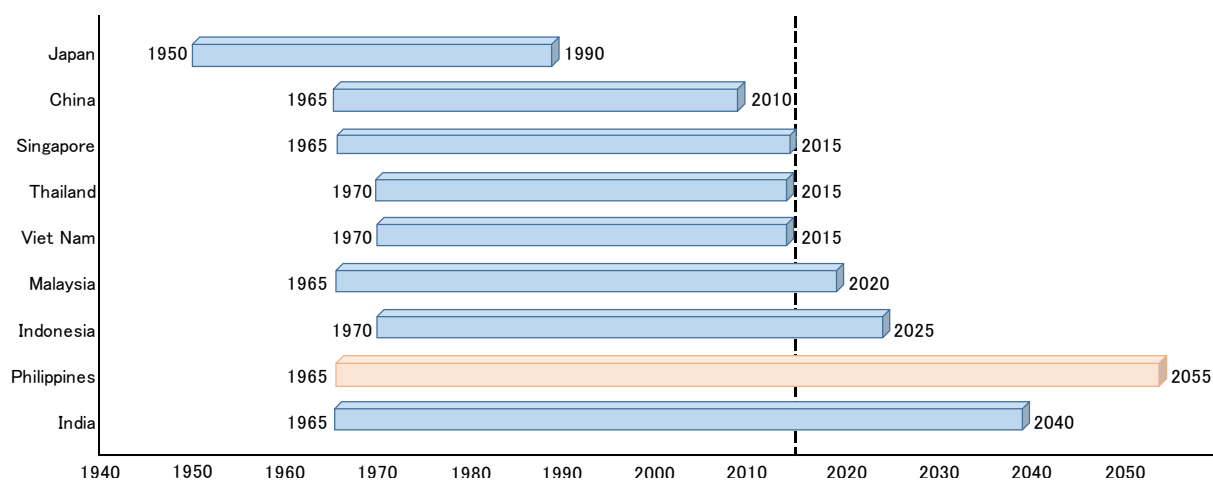
Table 73 Value exported, annual growth, share and ranking in world exports of motor vehicles, parts and accessories (2015)

Exporters	Trade Indicators			
	Value exported in 2015 (USD thousand)	Annual growth in value between 2011–2015 (%)	Share in world exports (%)	Ranking in world exports
World	1,312,175,321	1	100	
Japan	134,041,243	-3	10.2	2
Korea, Republic of	69,058,752	1	5.3	5
China	62,651,637	6	4.8	6
Thailand	26,555,654	9	2	14
India	14,081,904	8	1.1	21
Taipei, Chinese	10,200,801	3	0.8	23
Indonesia	5,418,833	11	0.4	29
Singapore	3,797,457	-8	0.3	31
Viet Nam	1,872,172	26	0.1	39
Malaysia	1,783,509	3	0.1	40
Hong Kong, China	1,478,334	-1	0.1	43
Philippines	1,429,169	-10	0.1	44
Cambodia	281,295	-34	0	61
Lao People's Democratic Republic	8,799	-8	0	116
Brunei Darussalam	6,987	13	0	122
Myanmar	2,053	-1	0	150

Source: International Trade Center, Trade Map

5.3.2 Population and Labor Force of the Philippines

When it comes to population and labor force, low birthrate and aging begins at relatively early stage in Singapore, Thailand, and Vietnam. On the other hand, the birth rate is still high in Indonesia, the Philippines, and India, and the productive population continues to increase during a certain time period. The population dividend period of the Philippines is remarkably long and the Philippines might enjoy lasting economic growth if it could continuously create gainful employment for its abundant work force.



Source: World Population Prospects 2012, United Nations.

Note: During the population bonus period, dependency population index (dependent population (0-14 years old + 65 year old and older) ÷ productive population (15-64 years old)) continues decreasing.

Figure 39 Population Dividend Periods

The wage level in the Philippines is not very cheap, but the pay rise is generally slower than China and Thailand. The order among the countries does not greatly rise. The ranking in the region has also not increased significantly. The average daily salary of workers, engineers and managers in the Philippines is still competitive compared to other countries.

Table 74 Wages -Annual Salary- (USD)

2009 Manufacturing – Worker

Country	Number of firms responded	Wage (USD)
South Korea	28	24,646
Singapore	43	20,856
Hong Kong	7	20,174
Taiwan	42	15,200
Thailand	318	4,449
Malaysia	114	4,197
China	316	4,107
Philippines	72	3,606
Indonesia	58	3,454
India	44	3,213
Viet Nam	79	1,903

2015 Manufacturing – Worker

Country	Number of firms responded	Wage (USD)
Singapore	31	32,666
South Korea	65	31,929
Hong Kong	22	28,785
Taiwan	34	18,174
China	379	8,702
Thailand	233	6,337
Malaysia	87	5,257
Indonesia	156	4,316
Philippines	49	4,098
Viet Nam	260	3,855
India	134	3,660

2009 Manufacturing – Engineer

Country	Number of firms responded	Wage (USD)
Singapore	36	32,658
South Korea	24	31,178
Hong Kong	6	26,515
Taiwan	37	19,114
Malaysia	109	12,068
Thailand	308	9,197
China	283	8,262
India	52	8,070
Indonesia	55	5,748
Philippines	66	5,544
Viet Nam	72	4,520

2015 Manufacturing – Engineer

Country	Number of firms responded	Wage (USD)
Singapore	24	47,800
Hong Kong	10	47,359
South Korea	59	39,911
Taiwan	29	22,141
China	341	13,709
Malaysia	80	12,067
Thailand	226	11,529
India	141	8,403
Indonesia	131	6,827
Philippines	47	6,429
Viet Nam	235	5,940

2009 Manufacturing – Manager

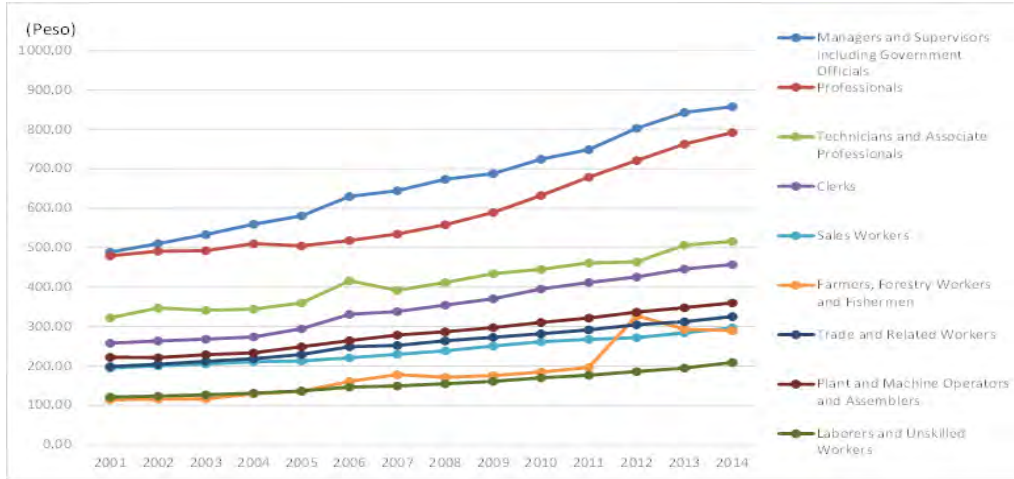
Country	Number of firms responded	Wage (USD)
Singapore	39	52,682
Hong Kong	8	47,579
South Korea	31	42,660
Taiwan	41	30,442
Malaysia	114	27,782
Thailand	305	21,522
India	53	18,978
Indonesia	55	14,858
China	296	14,694
Philippines	63	13,956
Viet Nam	68	11,500

2015 Manufacturing – Manager

Country	Number of firms responded	Wage (USD)
Singapore	34	73,772
Hong Kong	28	57,655
South Korea	67	52,865
Taiwan	34	33,367
China	370	24,391
Thailand	229	23,657
Malaysia	79	22,544
India	151	19,686
Philippines	48	16,621
Indonesia	154	14,785
Viet Nam	236	12,865

Source: JETRO, “Survey on Business Conditions of Japanese Companies in Asia and Oceania” (2009 and 2015)

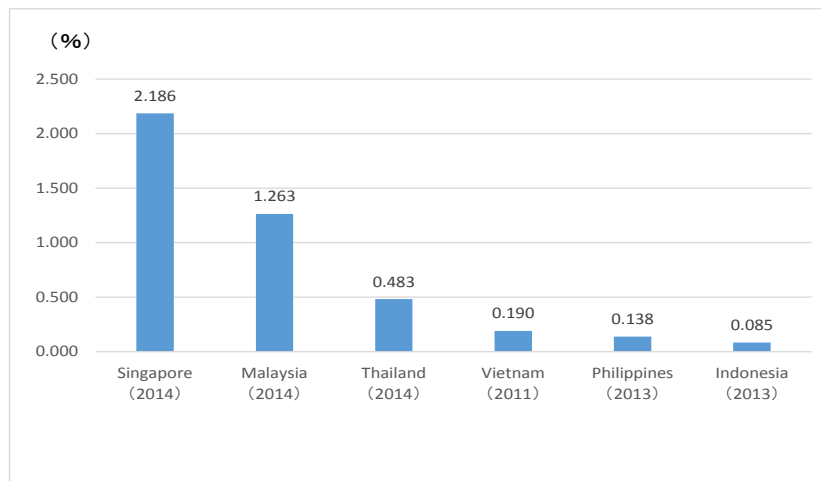
The trend in the increases of the mean daily wages of unskilled workers and skilled workers in the Philippines is slow, too.



Source: Yearbook of Labor Statistics, BLES-DOLE.

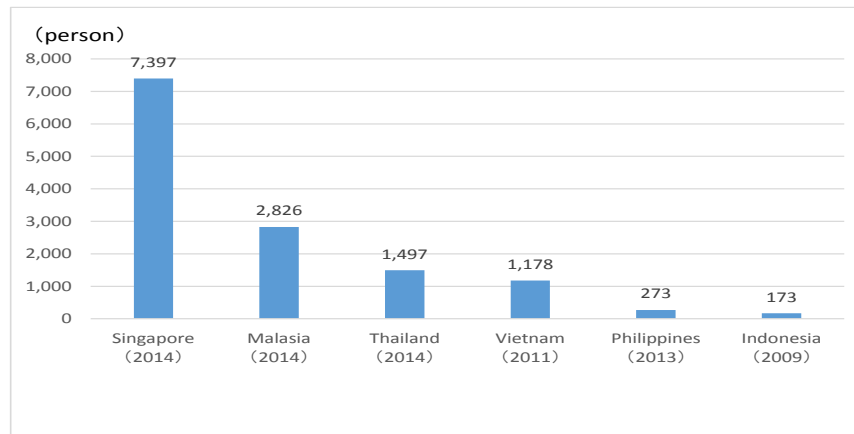
Figure 40 Average daily wages by occupation (Php)

It is expected to see improvement in the added value and to further develop the manufacturing industry by innovation in the future. However, the Philippines has low research and development expenditure and research and development workers per 1 million people.



Source: National Statistical Coordination Board)

Figure 41 Share of research and development expenditure (% of GDP)



Source: Compendium of Science and Technology Statistics, Department of Science and Technology

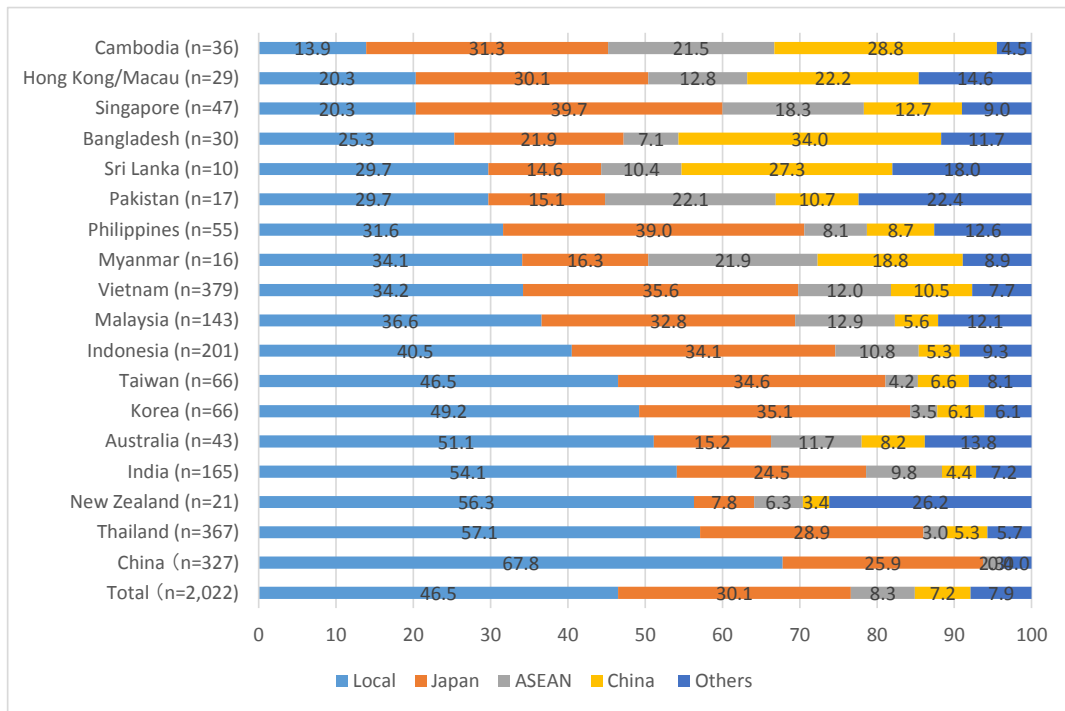
Figure 42 Number of full-time research and development workers per 1million population (person)

Table 75 Number of Researchers in Engineering and Technology (person)

Country	Number of Researchers (Year)
Malaysia	22,203 (2012)
Philippines	11,260 (2013)
Singapore	22,122 (2013)
Thailand	10,207 (2014)

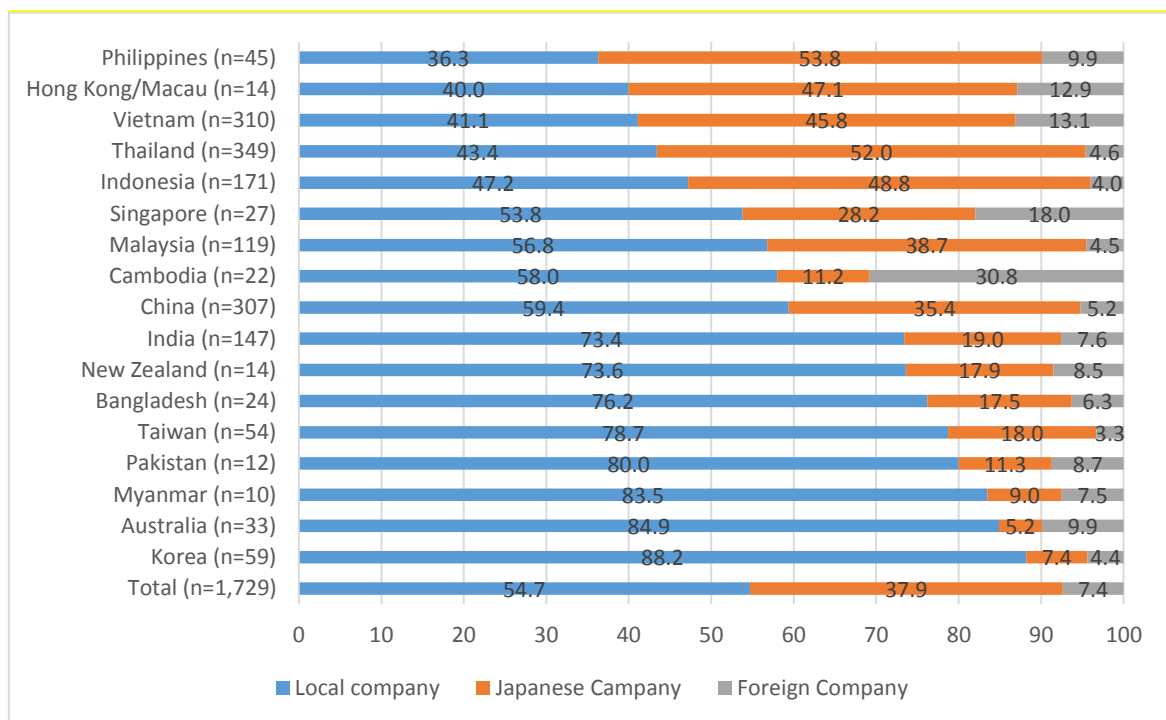
Source: UNESCO Statistics <http://data.uis.unesco.org/>

According to JETRO “Survey on Business Conditions of Japanese Companies in Asia and Oceania”(2016), the Philippines has a lower local procurement rate of raw materials and parts than neighboring countries such as Indonesia, Malaysia, Vietnam, and even Myanmar. Within ASEAN, the local procurement rate in Thailand is high. Looking at the breakdown of local suppliers, procurement from local enterprises in the Philippines is the lowest among the surveyed countries, and procurement from Japanese companies is the largest among the surveyed countries. This is the major cause of the high cost.



Source: JETRO, “Survey on Business Conditions of Japanese Companies in Asia and Oceania” (2016)

Figure 43 Suppliers of raw materials and parts (%)



Source: JETRO, “Survey on Business Conditions of Japanese Companies in Asia and Oceania” (2016)

Figure 44 Breakdown of suppliers of raw materials and parts (%)

Based on the analysis above, the features of the Philippines in ASEAN are its large population

coupled with a continual high economic growth. In the future, it can be said that the strong growth of the market and abundant labor force will become strengths.

On the other hand, the country's infrastructure development is lagging behind its GDP growth, while foreign direct investment is relatively small. More importantly, the added value of its manufacturing industry is low. As mentioned earlier, the Philippine electronic industry is an export-oriented industry, but its size is still small comparing to the exports of other countries. The presence of the Philippine electronics industry within ASEAN is also limited. Cultivation of supporting industries of the manufacturing industry has not developed yet, and the local procurement rate is low. Investment in innovation is also limited.

In the future as the ASEAN Economic Community is deepening further, it is important to promote the location of the manufacturing industry with high employment absorption capacity to secure domestic employment and sustain growth. Growth by investment in both domestic and overseas markets may not be realized unless there are significant public and private efforts to raise the level of resources from mere potential existence to international competitiveness.

In the next section, we will consider the possibilities in Central Luzon and CALABARZON based on the trend of international division of labor for several industrial sectors.

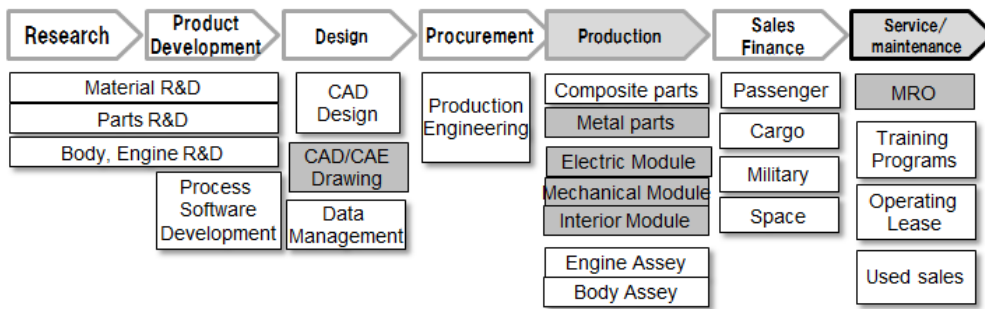
5.4 Global Value Chain Analysis of the Potential Industries

5.4.1 Aerospace Industry

5.4.1.1 Market Overview

The aerospace industry is comprised of four supply chains mainly, aircraft processing/Fabrication, career, Maintenance, Repair and Operation (MRO), and Airport operations. The Philippines has module suppliers (Flight Control Systems) and metal workshops for aviation components, cabin assembler and MROs.

Aircraft parts for mass production may be located in a cost-competitive country, mostly for export, and final products may be assembled in or near the headquarters of aerospace manufacturers. On the other hand, operating business can be located near the strategic points in the traffic. Especially in Asia, components and MRO business (related to aircraft building) will be promising in the Philippines due to increasing global demand for aircraft.



Source: The Philippines in the Aerospace Global Value Chain, Center on Globalization, Governance & Competitiveness, Duke University

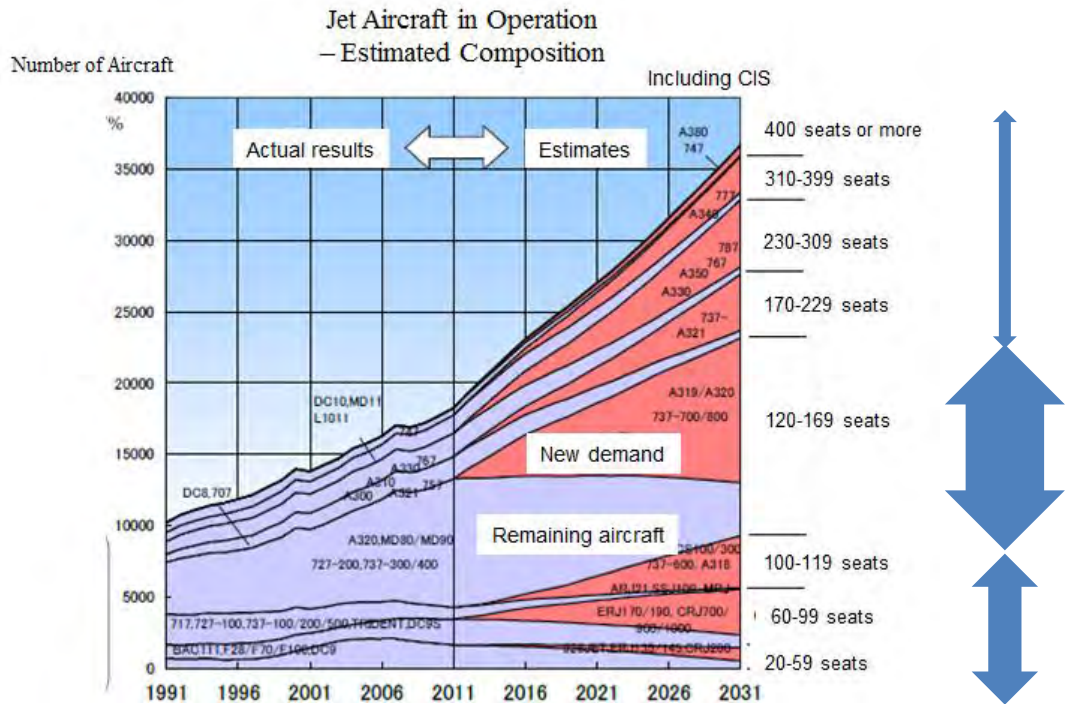
Figure 45 value chains of aerospace industry

The global aerospace industry (related to aircraft building) is estimated to be worth over USD650 billion in 2014, with global trade over US\$400 billion. The industry, which includes the development of aerospace systems for both commercial and defense markets, is one of the largest producers of high-technology goods in the global economy.

The aerospace industry is comprised of seven stages, including Research, Product development, design, Procurement, Production, Sales Finance, and Service/Maintenance (see Figure 45).

The Philippines has the parts and its related industry, electric and machinery components, interior systems and MRO, which are collectively promising in aviation industry because the more aircrafts are operated by LCC as well as traditional air carriers. This indicate a potential high demand in the future.

The aircraft manufacturing industry is mostly dominated by US and European companies with the aircraft manufacturers Boeing and Airbus as key players. Other significant players are the engine manufacturers such as GE, Pratt & Whitney and Rolls-Royce, Honeywell in Avionics, and Messier-Bugatti-Dowty in Landing Gear. Most of the demand is for aircrafts with 120 seats or more (B737 and A318 or larger), since leading manufacturers have been producing aircraft focused on this segment. On the other hand, it is expected that Regional jets (RJ) with less than 120 seats will greatly expand its market share in the future. Production of such aircraft is seen in countries outside the US and Europe as in the case of Canada's Bombardier and Brazil's EMBRAER. In recent years, production of Japan's Mitsubishi Heavy Industry's (MHI) Mitsubishi Regional Jet (MRJ) has also progressed (see Figure 46)



Source: JADC

Figure 46 Jet Aircraft in Operation – Estimated Composition

Looking at market trends in terms of passenger numbers, there continues to be an increase in networks with direct routes to destinations rather than the traditional hub and spoke networks (with large aircraft flying to the major airports and small aircraft flying connecting to other destinations). The flying distance of small aircraft such as RJs has increased, so the demand for small aircraft is expected to grow to close to 100 units more than for large aircraft.

In fact, the demand for small aircraft is centered on flights within regions, for example, within the Asia and ASEAN region as well as within China. It follows that the demand for maintenance services is also expected to expand in these regions (see Figure 47).



Source: METI Document

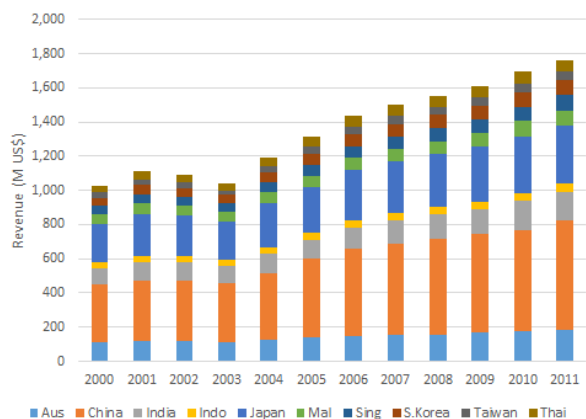
Figure 47 Jet Aircraft in Operation – Estimated Composition

In the aircraft manufacturing industry, although production of aircraft and parts will be centered in and around the countries where the OEM companies are based—such as the US (Boeing), the UK, France and Germany (Airbus) in the future—the manufacture of aircraft parts for small-sized to medium-sized aircraft has increased in South and Central American countries such as Mexico and Colombia, due to the ease of export to the US and labor arbitrage because of NAFTA. This is particularly true for the case of Boeing, where there is accessibility to move goods between North America and South America.

Even in Europe, Maroc has developed aviation components industries mainly for small- to middle-sized aircraft. The maintenance business in Royal Air Maroc has grown to MRO business with the aviation component companies with the differentiation by low cost operation.

In addition, in proportion to the increasing numbers of completed aircraft, attention is focusing on the MRO business (Figure 48). Until now, maintenance has mostly been carried out by the airline maintenance or the OEM. However, airlines, particularly LCCs, are emphasizing low cost maintenance, so third parties (aircraft-based: Lufthansa Technik (LT), Singapore Technologies Aerospace Ltd. (STA), independent: MTU Aero Engines, Goodrich Corporation) other than the OEMs are starting to carry out MRO maintenance business on behalf of the airlines.

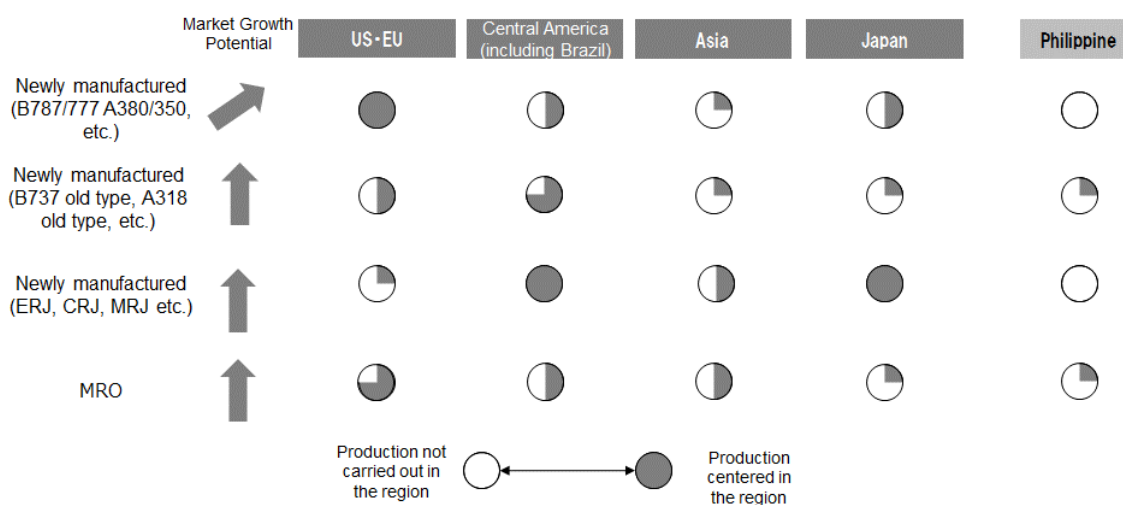
For comparison, Indonesia has launched MRO business at Hanger 4 in Scaruno Hat international airport focusing on 737max8, which are popular to LCC.



Source: Frost & Sullivan

Figure 48 Shifts in the Global MRO Market by Country

These MRO businesses are continuing to expand within Asia as well, starting with Singapore, home to STA, and are also being carried out mainly in Xiamen (China), in Okinawa (Japan), and in NAIA in the Philippines.



Source: JICA Study team

Figure 49 Major Aircraft Manufacturing by Region

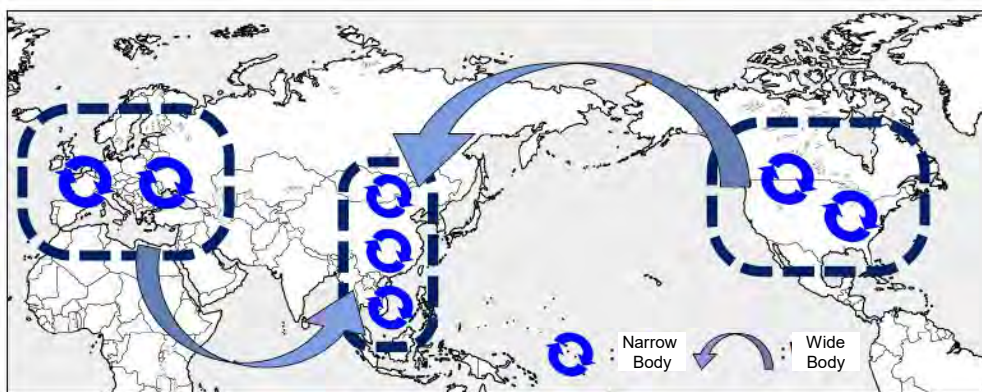
As mentioned, attention is being focused on market expansion in the aircraft industry, but market expansion is expected in aircraft production and the MRO business for small aircraft such as RJs, centered in emerging countries (Figure 49).

5.4.1.2 Key factors for market expansion

For countries outside the US and Europe, to carry out production of aircraft parts, they need to achieve both production of small aircraft (including the B737 old type) starting with the RJs, and parts production for MRO. The demand for aircraft itself is certainly not such a large number, so it is difficult to achieve scalability. For this reason, in parts production it is necessary to produce a wide range of standard parts and to offer maintenance services.

To strengthen these businesses, it is necessary to establish a base near the OEM's main production location or near the market where large demand is expected. One example is Mexico's case, being a location in the middle of RJ production (between Canada and Brazil) and near the North American market. With such characteristics, Mexico has an environment with easy access to MRO client markets. In regions with no OEMs, like Asia, it is important to be in a location near to regions that are hubs for air routes such as Singapore and Shanghai.

MRO business tends to shift from EU and US to Asian countries for wide body (Wide Body: B747, B76, B777, B787, A300, A310, A330, A340, A380 etc.). MRO business in Asian countries is expected to be not only for wide body but also for narrow body of LCC. SAIE Philippines (MRO of Singapore Airlines group at Clark) and Lufthansa Technik Philippines (MRO in Lufthansa Airlines group at NAIA) have started in early 2000s. Rolls-Royce also has plan to start MRO at Clark. With this, MRO business in the Philippines is expected to service Asian countries.



European Market

- Most of FSC (Full Service Carrier) maintain by themselves
- Some of WB(Wide Body), like Freighter, are outsourced to Asian MRO
- NB(Narrow Body) is maintained in Europa

US Market

- Almost of FSC (Full Service Carrier) outsource to maintain to Asian MRO
- NB(Narrow Body) is maintained in US

Source: JICA Study Team based on ANA's material

Figure 50 MRO Business market condition

In addition, in order to operate the MRO business itself, the following 3 points are important.

(1) Secure Maintenance Personnel

It is not simply service maintenance; advanced maintenance is also necessary such as overhauls requiring engineering personnel to carry them out.

(2) One-Stop Support Capabilities

Aside from maintenance services, production support capabilities such as parts production and repairs will be important. It is necessary to have the quantities required for a wide range of repairs.

(3) The Capability to Propose Value-Added Services

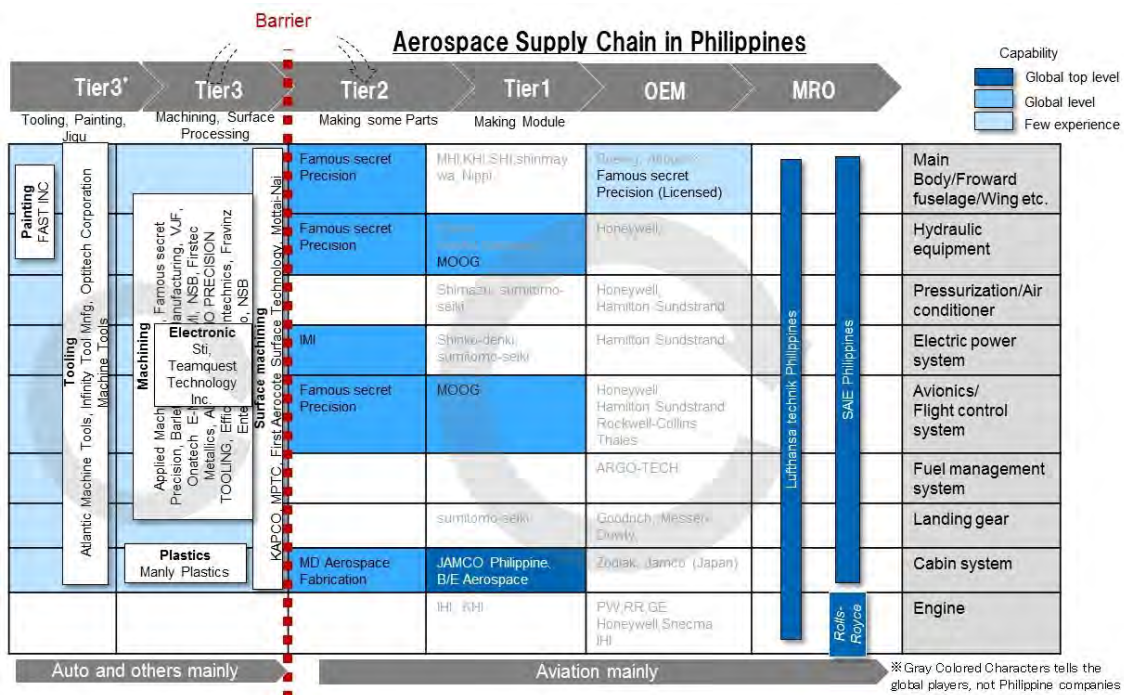
With the capability to support finance of engine leases, realization of turnkey services for the user can be sought.

In addition to geographical requirements, industrial clusters satisfying the three conditions above will be needed to implement the MRO business, to support mass production, and to provide differentiation.

5.4.1.3 Market situation in the Philippines

There are two supply chains in Philippine aerospace industry. The one is the business on MRO (SAEPI, Lufthansa Technik Philippines) and Tier1 manufacturers such as PEZA companies (Honeywell, JAMCO, MOOG etc.) as well as Tier1 or Tier2 manufacturer, like Famous Secret Precision, who supply components to OEM.

Another one is the business on Machining, Surface Machining, Tooling. Several manufacturers do not have enough good technologies for aerospace and mainly supply their products to the other applications (automotive and machinery etc.). These two supply chains have only limited relationship each other in Philippine aerospace industry (Figure 51).

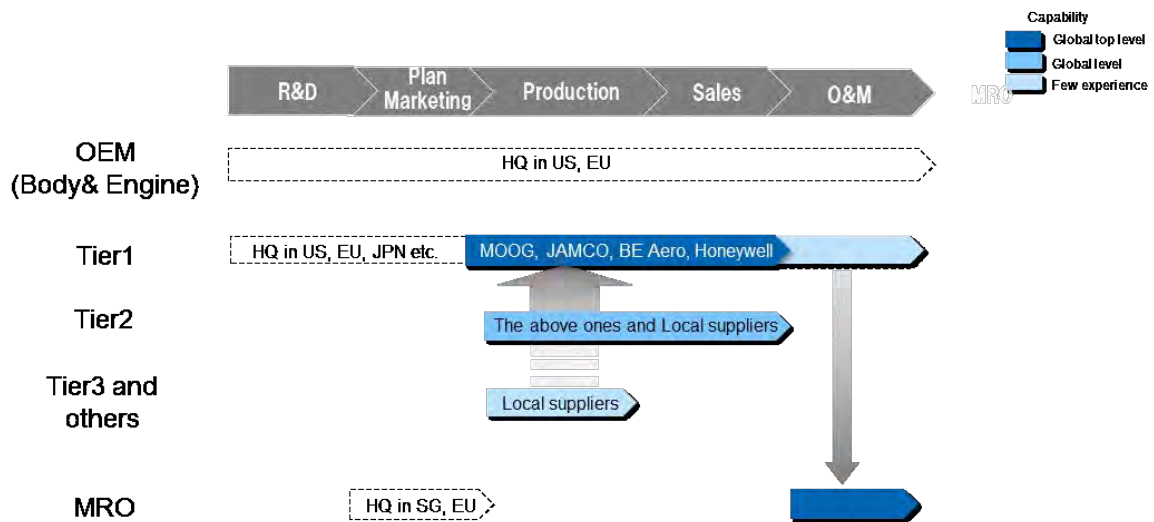


Source: JICA Study team

Figure 51 Supply chains in Philippine aerospace industry

In terms of value chain analysis, each business in Tier 1, 2 and 3 focuses on production only. Tier 3 business is operated by local companies and Tier 1 and 2 are operated by foreign companies, who have the mission in the fabrication in global value chains that is fabricating with parts imported from overseas countries (sometimes parts from local companies like tool and paints). MRO players are expected to expand their business in the Philippines, and procure the parts from overseas.

Thus, even in Value Chains, each business is independent and does not make any synergy to enhance Philippine aerospace industry.



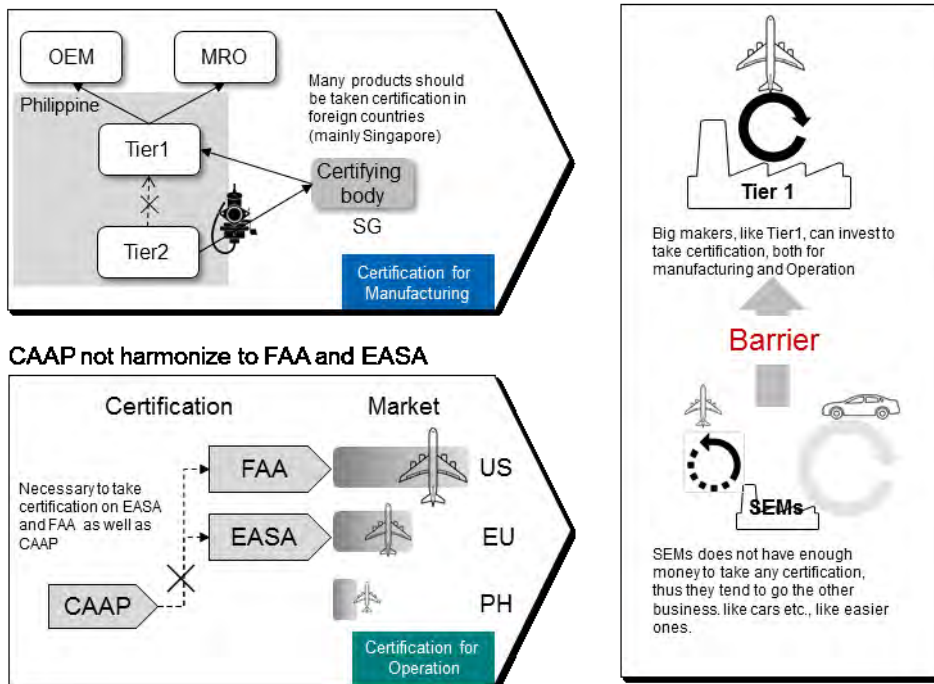
Source: JICA Study team

Figure 52 Value chains in Philippine aerospace industry

There are two reasons why the Philippine aerospace industry has not grown enough. First, the Philippine government has only few certification bodies for aerospace. If some manufacturers make the parts for aerospace, they have to take the certification (AS9100/EN9100 etc.) on these parts in Singapore and other countries. Thus, they lose their differentiation with low labor cost because the total cost includes the one for logistics between Singapore and Philippine.

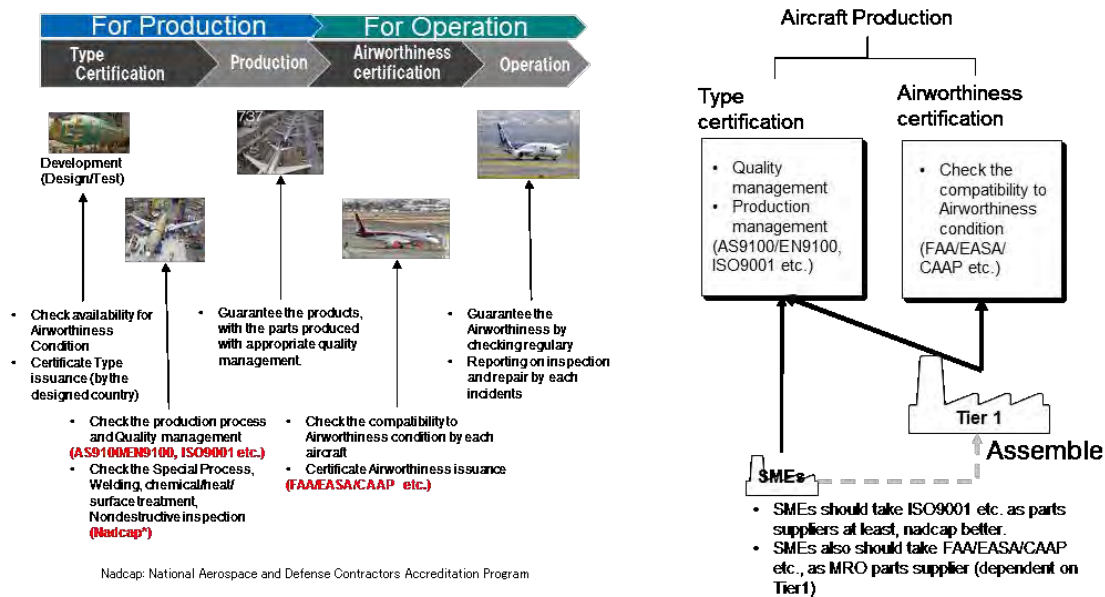
Second, the certification on airplane flying in the Philippines (CAAP: Civil Aviation Authority of the Philippines) has not been harmonized with FAA (Federal Aviation Administration: that in US) and EASA (European Aviation Safety Agency: that in EU). Generally, the parts for aircraft must be taken FAA and EASA for final products (aircraft) to fly in US and EU, but those with only CAAP certification are not useful. So, Philippine parts manufactures have to take FAA and EASA along with CAAP certification, but cannot take them due to the cost and time to take such certifications (lost their differentiation too).

Finally, only few parts manufacturers in the Philippines can go downstream to Tier 1 with two types of certification, like Famous Secret Precision who has invested aggressively among SMEs. Many of SME manufacturers focus on the other industries and apply their products to aerospace industry (Figure 52).



Source: JICA Study team

Figure 53 Issues in Philippine aerospace industry



Source: JICA Study Team based on SJAC materials

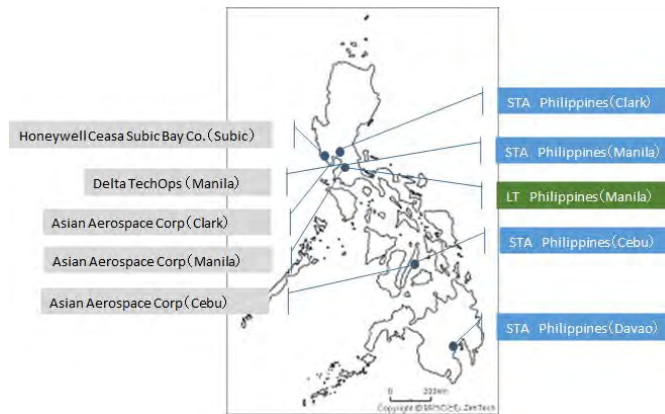
Figure 54 Main Certifications in Aerospace industry

5.4.1.4 Business Opportunities for the target regions

Regarding the requirements for running an MRO business in the Philippines, although to some extent service providers may be able to possess maintenance personnel and one-stop support capability due

to the production of engineering personnel in other industries and the attraction from the domestic components industry, the financial support capability for high-value-added services is provided by Western or Chinese financial institutions or aircraft and engine manufacturers.

For this reason, it is difficult for Philippine business operators to carry out the MRO business itself; however they can possibly position their respective business operations as a “parts supplier” for overseas MRO business operators which are already advanced.



Source: JICA Study Team

Figure 55 Distribution of the MRO Business in the Philippines

Table 76 MRO Players in the Philippines and their Business Scope

MRO Companies	Location	Work				Notes
		Base	Engine	Component	Line	
Aerotechnik Services Inc	Manila,	✓	✓	✓		At the level of manual repairs.
Air Ads Inc	Manila,	✓	✓			Aviation advertising agency. Centered on small aircraft.
Asian Aerospace Corp	Manila, Clark and Cebu	✓				Centered on RJ.
Aviation Partnership (STA Philippines)	Manila, Cebu and Davao and Clark	✓	✓	✓		Centered on Airbus, Boeing.
Delta TechOps	Manila,				✓	Centered on Airbus, Boeing.
Honeywell Ceasa Subic Bay Co.	Subic		✓	✓		Centered on Airbus, Boeing.
Lufthansa Technik Philippines	Manila	✓	✓	✓		Centered on Airbus, Boeing.

Source: JICA Study team

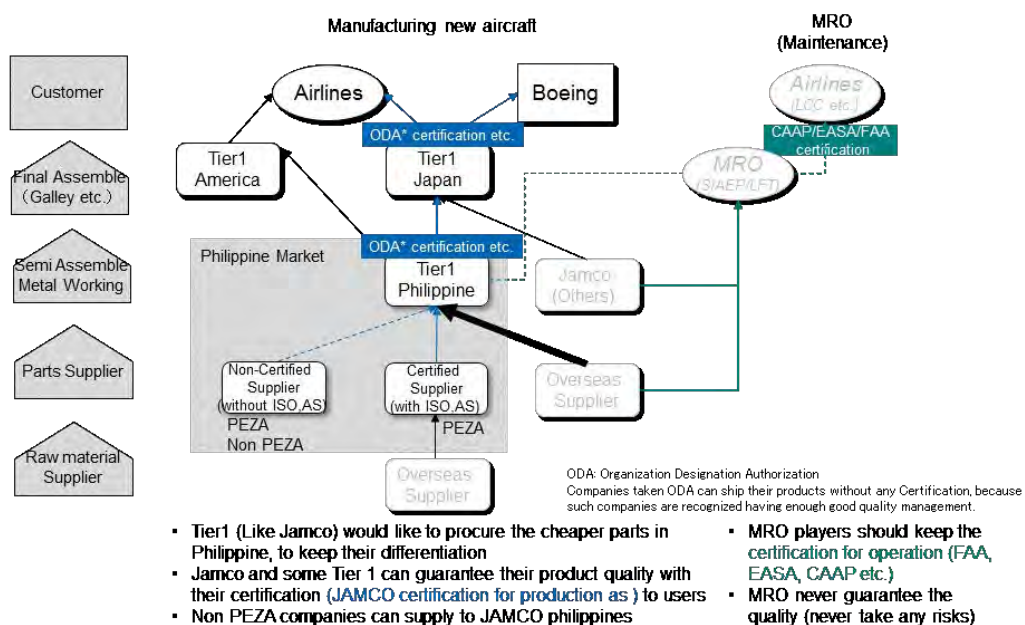
Looking at the distribution of the MRO business in the Philippines, the major MRO players are concentrated in Manila-Clark-Subic, so we can expect the accumulation of the aircraft parts industry aimed at the MRO business in the surrounding areas (see Figure 55 and Table 76).

JAMCO (cabin) in Clark, Honeywell (Avionics) in Subic, and MOOG (Fight Controller and hydronic equipment) in Baguio are located near the Clark airport (SEAPI/ Rolls-Royce), thus MROs can procure the parts from them easily.

In other hand, B/E Aerospace (cabin) in Batangas is located close to NAIA (Lufthansa technik). MROs can procure from them.

As SEAPI and Lufthansa Technik focus on different airlines and are not competitors, the development of industrial cluster in Greater Manila is expected if infrastructure, highway and railways, will be developed.

As MRO business expands, local component manufacturers will expand their business too. It might be possible that the local players can supply their products to Tier 1 due to the self-certification of Tier 1 companies in the Philippines (even though are existing issues on type of certification and production). Because Tier 1 has quality control management system and knowhow to operate with higher level, they can supply their products to OEM without AS9100 or EN9100 (recognized the quality of their products by OEM/Airlines). Like ODA (Organization Designation Authorization), self-certification in Tier 1 can be equal to the AS and EN certifications. Actually, a few parts are supplied by local manufacturers to Tier 1 companies (Paints and some ones). Tier 1 companies will face the challenge to procure more local parts in order to keep lower cost, as MRO market in the Philippines expands (Figure 56).



Source: JICA Study Team

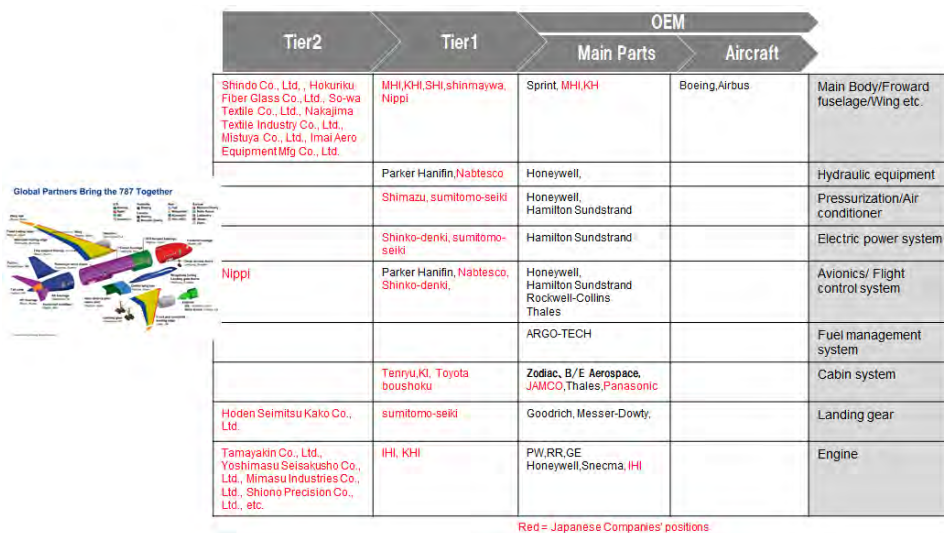
Figure 56 Possibility on the component business in Philippine expanding

Actually, some MROs are starting to evaluate the capabilities of local parts manufacturers; this is an opportunity for the aerospace component business in the Philippines to be promising.

5.4.1.5 Opportunities for attracting Japanese investments

Regarding business opportunities for the aircraft parts industry aimed at MRO in the Philippines, Japanese companies can take opportunities to expand the aircraft parts industry through local companies.

Excluding some aircrafts and engines such as the MRJ, the Japanese aircraft industry is positioned below the US and European Tier 1 manufacturers. Among these, the parts manufacturers at Tier 2 or below, are specializing in parts production for major Japanese heavy industries, and almost all of these are aimed at Japanese companies (see Figure 57).



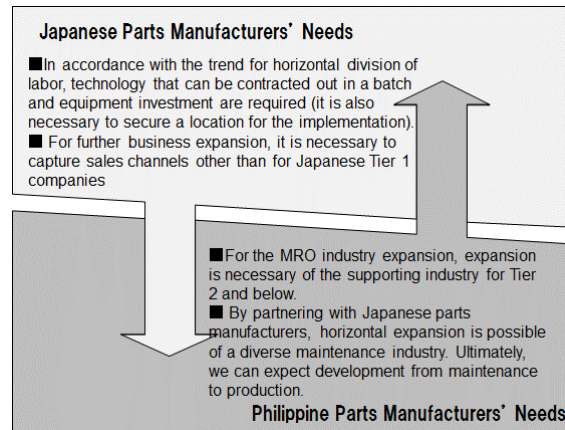
Source: JICA Study Team

Figure 57 Positioning of the Japanese Aircraft Industry

For this reason, the Japanese domestic aircraft market is revitalized and with good performance from the heavy industries, and the small and medium-sized parts manufacturer businesses are stable. However, if in the future the Japanese market becomes unstable or faces tendency to shrink, then the performance of these parts manufacturers will deteriorate as well. Although the parts manufacturers are considering opening sales channels overseas, there is no channel to overseas Tier 1 companies. It is expected that in the future, the unstable situation will continue.

If these kinds of Japanese small and medium-sized parts manufacturers can advance into the Philippines, then we can expect this to revitalize the Philippine MRO business. In particular, if the parts manufacturers supporting advanced technological capabilities aimed at Japanese Tier 1 companies can be attracted to the areas of (or near) Manila, Clark and Subic, they can achieve

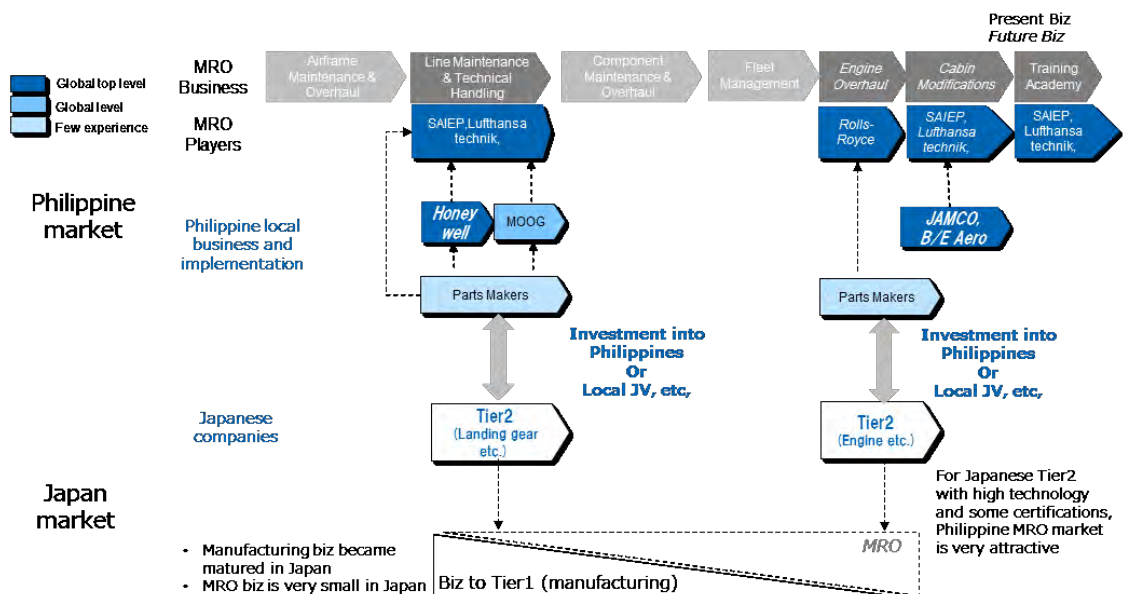
both advanced technology and quick delivery, and they will be able to operate MRO businesses that are differentiated in Asia (Figure 58).



Source: JICA Study team

Figure 58 Japan-Philippines Win-Win relationship in the Aircraft Manufacturing Industry

When you take into account the business content of STA and LT, the major MRO business operators in the Philippines, Japanese companies related to engines, elevators and hydraulic equipment may advance into the Philippines may partner with local companies. One opportunity is a scheme which supplies to these MRO business operators (see Figure 59).



Source: JICA Study team

*PMA : Parts Manufacturer Approval Parts that have received aircraft parts manufacturing authentication

Figure 59 Possibility of Tie-Up between the Philippines and Japan in the MRO Business

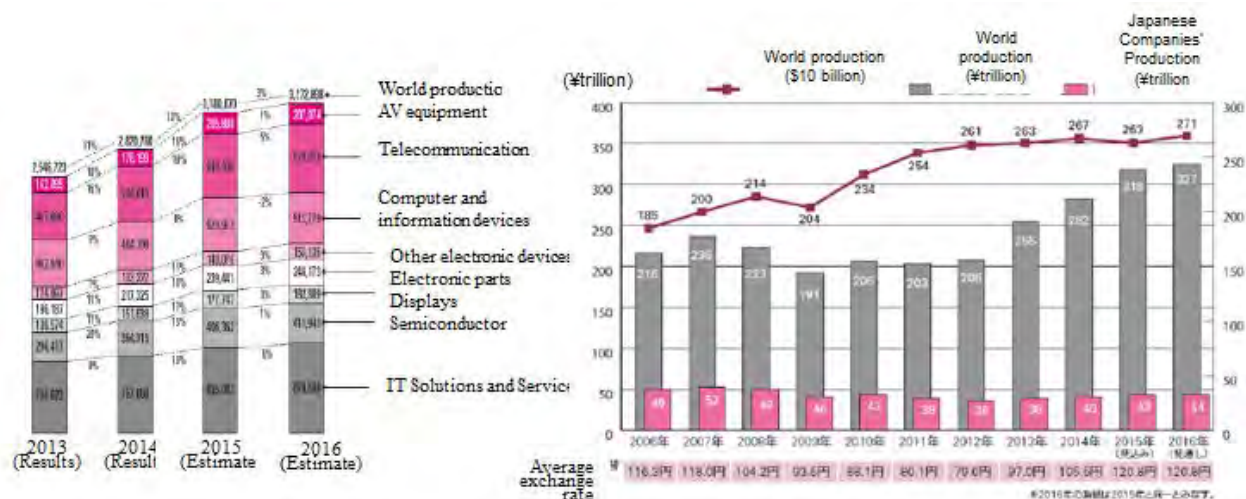
If local Tier 3 component manufacturers would collaborate with Japanese ones, the Philippine aerospace industry will expand and be competitive in the MRO business. This will be a vertical integration of supply chain in this industry.

Aerospace industry is one of promising industries in the Philippines with MRO and RJ related business. If some component supplier in Japan would invest in the Philippines, job creation with MRO and their parts vendors is estimated to be around 5,000 employees because MRO already has around 2,000 headcount and Tier1, like JAMCO, has around 200 personnel.

5.4.2 Electrical and Electronics Industry

5.4.2.1 Market Overview

Although the electrical and electronics industry global market will continue to grow, starting with mobile phones, much of the production is concentrated in the Asia region outside Japan (see Figure 60). US and European companies carry out the final product design, and there is a division of roles with responsibility for the production being in Asia. As earlier mentioned, the manufacturing industry is more than ever proceeding with a horizontal division of labor, and all the manufacturing services required for this are concentrated in Asia, with semiconductor foundries operated mainly in Taiwan (TSMC) and South Korea (Samsung), product manufacturing EMS (Electric Manufacturing Service) carried out in China by Taiwanese companies (Foxconn, Pegatron, and others.), and the outsourcing of the product design (referring to ESO) recently being carried out by Indian companies (Wipro, and others.).

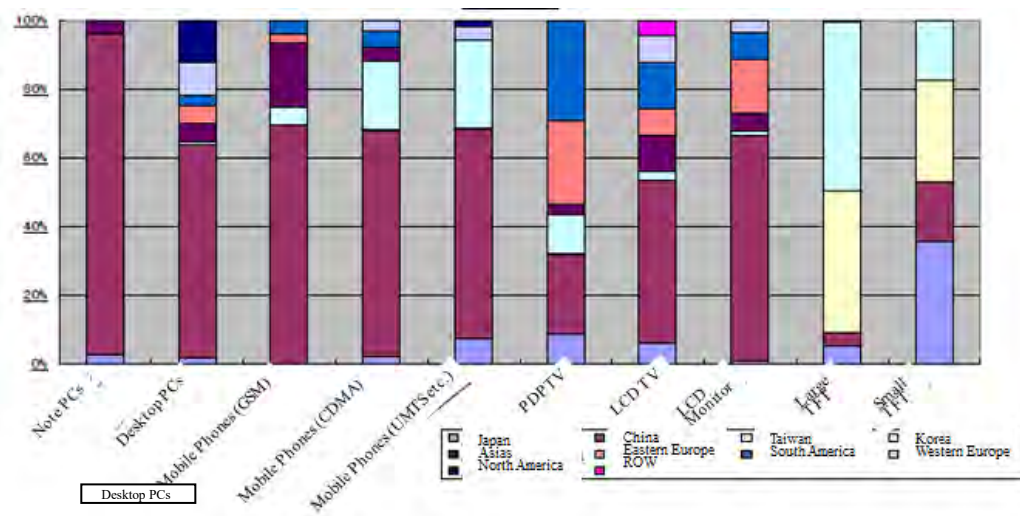


Source: JEITA

Figure 60 Shifts in World Production of Electronic Information Industry and Japanese Companies' Market Share

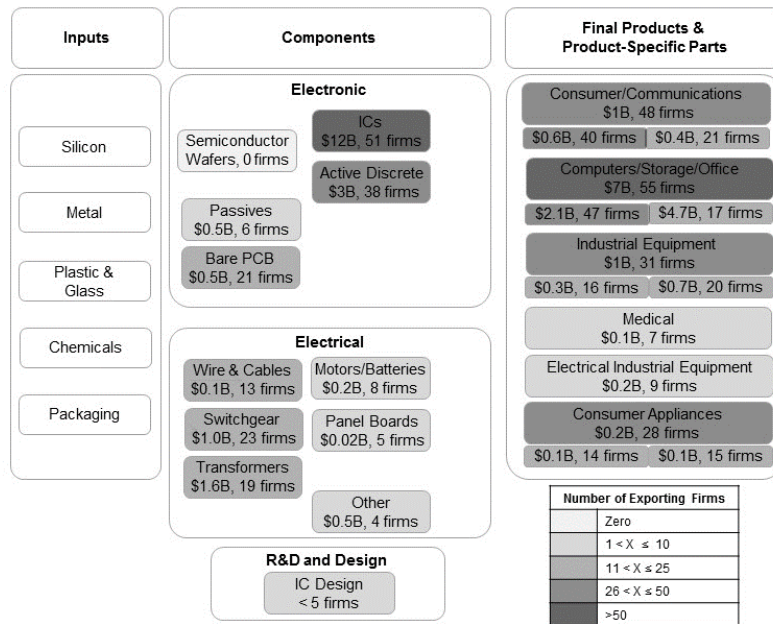
Foundries and EMS are labor-intensive requiring huge capital investment and securing large number of production personnel, so are carried out intensively in one place. For this reason, the market shares of China, Taiwan and South Korea in Asia may either be maintained or continually grow continue to be maintained or grow. This implies that other countries in Asia will need to differentiate with capital-intensive industries, like ESO (Figure 61).

Asian countries, Philippine, Thailand and Vietnam, has had the supply chain which procure the raw materials and components from overseas countries and assembles these ones. However, in these days, the companies in these countries have gone up stream, producing processed materials and components with them. For examples, Philippine Manufacturing Co. of Murata and Samsung Electro-Mechanics Philippines produce under middle grade MLCC (Multi-Layer Ceramic Capacitors) in CALABARZON and have the plan to invest much more there. Thus, these companies have the supply chain, upstream (raw material) in Japan and Korea, middle stream (producing components) in Philippine and downstream (assemble module and final products) in China.



Source: Fuji Chimera Research Institute, “Worldwide Electronics Total Market Research, 2010”

Figure 61 Distribution of Electronic Equipment Production Area



Source: The Philippines in the Electronics & Electrical Global Value Chain and JICA Study team

Figure 62 Value chain on Electric Industry in Philippine

Horizontal international specialization in Asia can produce the business opportunities for low scalable products. For example, machinery equipment is needed to customize to the local requirements, and requires flexibility with software and hardware technologies in order to adjust such needs. Printer business, which has gained traction for investments in the Philippines, has the similar trends. Especially, in the Philippines and Indonesia, a number of the private printers with the big ink tanks has been popular because many small to medium-sized companies use such printers. Many of printer makers will make their plants in the Philippines and will conduct a knowledge transfer from developed countries since because designing products and automation of designing process needs cost competitive IT skilled engineers (which the Philippines has advantages).

5.4.2.2 Key factors for market expansion

It is more important to gather the supply chains on components, for expanding the markets on electronic module and final products. Accumulating the resources from materials to components is able to produce various final products, and the more supply chains in one place is, the more various final products can be produced. Actually, Taiwan has the supply chain on processed material, semiconductor, electronics component and final assembles, then can make the huge EMS (Electronic Manufacturing Service).

Furthermore, merging between software and hardware technologies can strengthen the differentiation on various production. Simulation and its software technologies (CAD, or Computer Aided Design as well as MES, or Manufacturing Execution System) can be expected to make various kinds of productions and process for them. In the past, Software technologies, like simulation, has been used to check the specs of hardware, but from now such technologies will be expected to use making the new design.

Under these current conditions, the data library and (simulation) modeling for simulation will be much more important for designing, and dynamic data (can be traced its changing dependent on the other conditions) not static data (cannot traced such changing) also become important. The current simulation with “static data” makes some gaps between real and simulated condition because of the less tracing the conditions, but the simulation with “dynamic data” can match the condition between real and simulated ones accurately and can be applied to design the new products and have cost saving (shorten lead-time to design etc.). The data transformation and customizing software are needed to build the dynamic data, and they are needed with the persons who are good at IT skill and engineering.

Then, outsourcing services with the persons well IT and engineering skills and low labor cost are focused in manufacturers at IoT age

5.4.2.3 Market situation in the Philippines

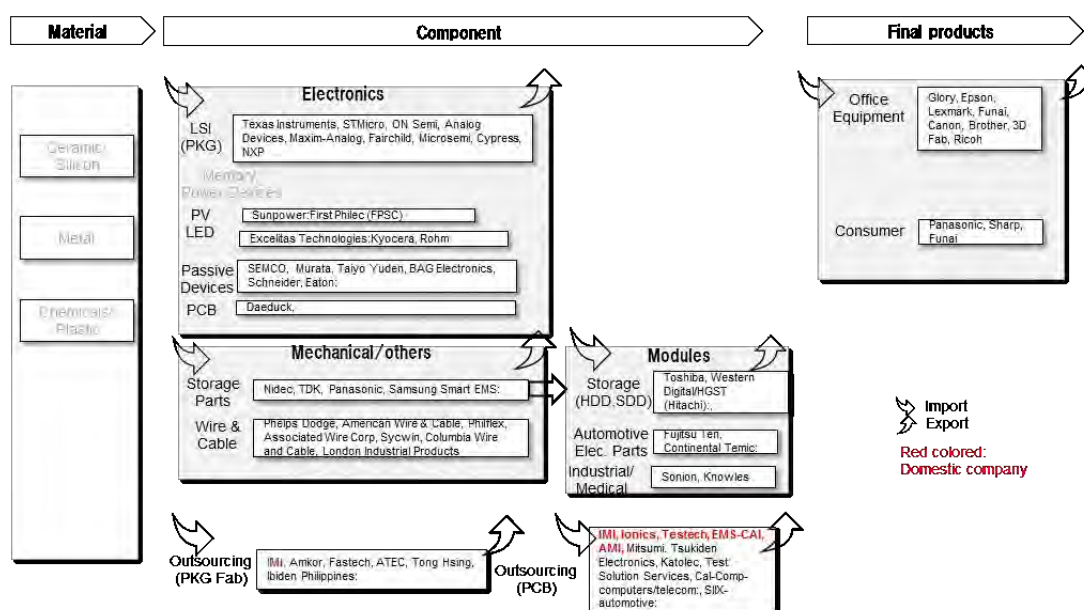
In the Philippines, component makers and final product makers focus on production outsourcing and do not connect their supply chains each other. Most of these companies import the raw materials and parts from suppliers in overseas countries, fabricate in the Philippines, and export their products to overseas users, as PEZA companies. Besides, these companies are foreign-owned (subsidiaries of foreign manufacturers). Local manufacturers AMI and IMI conduct production outsourcing on module fabrication mainly (Figure 63).

In global supply chain on electronic products, Japan, Korea and Taiwan (recently and China) have the technological resources on material and semiconductor (former process), and Philippines, Taiwan, Vietnam and Thailand have them on semiconductor package, PWB and components. Finally Vietnam and China have them on final assemble. The Philippines has focused on various kinds of components with 1,000 to 10,000 units per month of production, like HDD and so on, while those not focused on PC and smart phone with over one million units per month.

The Philippines has also been at the market position which produce the various components with cheaper prices due PEZA incentives. Actually, with such market incentives, Murata, SEMCO, Rohm, Toshiba (SSD and HDD), Canon and Brother have invested in the Philippines.

Both being PEZA-registered companies, Murata and SEMCO invested near the harbors in the Philippines for procuring the material and near airport for supplying their products. In the future they also have plan to invest more. In fact, Samsung has the organization for production: MLCC production and PWB in the Philippines, while the final assembly for smartphones in Vietnam. Other component companies have similar operations, while considering plant expansion in the Philippines.

In the other hands, the market on fabrication of HSS has been getting smaller because of replacing to SSD (Solid State Drive) in basic storages. Actually, Toshiba tend to focus on SSD and IMI also tend to focus on Camera module for automotive then can keep high yield rate in their factories. Local companies are mainly EMS companies, like IMI and AMI, who are good at assembly.

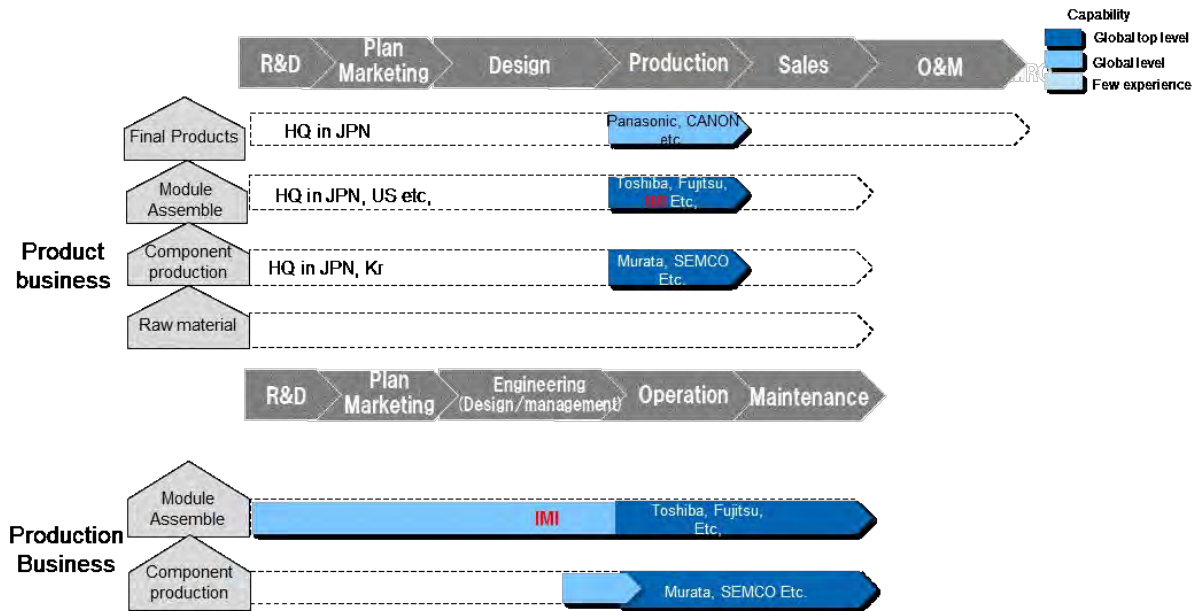


Source: JICA Study Team

Figure 63 Supply chain on Electric Industry in Philippine

In the view point of value chain and as the mentioned above, foreign companies focus on mass production and such production technologies are accumulated in the Philippines (see Figure 64). IMI, who has conducted production outsourcing over 20 years, has accumulated technologies on maintenance as well as production line design, and can make various type of productions.

Currently, IMI focuses on the products with 10,000 to 100,000 units per month lot (camera module and so on), not the ones over one million units per month lot (like mobile and its components) which Chinese competitors focus on.



Source: JICA Study team

Figure 64 Value chain on Electric Industry in Philippine

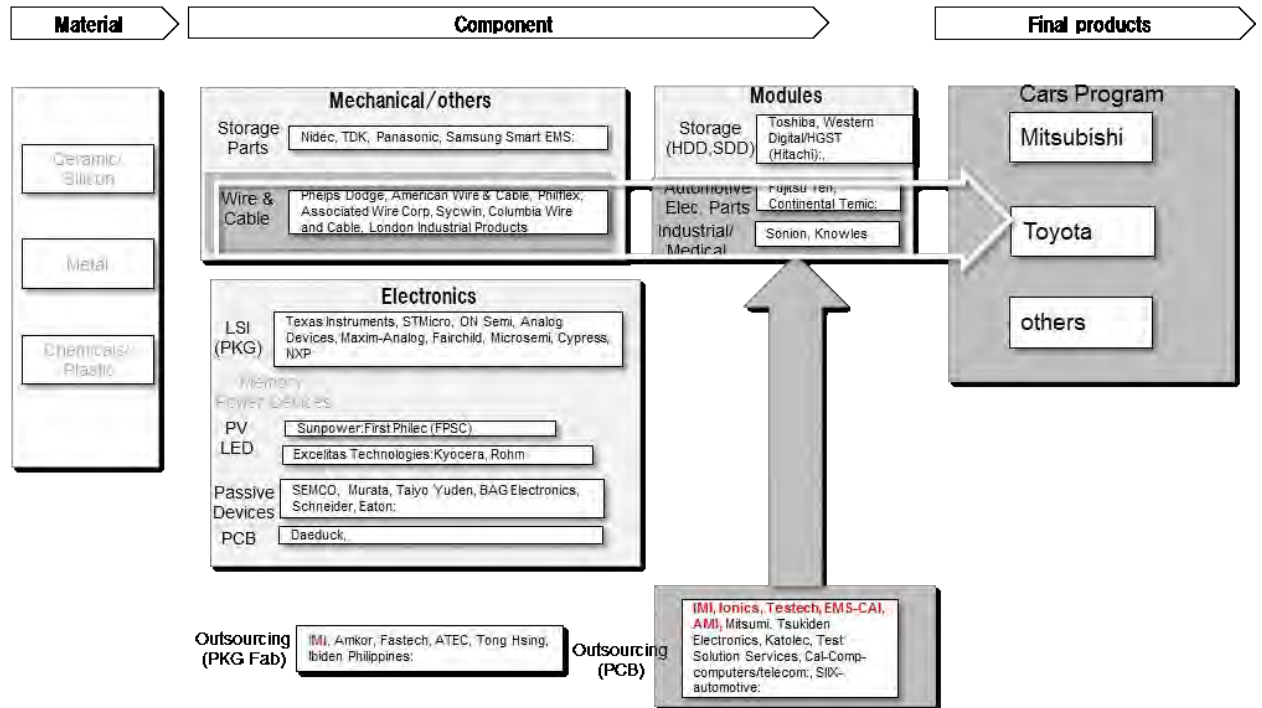
Thus, Philippine electronics industry should focus on the production technologies for middle lot and various type products, and based on their accumulated knowhow/ technologies. In the past, overseas companies have invested in Philippine with the merits on the low labor cost and will skilled workers. However, Philippine electronics industry should focus on the production with various kinds and small/middle quantity mainly for automotive components, based on shifting to automotive industry in local manufactures and SEIPI.

5.4.2.4 Business Opportunities for the target regions

As previously mentioned, there are two types of directions to enhance electronics industry in the Philippines: automotive components and solutions to produce many kinds in small quantities.

For automotive components, the Philippines has already accumulated the experiences of production on wire & cable as well as camera module markets for automotive. The automotive component business will be accumulated, because the supply chains among the automotive parts are connected when OEMs in Philippine tend to procure from the local suppliers in CARS Program. The bigger automotive component industry, the bigger the business synergy, cost

reduction, and production volume to overseas markets, because the production outsourcing makers will be attracted to enter the Philippine market.



Source: JICA Study team

Figure 65 The scheme to enhance the supply chain for automotive products

Regarding the solution to produce many kinds in small quantities, business expansion with IT technologies will be expected too.

In Asia, countries such as China, South Korea and Taiwan have the experienced engineering human resources in production management and with advanced IT skills. On the other hand, in surrounding countries like India, engineering outsourcing services known as ESO are progressing. When new production systems like IoT are built in the producing countries, they carry out a variety of tasks as system integrators. In India, having IT engineers with accumulated production know-how and advanced technical capabilities, ESO has been realized, for example, using IoT technology.

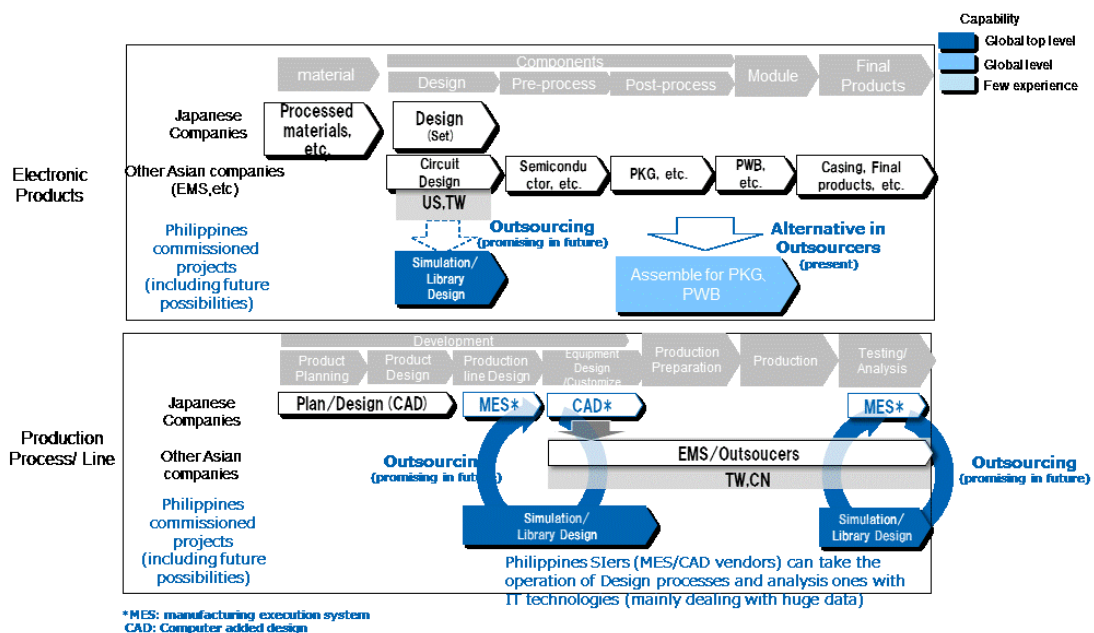
According to the engineering skill in Philippine, such ESO business will be promising in Philippine, and actually IMI and IBPAP (IT & Business Process Association Philippines) think ESO is one of promising business. AWS, Japanese IT Sler in Philippine, also focus on ESO

business in Philippine, then ESO on engineering and simulation in Alabang and CALABARZON are expected promising.

5.4.2.5 Opportunities for attracting Japanese Investments

It will be expected to attract Japanese companies not only component manufacturers but also solution providers to support the engineering for building the production lines. In the case of component production, Japanese companies are expected to collaborate with Philippine firms, outsourcing to produce the components and modules and to support the design of them (ex. Building the data library and simulation). This will be most attractive for Philippine players to improve the digital design technologies, designing and building the data library in the outsourcing on “Product Design” for Japanese companies.

On the other hands, it will be required a simulation of production equipment and engineering in “Production Design” of IoT age. Various products will be produced with one production line, and the engineer who can conduct simulation on CAD/CAE and can operate MES, will be needed much more than today. In such situations, IT engineers in the Philippines can support offshore operation of simulation and IT operations for Japanese companies and also can make the differentiation with high value processes in electronics industries.

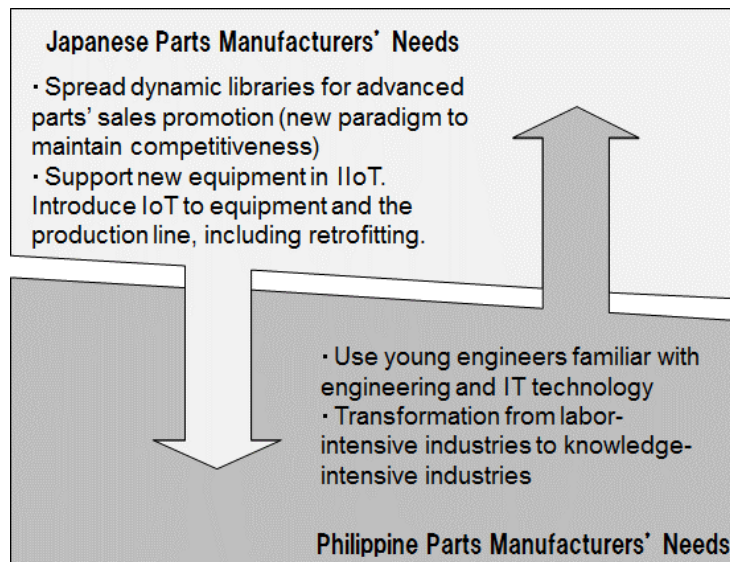


Source: JICA Study team

Figure 66 Possibility of Tie-Ups between the Philippines and Japan in the Electronics Business

In particular, as Japanese companies are attempting to differentiate in high value-added upstream processes in the electronics industry, they want to outsource building data library.

On the other hand, for the Philippines side, by having contact with leading Japanese edge parts (products) and equipment, they would be able to improve their technological level. If the Philippines can build such kind of data management skills, as with the recent IoT companies, the Philippine companies can apply (with a business model with revenues from supporting increased user business efficiency and some of the cost reduction) the data management skills in the electronics industry to other industries (Figure 67).



Source: JICA Study team

Figure 67 Japan-Philippines Win-Win relationship in the Electronics Industry

Yazaki, an automotive component maker, has around 8,000 employees, and IMI has around 5,000 headcount. If the automotive component makers would invest much more, job creation in automotive components estimates around over several 10,000 employees. Furthermore, in simulation fields, job creation estimates around 10,000 employees because JGC and Chiyoda, who are prime constructors, already have over 1,000 employees each and their vendors have same or more employees as the total.

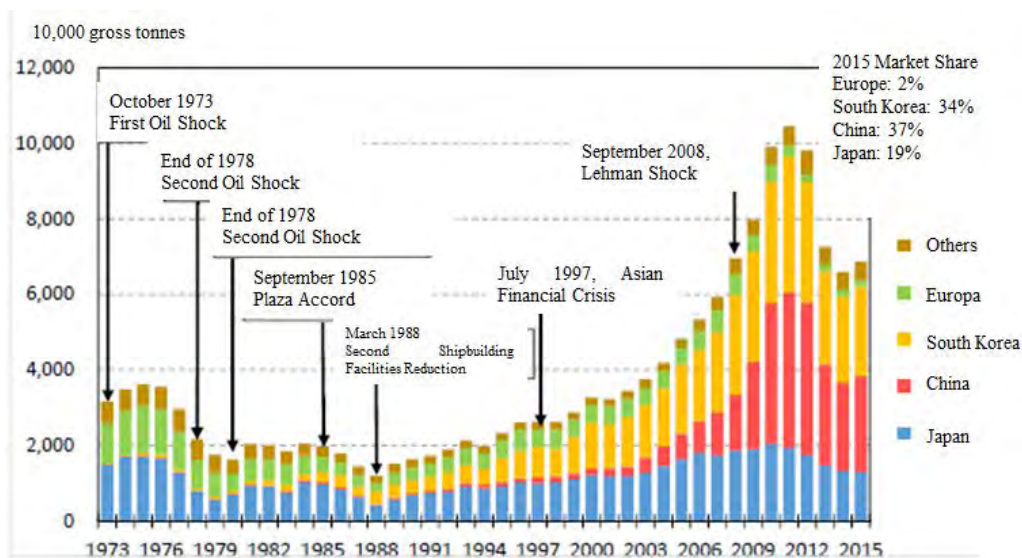
In total, job creation in the Philippine electronics industry is estimated to reach around 100,000 employees.

5.4.3 Shipbuilding Industry

5.4.3.1 Market Overview

In the shipbuilding industry, until around the year 2000, Japanese and South Korean companies were market leaders. After 2000, Chinese companies have continued to become the world's largest market players, not only in volume of orders but also in volume of completed work. With low-cost labor and procurement of abundant and inexpensive raw materials, Chinese companies have ended up with a significant market share (see Figure 68). Under the severe market situation, shipbuilding companies are not very active and aggressive to invest in emerging countries.

South Korea and China have expanded their market share through new building and expanding construction equipment: in South Korea on a scale of 1 construction plant, and in China, expanding capacities of large scale equipment using cheap labor among many state-owned shipyards. On the other hand, it is difficult to practically expand construction equipment within Japan.

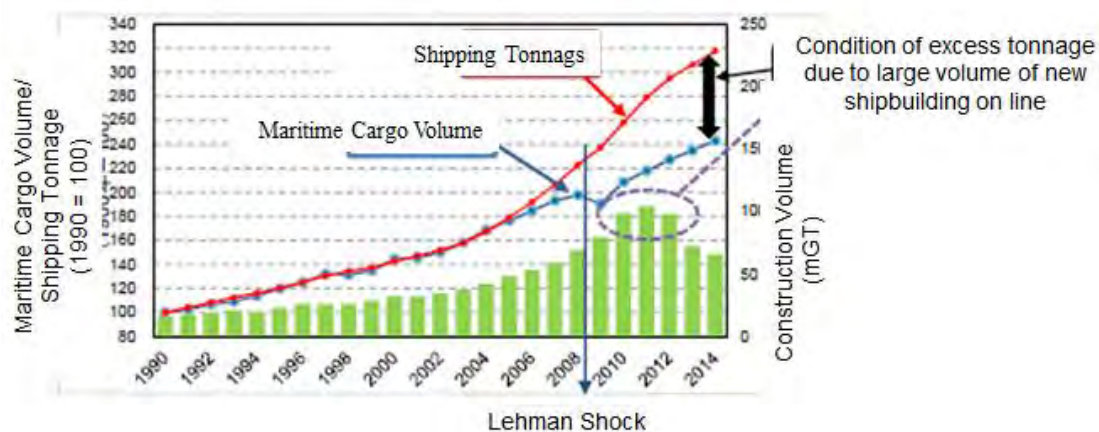


Source: Initiatives that must be promoted to expand shipbuilding exports and for regional revitalization through a productivity revolution in the maritime industry (i-Shipping) April 5, 2016 Transport Policy Council, Maritime Subcommittee, Maritime Innovation Group

Figure 68 World Shipbuilding Market (Overview)

Within this three-way competitive environment, from 2010, due to a large volume of completed ships ordered in large volumes, the supply and demand gap increased with shipping tonnage in excess of the volume of maritime cargo. However, the volume of new shipping orders decreased rapidly thereafter. This trend was known as the 2014 Problem, due to the continued decrease in

orders from 2010: it wasn't until 2014 that the phenomenon of the disappearance of under construction work was observed (Figure 69).



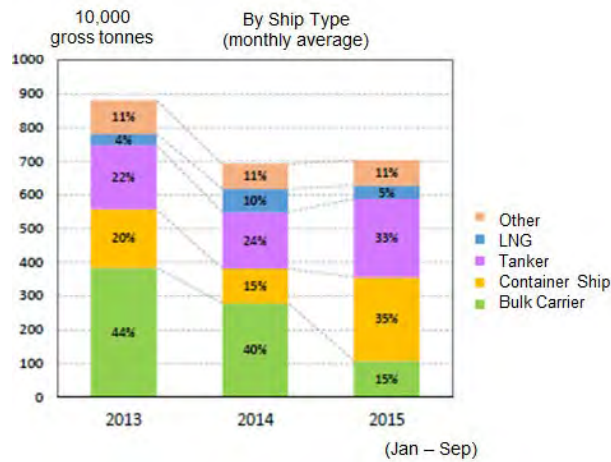
Source: Initiatives that must be promoted to expand shipbuilding exports and for regional revitalization through a productivity revolution in the maritime industry (i-Shipping) April 5, 2016 Transport Policy Council, Maritime Subcommittee, Maritime Innovation Group

Figure 69 Shifts in the Maritime Cargo Volume and Shipping Tonnage

Under the policy of “Chinese cargo carried on Chinese ships built in China”, although tankers owned by the state-owned shipping company focused on container vessels were ordered by the state-owned shipyard, due to sluggish demand of the main bulk carrier, ongoing construction work has become exhausted. The Chinese government is carrying out measures such as alternative assistance targeting Chinese shipbuilding, but with no measures being effective from 2016, the government will continue to support the shipbuilding industry.

In South Korea, since 2013, major shipyards have registered significant deficits due to the reduction in volumes of orders, and government financial institutions have provided public support. Among these, many advanced shipyards which were new entrants from 2000, have closed down or are being financially rebuilt under bank administration.

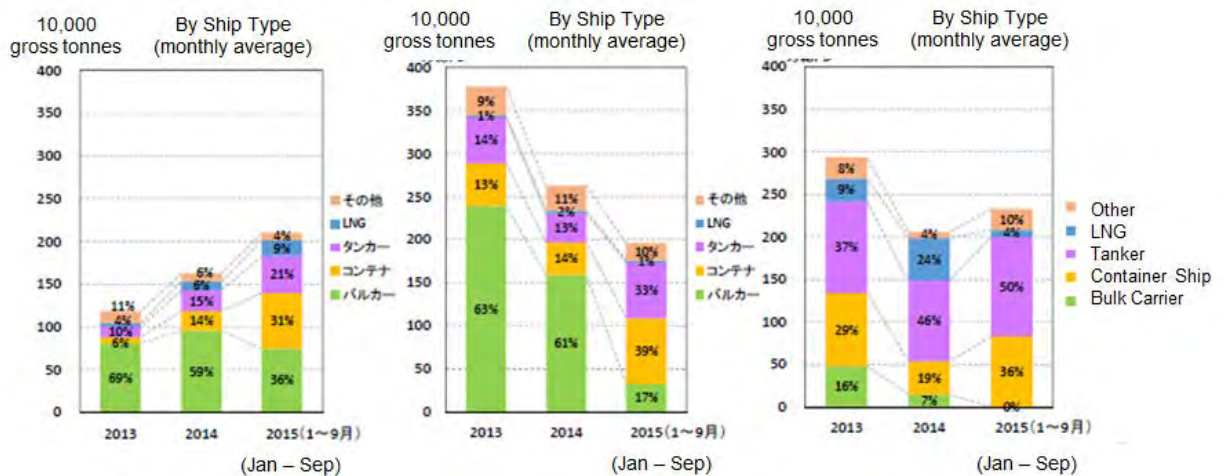
On the other hand, Japan has strengthened the efficiency of its facilities and in a form to take the market share of other countries. Japan has increasing orders received centered on high-performance, high-quality vessels. However, if further innovation in shipbuilding technology would not be achieved, the possibility is high of again having market share taken by other countries. With this, a New Shipbuilding Policy Study Group targeting further growth was established in 2010 under the Ministry of Land, Infrastructure and Transport, and this group is promoting an industrial policy based on a roadmap of comprehensive new shipbuilding policies.



Source: Initiatives that must be promoted to expand shipbuilding exports and for regional revitalization through a productivity revolution in the maritime industry (i-Shipping) April 5, 2016 Transport Policy Council, Maritime Subcommittee, Maritime Innovation Group

Figure 70 Trends in Shipbuilding Quantity by Ship Type

On the other hand, looking at the volume of completed works by ship type, from 2013, bulkers have reduced in number and the share of tankers and container vessels have increased. Bulkers are ships that can simultaneously load a variety of goods (solid resources (such as iron ore, coal, grain and bauxite) and liquids and gases such as LNG, and they have responded to big changes in market conditions up to 2013. Since 2013, increases in energy demand and more efficient logistics have proceeded, so tankers and containers as specialized ships have become predominant.



Source: Initiatives that must be promoted to expand shipbuilding exports and for regional revitalization through a productivity revolution in the maritime industry (i-Shipping) April 5, 2016 Transport Policy Council, Maritime Subcommittee, Maritime Innovation Group

Figure 71 Trends in Shipbuilding Volumes by Country and by Ship Type

Under these global market trends, Asian shipbuilding companies, which are the main producers, have almost exclusively been building bulkers. Production is centered in the facilities in Oshima Shipyard and Sanoyas Hishino Meisho in Japan, in Daewoo Shipbuilding and Marine Engineering and Hyundai Heavy Industries in South Korea, and in Dalian Shipbuilding Industry Company, Chengxi Shipyard and Shanghai Waigaoqiao in China, and all these shipyards are switching to tanker and container ships of a similar displacement from bulker construction.

5.4.3.2 Key factors for market expansion

The future opportunity in the shipbuilding industry is the continuous increase in energy demand. It is thought that the numbers of ships, including tankers, which transport petroleum or LNG will continue to increase in the future, and it is thought that shipbuilding companies with facilities in China and South Korea which take advantage of low manufacturing costs will expand their market share.

In addition, ancillary facilities and ships in marine resource development are expected to grow significantly in number as a field which requires advanced technology. In particular, in the marine development field, as the proportion of the design cost is considerably greater compared to merchant ships, the marine resource development field is considered a target for companies with technical capabilities. In particular, in this field, not simply the technology of ships, but also comprehensive technical capabilities are required such as equipment installed on the floating vessels.

As the business KFS which can be said to share points in common with these market opportunities, as stated in the above-mentioned comprehensive new shipbuilding policy, companies can proffer “strengthening the ability to win orders”, “expansion into new markets and new businesses”, “business-to-business cooperation”, “human resource development” and “international cooperation”.

Regarding strengthening the ability to win orders, in order to improve the ships’ fuel efficiency and respond to the increase in demand for LNG transportation associated with the start of shale gas export, new ships need to be developed with a high transportation efficiency. The ability to develop customized ships corresponding to these demands will get large amount of orders.

In new markets, marine resource development aimed at petroleum and natural gas development in the oceans is required. Although marine resource development temporarily stagnated due to a

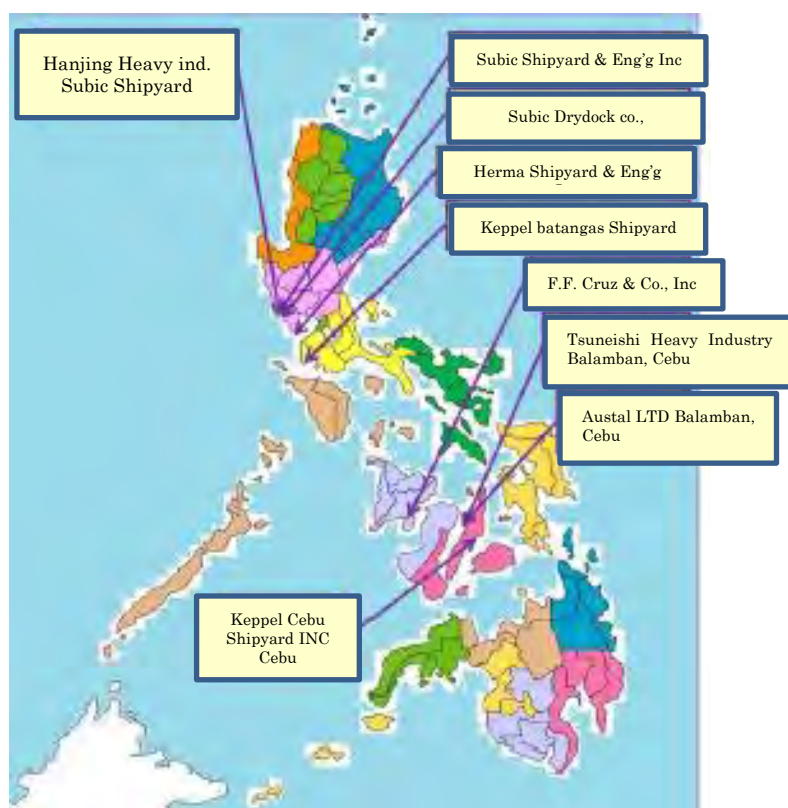
low oil prices for a period from 2014, in medium to long term dealing with this field is considered essential.

In order to avoid a situation of oversupply as suffered in 2010, to handle secondhand ships and the lifecycle up to ship breaking is required. Both for new shipbuilding and completed ship, the management of the lifetime of individual parts and modules is required; maintenance for ship operations will require the elimination of waste material and waste fuel. With IoT technology, it is expected that increases in efficiency will progress in tasks and projects in this field.

Finally, comprehensive manufacturing is required with integrated technology of specialists in each profession such as technicians who have expertise in design drawing and welding, curved iron, piping and painting. In advanced countries starting with Japan, the generation with the above technologies is already retired or is already near retirement, and in particular there are few young workers with technical expertise. In the future, such knowledge will dwindle away. For these risks, personnel from overseas can be educated in Japan. As they acquire development and design skills as well as technical skills, the immediate future of the Japanese shipbuilding industry will be supported. It is expected that these workers can contribute to the industrial development in that country.

5.4.3.3 Market situation in the Philippines

There are eight shipbuilding and ship repair (SBSR) industry operators with capabilities of 20,000 DWT (deadweight tonnage) or over, 121 medium-sized operators (possess facilities such as docks and carry out projects of 3,000 ~ 19,999 DWT) and small operators (of 2,999 DWT or less). Japanese, Chinese and South Korean companies occupy the market of large DWT ship, and they are located on the island of Luzon (Figure 72). Also, only a limited number of docks can support new shipbuilding, and one of their characteristics is essentially focusing on repairs and remodeling.



Source: 2013 “Needs Assessment Survey” by the Overseas Economic Cooperation Business Outsourcing Budget Japan Marine Science Inc.

Figure 72 Location of Large-Scale Shipyards in the Philippines

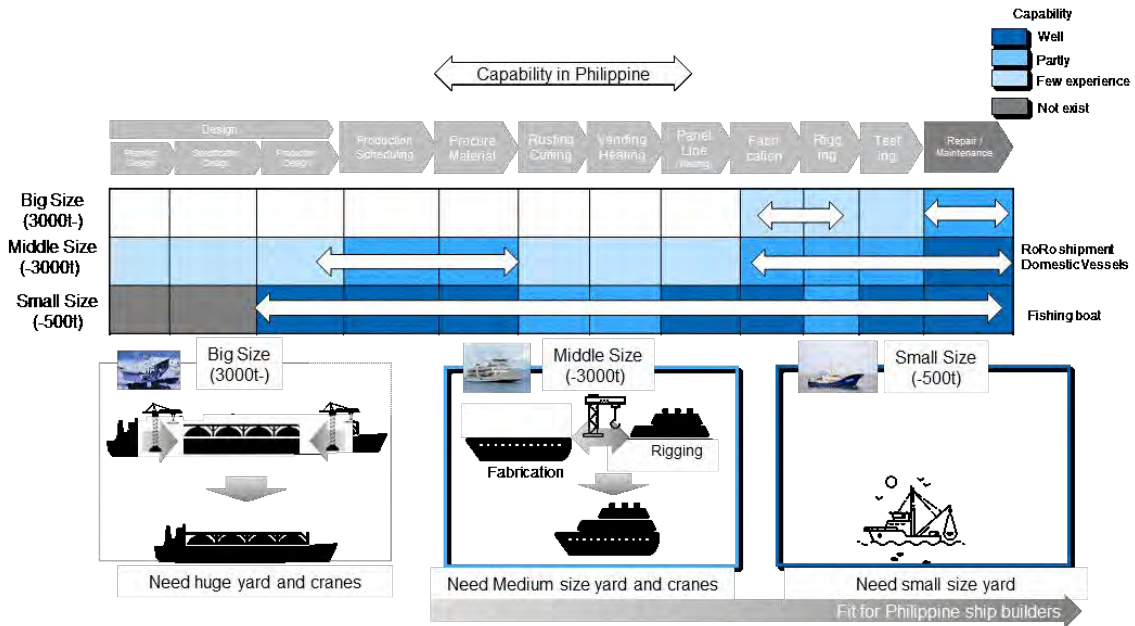
Table 77 Overview of Large-scale Shipbuilding Operators in the Philippines

Region	Shipyard Name	Main Building and Repair Equipment Scale	Zone	Equity
Luzon	SUBIC DRYDOCK CO. Subic	168m×38m floating dock 61m×20m floating dock Inward and outward bound ship repair, repair center for US and Philippine vessels	Subic SEZ	100% foreign capital
	SUBIC SHIPYARD & ENG'G. INC. Cawag, Subic	550m×65m dock and other Repair of all types of commercial ships, remodeling and new builds, outward bound ships, focused on export ships	SEZ	100% foreign capital
	HERMA SHIPYARD & ENG'G., INC. Mariveles, Bataan	150m×23m dock 120m×20m berth Centered on construction and repairs of group company tankers	SEZ	Philippine capital
	KEPPEL MARINE PHIL. INC. Batangas City	200m×38m dock 172m×28m ship lift and other	SEZ	100% foreign capital

		Focused on remodeling, repairs and construction such as marine structures		
	HANJIN HEAVY INDUSTRY SUBIC SHIPYARD, Subic	550m×135m dock 370m×100m dock From 2010 began new builds such as Panamax	SEZ	100% foreign capital
Visayas	TSUNEISHI HEAVY INDUSTRIES. Balamban. Cebu	450m×60m dock 200m×34m berth 250m×41m berth Centered on construction of Tsuneishi Shipbuilding's export ships	SEZ	80% foreign capital
	AUSTAL, LTD. Balamban. Cebu	80m×20 m dock 80m×80m Centered on Australian passenger ships, and specialized ships	SEZ	2012 Acquisition by an Australian company
	KEPPEL CEBU SHIPYARD, INC. Cebu City	210 m×30 m dock 105m×10m berth and other Centered on outward bound ships, and repair and remodeling of Philippine commercial ships	SEZ	100% foreign capital
Iloilo	F.F. CRUZ & CO., INC. Iloilo	3000 DWT floating dock and other Centered on repair of inbound ships	Unknown	Philippine capital

Source: 2013 "Needs Assessment Survey" by the Overseas Economic Cooperation Business Outsourcing Budget Japan Marine Science Inc.

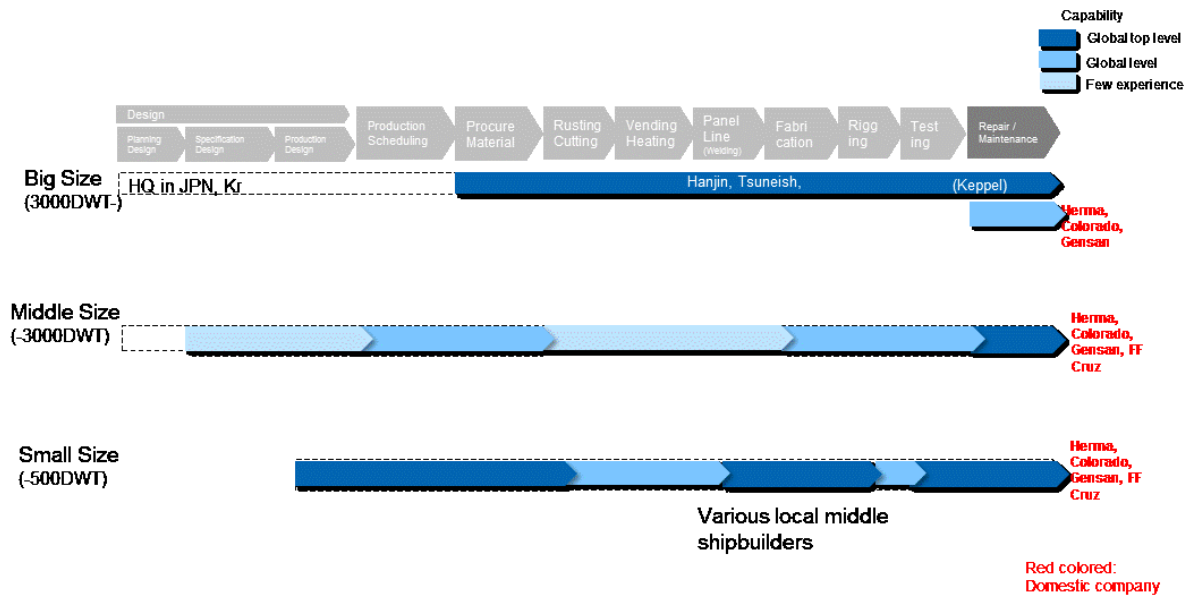
Regarding on supply chain of shipbuilding, rigging and fabrication are main in large ship market, whose major players are Hanjin (Korea) and Tsuneishi (Japan). Many local shipbuilders focus on middle/small ship, while foreign companies do Design and Metalwork (Rusting, Casting, Vending and Heading etc.) services, as shown in Figure 73.



Source: JICA Study team

Figure 73 Supply chain of shipbuilding in the Philippines

The Philippines covers all supply chains for small ship, which does not need high technologies and shipyard. Then, even if these technologies are accumulated much more, the country has never taken the shipbuilding technologies for middle/large ships.



Source: JICA Study team

Figure 74 Value chain of shipbuilding in the Philippines

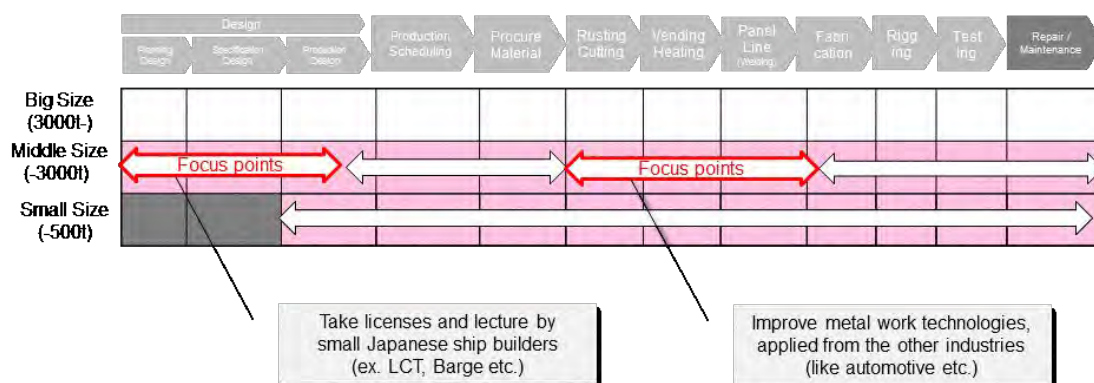
Furthermore, the Philippines also has many companies conducting repair and maintenance services. Marked by Keppel's services in Subic, the Philippine shipbuilding can focus on repair and maintenance for second-hand ships which were built in Japan, South Korea and others.

For large/middle size ship, second hand ships built in Japan and Korea are more durable than the new ship built in China and the other ASEAN countries. These second hand ships can make more effective operation in Philippine's seas, wherein stormy weather occurs. That is the reasons that repair and maintenance in Philippine are main business.

5.4.3.4 Business opportunities in the target regions

The main reasons that foreign companies take part in the shipbuilding industry in the Philippines are the following: a talented labor force required for shipbuilding, low cost repair and scrapping services, and geographical conditions suitable for repair and dry docks aimed at outbound ships. In addition, due to the initiative of the President's planned "strong national maritime highway (SNMH)" RORO ship (type of ship similar to a car ferry) sea routes have been established, there is a focus on the coastal maritime industry, and there is a promotion to replace deteriorated and retired vessels with newly built ships under the retired ship program (Republic Act No. 9295). All these will possibly lead to an increased demand for new shipbuilding.

Therefore, the main market in Philippine shipbuilding would be middle sized vessels (500-3000DWT) like RORO ship. However, the technologies for middle size vessels are different from small ones, and these vessels needs the high skilled engineers and the specialist on fabrication, metal vending and others. For example, LCT (Land Craft Tank) can reach without the yard, the other ship design are necessary, and metal vending technologies are necessary too in order to build the middle sized vessels in the Philippines.



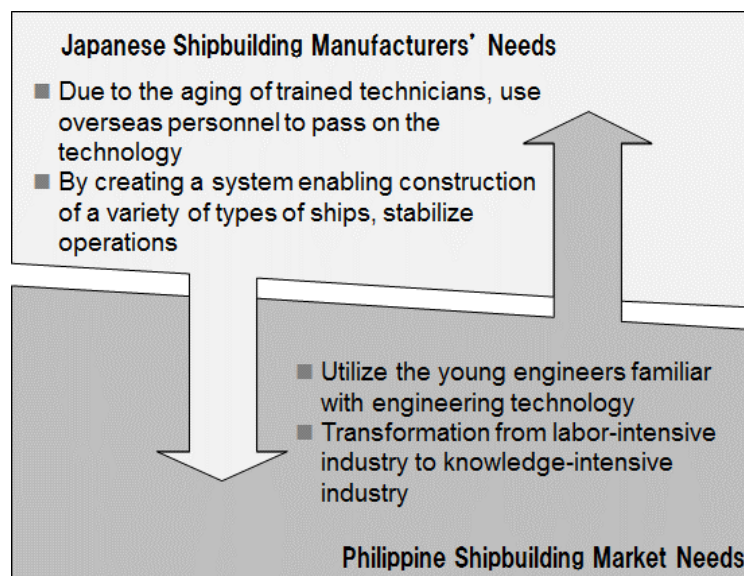
Source: JICA Study team

Figure 75 Target business for Philippine shipbuilding industry

However, the internal demand in the Philippines is limited and after over-supply in 2010, it has been difficult for the shipbuilding industry to go ahead with large-scale investment in the country. Conversely, increasing the operating rate at existing docks which have already been invested in, or using Philippine personnel familiar with shipbuilding, measures are sought to increase demand domestically.

5.4.3.5 Opportunities for attracting Japanese investment

The Philippine personnel familiar with shipbuilding could cooperate with the countries, like Japan, in which the handing down of technology is becoming challenging due to ageing shipbuilding engineers. While Japan possesses advanced shipbuilding technology, that technology is concentrated in older people coming to retirement age, and there is no-one to pass on that technology to. On the other hand, although there are many young personnel in the Philippines with shipbuilding skills, the opportunities to learn advanced technologies within the country are extremely limited and it is difficult to escape from the labor-intensive industrial structure. For the future revitalization of the shipbuilding industry, Japan and the Philippines should deepen their international exchange, and if Philippine human resources can be dispatched to Japan, a win-win relationship can be built for both sides (see Figure 76).

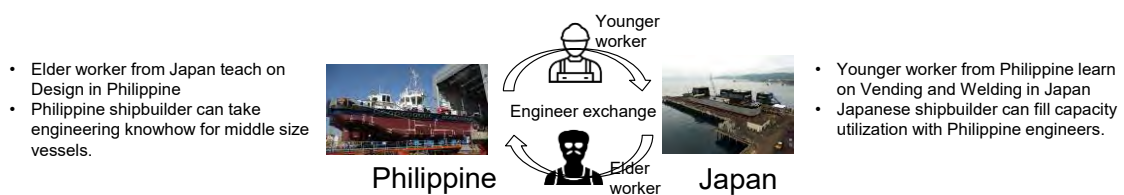


Source: JICA Study team

Figure 76 Japan-Philippines Win-Win Relationship in the Shipbuilding Industry

Each country can expect to enjoy the following benefits:

- (1) Japan can cover the personnel for tasks such as assembly and welding on-site with Philippine personnel.
- (2) Utilize the engineering knowledge of Philippine personnel, and outsourcing part of the design and engineering function (in particular, shipbuilding-related).
- (3) The personnel who take the engineering skills in (2), can spread shipbuilding technology centered on large ships on their return to the Philippines.



Source: JICA Study team

Figure 77 Japan-Philippines Win-Win Relationship in the Shipbuilding Industry 2

In cooperating with Japanese companies in the shipbuilding industry, not only is there direct investment, but we can expect industrial development through personnel exchange to progress more (Figure 77).

Japan shipbuilding industry has the risks not able to keep the business due to ageing of the engineers. On the other hand, the Philippines's one weak point is not able to design the middle and large size ship due to the lack of well-skilled engineers. If the experienced engineers in Japan exchange to the younger ones in the Philippines, each industry can fill the insufficient functions, contributing to the expansion of the Philippine shipbuilding industry.

However, it is important to match the target ship size for personnel exchange. In the past, the engineer in the Philippines took the training for large ship in Japan, then they could not use the acquired skills in the Philippines after the training. In order to prevent such mismatching, Japanese shipbuilding industry should prepare for the personnel exchange for middle size ship.

Hanjin and Tsuenishi shipbuilding, who are major players in Worldwide, have already their yards in the Philippines. However, they focus on big size ships, not on middle/small size ones, like RORO ship, which Philippine shipbuilding industry has focused on. It's difficult to expect an expanding demand only in the domestic market, since the global market has already been matured due to oversupply. The replacement from old RORO ships to new ones are promising temporary

but it will not be able to sustain the domestic market growth. Besides, the finance schemes to purchase the expensive shipment is also needed, too. Therefore, shipbuilding industry has less priority compared with the other industries in Philippines.

There is a concept of Maritime Industrial Park (MIP) in which berth and shipbuilding facilities are pre-equipped and rented to medium or small shipbuilding companies to manufacture medium sized vessels such as RORO. This salient feature of this concept is that it is not insisting on direct investments. It is like a rental factory for medium and small shipbuilders. As those SMEs do not have financial resource to establish a shipyard by themselves, rental shipyard may work for them. On the other hand, if the ships to be built in the Philippines are standardized and production facility is pre-equipped rather than tailor-made, then it will be difficult for shipbuilders to differentiate from others. If this is the case, then it will not be attractive to shipbuilders since their major source of profit comes from the originality of designing and/or production process. Detailed feasibility study will be necessary for designing the plan.

Based on such status, job creation estimates around several thousand employees in middle sized vessels market in the Philippines because Tsuneishi has around 800 people and around 10,000 people if the manpower of its suppliers are included.

5.4.4 Automotive/ Auto parts manufacturing Industry

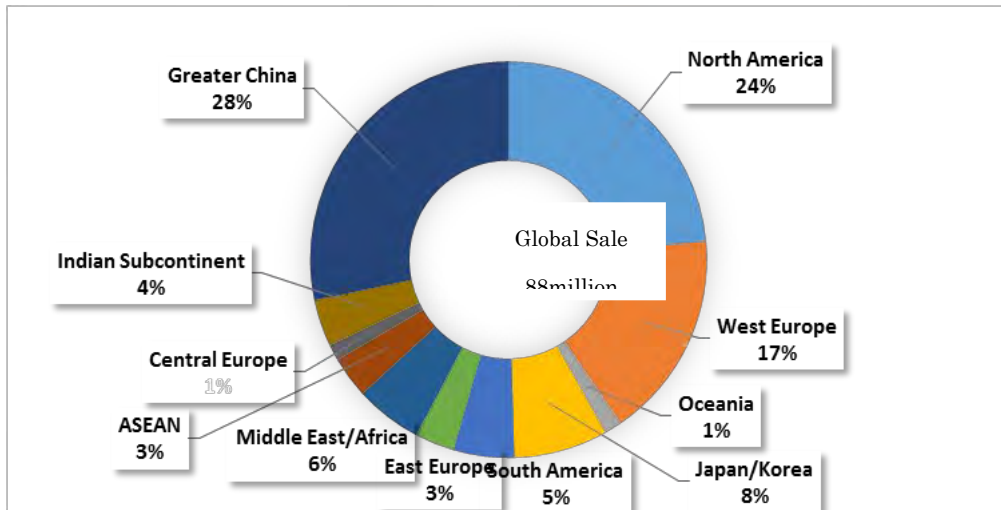
5.4.4.1 Market overview

(1) Global vehicle market trend

Total global vehicle sales have reached 88 million units, increasing 2% compared to last year. The growth is less than the growth rate in 2012~2014 which stood at 5%-6%. The major factors of the growth are explained by the two conflicting trends: while developed countries including North America and Western Europe are on the way of recovering from the impact of the global economic crisis; emerging markets except for Greater China (including mainland China, Hong Kong and Taiwan) have recorded slower growth due to low prices of natural resources and oil.

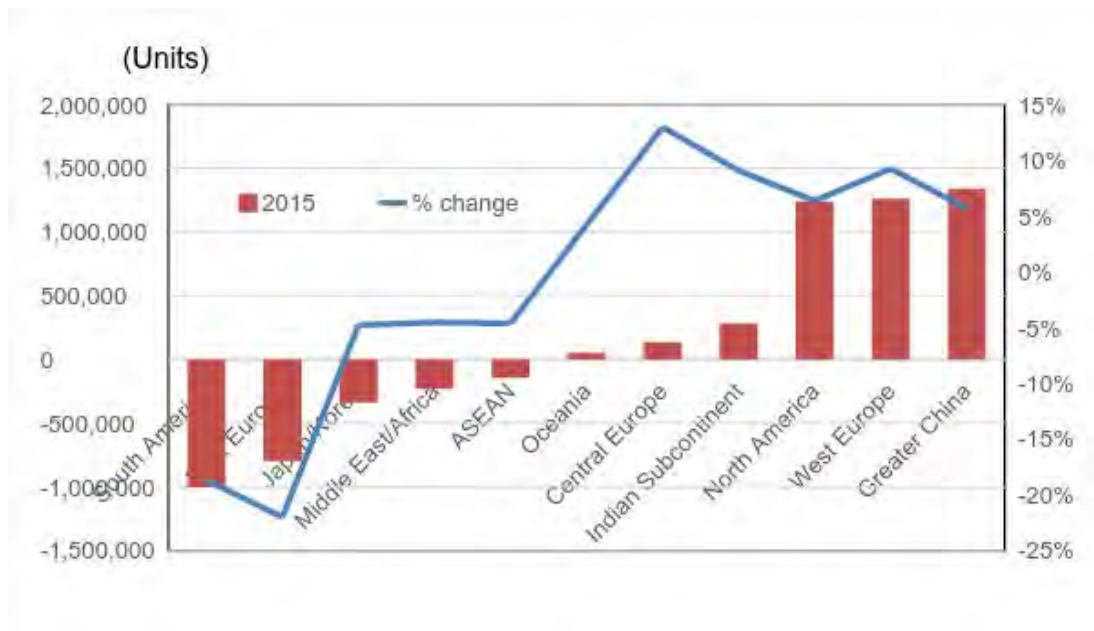
Since the Lehman shock crisis, many of the research institutions had expected that considering the high economic growth rate and the rise of middle class, emerging markets will take the majority share of market at the expense of developed countries. In 2015, the sales percentage of the emerging market including China and that of the developed countries are 50:50 or balanced. Certainly, the Chinese market makes up 30% of worldwide sales and over 20 million units in 2013, making China as the biggest market in the world. Greater China market is still outpacing the average growth rate of the world market. On the other hand, the ratio of the emerging countries

excluding Greater China is 22%. Compared with 2012, the growth rate is now on a decline. In particular, South America and Eastern Europe sales in 2015 were down 19% and down 22 % year-on-year respectively. They have significantly decreased, contributing to the major cause for share drop of emerging market.



Source : IHS

Figure 78 Regional car sales ratio

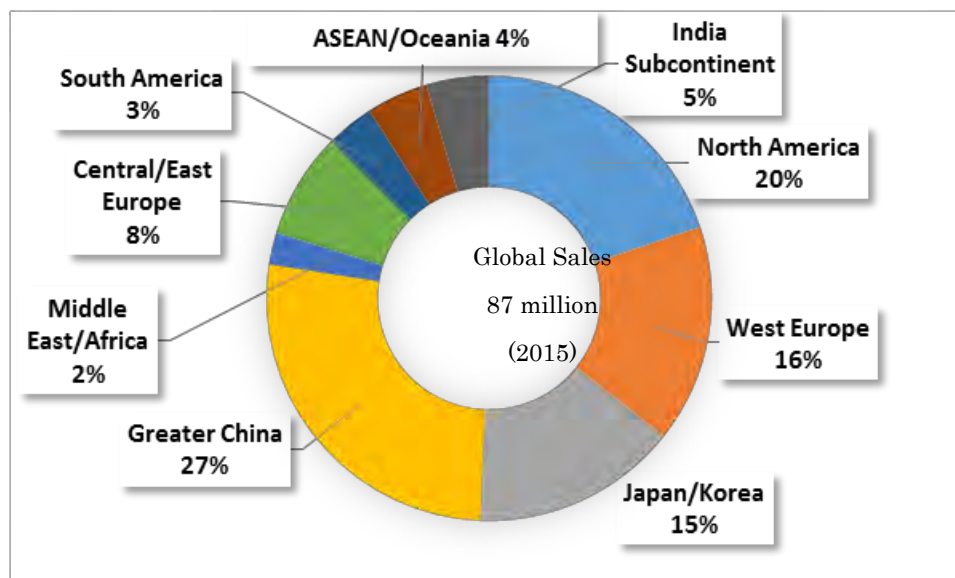


Source : IHS

Figure 79 Increasing and decreasing trend of global sales shown regionally year 2015

(2) Global trend of vehicle production

The global vehicle production reached 87 million units, increasing 1.5% year-on-year in 2015 but declining from the growth rate of 3.5 % between 2010 -2015.



Source: IHS

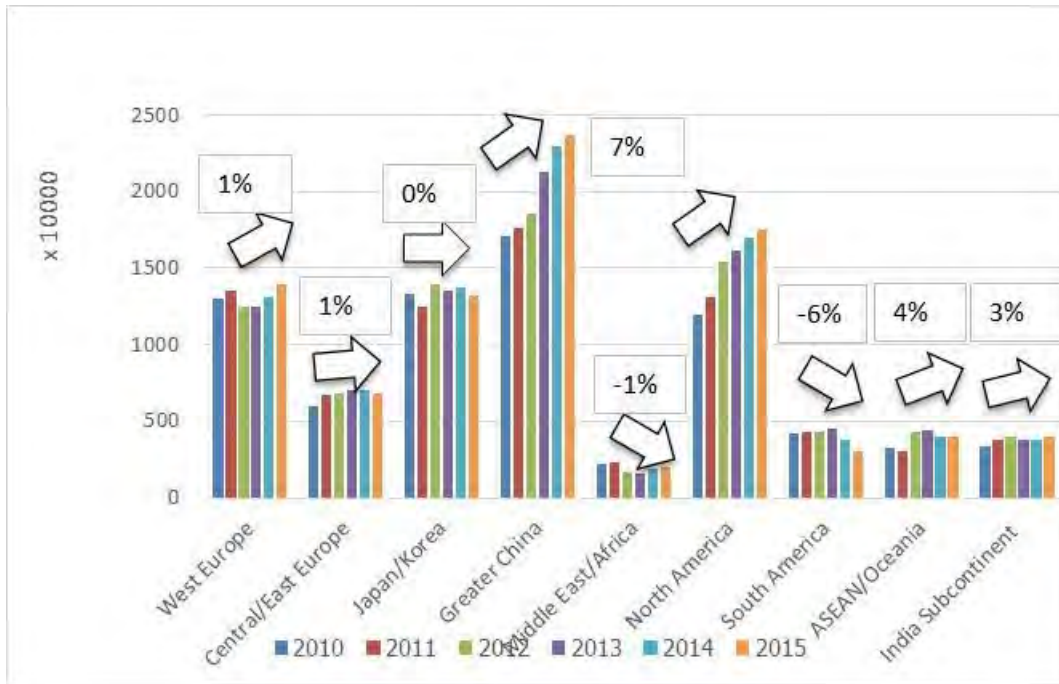
Figure 80 Regional global production ratio (2015)

Chinese production, the largest market in the world, recorded an average annual growth of about 7% and reached 20 million cars for the first time in 2013. China has been leading global production since the Lehman shock. In 2015, the year-on-year growth reached 3% which shows signs of growth slowing down. However, considering its size of population and low vehicle ownership ratio, China still has high potential for growth.

On the other hand, North America is in the process of recovery after the Lehman shock. North America had once largely decreased, but now shows strong recovery in production. Since 2010, its annual growth rate is 8% and their production had reached a record high at 20 million units in 2015. Production of Western Europe for the last five years has grown 1% in average. EU is back on the recovery track since Greece debt crisis in 2014. Their production increased 6% the year-on-year to 14 million units in 2015.

In emerging market except for China, production growth varies by region. Production of South Asia (India & Pakistan) had recorded 8% growth in 2015, turning from negative growth between 2013-2014 and recorded high production of 4 million units. Middle East and Africa had the stagnant average growth rate of 1% due to strengthening of sanctions against Iran, which lead to

a decrease of production in Iran. The year-on-year growth rate of Iran has improved to approximately 5% in 2015. On the other hand, Latin America and ASEAN had been regions which were acclaimed for its resilience against the Lehman shock, but now in reversal. The two regional markets are now recording negative growth since 2014. In particular, the shrinkage of Brazil and Argentina between 2014 and 2015 had a large impact on the regional growth of South America, resulting to 20% drop, the largest drop recorded by a single region



Source: IHS

Figure 81 Trends in regional global production (2010-2015)

In order to grasp production trend by country, we will focus on top 20 countries which recorded high production increase in the last five years. As shown in the Table 78, top 5 countries are China, the United States, Mexico, India, and Germany. The remarkable growth of production in China and in the United States show that the major market growth is driven by supplying to huge domestic market.

Table 78 Trend of Major Producing Countries (2010-2015)

(unit : per car)

	2010	2011	2012	2013	2014	2015	平均増減台数	2010-2015
China	16,823,643	17,275,860	18,234,601	20,920,211	22,609,639	23,310,604	1,297,392	6.7%
United States	7,621,038	8,455,203	10,114,881	10,872,227	11,431,379	11,858,066	847,406	9.2%
Mexico	2,258,727	2,547,270	2,865,872	2,926,860	3,211,815	3,379,640	224,183	8.4%
India	3,246,903	3,599,993	3,802,371	3,654,532	3,593,972	3,807,783	112,176	3.2%
Germany	5,452,083	5,777,142	5,548,662	5,638,548	5,830,430	5,928,754	95,334	1.7%
Indonesia	649,029	737,186	984,971	1,048,796	1,235,127	1,073,848	84,964	10.6%
Slovakia	476,365	511,840	782,969	827,571	843,023	897,012	84,129	13.5%
Spain	2,380,577	2,360,232	1,946,536	2,144,705	2,397,397	2,707,479	65,380	2.6%
Hungary	203,665	209,338	230,745	312,795	430,683	522,955	63,858	20.8%
United Kingdo	1,381,838	1,446,273	1,558,339	1,576,400	1,583,489	1,659,688	55,570	3.7%
South Korea	4,223,597	4,622,510	4,518,328	4,461,182	4,463,010	4,489,170	53,115	1.2%
Thailand	1,620,782	1,449,994	2,417,506	2,411,493	1,856,497	1,872,395	50,323	2.9%
Turkey	1,056,435	1,100,688	1,006,559	1,066,410	1,120,132	1,292,674	47,248	4.1%
Czech Republ	1,020,393	1,126,382	1,084,862	1,064,890	1,161,197	1,249,211	45,764	4.1%
Morocco	43,399	57,414	109,284	167,602	231,854	254,855	42,291	42.5%
Canada	2,060,837	2,123,379	2,453,587	2,377,897	2,386,373	2,246,554	37,143	1.7%
Italy	810,096	761,161	643,552	625,281	671,761	963,349	30,651	3.5%
South Africa	451,921	499,479	505,199	498,799	510,624	563,326	22,281	4.5%
Serbia	16,268	13,413	30,474	113,765	118,583	97,509	16,248	43.1%
Finland	6,665	2,540	1,254	7,573	45,842	79,564	14,580	64.2%

Source : IHS

In Asia, India and Indonesia, the countries with large population, also show strong growth. Their growth is also attributed to the expansion of domestic market. In Europe, Slovakia and Hungary, in particular, have high growth rates as they are supply bases for the EU market with increasing importance of its position. In the Middle East and Africa, Morocco and South Africa are growing in recent years as they have used FTA to EU and increased exports for the EU market.

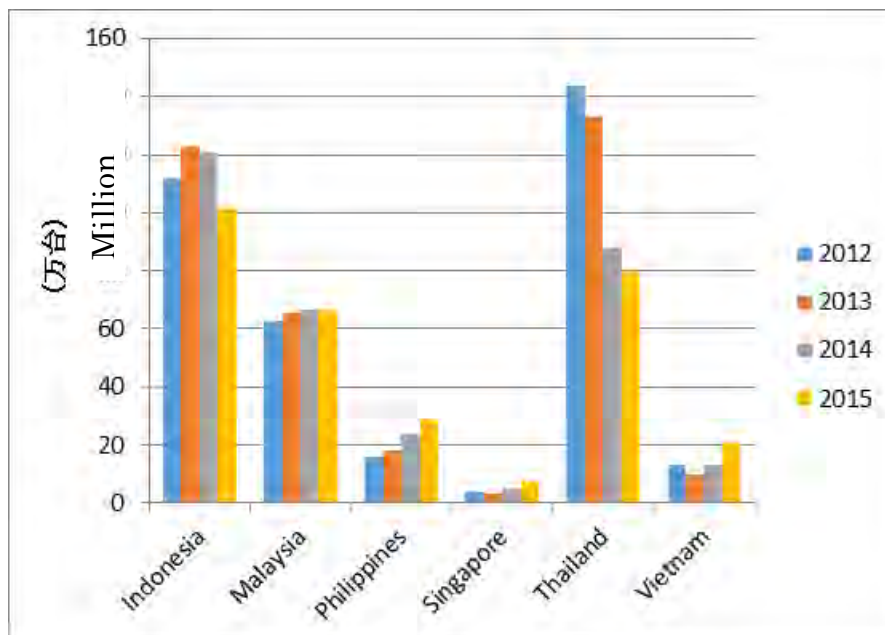
(3) Positioning of the ASEAN automobile industry

The ASEAN market has approximately 3 million units and makes up 4% of the world market. Compared to other emerging markets, ASEAN is smaller than Latin America which has more than 4 million units, and India which has approximately 3.5 million units. The long history of political and economic relationship between ASEAN and Japan has made Japanese brand strong, which resulted to the dominant share of Japanese manufacturers, reaching 90% of the market; ASEAN is thus one the most important markets for Japan. However, from viewpoint of Europe and North America, they have longer historical relationship with Latin America and Eastern Europe, and find China and India more attractive as emerging market. This is why they may not consider ASEAN as a high priority for market entry. Therefore, until now, ASEAN is dominated by Japanese manufacturers who set up full production base in the region, leaving European and Korean manufacturers with very small presence in the region. The only exception is Ford which has joint venture with Mazda, and established a pick-up export base in Thailand.

By country, Indonesia is the largest market in Southeast Asia region of approximately 1 million units, followed by Thailand with 800,000 units, and by Malaysia with 600,000 units. These are the three major countries in ASEAN, taking 80% share of all markets. However, in recent years, due to sluggish exports caused by Chinese economic slowdown and a drop in prices of natural resources, the growth of three major countries had dropped.

In particular, Thailand is affected by "The First Car Buyers Scheme" announced in 2011, which gave preferential tax measures for first time car buyers. The rush for purchase under the policy raised car sales, peaking at 145 million units in 2012. However after the boom passed, sales dropped to 800,000 in 2015.

On the other hand, Vietnam and the Philippines markets are growing since government successfully carried out domestic economic reform to fight high inflation, resulting to domestic consumption boom. The Vietnamese market is expanding at an annual rate of 20%, reaching to 200,000 units in 2015 and the country is expected to reach 300,000 units in 2016. The Philippine market has an annual growth rate of over 10% and has exceeded 300,000 units for the first time in 2015. However, the two countries which started growth late depend mostly on complete knock-down production through imported parts or on import of complete units, since investment for domestic automobile production stagnated in the past.

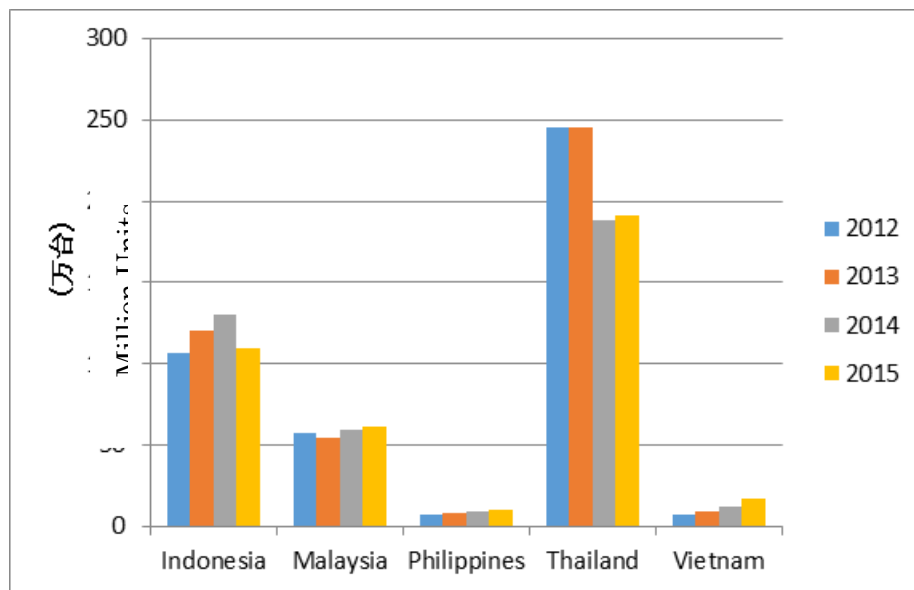


Source: ASEAN Automotive Federation

Figure 82 Trends in automobile market in major ASEAN countries (2012 to 2015)

(4) ASEAN automobile production trends

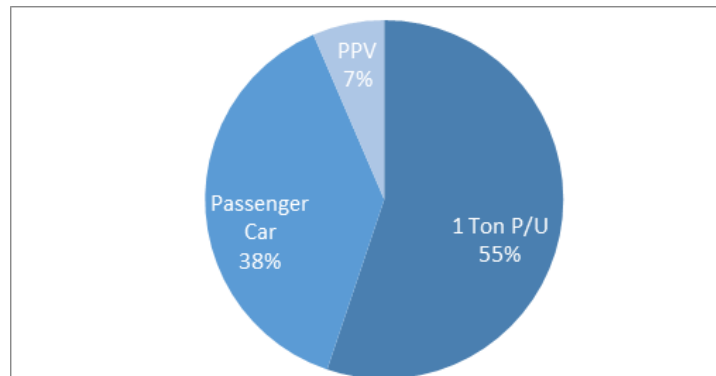
ASEAN automobile production size is 4 million to 4.3 million units and makes up 4% of the total global production. Thailand is used as a production base for one-ton pickup and it is the only country in ASEAN which has a significant position in the global value chain, as it became global production hub of 1 ton pickup. Thailand's total automotive production—or one million units—is intended for exports, while the rest is for the domestic market.



Source: ASEAN Automotive Federation

Figure 83 Trends in automobile production in major ASEAN countries (2010-2015)

The second largest producing country is Indonesia with one million units, then followed by Malaysia with 600,000 units. The three major countries in the region occupy 90% of total production in the region.



Source: FTI Automotive Club

Figure 84 Thailand by type of vehicle export (2015)

(5) Future direction of ASEAN production and investment

Vehicle production in ASEAN countries are classified into 3 types; 1) participant of the global supply chain: Thailand, 2) Domestic production type: Indonesia and Malaysia, 3) knock-down production and imports of complete built cars: Vietnam and the Philippines. Especially the gap between groups 1) and 2) or group 3), is expected to expand under AEC from 2016 onwards. For example, many manufacturers in Vietnam may stop knock-down production by 2018 as AFTA tariff is expected to be eliminated and switch to import of completely build-up units from Thailand or Indonesia.

On the other hand, auto parts and units may have better opportunity for the Philippines in the future, due to changes in investment environment, changes in logistics and institutional factors, the spread of electric technology and electronic control and other new technology. The value chain may become more susceptible to changes and the Philippines, which occupies marginal positioning among countries, will be able to participate in the global value chains. Until now, investment type in materials, parts and units in ASEAN is grouped as follows:

- (1) Localization investment type (= domestic vertical integration): In the past for the response to the domestic regulations, recently for shorter delivery lead times and lower logistics costs, local production of vehicle parts for local automotive assembly has increased.
- (2) Mutual complementation investment type (=horizontal division of labor): In the past, the investment was under the BBC, AICO Scheme; while, in the recent years investment under AFTA are subject to mutually complementation production.
- (3) "Thailand + 1" investment type (= in-process division of labor): Some parts of production or some parts of the process losing competitiveness are transferred to the neighboring countries from Thailand.
- (4) Intra-regional and extra-regional direct exports type (= export process type): the

main purpose of investment is to export outside the region such as Japan and the United States as well as within ASEAN.

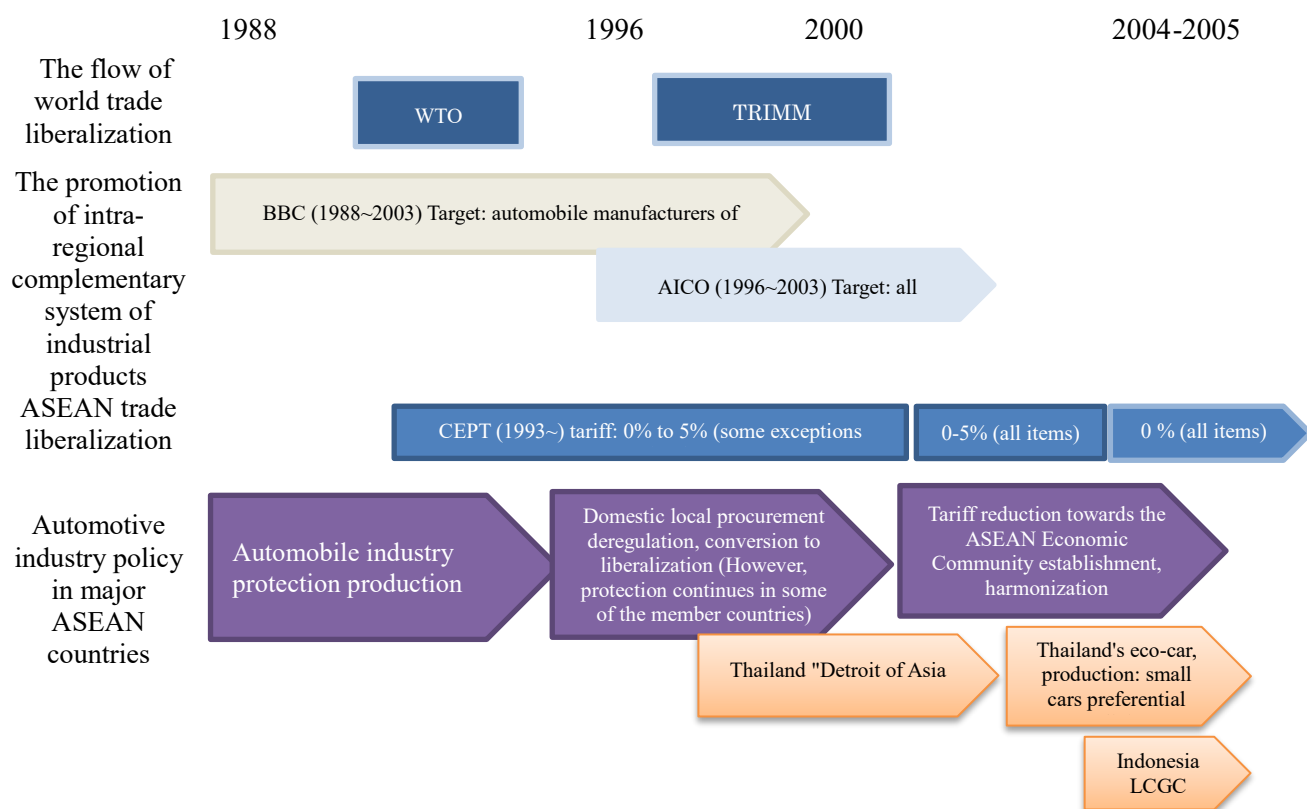


Figure 85 Transition of ASEAN automobile industrial policy and trade policy

For more information, some examples of investment model and recent trends of investment in auto parts are as follows.

(1) Localization investment type (Domestic vertical division type)

In the ASEAN countries, localization policy had been pursued until the year 2000 through setting up of localization target and making it mandatory to produce certain items locally to encourage local production of automobile and parts. Despite the fact that localization policy was eliminated since 2000, due to the WTO TRIM regulations, this type of investment increased in the country like Thailand, as an effort to strengthen its position as production hub in the region, as localization helped to reduce material cost, shorten delivery lead time cut, and reduce exchange rate risk, etc. As a result, not only Tier1 in Thailand but also small and medium sized Tier 2 and Tier 3 companies of components and raw materials from Japan invested; this resulted in "deepening of localization".

(2) Mutual complementation investment type (Intra-regional horizontal division of labor type)

This mainly refers to division of work between products in the region, consisting of specific product concentration in respective ASEAN countries and complementation of production to each other. From the 90's until the early 2000's, with the transitional period from local industry protectionism to the AFTA regional tariff liberalization, this type of investment was quite significant.

In order to increase intra-regional investment in 1988, ASEAN introduced BBC (Brand to Brand Complementation) and then AICO (ASEAN Industrial Cooperation). In 1996, BBC evolved to preferential tariff measures. Tariffs were exempted for the companies on the condition that the trade balance is maintained among the countries trading in the same group in the scheme. During this time, the local manufacturers raised local procurement ratio, and expanded horizontal division of labor in the region, driven by Japanese automakers and parts manufacturers, to strengthen competitiveness of their products. A typical example is Toyota's Toyota Utility Vehicle (TUV) initiative (as presented earlier in this study). In mid-90s, Toyota also used mutual complementation system with the preferential tariff rates under the BBC scheme. DENSO also took advantage of AICO scheme; in Thailand, DENSO produced electronic components such as starter, alternator, in Indonesia air conditioner compressor, spark plugs, while in Malaysia, ECU and electronics products, and in the Philippines combination meters.

However, in 2005, under the AFTA, the tariff rate in the region was reduced to zero and Thailand has improved its competitive advantage as a production base, and so the production of electric power steering (EPS), common rail diesel, injection, CVT and new localized functional parts and powertrain have been concentrated in Thailand; these would then be exported to the surrounding.

(3) Thailand + 1-investment (in-process division of labor)

This refers to action of transferring some processes and components from Thailand to neighboring countries, while maintaining Thailand as production hub. To be more concrete, it refers to action to move out labor intensive and low-value-added processes such as simple assembling and sewing and cutting from product manufactured in Thailand to lower wage neighboring countries like Cambodia and Laos. This is due to concentration of production to Thailand in mid-2010s, causing a severe lack of labor force in Thailand. In addition, Thailand's minimum wage are raised from January 2013 to THB300 per day, resulting to wider wage gap with neighboring countries such as Cambodia, Laos and Myanmar.

For example, harness maker Yazaki had set up the factory in Koh Kong where they sent materials and parts from Thailand crossing 5 kilometers from the border to the Cambodian side, then assembled and returned products to Thailand, which in turn, assumes a final quality check and delivery of product to the final customer. There is only one Japanese expatriate, and the rest are from Thailand (consisted of five or more Thai managers). So the company can be called "Thailand-factory" with 1,200 people managed by Thai. Potential benefits of "Affiliated Factory" system can be increased by improvement of institutional environment for investment in the country and road infrastructure of the Southern Economic Corridor linking eastern Thailand and Phnom Penh, Cambodia, and Ho Chi Minh City, Viet Nam, notwithstanding higher logistic costs between Thailand and neighboring countries.

(4) "Cross regional direct export type investment "

This refers to investments for direct exports markets within or outside the region such as Japan and the United States. Many labor-intensive products use this type. It is similar to "Thailand + 1", as it uses imported parts, raw materials, and cheap local labor for assembly and manufacturing. However, the difference from "Thailand + 1" is that this type does not source entire semi-finished products, parts, and materials from Thailand; moreover it directly exports outside the region, not passing through Thailand. This type of investment looks for cheaper labor costs and focuses on the areas along rivers and harbors for export. Typically, this type can import material and parts free of duty, while supplying to domestic market is limited.

For example, Toyota Boshoku established export base in the near the Haiphong, in Viet Nam, and mainly exports airbag products to Japan. Toyota Boshoku enjoy great benefits from production of air bags in Viet Nam as they can utilize the cheap wages for labor-intensive processes, such as sewing.

Nowadays, despite being located comparatively far from Japan, Myanmar also attracts attention since its wage is one-quarter of Thailand's wages. For example, the radiators for Toyo Radiator in Thilawa factory in Myanmar, which was established by the year 2015 through cooperation between local government and Japan to export all production of radiators. Main export destinations are the United States, Japan, Indonesia and China.

This type of investment requires relatively easy to find scalable size of workers and results to lead job creation. On the other hand, this type will have weak local industrial linkages and local cluster as they procure parts and materials from abroad.

5.4.4.2 Key factors for market expansion

This section will be separated in two: success factors for increased investment on auto parts and for completely build-up unit (CBU).

(1) Auto Parts

“Intra-Extra-Regional Export” process type is overwhelmingly predominant among the four investment types mentioned above. The investment policy pursued by the Philippines has traditionally emphasized on acquisition of foreign exchange and employment creation and thus focused on facilitating industry in export processing zones. For example, major auto parts makers such as Yazaki Torres, the largest automotive export company, Fujitsu-Ten are concentrated in Calamba and Sta. Rosa, Laguna in CALABARZON. This is due to advantages in material import and export process by development of industrial estate approved by PEZA and SLEX.

However, type (4) has shortcomings in a sense that material and parts are purchased from overseas and process or product only suited for export process will be transferred from overseas, resulting to limited development of industrial cluster. In order to develop the automotive industry cluster in the country, it will be indispensable to increase local automotive production and luring of product or process that has strong linkage with the local or regional automotive industry.

According to four investment types mentioned, this implies (1) localization investment type (=local vertical division of labor) and (2) Mutual complementation type investment (=horizontal division of labor type). CARS Program which offer incentives for local production will be tailwind for luring type (1). More investment opportunities for type (2) as wages in major automotive producing countries like Thailand and Indonesia are rising rapidly, prompting to transfer production to low wage countries like the Philippines. DENSO has dubbed this type of production transfer as “Billiard strategy”; moving out low value-added parts that have lost competitiveness in its major production hubs like Thailand and Indonesia, while moving in parts which are high value-added and can get increasing demand in the region.

Completely build-up unit (CBU)

Emerging countries in automobile production can be classified into 3(three) types as follows.

Table 79 Automobile Production Model across Countries

Emerging automobile production country type		Major country	The main supply market
Type 1	Domestic market base type	China, India, Indonesia, Brazil	Domestic
Type 2	Developed country export base type	Mexico, Slovakia, Hungary, Morocco, South Africa	EU countries, NAFTA regional market
Type 3	Emerging country export base type	Thailand, (Argentina)	Southeast Asia, Middle East, Oceania

Type 1 consists of countries with large population, typically China, India, and in the emerging domestic market supply for mainly consisting of industry. Indonesia boasts the largest population in ASEAN, with 200 million and it is therefore domestic market base type. Due to domestic economic crisis, Brazil has 200 million population and the largest market in South America, but due to the fall in resource prices in recent years, production dropped more than one million units from peak level recorded in 2013.

Type 2 is production countries which focus export to developed countries, like the EU and the NAFTA region, taking advantage of FTAs with these regions. Recently, Mexico's presence has risen as a production base for the NAFTA region. Over the past five years, Mexico's production increased 200,000 units annually or, more than one million units in cumulative base in the five years. Mexico's domestic market is around one million units including import, and it exports to NAFTA countries close to three million units. In recent years, due to the rapid recovery in the North American market, automakers are accelerating moves to transfer production from USA and Canada to low-wage production country like Mexico. For example, Toyota plans to transfer production of the next Corolla from Canada to Mexico and start operation of new plant in 2017. Also, Mexico stands out from the fact that Mexico attracts investment from global manufacturers from Europe, North America and production is expected to reach five million units in 2020 overtaking Korea, as the fifth largest production country in the world. Traditionally, Mexico was utilized as production base for the Big 3 American manufacturers and European manufacturers such as VW Group, however, recently the country is also attracting investment from Japanese and South Korean manufacturers.

Slovakia and Hungary are classified as type 2. By utilizing industrial cluster and relatively low wages, these countries mainly export to the EU economy. For example, Slovakia has become the export base for the VW Group, and luxury cars such as Porsche, Cayenne are mainly exported to Europe and to other developed countries. Recently, Morocco, which attracts attention as a new emerging producing country, also belong to this type. Morocco production jumped from 40,000

units in 2010 to 250,000 units in 2015, growing more than six times in the period. Morocco is located opposite shore of Spain and so close to Europe taking advantage of the FTA with the EU and export base.

Thailand belongs to the type 3, taking a course which no other major producing countries are taking. No special positioning in other major producing countries. The country is characterized by exports to emerging markets like Asia, Oceania, Middle East, etc. as its major export vehicle type is 1-ton pickup. This is because Japanese automobile manufacturers position the country as the production base for emerging markets, complementing production in Japan which mainly export to developed markets,. However, in the aftermath of the recent emerging market downturn and contraction in 2014 onwards, production dropped to 1.9 million units from its peak level of 2.4 million units.. The case of Argentina is close to the type 3 as it exports mainly to Brazil and other South American market; however, production depressed to 500,000 units from the peak of 800,000 units, affected by the market down turn in South America. Conditions for emerging countries to become strategic export base in the future could be summarized in four points as shown in Figure 86.

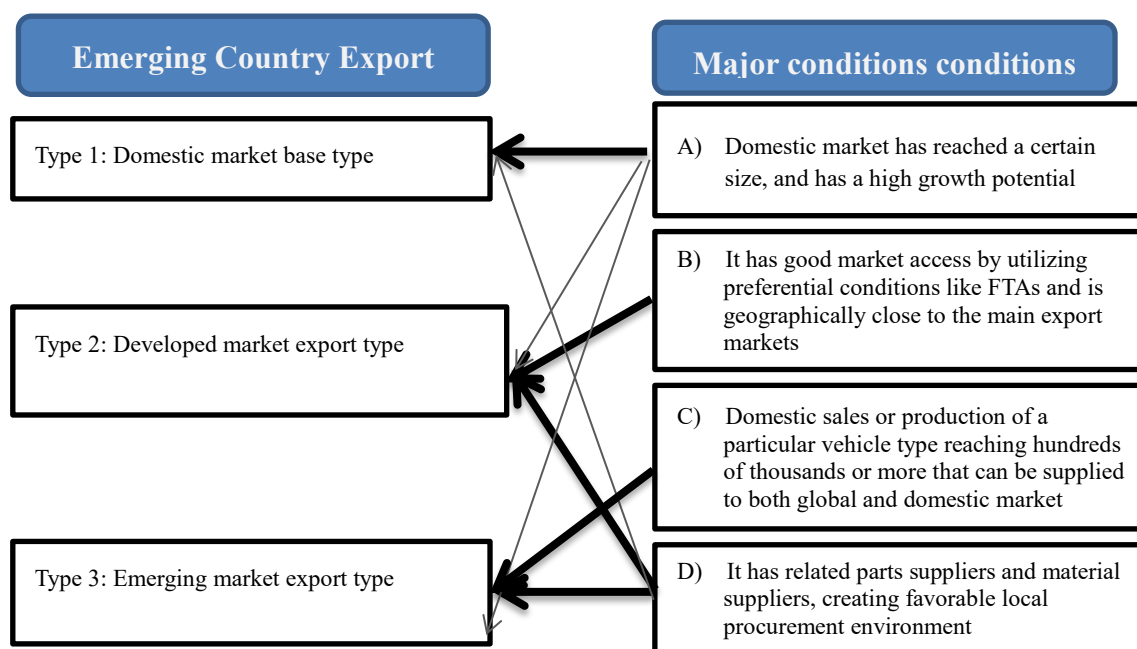


Figure 86 Types of car export countries

In order for Type 2 and Type 3 to be successful as export development model, conditions to benefit from preferential tariffs through FTA with neighboring countries (condition of B). For example, the driving factors that promoted Thailand to become the hub of auto industry in the region is

proactive FTA policy pursued by Thaksin government. Furthermore, Thailand has also met condition c) by achieving thorough economy of scale, localization, and export promotion of pickups. It has also met D) as it strived to develop local suppliers as well as to attract investment from Japanese parts manufacturers.

Among the three types, the Philippines has the largest chance to become type 3 or export base for emerging market. However, the prerequisite for the type 3 is that the country must differentiate from Thailand, the leader country of type 3, in terms of export products. In fact, production of major type of cars like small passenger cars and MPVs produced in CALABARZON is overwhelmed by Thailand and Indonesia in terms of volume. The Philippines, therefore, will find it difficult to compete with them, other than niche products, which are not produced elsewhere.

On the other hand, considering that the Philippines is left-hand-drive country and thus can enjoy merit for transferring local production model for export to left-hand-drive countries, Philippines may have chance in developing type 3; the Philippines will be successful on conditions that it can link local production model with left-hand drive markets in the region.

5.4.4.3 Business opportunities in the target regions

CBU assembly/ export business opportunities

CALABARZON has been the hub of CBU assembly at Sta. Rosa Industrial Estate, Laguna. CALABARZON is also the host of car assembly such as Toyota, Honda, Mitsubishi Motor, and Isuzu. In addition, despite their strong export orientation, many auto parts makers are concentrated in Laguna Province such as Sta. Rosa and Calamba, CALABARZON has benefits for local purchasing. Therefore, it will continue to have good advantages for CBU assembly and export.

Supply chains in Philippines have mainly involved in domestic low value-added, and simple assembly (finished cars, components). The automobile's domestic added value is around 20% – 30%. As it hardly cleared even 40% of ASEAN contents, the Philippine automobile industry was not able to have export competitiveness within the region. There are, thus, no automotive manufacturers that utilize Philippines as a base of export within the region, except manual transmissions. As for the manufacturers of components, there are only a small number of manufacturers such as DENSO who exports combination meters utilizing a complementary scheme within the region and Yazaki Corporation who uses Philippines as a supply base of wire harnesses from early on.

However, the CARS program, which serves as an incentive to domestic production, is implemented, so that it is forecast that certain kinds of components for bodies, exterior and interior components are to be localized. These components require the scale of 50,000 – 100,000 units at least per model. Therefore, if over 50,000 units per model are produced according to the plan of the CARS program, it is expected that the supply chains in Philippines will extend to press work, mold injection, machine processing and other domestic processing components. Furthermore, it is highly possible to promote the local production of molds, tooling, and other similar processes, which are required for component manufacturing, associated with the localized components. Most components and molds tend to be procured from Thailand and Japan so far, but if Thailand increasingly suffers from serious labor shortage, and becomes difficult to secure the craftsmen of parts processing and molding in the future, it is highly possible that such products will be shifted to Philippines where abundant manpower are available.

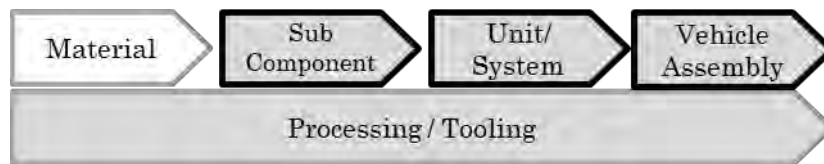


Figure 87 Trend in Supply Chain Formation in Philippines

On the other hand, it is difficult to extend the supply chains in Philippine to those materials. This is why localization is difficult unless tremendous scale merits or the superiority of material procurement exist. Local production of materials such as ABS and PP has expanded in Thailand, because they can be purified from natural gases produced in Gulf of Siam at a lower cost. The promoted localization of cold rolled steel sheets and galvanized steel sheets for automobiles in Thailand in this decade is mostly dependent on automobiles produced in Thailand exceeding two million given that the country secures the production scale. In view of the worldwide supplies of steel products overtaking demands, it is difficult to depend on export, and so localization cannot be realized without substantial domestic demands. Even if automobile production grows in Philippines by providing the production incentives through the CARS program and increasing domestic demands, it is not expected that the country will achieve the production scale exceeding one million units that enables it to localize materials in near future.

The unit system is classified into the three: a system for interior and exterior components which is comparably easily localized, a unit system related to driving function of which localization is rather difficult (brakes, suspensions, steering, drive trains, etc.) and a power train system such as engines and transmissions for which investment cost is highest.

It is expected that the formation of supply chains focused on interior and exterior components will be promoted in Philippines due to the future expanded local production. Main interior and exterior components include sheets, molded plastics, rubber products, and press parts. It is desirable to localize small parts and proceed to the local production of higher valued-added combined units.

As the unit system related to a driving function requires increased investments in plants and facilities, the system cannot be established unless supplies for the local region is to be taken into consideration. For example, it is difficult for brakes and steering to be localized without building related supply chains because they require a lot of components. Thailand tends to undertake the intensive production of such components, but if Philippines can extend its production to the scale of 500,000 to one million units, the possibility of localization is higher. It is desirable to gradually localize components while production grows, beginning with the unit system assembly. With the localization of components promoted, competitiveness will be enhanced and the Philippines can become a supply base to the region.

As the power train requires the scale merit of 300,000 - 500,000 units per model, it is necessary to position Philippines as a supply base inside and outside the region. Traditionally, the intensive production of power trains has been introduced at each production base in the ASEAN countries under the Brand to Brand Complementation (BBC) scheme or other schemes by division of labor within the region (for example, diesel engines for commercial use automobiles and gasoline engines for small cars in Thailand, small-to-medium gasoline engines for minivans in Indonesia, and manual transmission in Philippines). In recent years, the scale merit is increasingly important due to growing investment costs from the development to manufacturing of power trains and they come to be supplied not only inside the region but also outside the region. As a result of a division of labor within the region settled and supply chains established at each base, it is not assumed that the future picture of power trains under division of labor would drastically change.

Moreover, it seems that recent investments related to power trains tend to be concentrated in Thailand and Indonesia. For example, JATCO Ltd. constructed a CVT plant with production capacity of 200,000 units or more in Thailand in 2013 to mainly export to Nissan, Mitsubishi Motors and other companies in Thailand for eco-cars. Toyota-affiliated Aisin AW also built the third production site overseas in 2015 in Thailand, following China and Mexico and plans to operate an AT plant with annual production of 120,000 units for Toyota's commercial vehicles from 2017 onwards.

In addition, as Thailand has been a supply base for pickups to the world since 2004, local production is going well there with regard to engine-related core components such as cylinder blocks and cylinder heads, and electric/electronic devices around engines, as well as precision components such as common rails for diesel engines and turbo, along with assembly of engines.

According to an executive for the regional supervising department at DENSO, Siam DENSO Manufacturing, one of its affiliated companies, is manufacturing common rails for diesel engines in Thailand. On the background that the company invited a maker handling related-components and fostered local makers at the same time, a thick layered supply chains have been built there. He noted, therefore, Philippines, where there have been no supply chains for internal-combustion engines, has a low potential for establishing a new production base (quoted from past interview by NRI). On the other hand, he sees that for Indonesia with a high potential market scale, it is possible to extend investments in power train-related components in the future.

From above, in view of the development of supply chains in Philippines, it is desirable for Philippines to proceed to the first stage (number of vehicles manufactured: 100,000 – 200,000 units) where it localizes the assembly of (1) interior and exterior components/units for domestic use and (2) driving function-related units; the second stage (200,000 – 500,000 units) where it localizes the assembly and production of (2) driving function-related units and components, respectively, in addition to (1) above; and the third stage (500,000 – 1 million units) where it builds a base for driving function-related units for local use. However, it is expected that the localization of power train-related units will remain with a central focus on assembly.

(1) New Response to Changes in Technologies and Opportunity for the Philippine Supply Chain Formation

Supply chains for which Philippines will find more opportunities to take part in with the future changes in technologies growing include those for (1) systems/components related to Advanced Driver Assistance System (ADAS) and (2) systems/components related to electric-motor powered trains. This is why there are only a few existing players within the region, as they are still new technologies and products.

1) Safety-related Systems/Parts such as ADAS

In recent years, with the global safety regulations enhanced and the electronic control and sensor technologies advanced, the preventive safety function to avoid danger and to increase safety as well as the collision safety function which protects passengers when an accident happens become

widely used mainly in the developed countries. In order to reduce the load of drivers and realize more comfortable driving, driving assistance functions such as Active Cruise Control (ACC), Lane Departure Warning (LDW) and Intelligent Parking Assist (IPA) begin to be installed in the new models. ADAS stands for these advanced safety/driving assistance systems. As shown in Figure 88, ADAS is expected to be sophisticated due to the spread of automatic driving.

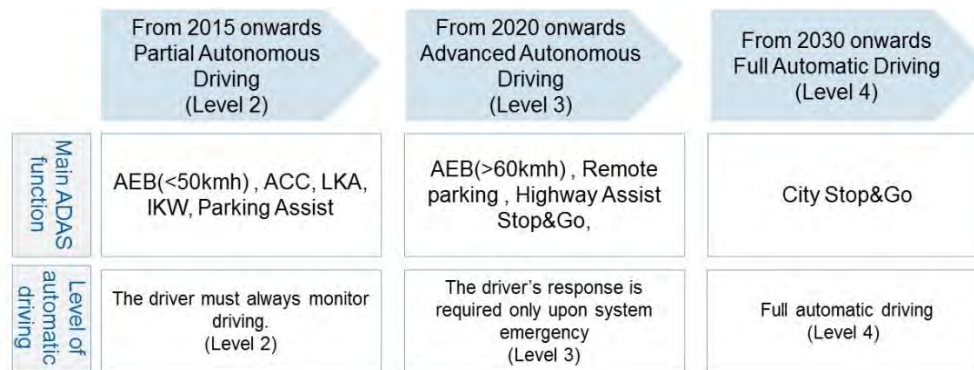


Figure 88 Roadmap of ADAS and Automated Driving

In Europe, a leader of the creation of the world's safety standards, the European New Car Assessment Programme (EURO NCAP) in particular introduced the Autonomous Emergency Brake (AEB) early in 2016 to support the spread of ADAS. On the other hand, against the backdrop of the traffic accident rate significantly exceeding the world average, ASEAN also adopted the ECE standards (European safety standards) and the UN-R standards as common criteria, as its attempt to strengthen its standards. Thailand and Malaysia of the ASEAN countries have adopted the UN-R standards (International standards) ahead of other countries within the region. In Thailand, for example, to provide the eco-car incentives of the preferential excise tax rates and the investment tax exemption to compact cars, it is required to comply with the collision safety standards (R-95) and equip ABS in the first eco-car policy and equip ESC (Electronic Stability Control) in the second eco-car policy introduced in 2014.

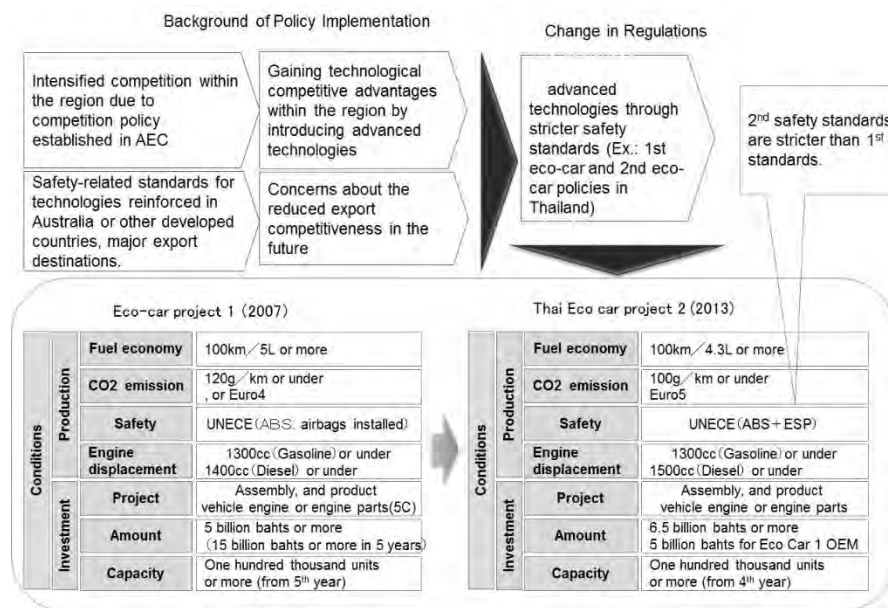
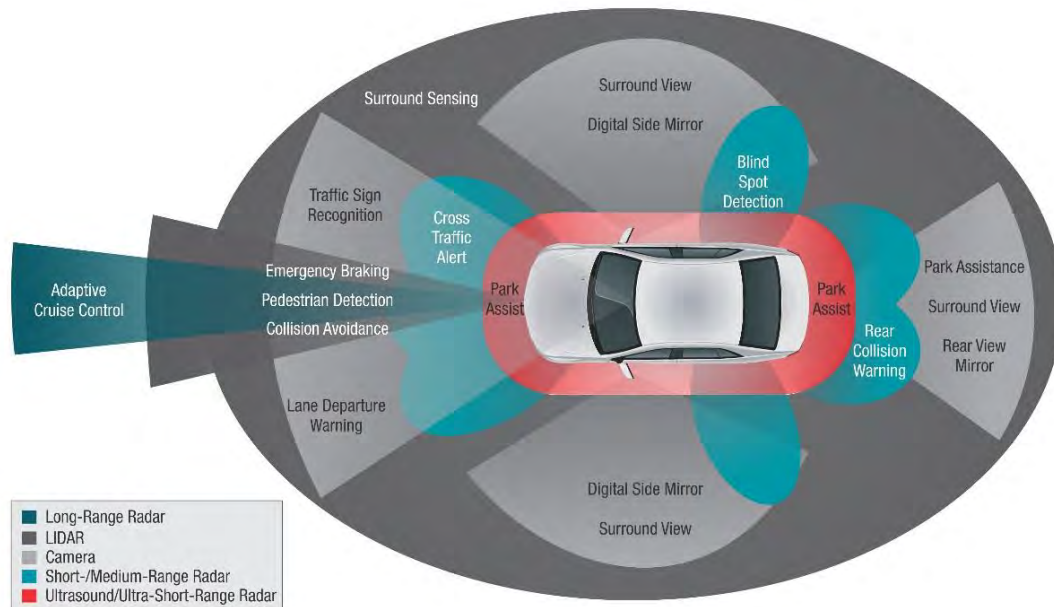


Figure 89 Trend in Introducing Safety Regulations in ASEAN

Attention is focused on the ASEAN NCAP (ASEAN New Car Assessment Programme) as a future contributor to encouraging ASEAN. Malaysian Institute of Road Safety Research (MIROS), a body under Malaysian Road Transport Department, has tried to disseminate the NCASEAN NCAP as a new car safety assessment common to ASEAN with assistance provided by European NCAP. In the first stage of NCAP between 2012-2016, the assessments are focused on seatbelt warning mainly on broadside collision, but in the second stage between 2017-2022, offset collision and ADAS will be added to evaluated items.

Electronic devices are expected to spread, including millimeter wave radars, cameras and ultrasonic scanners (LiDAR) along with the spread of ADAS. The Philippines has sufficient possibility to build the development and production base of those devices, as no full-fledged local production of the devices starts within the region yet. A regional headquarter executive at DENSO in Thailand notes, “The Philippines is a desirable country which has the foundation of the electric/electronic industry, abundant work force, and where wedges in dollar have been stable.” In addition, as ADAS requires significant IT human resources to develop software processing the images and information caught by cameras and radars, the Philippines with its abundant human resources can become a strong ADAS development base. For example, the Thai regional headquarter executive at DENSO, which has established DENSO Techno as an embedded software development base, notes, “The spread of ADAS can increase human resources at the development base in Philippines.”



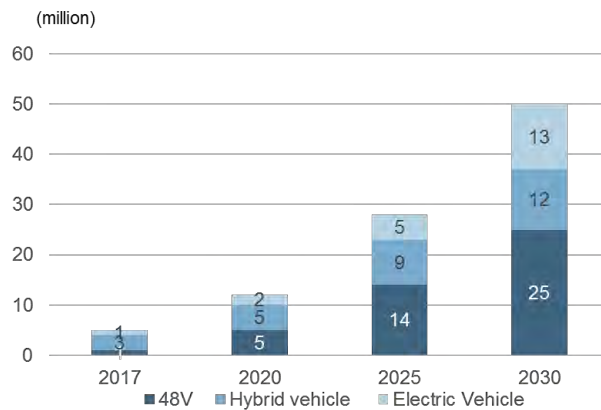
Source: Texas Instruments

Figure 90 Radars and Cameras Equipment Related to ADAS

2) Electric-motor Powered Train-related Systems/Components

The regulations for fuel efficiency and gas emission will be reinforced worldwide in the future. Fuel economy standards (Co2 emission standards) in the CAFE regulations will be reinforced by 20% compared to the current ones, mainly in the developed countries during the period of 2021 - 2022. Moreover, India and China where air pollution has been escalated will also reinforce the regulations following the developed countries. As there are limitations to responding to the regulations by the technologies of existing internal combustion engines, the spread of electric-motor powered trains used for mild-hybrid/hybrid vehicles (HEV), plug-in hybrid vehicles (PHEV), battery electric vehicles (BEV), etc. is expected to be accelerated in the future.

According to the forecast of Continental, a western component maker, the electric-motor powered trains will grow drastically from 40,000 units in 2017 to 10 million units or more by 2020 and to about 30 million units by 2025.



Source: Continental

Figure 91 Future forecast of electrified powertrain

As mentioned above, the supply chains of power trains for internal combustion engines have always been built within the region, mainly in Thailand, and thus there is a room for Philippines to introduce and develop the electric-motor powered train industry rather than the industry of internal combustion engines. That is, it is desirable for Philippines to aim at building the e-(electric power train) supply chain and invite the component and unit industry players responding to the electric-motor powered train systems. As the batteries of electric-motor powered trains are costly and premised on the existence of huge investments, high-functional materials and sophisticated precision assembly technologies, it seems that investments are for a while concentrated in the developed countries or China with big markets. On the other hand, since wire harnesses, OBC, DC-DC motors, etc. which flow high-capacity current are centering on the electronic assembly technologies, if a certain scale of mass production is secured, their localization in Philippines is possible.

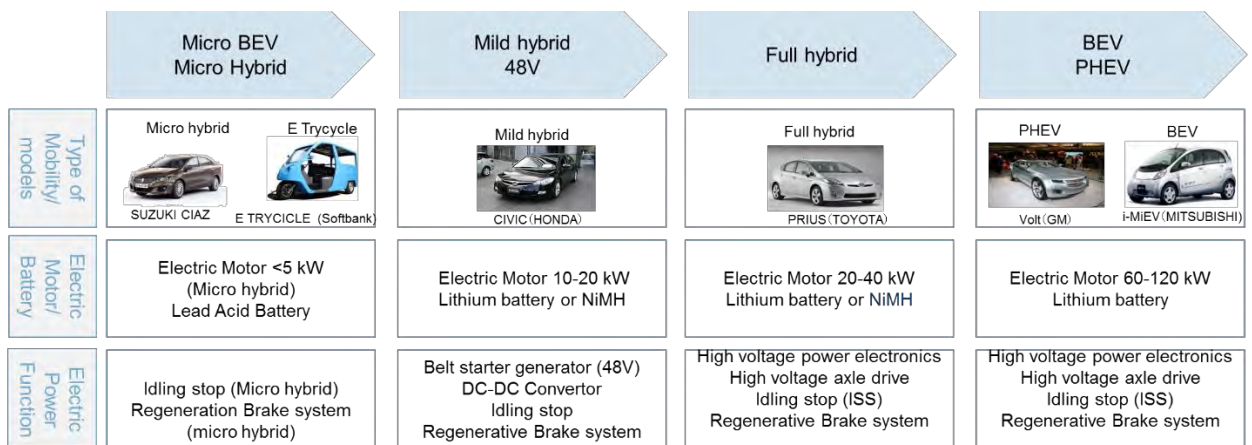
	Motor / Generator	Battery	Inverter	DC/DC Converter	On Board Charger (OBC)	Electric Compressor	Electric Power Steering	Wire Harness
Function/Description	<ul style="list-style-type: none"> • Power Assist or Power Drive 	<ul style="list-style-type: none"> • Energy Storage – Lead Acid, Li-ion or NiMH 	<ul style="list-style-type: none"> • DC to AC power 	<ul style="list-style-type: none"> • DC voltage Conversion 	<ul style="list-style-type: none"> • Charging with AC to DC 	<ul style="list-style-type: none"> • Device for Air Conditioning 	<ul style="list-style-type: none"> • Electric Motor steering 	<ul style="list-style-type: none"> • Electricity transmission

Source: JICA Study Team

Figure 92 Electric-motor Powered Train System/Components

In general, in terms of the electrification of power trains, attention tends to be focused on the electric vehicle (BEV), but it is recommended that the e-supply chain covers a wider range of

mobility and electric-motor powered systems. As BEV requires massive battery capacity, it is costly. Moreover, as technically restrictive factors still remain, such as a short travel distance per charge, it is said that a rapid spread of BEV would be difficult in the existing lithium technologies. It is easier to achieve the economies of scale by localizing partially electric-motor powered systems with less battery capacities such as mild-hybrid and HEV (Hybrid Vehicle), not being limited to BEV. Especially, emerging country like the Philippines have car owners which utilize cars for dual purpose (commercial and passenger), so they prefer long distance driving and large loading capacity cars. As BEV has driving range limits and basically suited for use in cities, it will be difficult to penetrate in market unless the user changes the way he uses cars. In addition, in view of the purchase level of the Philippines and the characteristics of its market where various vehicles such as Jeepney and tricycles are popular, the early spread of low-priced electric-motor powered vehicles such as e-tricycles, e-Jeepney, and small-to-medium type e-buses will facilitate the procurement of local materials due to their low technological requirements, which easily leads to the formation of e-supply chains with a broad base. On the other hand, it is desirable that attracting investment in e supply chain comes together with development of supporting industry and strategy to participate in global supply chain. For example, president of Japanese EV company, FOMM, commented to past interview with NRI that he chose to Thailand to set up its plant due to government leader’s enthusiasm in attracting EV, high local contents except for battery and motor which are imported, and good location and supporting infrastructure for exports. This shows that since EV market is still small, EV project is not feasible as business unless there is export business and in order to have competitiveness, it is important to have supplier base and export infrastructure.



Source: JICA Study Team

Figure 93 Vehicles and Electric Power Functions Responding to Each Stage of Electricity

3) Issues on Value Chains in Philippines and Future Strategy

In the Philippines, automobile-related value chains have been only partially built. In the automobile industry, the global value chain development is a trend, so it is not realistic that the country intends to build a complete value chain domestically from now. Therefore, it is desirable that Philippines will develop a value chain in the following three fields: downstream, midstream and upstream, while selecting and strengthening the value chain it has the advantages of.

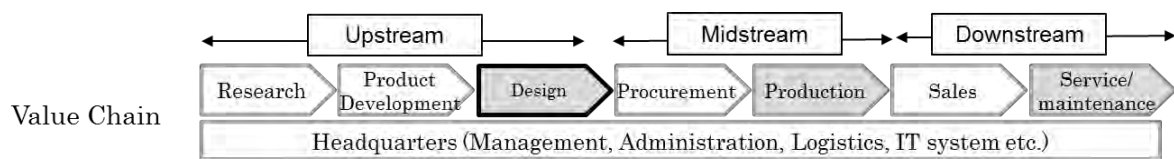


Figure 94 Image of Building an Automobile Value Chain in Philippines

Up stream	offshore design and development	Shortage of IT engineer as ADAS / Autonomous driving requires much human resources in Japan. Opportunity for offshore IT software development support, parts design and evaluation outsource	(example) • Global guess eniegeer who may become global Guess engineer
Mid stream	Strong process and manufacturing	Respond to customer needs in parts/material processing and die processing./ manufacturing , Thailand will not be able to secure enough skilled labor due to a halt of population growth Precision processing and manufacturing technology , the Philippines can become recipient of production or process transfer from Thailand	(example) • DENSO's Billiard strategy
Down stream	After service	Due to rapid car penetration in the Philippines, there will be more business opportunities for car after service, requiring car service men with formal education on car maintenance.. Japan, may also consider using service men from the Philippines .	(example) • Develop highly skilled service men and dispatch them

28

Figure 95 Measures for Enhancing the Automobile Value Chain in Philippines

4) Commissioned Design and Development Business

The commissioned design and development business has the highest potential in the upstream. For the commissioned design and development business, India, which has more abundant IT engineers than the other emerging countries, has become an international hub. Japanese companies, however, haven't been able to fully use Indian resources comparing to Europe and US companies due to the problem of English and different business customs, and thus they are extending the commissioned design and development business to the Southeast Asia. Japanese automobile makers have put the design and development base in Thailand, focusing on the assignment cut out to do specific tasks such as creating CAD/CAM data and the assessment of CAE according to instructions from Japan, but recently, they take more interest in extending the

commissioned design and development business to the other Asian countries due to low rate of engineer retention and increased wages in Thailand. Vietnam has attracted much attention as Nissan Techno uses the country as a design/development center. However, considering that the Philippine workforce generally has high English language ability and good adaptability to other societies, the Philippines is likely to be more suited for international engineer resources than Vietnam. If they are dispatched to the third countries such as Japan and Thailand after training as design and development personnel under consignment, they could become workforce for supporting the design and development business.

5) Reinforcement of Manufacturing/Processing Technologies

Manufacturing/processing technologies has the highest potential in the midstream. Traditionally, Philippines has mainly involved in the assembly of electronics etc. To extend and deepen the automobile supply chains, however, it is essential to reinforce manufacturing/processing technologies. In the “Billiard Strategy” in DENSO, the company considers to shift the labor-intensive products from Thailand to other Asian countries, while assigning further sophisticated products to Thailand. In the case of simple assembly, it is more possible to shift those products to the nearby countries such as Cambodia and Laos under the “Thailand + 1 strategy” of dividing operations within the process, taking their logistic costs into consideration. However, if they fall into the middle level value-added products rather than precision components such as electronic devices, molds, etc., Philippines can be a candidate of outsourcing because neighboring countries have a small number of skillful workers and engineers.

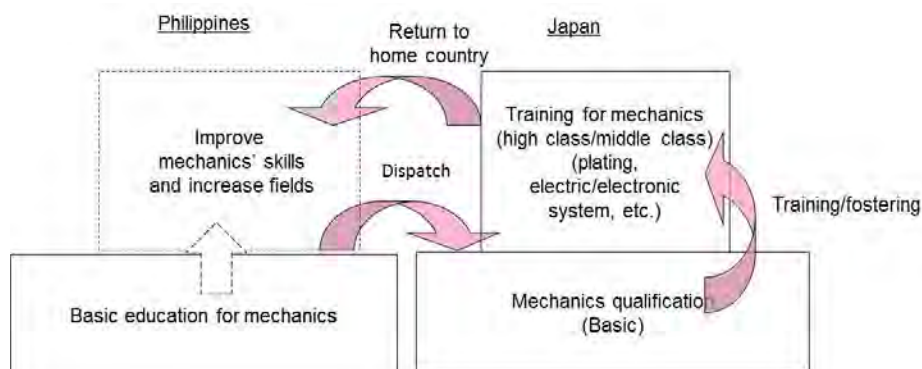
6) After-sales Services: Reinforcement of Manufacturing/Processing Technologies

In the Philippines, the after-sales services and related business is desirable in the downstream, because demands for after-sales services are increasing against the backdrop of expanded domestic sales. As there are still a small number of mechanics who had proper training aside from those employed by dealers’ in the Philippines, measures to improve mechanic skills are required in the future. It is expected that the enhancement of mechanic resources both in quality and quantity will lead to the deployment and extension of new business services such as car-care services which can offer after-sales services including light maintenance, inspection, car cleaning and parts sales in a one-stop way instead of traditional garage-type repair shops.

A Japanese NGO plans to try to dispatch the Vietnamese to Japanese maintenance facilities for a certain period as a cooperation project for mechanic skill training for emerging countries, after providing them with Japanese language education. It will not adopt the internship program but employ engineers (college graduates). This is because there are about 92,000 maintenance

factories in Japan, of which 85% are micro-, small-, and medium-sized enterprises consisting of about 10 employees. As a shortage of mechanics will surface, there will be a need for more foreign mechanics in the future.

The Philippines with abundant engineers (college graduates) can adopt the same scheme. It is expected that engineers who acquired mechanic skills in Japan will return to their home country and contribute to raising the level of local after-sales services.



Source: JICA Study Team

Figure 96 Scheme to Improve Philippine Mechanic Skills through Employment and Training in Japan

Common to these measures for building the three value chains is a global use of the Philippine human resources with good English language abilities and skills. The global use of human resources leads to creating a linkage between the global value chains and the domestic industry. At the same time, it is expected that it will generate a synergy effect of raising the level of domestic value chains through reflux of human resources acquiring the advanced skills outside the country.

5.4.4.4 Opportunities for attracting Japanese investment

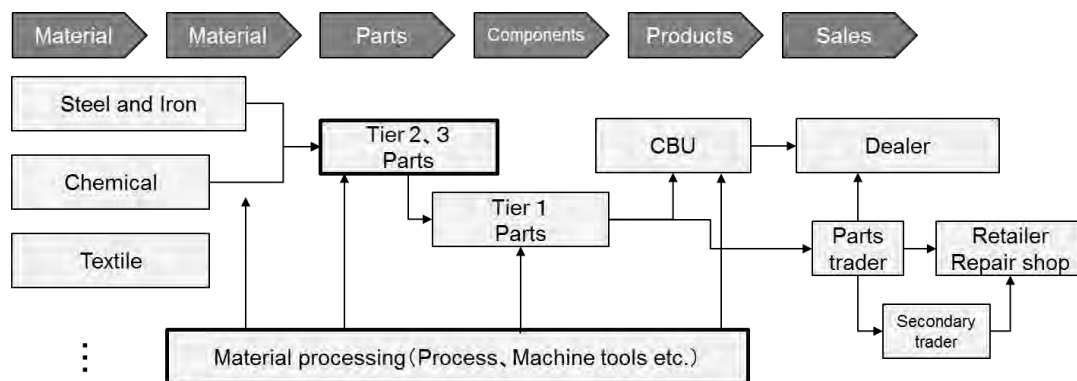
There are business opportunities for three value chains aforementioned. In the upstream, human resources for software development of ADAS is very much in urgent need, so there is high potential for design and development outsourcing work to utilize abundant human resources with high educational background from the Philippines. In order to respond to such needs of Japanese companies, the Philippines needs to develop human resources who has dual background of Japanese language education and IT education. IT development has two kinds of operation: standardized work which makes detailed design based on specification instruction from Japan and non-standardized work which design core function of product through close communication / feedback from customer and market. As Vietnam has already become outsourcing hub for standardized work for company like Nissan Techno, it is desirable for the Philippines to raise

highly skilled IT human resource who can manage non-standardized work. It is also preferable to cooperate with Japanese companies to compensate for product knowledge and evaluation technology that the Philippines may lack in. As for midstream, if the Philippines raises mold-and-die design engineers and mold-and-die process skilled workers, it will help to attract Japanese companies facing labor shortages in Thailand. As for downstream, as local companies will play central role due to foreign capital participation regulation in service sector, it is desirable to establish complementary relationship between the two parties; Japanese side transferring know-how of vehicle maintenance and the Philippine side supplying maintenance engineers who are in short supply in Japan.

5.4.5 Supporting industries

5.4.5.1 Outline of supporting industries

Although the definition of supporting industries is varied, in this survey it is meant a group of companies that processes and manufactures materials, parts and semi-finished products. Those products are provided to assemblers of finished products as raw materials of the final products. In other words, as in a supply chain, supporting industry is responsible for part of the industrial process of assembling and producing materials and parts for sectors such as aircraft, automobiles, and electric machinery.



Source: JICA Study team

Note: Bolded frame parts are often called as “Material processing” or “Supporting industry”

Figure 97 Supporting Industry in a Manufacturing Value Chain

Among the supporting industries, a group of companies that processes parts of metal and other material to produce parts is called the material processing sector. In this sector, there are processing steps such as casting, forging, metal mold, metal press, heat treatment, powder metallurgy, etc., and there are companies that are specialized in their fields. However, it is difficult to accurately distinguish one from other. For example, mechanical parts called bearings can be

made by processing steel materials. It can be said that the bearing manufacturer is a metal processing company and also a parts manufacturer. In addition, even among final product manufacturers or Tier 1 component makers, there are cases in which they process materials in-house where it is necessary.

Supporting industry tends to be located where there are many manufacturing and assembly-type manufacturing companies, and there is a strong tendency to locate in the area where products are mass-produced. Conversely, even if the manufacturing industry is located in a place where the production volume is limited, the finished goods manufacturers tend to process materials in-house and the supporting industry does not exist as an independent group of companies.

5.4.5.2 Market overview

The supporting industry refers to the upstream process of supply chain in various sectors such as aircraft, automobile, electric and electronics, and the market scale is basically proportional to the production scale of downstream products. Because the market size varies depending on the type of parts processed / manufactured, it is difficult to define the market size.

5.4.5.3 Key factors for market expansion

(1) General location selection factors

The quality of the final product depends on the accuracy and quality of the parts composing that product. The quality of supporting industries has a great influence on the quality of the final product. For this reason, the supporting industries are very important in the assembly. For example, in aircraft and automobile industry, safety related to human life is required, thus very high processing accuracy and durability are required for specific parts. If aircraft makers and automobile car manufacturers produce in a country where there is no such high-quality parts suppliers, they may request qualified material processing companies to invest in the country.

Material processing companies are, in many cases, small and medium enterprises. Even with the world's top level technology, their resources such as human resources and funds are limited, and the scope of overseas development cannot be expanded like a large company. For this reason, in the case of small and medium-sized enterprises, in determining overseas expansion, generally consider the following factors and make judgments.

- Whether it is possible to forecast to recover the investment by penetrating to the local market. For example, if there is a request for investment from existing client, then a company may consider the investment positively.
- Availability of qualified human resources.

- Whether there is a rental factory or some other measures that investors can minimize the initial investment, since they have only limited budget.
- Incentives on investment from the host country
- Investment support system in which investors can proceed with their native tongue (not many personnel are fluent in English)
- Whether living environment for staffs from the headquarters is suitable or not.

Among others, the first point among the conditions presented above is a highly important factor. Therefore, if there are few manufacturers of finished products, or, even if they exist, if the production volume is low, supporting industries do not find the need to locate.

In general, major parts such as automobiles and aircraft, which are directly related to the safety components for human life, are required to have extremely high accuracy. For this reason, reliability based on track record is required. Final product manufacturers sometimes request a specific part supplier to establish a factory close to a final product factory. However, if there is not much production at that place, the final product manufacturer may process and make parts by themselves in-house.

For automotive sector, there are certain supporting industries in countries where annual production volume is around 500,000 to 700,000. For example, there are 618 automobile parts manufacturers in Thailand where annual automotive production volume is about 1.9 million units, while there are 228 parts manufacturers in Indonesia where annual production is about 1.1 million units. Compared with 44 companies in Philippines, Thailand and Indonesia have larger accumulation of supporting industries⁴⁷.

On the other hand, in the case of electrical and electronic sector, it is generally said that there are not many cases where suppliers are requested to establish a factory to the site, since final product manufacturers cannot promise a certain amount of order to those suppliers. In that case, final product manufacturers import parts, replace them with the local products, or in-house production at the local plant of themselves.

⁴⁷ The number of cars produced is based on the data of the Japan Automobile Manufacturers' Association (http://www.jama.or.jp/world/world/world_t2.html) . The number of auto parts makers is the number of member companies of the automobile parts industry association in each country

(2) Cases of location selection factors in other countries

1) Cases of FDIs

In ASEAN, a large number of supporting industries are located in Thailand and Vietnam. The characteristics of these countries include the presence of large factories of final goods manufacturers and presence of business opportunities or markets which are sufficient for firms in supporting industries. In addition, in these countries, in order to build up industrial clusters, local governments have been inviting companies to attract small and medium-sized enterprises with high technology.

For example, in Thailand, as the automotive CBU manufacturers gathered, the Thai government subsequently developed investment promotion activities targeting electric and electronic machines and machine tools, and encouraged enterprises to enter. In Thailand, many rental factories that small and medium enterprises can enter with less initial investment were supplied. In promoting investment attraction, they have improved investment climate, such as providing information and accepting investment applications in foreign languages such as Japanese, so that Japanese small and medium-sized enterprises with limited English-speaking human resources will find it easy to invest.

Thailand and Viet Nam have successfully trained industrial human resources as a result of long years of practical training such as how to use the lathe and by support of Japanese companies at Tai-Nichi Industrial University in Thailand and Hanoi Industrial University in Vietnam.

These cases suggest that even if a large company comes, suppliers to the company does not automatically invest in the same country. In addition, by narrowing down the targeted industrial sectors, Thailand and Viet Nam could build up large industrial clusters of automotive and electronics. By doing so, it was possible to accumulate technology and personnel related to that sector, completing the "industrial cluster" ecosystem. There are many small and medium-sized enterprises with high technological capabilities, but it is very important for host countries to understand that even their technical strength is at the global level, management ability requires a lot of support for global expansion.

2) Cases of Cultivation of local SMEs

In order to cultivate SMEs with outstanding technical capabilities, it is important to promote the transfer of technology by attracting companies from overseas, and to train domestic companies. For example, in Vietnam, there are cases where a small supplier became to supply to global companies through several steps. In that step, a small car repair shop has expanded its business a

little by investing in basic equipment, and became able to hire a large number of employees. Next, they invested to introduce used machine tools from Japan and other countries and began to produce parts that are used by leading global companies. Once they are acknowledged, they introduced new machine tools from Japan, Korea, Taiwan, etc., and are adopted as global suppliers by multinational companies.

In those cases of other countries, business owners are growing their business with an ambition of becoming a supplier of global companies. In addition, most cases are investing in machine equipment for step-up. To do so, the family of business owner brings in funds and invested. In this point, the same case can be seen in the Philippines. Famous Secret Precision Machinery Company, which started out from a motorcycle parts repair shop, introduced a machine tool with high precision processing by investing a large amount of money which is not suitable for the initial scale of the project. As a result, they gradually began to contract automobile parts, and now they are able to receive orders from aircraft parts manufacturer. However, such cases are very few in the Philippines. Even though SME owners know that it is possible to achieve more sophisticated production by capital investment and to realize business growth, it is thought that many companies cannot make investment considering the burden of investment recovery.

In addition to promoting the introduction of machines that increase the accuracy of processing, training of industrial human resources who can master machine tools is necessary for nurturing supporting industries.

5.4.5.4 Market situation in the Philippines

According to the JETRO survey, the local procurement rate of Japanese companies operating in the Philippines is 31.6%, which is low compared to Thailand (57.1%) and China (67.8%), as well as Myanmar (34.1%)⁴⁸. Major factors and reasons of this low local contents in the Philippines are, based on interviews from both assemblers and suppliers, the following:

- For PEZA approved companies, VAT is levied when procured from domestic companies, but procurement from foreign countries is bonded, so they do not have incentive to procure locally⁴⁹.
- Because there has been no regulation on local contents standards, incentives to procure from local suppliers has not worked since local suppliers. Assemblers do not have leeway to cultivate local suppliers.

⁴⁸ JETRO (2016) "Survey on Japanese companies entering Asia and Oceania in 2016"

⁴⁹ When domestically procured parts are used for products which are finally export, there is a mechanism to reimburse the VAT afterwards. However, it takes time and effort to process and if it is actually refunded or not is uncertain.

- Foreign-affiliated companies have large-scale investment projects, but the number of engineers dispatched from Japan is not necessarily large in order to reduce costs, and there is no reserved capacity to nurture local suppliers.
- Although there are some suppliers in the Philippines, its number is very limited. And in many cases quality and delivery schedule have not reached the expected level in general. Also, because the number is small, the principle of competition does not work and it is difficult to verify the adequacy of the price level for quality and delivery time.

(1) Current status of foreign-affiliated companies

Since supporting industry is not specifically an industrial sector, statistics do not exist. For foreign-affiliated companies in particular, it is difficult to grasp the overall picture.

According to a survey carried out in the past, for example, JICA "Electronic Industry Supply Chain Survey" (2010), there are times when the production volume of hard disks was high in the past, so many parts suppliers have already invested in the Philippines. However, most of the core components are produced not by manual processing but by mechanical devices, and it is clear that there is a strong tendency to pursue the merit of scale by consolidating production in one place, and it has become clear that they have not invested in the Philippines. While the consolidation of hard disk manufacturers has progressed, the production volume in the Philippines has decreased, and the market size has been shrinking.

According to the Ministry of Economy, Trade and Industry (Japan) "Basic survey for effective implementation of policies for securing highly skilled human resources for small and medium enterprises overseas" (2013), in the Philippines, metal processing manufacturers and mold manufacturers were surveyed as small and medium enterprises. Because of the declining market size of the hard disk drive, suppliers to hard disk drive manufacturers were thinking that they would like to develop business for other uses such as automobiles. They were struggling to change the technology and skills they have possessed for electronics to automotive.

Such an existing survey shows that the production scale of the final product manufacturer in the Philippines is smaller than that in Thailand, or other comparable countries, and the location attraction for supporting industry as a "market" is low. In supporting industries, especially material processing companies, there are many small and medium-sized enterprises with comparatively weak management capacity compared with large companies, and it is difficult to make a large-scale investment or investment in a country where investment recovery period will

be long. To attract enterprises with high technical capabilities but limited management resources, a host country needs great support for them.

(2) Current status of local companies

Mold and Die

There are 121 member companies of the Philippine Mold Manufacturers Association. By region, 52 companies in Manila NCR, 44 in CALABARZON, 7 in Central Luzon, 16 in Cebu and 2 in Davao. Among them, 30% of active companies are involved, and the remaining 70% are not very active, including companies that do not conduct business activities. In addition, some of them are PEZA-approved companies. There are approximately 8,300 member companies in the mold assembly industry association in Japan, 895 companies in Thailand and 350 companies in Indonesia; from these figures, it is seen that the number of companies in the Philippines is significantly smaller compared to these countries.

The major mold and die companies in the Philippines are Samsotite, president of the association, and Manly. Samsotite has about 500 employees, manufacturing shampoo bottles and caps, molds and plastic injection molding of air conditioner body. Manly has approximately 700 employees, and performs molding and plastic injection molding for bumpers and dashboards of Toyota Vios. For other local companies, there are few specialized mold and dies manufacturers, and many companies are mold and dies maintenance companies which are conducting metal pressing and/or plastic injection by using their molds.

There are few cases where major mold companies have become mold tool companies that refine their technologies step-wisely to deliver to international companies such as Toyota and others. Such companies have done other projects in the past, and happen to purchase machinery for mold and plastic molding or press processing to start their business. For the rest of companies, they perform only simple maintenance of mold with some tens of people. There are few companies that accumulate technical know-how and grow into large companies in the Philippines.

The challenge for the mold and die industry is to secure employees. Human resources who got a job at a mold and die enterprise are going to work in the Middle East, Canada, the United States, and other economically advanced countries, when they become to utilize CNC machines. It is the greatest challenge that they are always in short supply.

Foundry

The number of member companies of the Philippine Foundry Association is 55 companies. There are 195 casting companies in the Philippines, but small companies are not participating in the casting association. There are 1,293 member companies in Japan's casting association and for Thailand, only in “die-cast” industry associations, there are 93 companies. The scale of the number of enterprises in the Philippines is small.

The major casting companies in the Philippines are Super Cast and Metercor. Super Cast has around 100 employees, casting pumps and manholes. They are working on R&D of cylinder design and production with support of DOST. Metercor has about 100 employees and manufactures brake drums of Mitsubishi Lancer. This company is a local capital company, but a PEZA-approved company. Majority of local companies in the Philippines have simple castings such as construction materials such as manholes and valves and agricultural machinery, and some companies are doing somewhat advanced casting such as pumps. There are few companies doing car parts and so on.

The biggest challenge of the foundry industry is technology shortage, followed by shortage of workers and financial limitations. The casting companies in the Philippines use very low technologies: they cannot cast complex shapes, the quality is not stable, etc. The shortage of workers is the same as the mold and dies, and when workers of machining of cast products acquire machining techniques such as lathes and milling, they often go out to work abroad. Many small and medium-sized enterprises lack funds, and working capital is often short.

5.4.5.5 Business opportunities for the target regions

At present, many PEZA approved companies use imported parts. However, the possibility of local procurement will be high if it is possible to secure sufficient quality, price, and delivery. It will also be important if taxation is not disadvantageous compared to import parts. At the moment, the production scale of the final product is not necessarily large, and it is considered that it is not easy for foreign-affiliated companies to make investment decisions. In addition, local companies also have difficulty in investing for expanding production due to disadvantage in tax compared to imported goods and market size. However, if these conditions are improved, the possibility of development is high in the medium to long term.

CALABARZON is the area where the most processed and assembled industries accumulate in the Philippines. Industrial integration of mechanical systems, processing and assembling systems, such as electric and electronic which has already accumulated to some extent, automobiles which

are currently strengthening by developing the CARS program, and aerospace where future accumulation is expected as a result of MRO etc. With the development of the future, it is expected that the possibility of supporting industries will continue to increase.

Central Luzon possibly develops supporting industries for existing electronics parts and shipbuilding. Moreover, in order to realize the development of the garment industry, although it is not a mechanical system, it is expected to revitalize the textile industry deploying from Central Luzon to CALABARZON.

The prerequisites of development of supporting industries are that the production scale of the customer industry will be expanded in the target areas and that equal footing of competitive conditions (especially taxation system) to those of imported components will be realized. It is necessary for the government of the Philippines to revitalize supporting industries' investment and location by clarifying the priority industries, showing the attitude to implement the necessary policies, and by promoting equalization of the taxation conditions of domestic procurement and import procurement,

The size of employment ranges from dozens to thousands, depending on the business of the enterprise. There are some cases of large local operations with small businesses in headquarters. For example, small company both in the Philippines and in Japan is a mold and die manufacturer whose operation in the Philippines have only a few people. On the other hand, Muramoto Industry Co., Ltd., is an example of small headquarters in Japan that have four factories and 6,500 employees in Thailand and two factories and 2,100 employees in Cebu, the Philippines. If the location of industries using a large number of parts such as automobiles and aircraft are advanced, tens of thousands of employment can be expected.

5.4.6 Food processing and Fast Moving Consumer Goods

5.4.6.1 Market Overview

The global food industry expands in the region where the population and the economy grows. Based on the global population changes and projection from 2000 up to 2050, the population of Asian and African countries are expected to grow with higher growth rate while the population of other regions will remain unchanged. Therefore, the demands on foods obviously increases in the area where the population increases. In Asia or Africa, the population of higher-income or middle-income class is also expected to increase due to the economy growth in addition to the population growth. The real GDP growth of Southeast Asia is the second to China followed by Africa region. With this, the increase of the purchasing power in those regions will lead the

expansion of food industry. On the other hand, the population of developed countries, especially those in North America, tends to increase, but the growth rate is smaller than those of Asia and Africa, which may imply a stagnant growth in the food industry.

Especially, it is expected that the Japanese food industry will shrink due to the decrease of the population, making this a critical issue for Japanese food manufacturing companies. Entering Asian market is one of the necessary strategies for Japanese food manufacturing companies to increase their revenue. Under this situation, in June 2014 the Ministry of Agriculture, Forestry and Fisheries of Japan formulated a strategy of Global Food Value Chain aiming to assist overseas expansion of Japanese food industry and development of economy in developing countries. This strategy has been implemented to develop a food value chain involving the rapidly growing food market. The food market of Southeast Asia will be the target of food manufacturing companies because of the increase of the population and economy in near future.

The market of fast moving consumer goods also grows in the region where the population and purchasing power increase. Based on the market outlook of the non-food products in five countries in Southeast Asia, the market is expected to continuously expand. Similar to foods, the purchase of fast moving consumer goods is also influenced by the culture or circumstances in the local market; sales strategy adjusting to the local market is required. Regardless of the level of economic development across countries, global manufacturing companies dominate the market of the fast moving consumer goods such as personal care and healthcare products. The products manufactured at a large plant doing mass production are exported to the neighbor countries and distributed by the overseas affiliated company or contracted distributors.

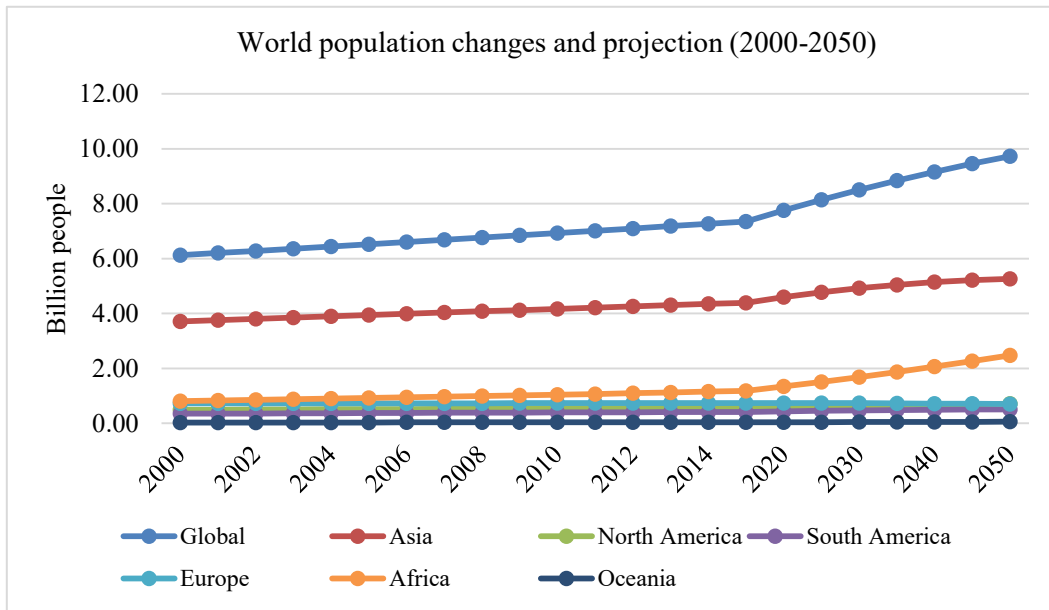


Figure 98 World population change and projection⁵⁰

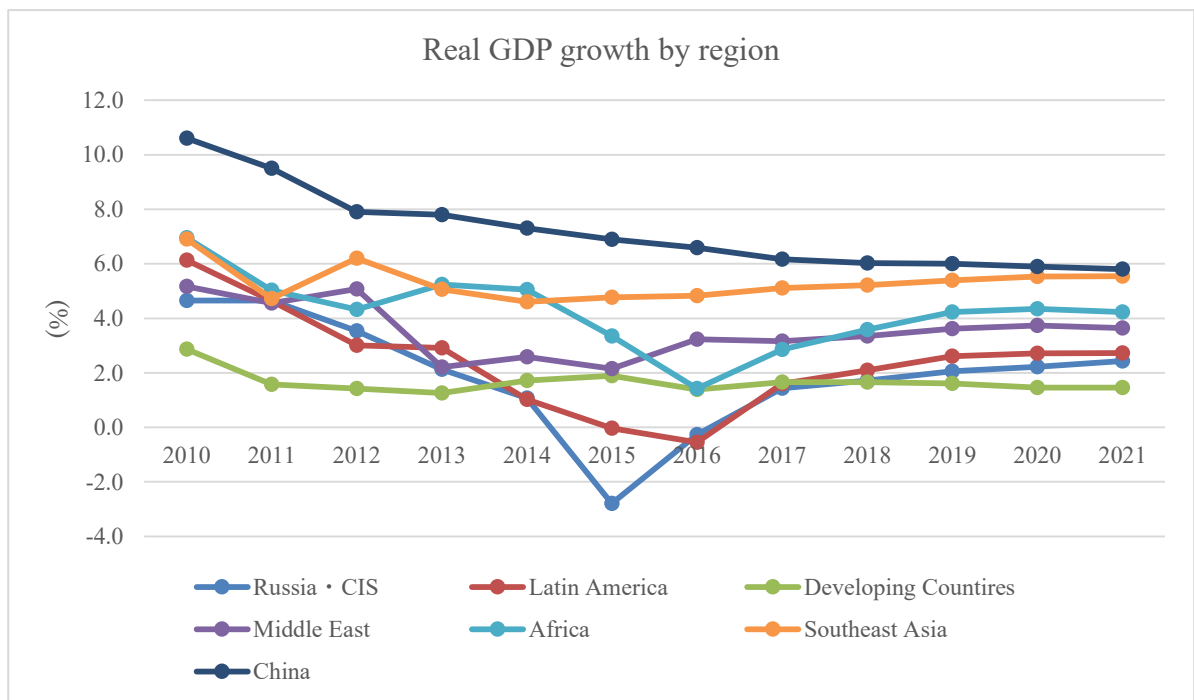


Figure 99 Real GDP growth by region ⁵¹

Overseas Expansion of Japanese food and FMCG manufacturing company

⁵⁰ UN, [World Population Prospects The 2015 Revision](#), Statistic Bureau of the Ministry of Internal Affairs and Communications

⁵¹ IMF World Economic Outlook April 2016

The food and FMCG industry originally targets the domestic market due to the preference by consumers and short shelf life. However, the increase of the domestic ingredients cost, manufacturing cost, and shrink of the domestic market in some developed countries have been made the food and FMCG industry to expand to the overseas market. In the case of Japanese companies, some major food manufacturing companies and FMCG companies already entered to the overseas market, especially the ASEAN market targeting the expansion of food industry and FMCG industry driven by the increase of the population.

Table 80: Overseas Expansion of Japanese Food and FMCG Manufacturing Companies

Company	Manufacturing Plant	Description
Yamamori	Thailand	Established a plant in 1995, have 50% of market share by improving freshness and cost efficiency of local manufacturing.
Acecook Co.,Ltd.	Vietnam	Entered the market in 1993, have more than 60% of market share. Their strength is network of dealers developed through public enterprises in Vietnam. The acceleration of local procurement to reduce the cost and improving product quality are the key factors for success. The company achieved making the product price affordable yet maintaining the high quality of the products.
Pasco Shikishima Corporation	Indonesia	The population of Indonesia is 240 million people. The staple food is rice, however breads became popular among middle-income class, the bread market is expanding. Pasco Shikishima has invested on 8 plants in Indonesia together with local equity and trading companies.
Yakult	China, Indonesia, Philippines, etc.	Introduce “Yakult Lady” as their sales and distribution strategy, it has been adopted in the local culture. The sales in Asia and Oceania lead the revenue of Yakult.
Ajinomoto	13 countries in Asia	Ajinomoto has 13 branches in Asia including Japan. They customize the product development and sales method suitable for the local market.
Nippon Suisan Kaisha, Ltd.	China, Thailand, Vietnam, North America	Established processing plants in worldwide. Purchasing fishery processed foods.
Kewpie	Vietnam, Malaysia, Thailand, Indonesia	Target China and Southeast Asia as growing market, introduce their mayonnaise and dressing taking in the needs of the target area. Target to entrench Kewpie brand in the market.
Glico	China, Thailand, Indonesia	Prioritize increasing the exposure of products and the share in ASEAN market where the population increases. Their challenge is to make their product price affordable for the market in ASEAN with maintaining the quality of the products.
Unicharm	Indonesia, Thailand, Vietnam, etc.	Production of baby and child care products, feminine care products. Their baby care products are successfully penetrate the local market by developing affordable products.
Mandom	Indonesia	Production of hair care products. Their men’s hair care products penetrate the local market by selling sachet type products

The large enterprises aim to expand their business in the growing Asian market, basically there are three steps observed when Japanese companies expand their business in overseas.

1. Procure raw materials from overseas for domestic market.
2. Manufacture products in overseas, then export to Japanese market.
3. Manufacture and sell products in overseas, the target market is the local market.

Japanese companies have expanded to overseas to seek lower cost in raw materials and labor and has been manufacturing products for exportation. As the Japanese market shrinks, they see the business opportunities in the local market where their manufacturing plants locate to increase their sales. Before Southeast Asia is recognized as the food market, it has been developed as the place for food manufacturing by its lower labor cost and good supply of raw materials. The position of Southeast Asia in food industry has been shifted from the manufacturing place for exporting to Japan, Europe or US to manufacturing place for domestic market. The Southeast Asian market is considered as the potential area providing lower labor cost, good availability of raw materials, and growing consumption market.

Trends of Japanese food manufacturing companies expanding to overseas

Value Chain means to establish a chain of added value by linking each process from R&D, and procurement and up to consumption with increasing the added value. The study of Food Value Chain done by Ministry of Agriculture, Forestry and Fisheries of Japan shows the trends on oversea business expansion of Japanese food processing companies in the table below.

Table 81 Trends of Japanese companies

Region	Trends of Japanese companies
ASEAN	Strengthening integration of human resource, products, and service
China	Focusing on higher value added products for urban cities
Southwest Asia	Providing higher value added products derived by advanced technology
Middle East	Installing advanced technology, higher value added and halal products
Latin America	Healthy and high quality products, and fishery products
Africa	Increase of agricultural production, shifting to market needs driven agriculture

ASEAN is close to Japan and has a large market with 600 million people and higher economic growth. ASEAN integration enables the market to strengthen the linkages among human resource, products, and services. The ASEAN market can be considered as a one big market due to the Economic Partnership Agreement (EPA) between Japanese government and ASEAN countries.

The Food Value Chain in the Greater Mekong Sub-region where Thailand, Vietnam, and Cambodia has been developed because of the logistic network being built are adjacent enables to be developed. Several cases of Japanese food processing companies expanded to overseas are shown hereafter.

Case 1

Company Name	ISE FOODS.INC.
Country to expand	China, Singapore, Indonesia
Type of expansion	Own capital
Category of industry	Egg production
Business outline	Egg production controlled by integrated system
Reason of expansion	<ul style="list-style-type: none"> · Shrinking of Japanese market due to falling birth rate and the aging population · Potential growth of Indonesian market
Value Chain	Install the advanced system to established value chain by the integrated system controlling milling, breeding hen, hatching, farming, selecting, packaging, and shipping.
Key points	Installed Japanese egg production technology and food sanitation management. The public funding scheme given by Japanese government assisted the company to transfer the technology to overseas. They target the Asian market based in Singapore.

Case 2

Company Name	Kyokuyo Co., Ltd.
Country to expand	Thailand
Type of expansion	Joint Venture
Category of industry	Food processing
Business outline	Frozen Sushi, Processed Marine Products
Reason of expansion	<ul style="list-style-type: none"> · Shrinking of Japanese market due to falling birth rate and the aging population · Started with procurement of frozen seafood (frozen shrimp), eventually expanded the business to processing fisheries products due to the market demands
Value Chain	<ul style="list-style-type: none"> · Established value chain of procurement of raw materials utilizing the network of Partner Company in joint venture, processing using partner's plant, and products distribution utilizing the network of partners. · 70% of total sales is for Japanese market, 30% is for overseas market (including Thailand)
Key points	<ul style="list-style-type: none"> · Established food value chain in order to utilize the network of the partner companies and Japanese manufacturing technology. · Started the overseas business in 1970 purchasing frozen shrimp, proceeded to processing fisheries products in Thailand and exporting to the third country

Case 3

Company Name	Kyoei Food Co., Ltd.
Country to expand	Thailand, Vietnam
Type of expansion	Thailand : Joint Venture, Vietnam : Own capital
Category of industry	Food manufacturing
Business outline	Manufacturing of bread crumbs
Reason of expansion	Followed their major client (frozen food processing company)
Value Chain	Procurement through partner company, production at own plant, export to Japan and supply to the local market.
Key points	Originally expanded together with the client company.

Case 4

Company Name	Riken Vitamin Co., Ltd.
Country to expand	China
Type of expansion	Own capital (Strong collaboration with local government)
Category of industry	Food manufacturing
Business outline	Manufacturing and sales of foods for households, foods for industrial use, raw material for food processing, etc.
Reason of expansion	Requested by Chinese government
Value Chain	Locally procure vegetables, processing is done at former government owned plant.
Key points	Aimed to contribute to the development of food processing technology in China. Instruct farmers to cultivate low pesticide vegetables meeting the international requirements.

Case 5

Company Name	House Foods Corporation
Country to expand	China, ASEAN, North America, etc.
Type of expansion	Own capital, Joint Venture
Category of industry	Food manufacturing
Business outline	Food processing, manufacturing of functional beverage and tofu products
Reason of expansion	Seek for opportunities in the growing market led by population increase and economic growth. China has the similar food culture as Japan where rice is the staple food.
Value Chain	Manufacturing of roux at a plant in China, sales in other Asian countries.
Key points	Customize the taste of curry roux based on the preference of Chinese consumer. Utilize the resource of House Food Corp. and partner company for sales.

Case 6

Company Name	Morinaga & Company, Ltd
Country to expand	US, China, Indonesia
Type of expansion	Own Capital (US, China), Joint Venture (Taipei, Indonesia)
Category of industry	Food manufacturing
Business outline	Manufacturing and sales of snacks, foods, ice cream, healthy foods
Reason of expansion	<ul style="list-style-type: none"> Shrinking of Japanese market due to falling birth rate and the aging population Entering to the growing market to expand the business opportunities
Value Chain	Indonesia : Utilize the resource of partner company (procurement to distribution)
Key points	<ul style="list-style-type: none"> Collaboration between oversea branches. Share the technology and business tips with JV partner. Establish halal certified plant in Indonesia to target the Middle East market

Case 7

Company Name	Yukiguni Maitake Co., Ltd.
Country to expand	Bangladesh
Type of expansion	Joint Venture with the local foundation(Gramin krishi)
Category of industry	Agriculture
Business outline	Farming and distribution of mung bean in Bangladesh. Export to Japan
Reason of expansion	<ul style="list-style-type: none"> The price increase of mung bean imported from China Seek for stable supply from other country to lessen risks
Value Chain	<p>Procurement : micro credit and training (farming, harvesting, and selecting) provided by Gramin-Yukiguni maitake and Gramin krishi foundation for contracted farmers, and purchase of their mung bean by the JV</p> <p>Distribution and Promotion : Local distribution through the local distributor network of Gramin krishi foundation. Export to Japan by Gramin-Yukiguni Maitake (Outsourced to Marubeni trading)</p> <p>Sales : Sold in Japan by Yukiguni Maitake Co., Ltd.</p>
Key points	<ul style="list-style-type: none"> Achieved to lessen risks and to penetrate to local farmers by collaborating with local foundation (Gramin) Contributed to the income increase of the farmers led by improving the productivity of the farming through training. Utilize the business supporting scheme given by JICA and JETRO Established a win-win business model for sustainability <ul style="list-style-type: none"> Bangladesh : Employment generation in the agricultural region with lower income. Sales of mung beans with lower price, installation of Japanese advanced technology Japan : Secure the stable supply, lessen the risks of price increase, secure the quality and safety of the mung bean

Good procurement and manufacturing cost, food safety, and food processing technology are important factors for food manufacturing regardless if the products are intended for local market or for exports. Thailand is one of the countries where the food processing cluster has been

developed by attaining the mentioned factors by government policy, investment from private sector, and technology transfer from developed countries.

5.4.6.2 Key factors for market expansion

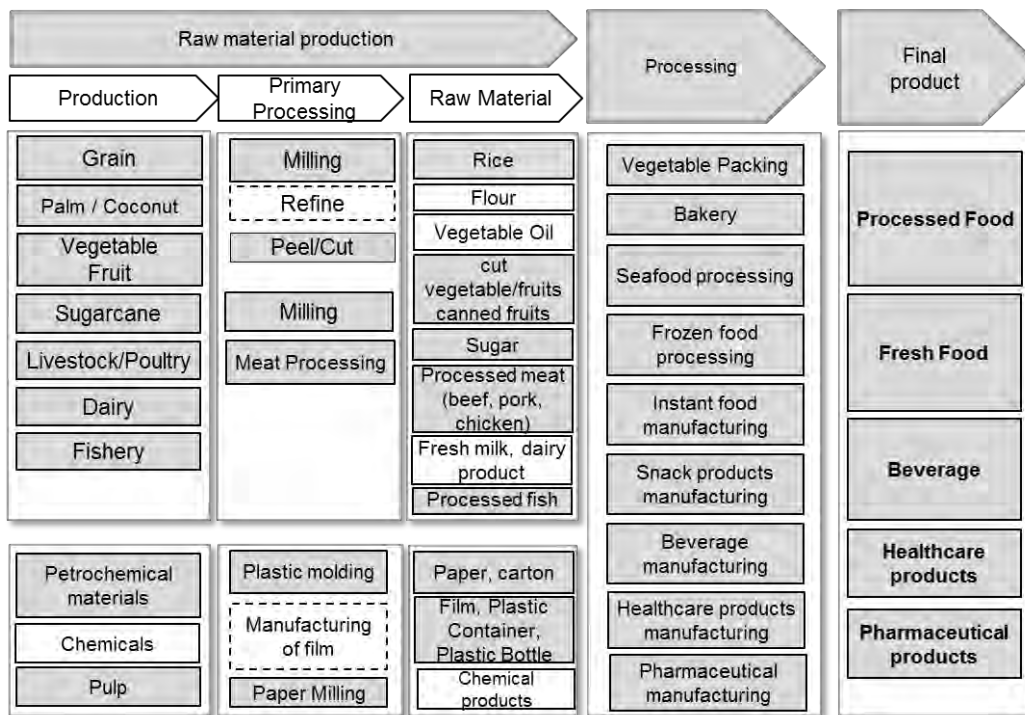
Key factor for success for establishing the value chain of food and FMCG in the Philippines can be identified based on the cases of Japanese companies. The study will identify the factors by analyzing those cases mentioned above.

Table 82: KFS for Food and FMCG

Factors	Details
Size of sales	The population (market) size is large
	Purchasing power of the market is high
Low cost in location (Low cost in production)	Low but good quality labor force is available
	Low in price and good quality materials are available
	Availability of raw materials (Stable supply and variety)
	Convenient logistics
Processing technology	High processing technology of local existing companies
	Practice of food safety management system
Human resource	Skilled employees
Support from the government	Specific support from the government regarding industrial promotion
	Incentives for investment
Business environment	<ul style="list-style-type: none"> · Presence of local companies with good procurement network and distribution channel which are potential partner · Establish the value chain through collaborating the local organization(JV or government agencies) to utilize the strengths of the both parties

5.4.6.3 Business opportunities in the target regions

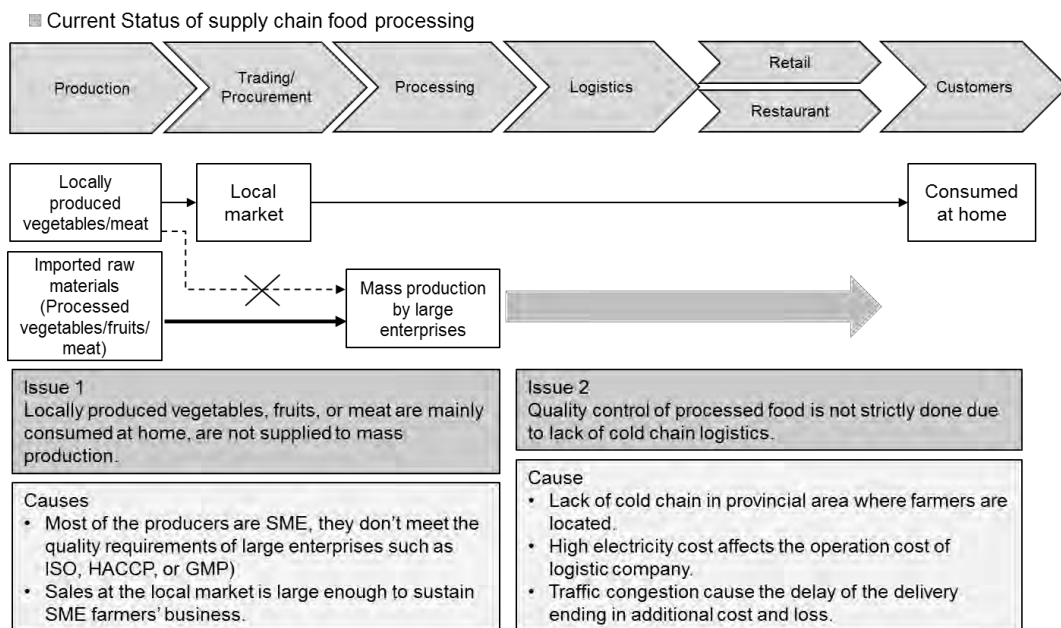
The food processing and fast moving consumer goods industry are comprised of three supply chains mainly, raw material production, processing, and final products (see Figure 100). In the Philippines, the vegetables, fruits, livestock and poultry are locally available, however some the food ingredients and most of non-food materials are still depending on imports.



Source: JICA Study Team

Figure 100 Supply chains of food processing and fast moving consumer goods and resources in Philippine

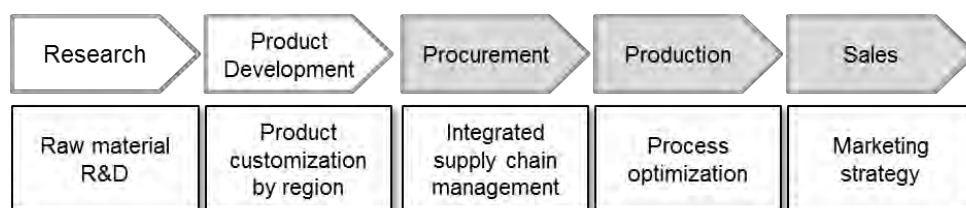
In the domestic market of the Philippines, the quality of agricultural products and meat products does not meet the requirement of large enterprises which do mass production. The production of raw materials exists in the Philippines, however they are not involved in the supply chain of mass production. One of the reasons is in sufficient logistic connecting the farm to the warehouse of the factory keeping products fresh and in good quality.



Source: JICA Study Team

Figure 101 Issues in supply chain of food processing industry

The value chain of food processing and FMCG industry is comprised of five processes. R&D process is mainly done in the country where the headquarters is located, however due to the characteristic of the industry, product development process is located in the target market. The food industry and FMCG industry are influenced by the preference of the taste and living circumstances such as income, culture of the consumers in the target area, thus locating product development process in the target area is effective. Some Japanese companies are successfully entered the ASEAN market by adjusting their products to the market preference.



Source: JICA Study Team

Figure 102 Value Chain of food processing and fast moving consumer goods and resources

Food Processing

Food processing industry is required to customize their products to meet the demands of the local market in terms of the taste, and also is required the freshness of the products. The business

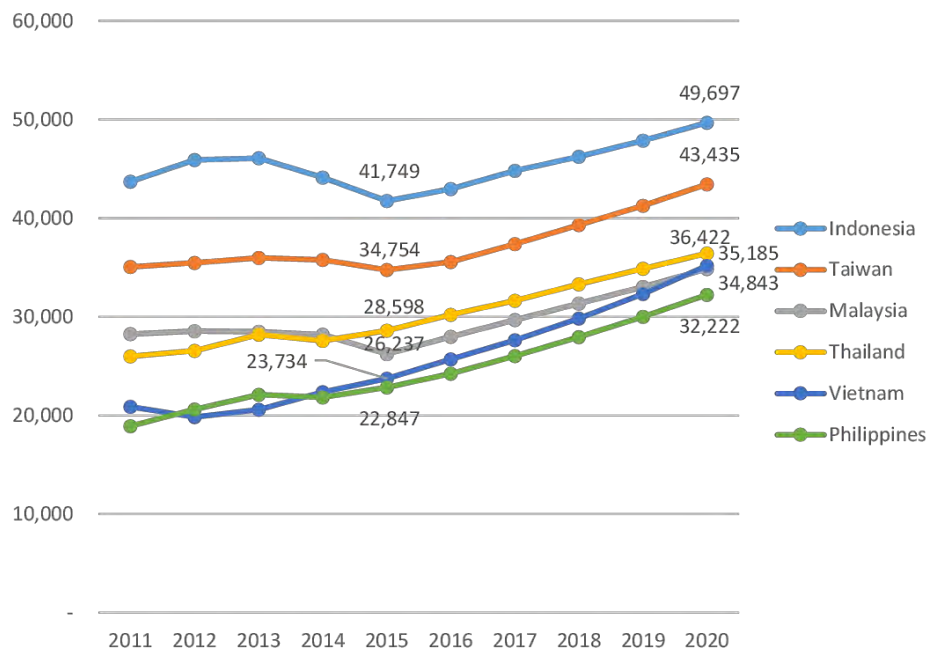
strategy varies depending on the target market. For example, vegetables or fruits requires the freshness, distribution shall be limited due to the distance from the production site to the final consumption. On the other hand, if the products are for exports, the logistic cost influences the product price. The products to be exported shall be competitive in price, quality, or availability. In order to be competitive in food exportation, the food industry in the Philippines shall utilize the low labor cost and pursue the freshness and quality. The establishment of food processing cluster in Central Luzon where Clark Airport and Subic seaport are located is expected.

Table 83 Requirements on foods (based on the type of food and target market)

	Requirements on fresh foods	Requirements on processed foods
Domestic market	<ul style="list-style-type: none"> • Freshness • Low price • Stable supply • Food safety 	<ul style="list-style-type: none"> • Affordable price • Customized for local market needs (taste and concepts, etc.) • Stable supply • Food safety
Overseas market	<ul style="list-style-type: none"> • Freshness • Meet the international food safety standard • High value added (competitive products even logistic cost is added on the price (area limitation, scarcity, high quality etc.) 	<ul style="list-style-type: none"> • Low cost in manufacturing • Low cost in raw materials • Meet the international food safety standard • Meet the international food safety by the customers

Fast Moving Consumer Goods

The global companies distributing mass produced products dominate the FMCG market in the Philippines. Those companies already have their plants in other ASEAN countries, it's difficult to compete with those plants. However, if the demands on higher quality products or luxury products increase in the Philippine led by the increase of the purchasing power, there might be the possibilities to attract the companies with advanced technology to manufacture higher quality and high value added products. Production of more functional or efficient products are expected to achieve through technology transfer from foreign company to local company.



Note: Data beyond 2016 are projection done by Euromonitor International
 Source: Euromonitor International (Year on Year Exchange Rate)

Figure 103 Outlook of non-food market of the 5 countries in Southeast Asia (2011-2020)

5.4.6.4 Opportunities for attracting Japanese companies

In terms of opportunities to attract Japanese companies in food processing industry, installing technologies for farming, improving quality control and sanitary control, or installing new technologies to produce organic vegetables as value added products are the area where Japanese companies can enter the Philippine with their skills and technologies. Quality control or sanitary control are the area where Japanese companies have been accumulated their know-how, thus collaborating with Japanese companies or encouraging Japanese companies to locate in the Philippines will realize the bottom up of food processing industry by know-how of Japanese companies or new technologies. Especially, traceability of the products or quality control can be implemented by installing IT, it's another opportunity for Japanese IT companies to enter the Philippine market.

There is a case that one Japanese food manufacturing company tried to procure raw materials for potato chips in the Philippines, however the materials didn't meet the quality requirements. The challenges for Japanese companies are the commitment of farmers and stable supply. Although

each farmer produces vegetables, their production is not stable and they don't commit the delivery; it makes Japanese food manufacturing company to stop investing in the Philippines.⁵²

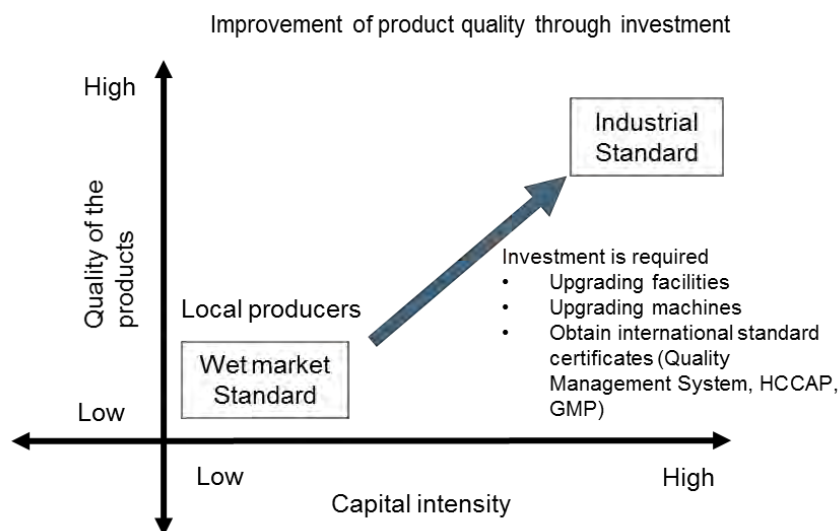


Figure 104 Image of improving product quality through domestic and foreign investment

Producing value added products is to create a new business model in the production field. The technologies of Japanese companies with experiences of producing value added products are needed in agriculture and livestock farming in the Philippines. Utilizing biotechnology or IT in agriculture or livestock is expected to achieve obtaining further quality improvement and better quality control procedure and will lead to produce higher value added products. Quality controlled products have possibilities to be traded in the global market. If farmers in the Philippines can improve the product quality, their products become competitive to be exported to ASEAN market not only being consumed in the domestic market. Product quality improvement can be achieved together with restructuring of logistic in the Central Luzon area, and it would be one of the potential areas to develop.

The employment in food processing industry is 200,000 persons.⁵³ However, large enterprises are few, most of the companies are small and medium enterprises. The farmers as raw materials producers are more than 10 million people. If these two sectors can become more efficient and competitive, it is expected to lead increasing income and economy development.

⁵² Interview from Japanese expert in agriculture deployed to the Philippines

⁵³ Source: PSA

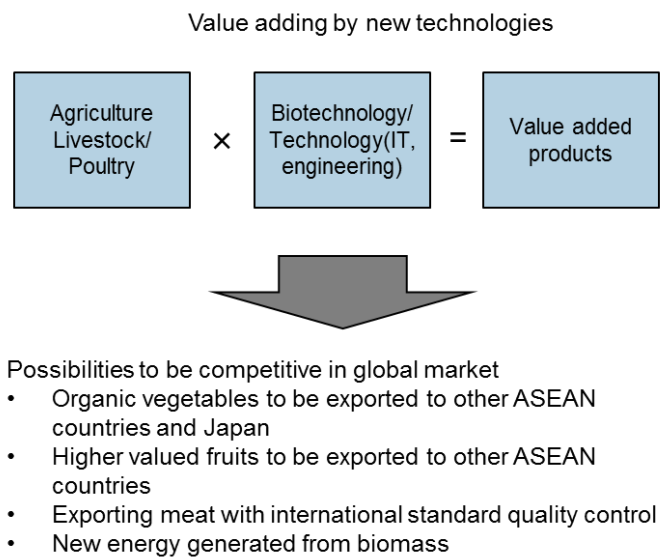


Figure 105 Value adding by combination of conventional and non-conventional technologies

5.4.7 Biotechnology Industry

Biotechnology doesn't require the accumulation of the skill or experience to improve the precision of processing or precision of parts combination unlike other manufacturing industry. This industry directly reflects the R&D activities in the outcome of the business.

5.4.7.1 Market overview

OECD estimates that biotechnology could contribute up to approximately 2.7% of GDP in the OECD by 2030, agriculture, forestry, and fishery will be the major contributing sectors, and industrial use will be 40%⁵⁴. Biotechnology is used in agriculture, food manufacturing, non-food manufacturing, medical or pharmaceutical industry, or assisting service for research. Agricultural breeding, renewable energy, drug discovery and therapeutic development are examples of biotechnology used, all of them are R&D process in value chain.

In agriculture, the major output using biotechnology is GMO crop. In renewable energy, biotechnology is used for improving the productivity of bioethanol production. Those R&D are done by national research institute or large private enterprises which can invest a large budget on it, the factors for locating R&D process in the target area will be the level of the researchers. Biotechnology includes gene modification, the settling the regulation or guideline given by the government is also necessarily done.

⁵⁴ The Bioeconomy to 2030 designing a policy agenda, OECD 2009

The biotechnology is used in medical or pharmaceutical industry for drug discovery, therapeutic development, and clinical laboratory test. The clinical laboratory test includes gene test used for checking before prescription of drug or preventive care. In the research assisting service, it is used for outsource service such as bio-informatics and gene analysis.

Biotechnology in agriculture

One of the leading products of biotechnology in agriculture is genetically modified plant which has pesticide resistance. Biotechnology is also used to improve the fermentation process in bioethanol manufacturing by inventing a new type of yeast. Those research and development work are done by national research institute or R&D center of private seeds or pesticide companies with a lot of investments. In order to attract the R&D process in the country, the competency of local human resource is the key locational factor. Genetically modified plants or organisms need to be strictly controlled in terms of environmental safety; thus, the government should implement the guideline to control the activities using biotechnology of private companies.

Biotechnology in pharmaceuticals, medical, and R&D supporting industry

Biotechnology is used in pharmaceutical and medical industry to develop new drugs, new treatments, or clinical assay. Clinical assay includes immunological tests and gene tests used for diagnosis before prescription or preventive care. Bioinformatics is supportive industry for R&D used in gene analysis.

Pharmaceutical industry

R&D activities to develop new drugs are necessary for pharmaceutical industry. However, the cost of developing new drugs is high, the tendency of pharmaceutical industry is to locate R&D center to lower cost country or collaborate with external organization to outsource the process. The company is required to comply with regulations of the country where they newly locate, thus pharmaceutical company prefers to collaborate with universities to conduct R&D. European pharmaceutical companies are accelerating collaborating with universities to enhance their new drug development capability. Their partners are not only in Europe, but also in Asian countries such as China, Korea, or Singapore where the specific needs to develop new drugs exist based on the regional situation.

Europe or Japan are the main regions for R&D and production, however due to the cost increase, some European pharmaceutical companies close those institutions or plants in developed countries, and relocate to emerging countries. Novartis, one of the largest pharmaceutical companies, closed R&D centers in Europe and Japan, relocated them in China and India. They

also closed production sites in Europe, relocated to Singapore and India. The reasons why India is chosen as a place for R&D center and production site are that there are many engineers with PhD, and their skills and technologies to reduce the cost of manufacturing generic pharmaceutical products are excellent. The support from the government to venture companies which entering R&D business also contributes to enhance the R&D environment.

5.4.7.2 Key factors for market expansion

There are two key success factors for agricultural biotechnology and pharmaceutical and medical biotechnology. The first one is science level of the country which possesses excellent human resource, international reputation in research activities, and universities with expertise. The government supports for science and technology development is also important factor. The second is that ease of collaborating with external organization. Especially in pharmaceutical industry and its R&D, companies tend to outsource the research process to accelerate developing new drugs. The environment where private companies and universities or public research institutions can collaborate easily is an important factor.

Biotechnology is used in various industries. Recently, IT is also essential tool for biotechnology and pharmaceutical industry. For example, in life science field, big data analysis is necessary; with this, developing industrial human resource for IT in life science field would be a key success factor.

5.4.7.3 Market situation in the Philippines

In the Philippine market, biotechnology itself is not established as industry yet. There are few Japanese food manufacturing companies using biotechnology. Those Japanese companies utilize local materials such as papaya and rice available in the Philippines to manufacture food supplements or food products. Their locational factors are low labor cost, abundance of raw materials and human resource with agricultural biotechnology skills. Biotechnology is a niche industry, but at the same time, it can be utilized in other industry as an innovational tool.

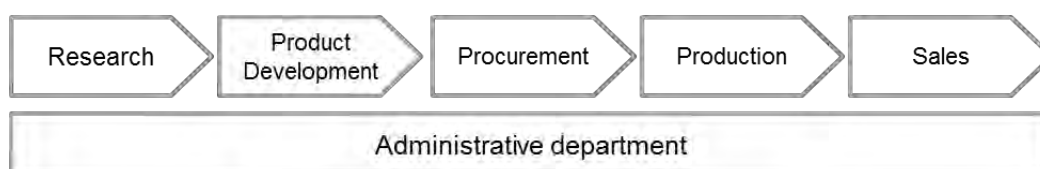


Figure 106 Value chain of biotechnology

In pharmaceutical industry, there are major companies located in the Philippines such as GlaxoSmithKline or Bayer manufacturing vaccine or conducting clinical trials. However, most of the raw materials for manufacturing pharmaceutical products depends on importation, most of the finished products of prescription medicines or over the counter (OTC) products are imported. Major pharmaceutical companies contract with local distributors and the distributors sell prescription medicines or OTC products to hospitals or drug stores. One of the locational factors that major pharmaceutical companies have a factory in the Philippines is to manufacture vaccines close to the market and also comply with regulation on the package that the Philippine government regulates. There is no pharmaceutical R&D process in the Philippines, and the production is just to manufacture products already developed and formulated in other countries. With the increase of the needs of generic products, some foreign companies contract with local pharmaceutical companies to manufacture generic products in order to lower the price of the pharmaceutical products.



Figure 107 Value chain of pharmaceutical industry

5.4.7.4 Business opportunities in the target regions

(1) Biotechnology

It's hard to establish a business only with biotechnology out of pharmaceutical industry. Biotechnology is a diversified industry. In order to develop biotechnology as an industry in the Philippines, analyzing what type of biotechnology shall be brought in the target area to create the synergy with the existing industry is important. One of the opportunities might be vegetable plant powered by solar panels. If the vegetable plants can produce higher value vegetables or fruits, then quickly export to other countries, it will create higher value in agriculture sector. Another possibility might be to utilize the lower labor cost in this industry. The gene analysis services are offered in the developed countries. If this services are outsourced to the Philippines, the country can maximize the labor advantage to lower the cost. Another business opportunity for the Philippines might be bioinformatics. This service is a combination of biotechnology and IT, and it's also labor intensive service. Thus, the Philippines can leverage the lower cost in labor and abundant university graduates. However, R&D process or testing service need supply of equipment and chemicals, the availability of those supply chain is necessary, the business opportunities shall be analyzed considering supply of equipment and chemicals.

In agricultural biotechnology, new technology such as plant factory will be one of the potential business by installing new technology to differentiate from conventional agriculture. Plant factory can produce no-pesticide vegetables or organic vegetables. If certifying system for organic or no-pesticide vegetables can be well implemented, exporting those products to other countries, especially other ASEAN countries can be realized, farmers can produce higher value added products.

(2) Pharmaceutical industry

The possibility of locating R&D process in the Philippines depends on the strength of R&D capability of the Philippines. There is one example of Japanese pharmaceutical company that developed new drug from indigenous shell of the Philippines. Thus, there are possibilities that the Philippines can be the source of seeds of new drugs. Recently, CRO (Contract Research Organization) business in the Philippines has been increased. Based on the Clinical Trial of U.S. National Institutes of Health shows that the number of clinical trial conducted in the Philippines from 2012 to 2016 was 268, it is the 4th place after Malaysia (405) in ASEAN countries. The factors that Philippines was chosen clinical trials are the population of patients, applying process in English, IT infrastructure, and IT engineers available.

5.4.7.5 Opportunities to attract Japanese companies

(1) Biotechnology

In agriculture, combination of conventional agriculture and biotechnology would create higher value added products. The plant factory powered by solar panels is one of possible business to generate high value added products such as no-pesticide used vegetables. Improvement of soil or manufacturing of bioethanol from wood-based material is also possible business using biotechnology. Japanese companies have many business experiences with combination of agriculture and biotechnology; thus, attracting Japanese companies or transferring technologies to the Philippine enables Philippine agriculture to generate new business and produce higher value added products different from conventional products. If R&D process is also transferred to the Philippines, knowledge transfer and human resource development can be achieved. However, in order to locate Japanese companies in biotechnology industry, the market should be established in the Philippines first. For example, there should be a market with consumers for higher value added vegetables, needs of improving soils, or demand of bioethanol is high.

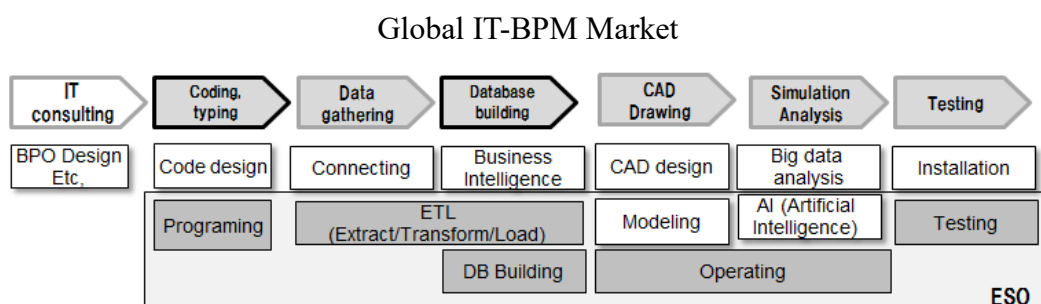
(2) Pharmaceutical industry

The business opportunities to attract Japanese companies in pharmaceutical industry is relatively low. This is because most of the prescribed medicines are imported, most Japanese pharmaceutical companies located in the Philippines have mainly wholesale function. Since human resource for R&D activities is few, the possibilities of locating R&D center in the Philippines is also low. However, utilizing the strength of capability in IT business can be the key factor to attract Japanese companies which aim to reduce labor cost and as well as obtain advanced IT skilled persons in data processing and analyzing work in R&D process or in data management of clinical trials. Currently, the number of employment in the pharmaceutical industry is 100 people per company. Since the human resource of biotechnology is still limited in Central Luzon and CALABARZON, accommodating more than 100 companies in these area is not realistic. Even if investments are done in this sector, the estimated maximum employment will be from 1,000 up to a couple of thousand people.

5.4.8 IT/BPO Industry

5.4.8.1 Market Overview

IT, BPM and ESO are service sub-sectors. Basically, they do not procure materials or parts to make a product like manufacturing. Their business process may differ depending on the type of business they are contracted from a client. The most basic type of business is coding or typing. Other types of business are data gathering, database building, CAD drawing, simulation or analysis (CAE) and/or testing/inspection.



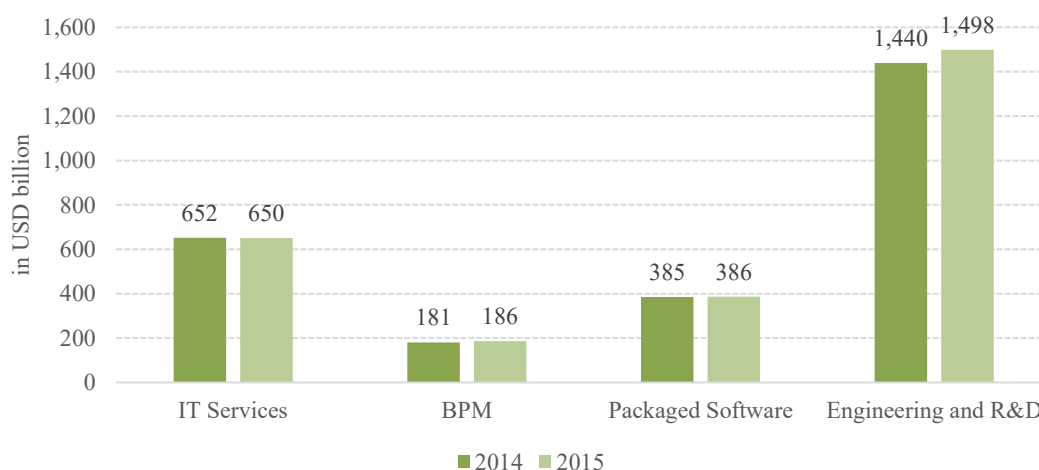
Source: JICA Study team

Figure 108 Supply chains of IT/BPO industry in Philippine

Corresponding to the “modularization” of products (such as consumer appliances or automotive), the scope of ESO is widening. Starting from simple operation of R&D outsourcing, there will be a chance for further upgrading to core engineering that will also contributing to manufacturing.

The National Association for Software and Services Companies in India (NASSCOM)⁵⁵ reported that in 2015, the global information technology and business process management (IT-BPM) spending—comprised of IT services, BPM, and Packaged Software—reached a total of USD1.2 trillion in 2015, or about 0.4% growth between 2014 and 2015.

As shown in Figure 109, NASSCOM described that the marginal decrease in the IT Services spend was due to the shift to cloud-based applications leading to the decline in traditional IS outsourcing. On the other hand, global BPM spend increased by USD5 billion. NASSCOM explained that was seen with the changes in customer trends in analytics services. Customers are expecting analytics to be bundled with other BPM services. Global Engineering and R&D spend was also reported to reach approximately USD1.50 trillion in 2015, due to the investments in new technologies such as robotics, 3D printing, Internet of Things, and SMAC technologies.



Source: NASSCOM IT-BPM Strategic Report Executive Summary, 2016

Figure 109 Global IT-BPM Spending, per segment⁵⁶

These global spend does not necessarily translate to the global sourcing spend. “Sourcing” refers to the delivery of a service from another location. NASSCOM remarked that in 2015, the global sourcing was estimated between USD162 billion and USD166 billion. It is important to note that the year-on-year growth from 2014 to 2015 was 8.5%, significantly higher than the growth of the global IT-BPM spending. This indicates that there has been a continual realization of sourcing opportunities among different service centers.

⁵⁵ NASSCOM is a recognized authority in the global IT-BPM industry. NASSCOM is the umbrella and lead organization for IT, BPM, and other related or affiliated companies and agencies in India. NASSCOM releases an annual strategic review for the IT-BPM industry.

⁵⁶ The illustration excludes global spend for Hardware.

5.4.8.2 Key factors for market expansion

Human resource is the Philippines’s best assets and primary advantage in the IT-BPM market. The Philippines has a sizeable talent pool which can be tapped for English-based BPM services. The country has been churning out approximately 500,000 graduates per year, which are educated and versed in English language. Moreover, the cultural affinity to the US market is another leverage for the talent pool to relate to US clients.

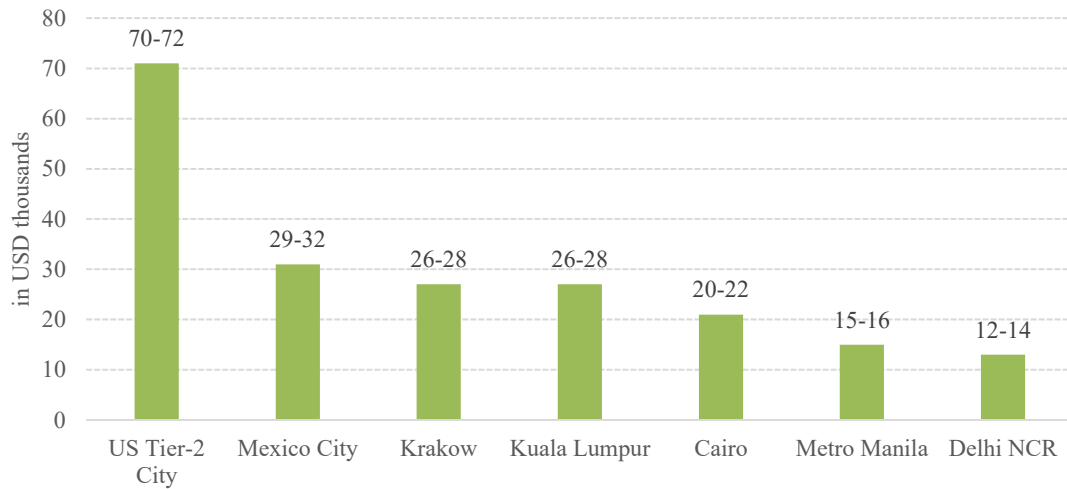
In addition, government support is present for both new locators and established IT-BPM companies. Income tax holidays are present for new locators, while support for additional short training courses to current employees are given by TESDA.

Table 84 Summary of Key Advantages of the Philippines

	Description
Scalable Talent Pool	<ul style="list-style-type: none"> • Third largest English speaking country, 12th most populous country • More than 500,000 college graduates per year, ~93% literacy rate • Western-based legal and accounting curriculum and certification
Filipino Workforce	<ul style="list-style-type: none"> • Service culture • Adaptability • Compassionate and caring by nature • Loyalty
Cost Competitiveness	<ul style="list-style-type: none"> • Labor costs for English-speaking professionals among lowest in the world • All-in costs among the lowest in the world • Predictable and manageable inflation
Excellent Infrastructure	<ul style="list-style-type: none"> • Abundant low-cost and high-quality real estate in several urban areas • Reliable, redundant, low cost telco infrastructure • Reliable power and building 100%-200% back-up as a standard • Available 24/7 low-cost transportation
Government Support and Public-Private Partnership	<ul style="list-style-type: none"> • Government support in education (TESDA, CHED), locator support (PEZA, BOI), industry development (ICTO) • Income Tax Holiday • Presence of Industry Roadmap
Proven Track Record	<ul style="list-style-type: none"> • No. 1 in Voice: customer care, tech, financial services, sales, collections • Mature/growing industry-specific and cross-industry capability • Primary English-based services plus other Asian and European languages • Analytics and KPO capabilities

Source: IBPAP, 2012

In addition, cost advantages were also significant to attract service providers to locate in the Philippines. For instance, in 2012 full-time employee (FTE) costs of the Philippines for English voice-based services is lower compared to other locations. Metro Manila, the primary destination for IT-BPM investments, only had marginally higher costs than India’s Delhi NCR.



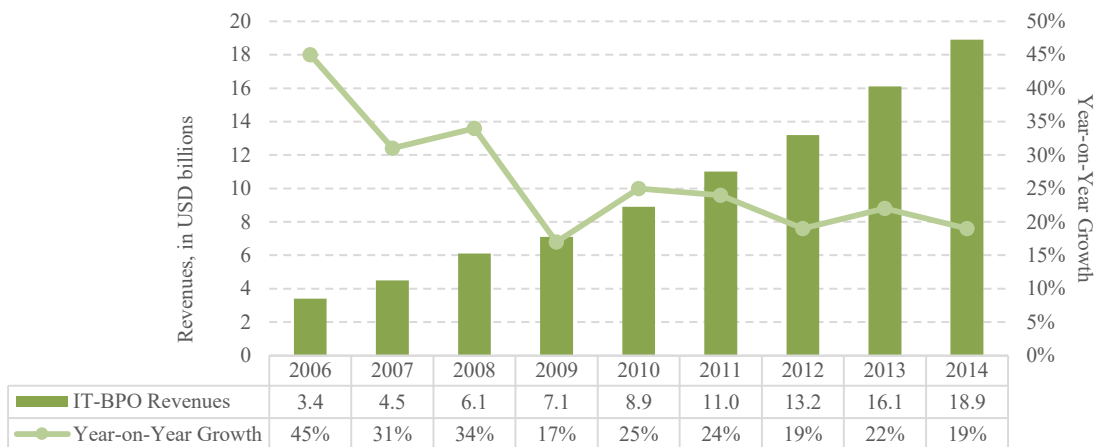
Source: IBPAP, 2012

Figure 110 Cost Comparisons for English Voice-Based Services

As mentioned above, the key success factor in IT/BPM market is the low-cost, English speaking people available in the country.

5.4.8.3 Market situation in the Philippines

The Philippine IT-BPM was considered as a “sunshine industry”. IT-BPM’s development started in the early 2000s, and gained more traction over the years. IBPAP noted that the industry’s revenues increased to USD18.9 billion in 2014, from only USD3.4 billion in 2006. The Philippines has only captured 11.3% of the global sourcing market.



Source: IBPAP, 2015

Figure 111 Philippine IT-BPM Performance, 2006-2014

In the Philippine landscape, IT-BPM services are either done by third party outsourcing service providers or by global in-house centers (or shared services centers). Global in-house centers refer to those service delivery operations in lower cost locations which are owned and operated by the same company receiving the services.⁵⁷ Third party outsourcing service providers can render services to other companies.

IT-BPM has also been an employment-generating industry. In 2014 about 1.07 million people are employed in the industry, from only 236,000 in 2006. Between 2006 and 2014, the industry's headcount reached 20.81% CAGR.



Source: IBPAP, 2015

Figure 112 Philippine IT-BPM Headcount

Contact support services (voice-based services) dominate the IT-BPO industry in terms of revenue generation. Non-voice services include back office services, healthcare services, animation, game development, ITO (information technology outsourcing) and engineering services. Back office services are comprised of financial and accounting services, legal process, and other transcription services. Key markets for IT-BPM services include North America (77% of revenues) and Australia (9%), indicating the strength of the country to service English-speaking markets.

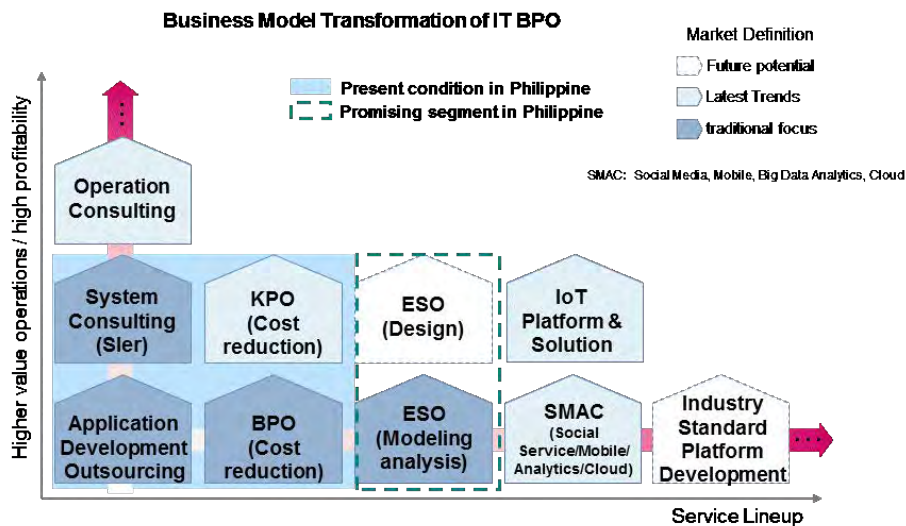
⁵⁷ From Everest Group. <http://www.everestgrp.com/wp-content/uploads/2016/09/GICtoCaptive.pdf>

Table 85 Distribution of IT-BPM Services, by revenues and by headcount, 2014

	Revenues (in USD millions)	Headcount
Contact Centers	11,700	685,000
Back Office / KPO	3,440	187,000
ITO	2,122	86,000
Healthcare	1,304	87,000
Engineering Services Outsourcing (ESO)	227	13,000
Animation	142	10,000
Game Development	55	4,000
Total	18,990	1,072,000

Source: IBPAP, 2015 (Values may not add up due to rounding off).

In IT/BTM business, it is difficult to express these supply chains and value chains due to the simplicity of them (outsourcing or not, and other models.). Thus, these two analysis is omitted in this section and is discussed in the sections of other industries (shipbuilding, material etc.) Actually, IT/BPM industry has already reached to ESO not to KPO, and the challenges for ESO are very important in near future (Figure 113).

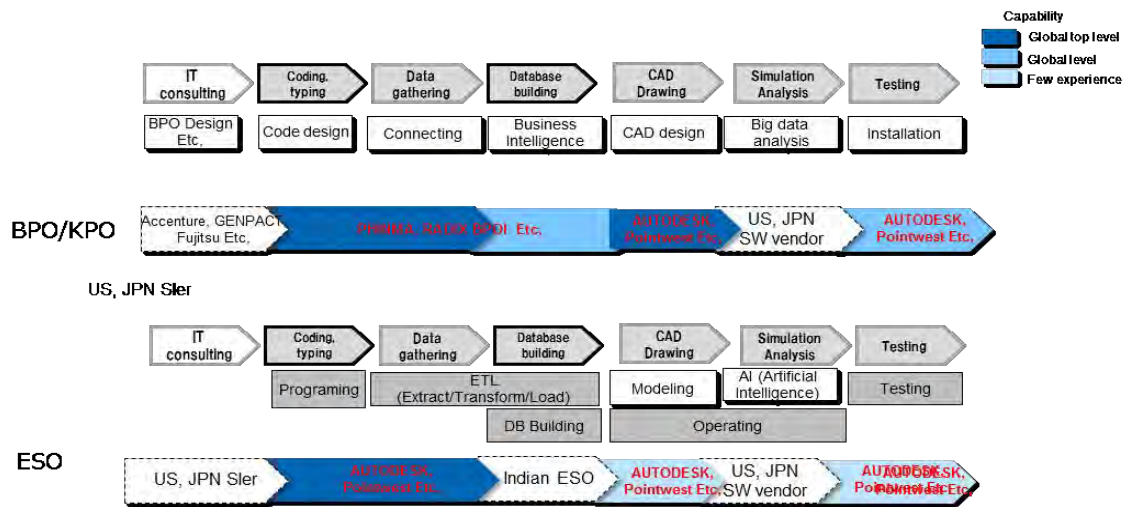


Source: JICA Study Team

Figure 113 Development on IT-BPM business

In the supply chain, Coding, CAD drawing and Testing, labor intensive works, are main services in the Philippines. Database building presents very promising outsourcing jobs, especially in

manufacturing industries with IoT technologies. The Philippines should improve such technologies with using their IT skill.



Source: JICA Study team

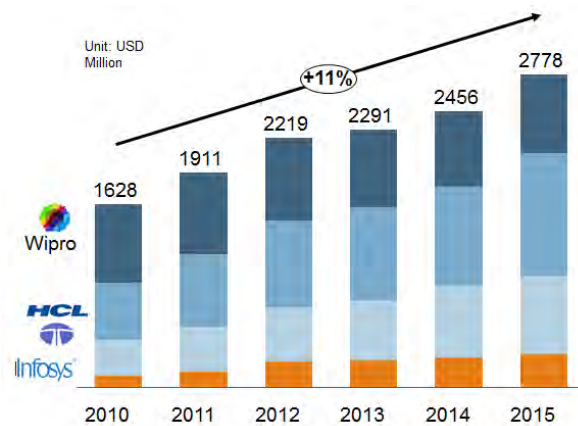
Figure 114 Development on IT-BPM business 2

5.4.8.4 Business opportunities in the target regions

As mentioned, Philippine has seven types of IT/BPM services. For ESO, although the market size is still small, it will be promising. Looking at India's experience, its ESO market has been developing over the past 10 years and will expand in future (Figure 115). Moreover, the Philippines has similar human resources.

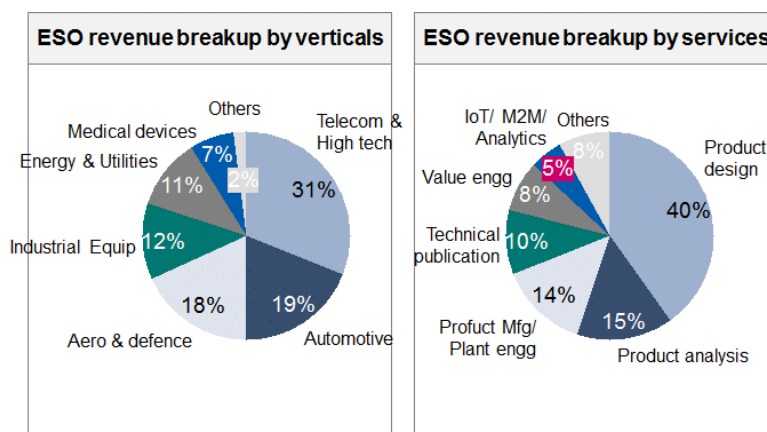
As the market of Industrial IoT (Utility, Oil and Gas, transportation and manufacturing etc.) becomes bigger, there will be more demand for outsourcing, which is an opportunity for ESO to expand. Actually, Indian ESOs get much revenues from product design and engineering in industrial fields (automotive, Aerospace and machinery equipment etc.)

In this report, the outsourcing in IoT business are touched on electric industry and on shipbuilding.



Source: NRI India

Figure 115 Market Trend by Major Indian ESOs



Source: NRI India

Figure 116 Revenues by vertical and services in major Indian ESOs

Industrial IoT market has been developed in Utility, Oil and Gas, transportation and manufacturing etc. and especially, developed in standardizing on product design and process line design with Indian ESO (Figure 115 and Figure 116).

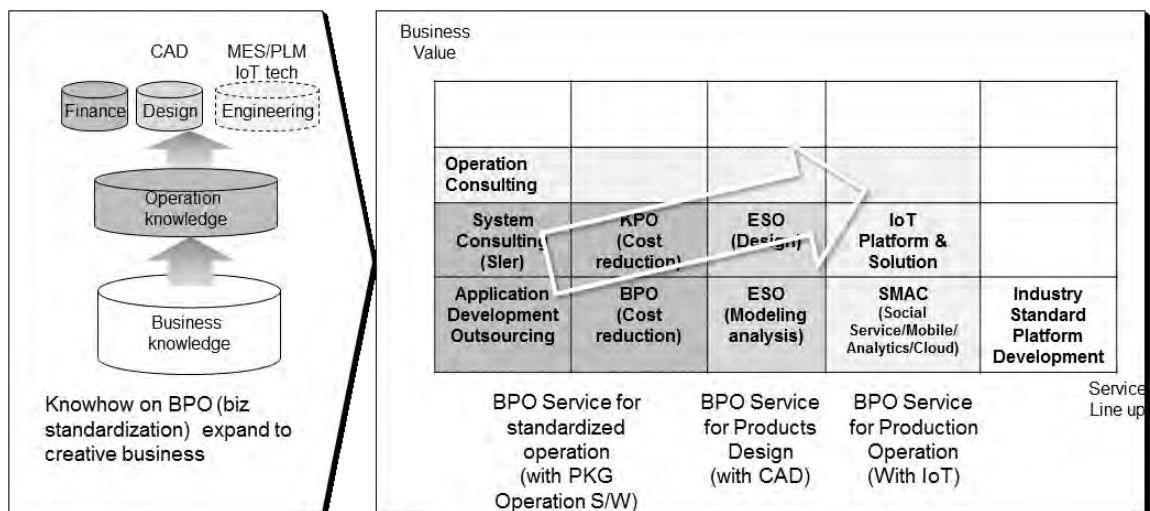
There are two types of ESO, outsourcing on product design and outsourcing on engineering (equipment) design. The former one can make cost saving on designing to brand makers with their standardization through the experiences on outsourcing on product design, and the latter ones can make cost saving and production efficiency with their standardization through the experiences on outsourcing on engineering (equipment) design too.

Asian manufacturers have taken the outsourcing from Japanese makers and accumulated the production knowhow, then the outsourcing on both product design and engineering design will

be effective for enhancing the manufacturing market in these countries. Infosys, one of the biggest ESO, has already had their business in Manila; with this IBPAP expects to gather such outsourcing companies to support the local manufactures (especially PEZA companies) in CALABARZON too.

If Philippine outsourcing companies (Philippine ESO) touch with manufacturing much more, they can acquire better knowhow on standardizing and production efficiency of manufacturing and design. Then, they can propose such solutions to PEZA companies in CALABARZON where a number of assembly companies are located, and in Clark Green City where higher-value manufacturers (aerospace and semi-conductor etc.) are located.

Besides, Philippine ESO should focus on various kinds and small quantity products rather than small kinds and high quantity ones, which Indian ESO currently focuses on. The automotive products, what global market as well as the Philippine market focus on, are appropriate for Philippine ESO and they should grow up as the player who can make the efficiency production/design.



Source: JICA Study team

Figure 117 To-Be model of IT/BPM in Philippine

For Reference: Cases of ESO in India

In India, the business style of ESO is expanding, mostly developed from IT outsourcing. Although they originally started from IT outsourcing, they gradually realized outsourcing in a wide range of design and development process. What is to be outsourced depends on the needs of the clients

and the extent to which the service provider can arrange resources. As one representative example, Wipro's service contents are shown below.

Table 86 Outline of ESO service menu of Wipro of India

Menu	Outline	Value provided
Value engineering	Strengthen cost competitiveness of existing products by reevaluating cost structure and designing	Cost reduction
Streamlining sustainable maintenance	Contracting service for continuous software updates	Resource optimization
Designing architecture and PF/SW	Development support by utilizing telecommunication and cloud technology and know-how	Lead time reduction, Acceleration of new business development
Automation and streamlining verification and testing process	Streamlining by process automation and standardization	Cost reduction, Lead time reduction , Resource optimization
Streamlining SW coding	Automation of coding	Cost reduction, Lead time reduction , Resource optimization

Note: PF is Platform, SW is Software

Source: Documents from Wipro and discussion with Wipro

Value Engineering

Value engineering, in terms of automobiles, is to disassemble completely built up cars of competitors and to evaluate the quality and suppliers of parts used therein. Based on the result, outsourcer proposes cost reduction to clients based on quality and price level of parts accepted in the market. Japanese carmakers already in India are also using such services.

Streamlining sustainable maintenance

As described in Table 86, streamlining of sustainable maintenance operation is a contract service for software that needs updating at a certain frequency. This service is close to the conventional IT outsourcing.

Designing architecture and PF/SW

Architecture design and PF, SW development is a service menu that streamlines design procedures and methodologies. For example, in automobiles, "platformization" is progressing. It is introduced in many automobile manufacturers by preparing only a few patterns of skeleton such as car chassis and giving variations in the overview and engine types etc. By standardizing parts and sizes of parts that are not seen by the user, cost reduction is achieved by using a large amount of the same parts.

In the case of a washing machine, for example, as shown in the Figure 118, the components are classified into "door", "body", "electronics", "driving system", "water", "washing part", "heat pump", "drying system", "control board" and so on. They produce a limited number of common platforms for each module and produce products with these optimal combinations according to the market needs. Developing products from scratch by customizing for each market is time-consuming and costly. However, by preparing several patterns in modules, it is possible to introduce products suitable for the target market by merely combining them. Available parts and modules are in the form of libraries, and designers can simply choose from them and assemble them

Module	Variation						Module structure for country X	Module structure for country Y	Module structure for country Z
	A	B	C	D	E	F			
Door	A	B	C	D	E	F	A	C	F
Body	A	B	C	D			B	C	D
Electronics	A	B	C	D	E	F	A	C	F
Driving system	A	B	C				B	B	C
Water	A	B	C	D	E	F	B	B	F
Washing part	A	B	C	D			B	D	D
Heat pump	A	B					B	B	A
Drying system	A	B	C				C	C	A
Control board	A	B	C	D	E	F	E	C	F

Source: Compiled by JICA Study Team based on several discussions

Figure 118 A conceptual model of module sets of washing machine

Automation and streamlining verification and testing process

Automation, streamlining verification, and testing process is literally to digitize and automate the verification and testing process performed in the design process. Previously, designing division first makes a prototype (mockup) to verify whether it works properly. Then designers undergo the process of modifying based on the result of testing and completing it. However, it took time and cost to create this prototype and verify it in such manner. In recent years, the process of design drawings has been digitized using 3D CAD, making it easier for simulation such as verification and testing on a computer by utilizing the data (CAE).

Under such circumstances, Electric Data Automation (EDA) is in progress. EDA is a sort of streamlining verifying and testing process. For example, for components used in a certain product, information necessary for verification and testing is preliminarily made into a library and the library will be fully utilized throughout the process. Until recently, even if it was designed by CAD system, the material properties of each part were not necessarily digitally registered in a

library in advance. Therefore, after a product combining these parts is completed, for example, verification and testing on tolerance to temperature change will be carried out. On the other hand, EDA registers information on tolerance for temperature change in the library for all parts. When doing a simulation with CAE, information on the library is referred and designers can evaluate the resistance to temperature change when made into products from an early stage, and to avoid wasteful measures and verification work.

Streamlining SW coding

Streamlining software coding work is a service menu which is somewhat extended from conventional type of IT outsourcing. It is an effort to standardize SW design procedure to some extent and to automatically perform coding work. It is an effort to accumulate know-how while commissioning a large number of IT outsourcing, and to promote standardization and efficiency improvement of coding.

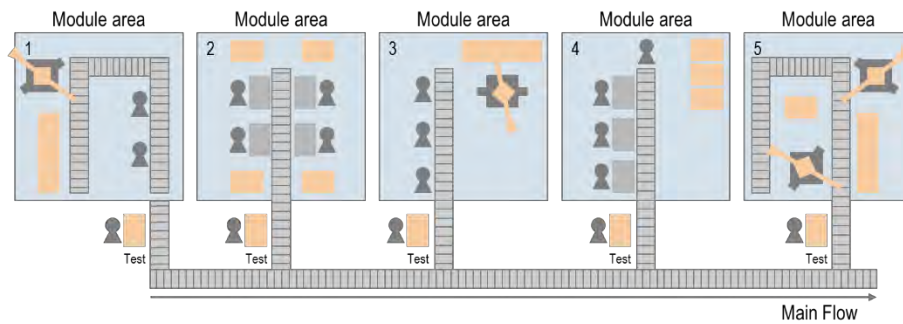
The above is exemplified from the service menu of Wipro. Further outsourcing of test inspection and outsourcing of design of production line is described as a service menu related to automobile, electric and electronics products.

Outsourcing of test inspection

Among ESOs in India, some companies have test equipment such as automotive test course, sound, vibration, shock, heat resistance testing equipment. Wipro mentioned above also has an anechoic chamber which is one of advanced testing equipment even in a manufacturing industry, and it is possible to support full-fledged design development work.

Outsourcing of production line designing

This service is being introduced relatively recently. As described above, by modularizing the product design, the production line also becomes a standardized line for each module, and it is becoming possible to combine modules. Prior to being modularized, it was necessary to assemble individual parts on a long production line, indicating that the order of assembly was equally important. However, the modularized parts are relatively easy to assemble because the joining parts are standardized. As the modularization of the design progresses, the design of the production line becomes easier to outsource, and it is becoming the scope of the ESO business.



Source: Based on discussions with white appliance manufacturers in Europe

Figure 119 An image of a production line for modularized products

What matters among the various service menus above is not only the mere IT engineering ability but also the fact that it is necessary to understand the design process of manufacturing, the evaluation, verification, testing method, quality of parts, and other relevant factors. Indian ESO operators have acquired such capabilities while accepting many design engineers from the manufacturing industry and realize outsourcing of advanced core engineering.

5.4.8.5 Opportunities for attracting Japanese investments

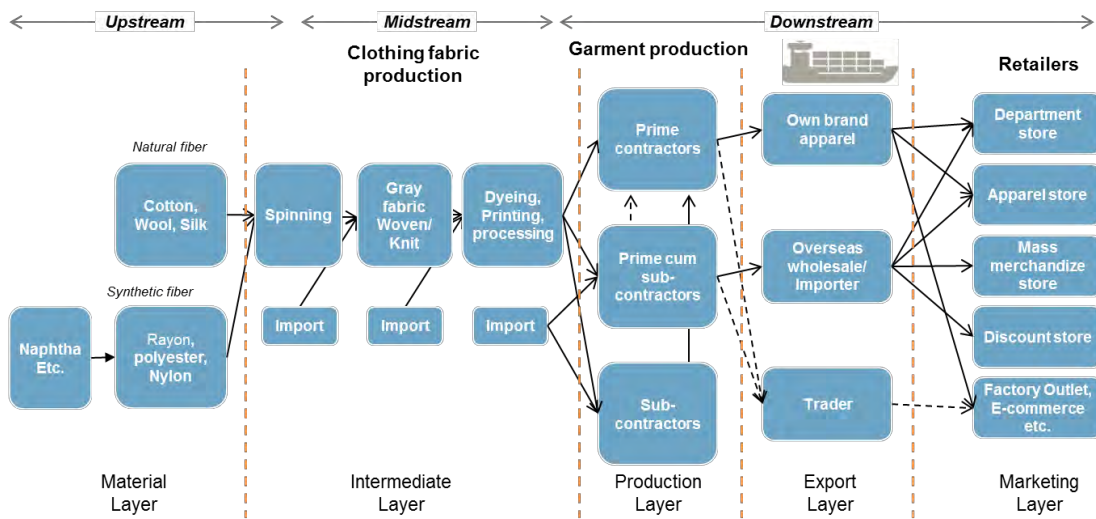
In fact, some Japanese manufactures try to use Indian ESOs for building their IoT system, and many of such manufacturer have their own SIer or the partnership with the large SIers, Hitachi and NEC., but does not have any appropriate partners to cleansing and normalizing raw data from machines etc. yet. Due to few partners to take such data management, IoT market in Japan has not expanded enough.

Thus, if ESOs in Philippine are able to make cleansing and normalizing any data, they can take the good opportunities to collaborate with Japanese ones.

5.4.9 Textile and garment

5.4.9.1 Market overview

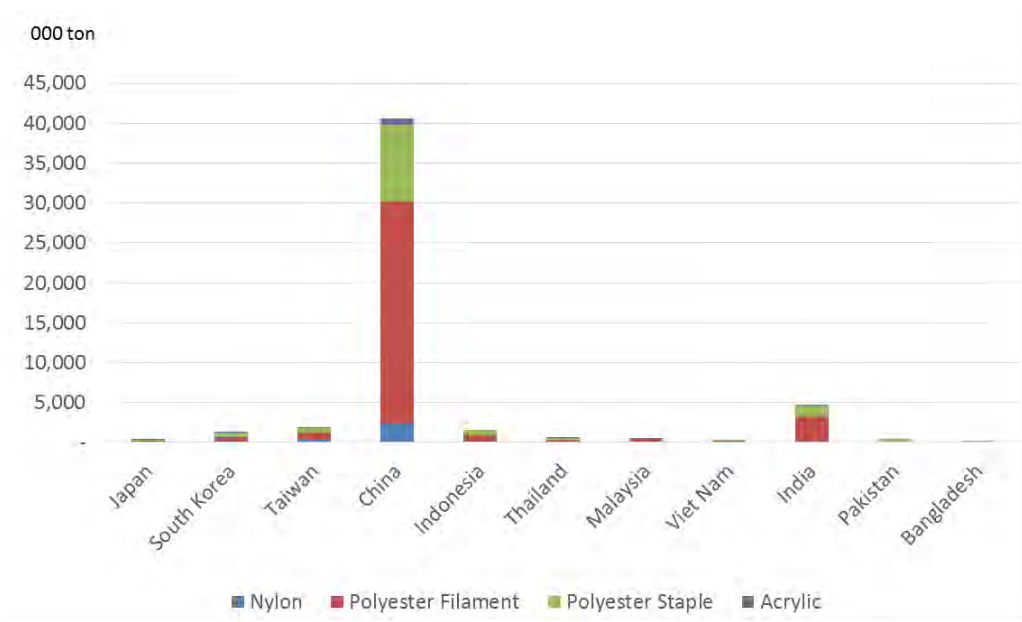
The supply chain of textile and garment is fragmented. Synthetic fibers on the upstream are produced by the chemical sector. In the midstream, fibers are made into fabrics. Then there is downstream of garment (apparel) production. After that, it is exported or consumed domestically. Since the supply chain is fragmented, value added by the sector is also fragmented in the Philippines. Because fragmentation of supply chain does not bring much value, Indonesia, Vietnam and others, which are strategically strengthening the textile industry, are trying to improve domestic added value through integrated production from upstream to downstream.



Source: JICA Study Team

Figure 120 Supply chain of textile and garment

In the first place, there is no natural fiber in the Philippines. Also, there is no production facility for synthetic fibers. In the neighboring countries, China produces an overwhelming amount of synthetic fiber. Among the ASEAN countries, Indonesia is the largest, producing about 1.5 million tons in total for various type of synthetic fibers, followed by Thailand where fibers are produced 660,000 tons.

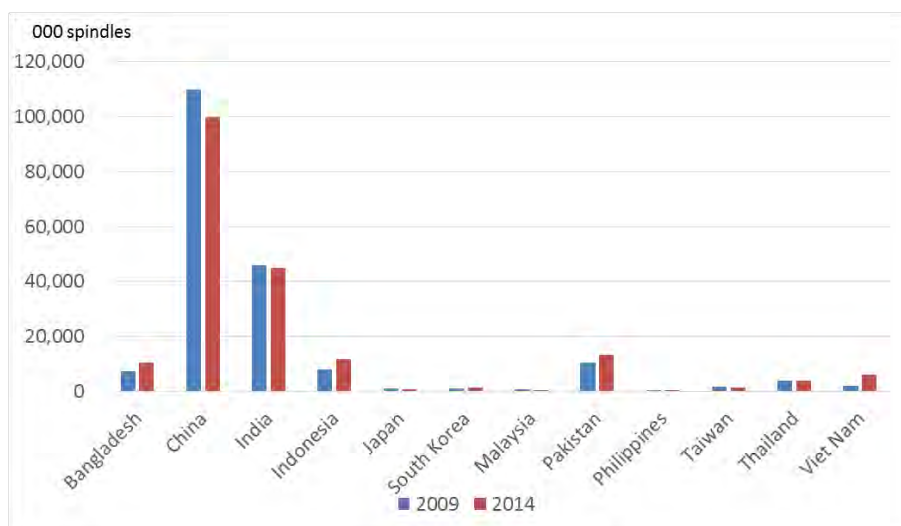


Source: Compiled from the date of the Japan Chemical Fiber Association "Textile Handbook 2017"

Figure 121 Production volume of synthetic fiber products in Asian countries

From synthetic fiber staple (short fiber), thread is made by spinning. In this process, cotton and synthetic fibers may be mixed. The textile industry has been closed down in the Philippines mostly due to so-called "technical smuggling" by which influx of unduly cheap foreign products crowd out domestic textiles that lost cost competitiveness.

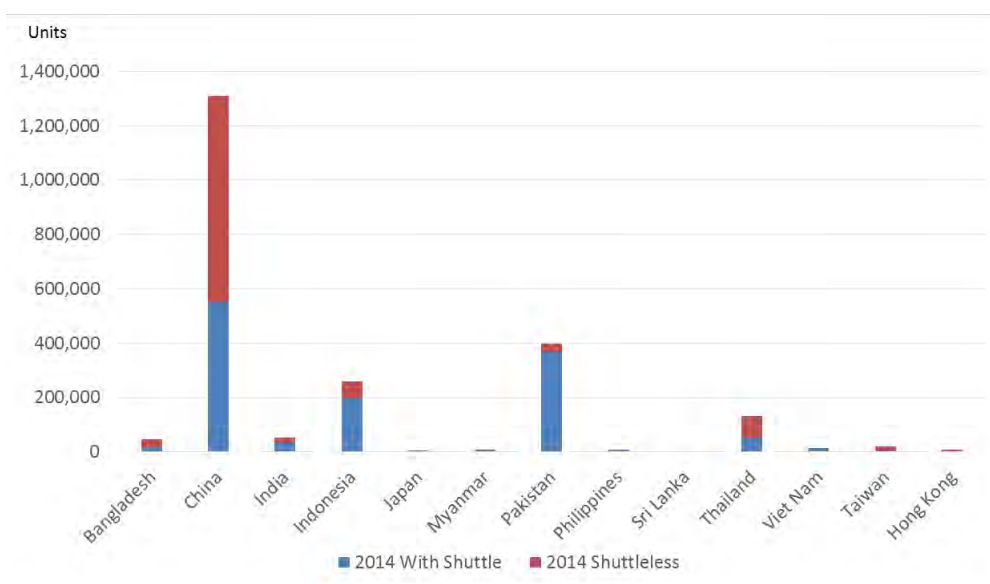
In the past, there were more than 60 textile companies in Central Luzon and CALABARZON, but, according to industrial association, now only two mills remain in Bulacan. In terms of number of installed spindles for staple spinning, China has very large number, followed by India, Indonesia, Pakistan, Bangladesh etc. Recently Vietnam's production capacity has been rapidly expanding and has increased at an annual average rate of about 26% over the five years from 2009 to 2014. The Philippines has only 250,000 spindles, which is the second smallest and since 2009 the number of spindles remains the same.



Data: ITMF, "International Textile Machinery Shipment Statistics"
 Source: The Japan Chemical Fiber Association "Textile Handbook 2017"

Figure 122 Number of installed spindles for staple spinning in Asia

Cotton looms are used for making textile raw materials into fabrics. In terms of number of installed cotton looms, China dominates in Asia, followed by Pakistan, Indonesia and Thailand. In the Philippines, the number of weaving looms is 7,000 units (with shuttle), which is only half of Vietnam (15,000 units).



Note: In addition to above, as the number of power rooms and hand rooms existing in non-integrated sectors, 30,000 and 500,000 for Bangladesh, 2.4 million and 2.3 million for India, 20,000 (hand room) for Indonesia, 20 thousand and 80 thousand units for Pakistan, and 70 thousand units (hand room) for Viet Nam.

Data: ITMF, "International Textile Machinery Shipment Statistics"

Source: The Japan Chemical Fiber Association "Textile Handbook 2017"

Figure 123 Number of installed cotton looms in Asia

The textile industry in the Philippines has a very small scale compared to other Asian countries. One of the reasons could be, as mentioned above, "technical smuggling". In fact, from the export / import statistics on textiles, there is a big gap between the Philippine import statistics and the exporting country's statistics. It is natural that these figures are exactly the same for some reason, for example, exchange rate may not be the same. However, the following figures have such a difference that cannot be explained by such aggregation error. It is estimated that import value is under-declared when it is imported into the Philippines, and it is distributed to the market without paying proper custom duties and value-added taxes.

Table 87 also shows the figures for garments, but the statistical deviation between the exporting country side and the importing country side (Philippines) for garment is also very large. This discrepancy implies that "technical smuggling" is being carried out on a considerable scale for garments as well.

Table 87 Import value and weight of yarn, fabric and garments to the Philippines**Data from the Philippines (imports)**

	UOM	2010	2011	2012	2013	2014	2015
Total Yarn	MT	26,062	22,896	24,987	11,519	17,715	7,216
Woven Fabric	MT	37,586	3,734	35,552	42,211	69,718	50,741
Knitted Fabric	MT	15,974	15,894	17,434	18,256	18,712	22,971
Total Fabric	MT	53,560	19,628	52,986	60,467	88,430	73,712
Knit Apparels	USD('000)	36,292	56,434	52,779	73,447	117,076	149,785
Woven Apparels	USD('000)	76,110	127,196	159,193	182,831	192,982	226,577
Total Garments	USD('000)	112,402	183,630	211,972	256,278	310,058	376,362

Data from Exporting countries

	UOM	2010	2011	2012	2013	2014	2015
Total Yarn	MT	59,847	44,546	44,252	45,771	53,300	44,727
Woven Fabric	MT	52,677	53,297	71,962	95,492	62,969	103,963
Knitted Fabric	MT	65,010	77,185	71,503	76,170	65,465	77,095
Total Fabric	MT	117,687	130,482	143,564	171,662	128,434	181,058
Knit Apparels	USD('000)	549,852	637,809	841,629	915,218	772,474	1,103,789
Woven Apparels	USD('000)	159,936	213,706	281,164	333,941	478,307	726,504
Total Garments	USD('000)	709,788	851,515	1,122,793	1,249,159	1,250,781	1,830,293

Note: The upper rows are tabulated from the Philippine side import statistics. The lower rows show the export statistics of the same item from the exporting country to the Philippines from the export statistics.
Source: Provided by Indo-Phil, original data from UN Comtrade.

There are 668 garment companies in the Philippines.⁵⁸ According to several interviews with industrial associations they are scattered nationwide, and it means that there is no specific area where garment sector companies are clustered. Compared with Asian competitors, size of Filipino companies are small in general. The biggest company is said to be Luen Thai International Group Phils. located in Pampanga, but the company has about 3,000 employees.

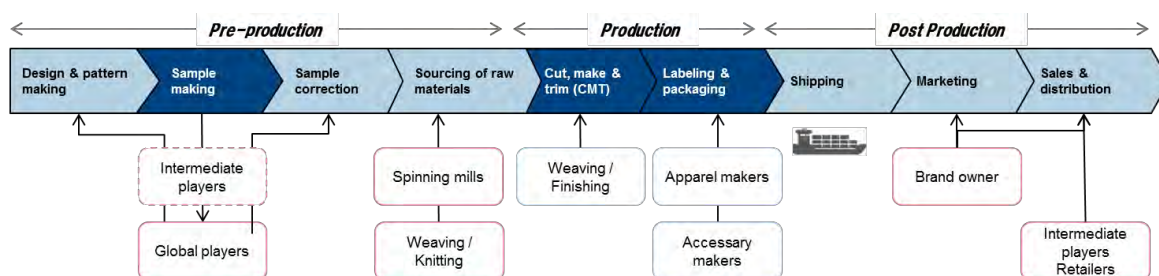
Until 2004, there used to be a textile import quota system in the US, and the Philippines secured a certain number of export quotas. However, after the system was abolished and safeguards ceased to exist, the competitiveness of the Philippines was lost due to high cost, quality, and small production volumes.

In the value chain of the sector, there is a part of material procurement very slightly in the Philippines, but majority of value chain function is the sewing. Its sewing function is also basically contract manufacturing from a company of United States. They import fibers and trims

⁵⁸ Census of Philippine Business and Industry, 2012 preliminary data

from China and other countries, which are designated by the consignor. Basically, major value chain function of garment sector in the Philippines is only simple sewing.

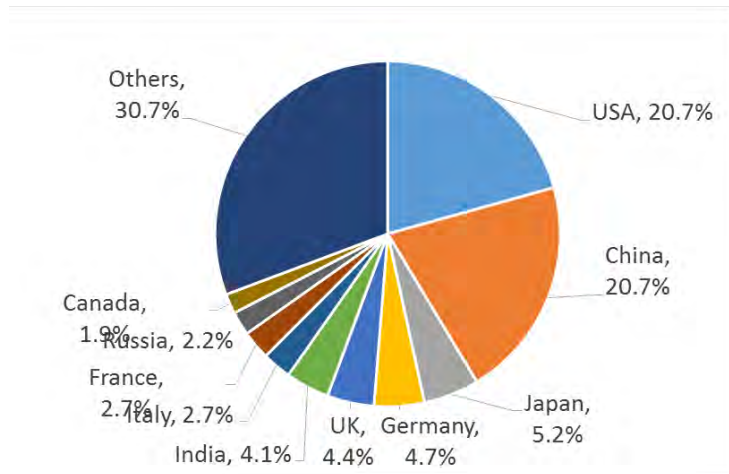
There are Filipino designers who are active in global fashion shows, but such most upstream function is not connected to rest of the value chain (sewing). In addition, even though the garments market of the Philippines is the second largest in ASEAN after Indonesia, domestic manufacturers are focusing more on export rather than domestic market. For domestic market, imports from China and others are flowing. There are also points that second-hand garments imported without duties and tax for the reasons of humanitarian assistance etc. are sold at the second-hand market. For domestic manufacturers, competition conditions are not equally footed with those improperly imported goods and this may be an obstacle for the industrial development.



Source: Compiled by JICA Study Team

Figure 124 Value chain of textile and garment

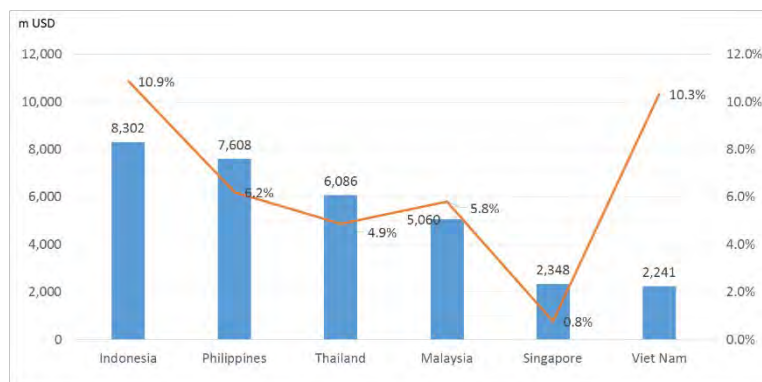
The world market for garment (apparel) is estimated at about USD1.3 trillion in 2016. The average annual growth rate from 2011 to 2004 is 4.0%, a growing industry. However, the market share of China and the United States is 20% each. Only two countries have captured 40% share of the world market. The top 10 countries account for about 70% share. Indonesia and the Philippines, which are the largest markets in ASEAN, have only 0.6% share each. In general, the apparel market tends to become large as the GDP per capita rises. Therefore, the larger the population size and the higher the GDP per capita, the larger the market size. Therefore, all of the top market shareholders are developed countries. Because these developed countries generally have high production costs, it is a feature of the garment sector that the consumer market and the supplier market do not necessarily match.



Source: Eurononitor database

Figure 125 Share by country of world garment (apparel) market

Looking at the size of the apparel market in ASEAN countries, the Philippines is big after Indonesia. The average annual growth rates of the market of Indonesia and Viet Nam in the past five years were very high level at around 10%. The Philippine growth rate was 6.2%, and the market scale continues to expand in line with economic growth. However, as mentioned above, the market share of ASEAN countries in the global market is still at a low level.



Note: Estimation by Euromonitor for the year 2016

Source: Eurononitor database

Figure 126 Market size of major ASEAN countries and annual growth rate for the past 5 years

5.4.9.2 Key factors for market expansion

In recent years, investment in the textile and apparel industry into Vietnam has been increasing. A major reason is that Vietnam is participating in the Trans-Pacific Strategic Economic Partnership Agreement (TPP). Companies invested with expectation of low cost production and export to the large market of the US under favorable tariff conditions.

According to the interviews with US Fashion Industry Association (USFIA) and some individual companies, the United States is the world's largest apparel market, and this market can be divided into three segments. Currently, the low-end segment market accounts for approximately 50% to 60%, which is the largest and expanding segment.

In an interview with a Japanese fast-fashion enterprise that has global deployment, in order to secure market share in this segment, it is necessary to produce the same product in large quantity, cheaply, and of good quality. This point will be a key success factor for the textile and apparel sector. In China, Thailand and others, foreign-funded enterprises including Japan have also provided technical guidance in the past and high-quality garment production has become possible. However, in Thailand the labor force shifted to industries with higher value added such as automotive, labor costs also rose, and now the price competitiveness is lost. Later in Bangladesh and Vietnam, technical guidance by foreign investors including Japan has carried out, and it is now possible to produce large quantities at low price with high quality.

Table 88 Segment outline of the US apparel market

Segmentation	Representative companies	Share by volume	share by value	Approximate price range for men's casual wear
Low end	Fast fashion: H&M, Forever 21, Primark	Approx. 60%	Approx. 50%	\$6.99 - \$26.99
	Discount: Nordstorm, Saks off Fifth, Marchalls, TJMaxx, Walmart, Costco, Aramark etc.			
Middle segment	Dillard's, Target, Kohl's, Sears, JC Penny, Abercrombie & Fitch, Perry	Approx. 30%	Approx. 30%	\$20.0 - \$120.0
	Medium price range: Nine West, Levi's, GAP, Van Heusen			
Upper middle and designer segment	Upper middle: PVH (Calvin Klein, Tommy Hilfiger etc.), DKNY	Approx. 10%	Approx. 20%	Upper middle: \$50.0 - \$200.0
	Designer brands: Gucci, Prada, Versace, Balenciaga, Marc Jacobs, Josef Abboud, Bill Blass, Oscar de la Renta etc.)			Designers' brand: \$300 - \$2,000

Source: United States Fashion Industry Association (USFIA) and interviews with companies

5.4.9.3 Market situation of the Philippines

As for the business environment for production of the Philippines, according to the above-mentioned Japanese fast-fashion company's assessment, the Philippine garment sector cannot produce at the same level of quality as those of Bangladesh and Viet Nam. It is also an issue that they cannot secure the quantity they need due to fragmentation of garment companies. Although the Philippine garment sector is making products for renowned brands in the United States, there are no companies that can satisfy the Japanese company's quality evaluation criteria.

Regarding production costs, the wage level of the Philippines is higher than Vietnam and Bangladesh. As for the textile industry, a large amount of electric power is required for the operation of automatic looms, and other processes. However, from the viewpoint of the industry, it is pointed out that cost competitiveness is very weak due to the high electricity bill.

With regards to the market, despite the fact that it is the second largest market in ASEAN, it is thought that there are improperly cheap imported products in the market primarily due to "technological smuggling". Sales for the domestic market is also in a difficult situation.

Currently, the textile industry has been largely devastated, and in the garment manufacturing industry, they produce and export products commensurate with the cost level, mostly niche products (not mass production) for overseas markets such as the United States.

5.4.9.4 Business opportunities in the targeted regions

For the textile industry, two spinning factories remain in Bulacan. However, the scale of these companies is limited. Regarding the garment manufacturing, there are numerous companies in Central Luzon and in CALABARZON, but there is no accurate statistical data.

As for the textile industry, new entry is considered to be difficult unless technical smuggling will be regulated and expensive electricity cost will be lowered. The production of textiles has a large employment scale, but the capital investment is even greater than that. It is difficult for a company to make decision of such investment in the current business environment. In fact, one of the local spinning factories located in Bulacan would like to introduce more advanced spinning machines and has own funds for the investment, but they do not, since the risk is too high in current situation.

The garment sector of the Philippines is supported by clients who put importance on the balance between cost and quality. Compared with Vietnam and Bangladesh etc., there is no cost competitiveness. However, Filipino garment companies are specializing in niche products that are not large-scale and inexpensive manufacturing, by improving productivity and concentrating on knit products that are more fashionable and higher value added rather than woven products.

Among the target areas, especially in the southern part of CALABARZON, the minimum wage is relatively low, so there may be room for the location of sewing function. There is a naphtha cracker plant owned by a private company (JG Summit) at Batangas Port. In principle, once a plant is built for converting compound produced from the naphtha cracker into synthetic fibers,

then, one missing link of domestic supply chain will be connected. However, according to the company, there is not yet a plan to install a production plant for textile materials. The amount of investment for one plant is very large, and the company is going to gradually establish plants. By the year 2030, the domestic production of textile materials is not currently forecasted.

5.4.9.5 Opportunity for attracting Japanese investments

In recent years, many Korean companies and Taiwanese companies, followed by Japanese companies have invested in Vietnam. If the Philippines meets certain criteria for production quantity, cost and quality, there is a possibility of development as a production and export base for developed country markets. However, in the Philippines there is no upstream process in the country and labor costs are not competitive. As for quality, it has not reached the level of global supplier with stringent evaluation criteria. It is difficult to attract foreign enterprises including Japan, because domestic competitive environment is distorted by technical smuggling etc., and it is difficult to expect enough profitability to investments under such environment.

For the time being, it is necessary to prevent technical smuggling, to increase the efficiency of electricity supply (especially transmission and distribution which is said to be very costly), and to establish an appropriate competitive environment in the domestic market. The apparel market tends to grow with population size and per capita GDP, and the Philippine market is expected to grow greatly in the future. At least it is the second largest market in ASEAN, there is still room for domestic companies to grow only by eliminating unfair competition.

In this way, first measure to be taken is to improve the domestic business environment and to create an environment in which companies located in the Philippines can earn revenues suitable for market size. In addition, if the country is to acquire international competitiveness over the long term, Filipino companies will be required to receive technical support from foreign companies including Japan and encourage consolidation of factories to expand production scale.

In the short to medium term, the possibility of attracting investment from abroad is low, but there will be a chance to create employment in following scenario. Among spinning and garment factories in the Philippines, relatively large companies employ 2,000 to 3,000 people. If more factories of this scale will be established, like what is happening in Viet Nam, then approximately 40,000 to 50,000 jobs will be assumed, although such expansion will be in a long run, probably after 2030.

5.4.10 Others

5.4.10.1 Healthcare

(1) Potentiality of Nurse and Caregivers

The Philippines dispatches nurses and caregivers to Japan based on EPA with Japan. It is a positive reciprocal relationship for both countries. Up to now, the number of people accepted from the Philippines to Japan has exceeded 300 in 2016 and 1,633 in the cumulative total since 2009. This is the scale after Indonesia's cumulative total of 1,792 people, which started a year earlier than the Philippines, and has cultivated a lot of human resources. In addition, Philippine nurses and caregivers generally have good reputation from service recipients compared with other countries.

However, obtaining certification from Japanese government is difficult partly due to language barrier. The passing rate for national examination of nurse for foreign nurse candidates dispatched based on the EPA with Japan is around 10%. Those who took the exam for several years but could not pass returned to the Philippines. Even though they could not pass the exam, they have been trained in Japan and are expected to play an active role in their homeland. But the wage rate of nurses and care givers in the Philippines is, in general, very low compared to that of Japan. Especially, in the Philippines, care giving is traditionally a role of family rather than a professional service, it is regarded as a sort of voluntary work, with an exception for professional care giving for foreigners. Consequently, those who return to the Philippines, it is said that many trained nurses and caregivers get to work that is not related to nursing or nursing care, such as interpreter utilizing Japanese language skill.

Table 89 Acceptance of Philippine nurse and caregiver candidates in Japan

	Nurse candidates	Caregivers candidates	Total
FY 2009	93	217	310
FY 2010	46	82	128
FY 2011	70	61	131
FY 2012	28	73	101
FY 2013	64	87	151
FY 2014	36	147	183
FY 2015	75	218	293
FY 2016	60	276	336
Total	472	1,161	1,633

Source: Ministry of Health, Labor and Welfare

(2) Potentiality of the targeted regions

Among developed nations aging is in progress, and care needs are increasing. On the other hand, the Philippines has many young people and has high English proficiency. It is desirable to provide a lot of skilled human resources, including people who have training as nurse and caregiver in Japan, and to provide opportunities for their participation to business in the Philippines. Compared to similar initiatives such as Thailand and Singapore, the Philippines is cost competitive. In the future, by strategically introducing medical and healthcare facilities as a strategic industrial development field, it is expected to be a growth sector. For example, Japan's Cabinet Secretariat's "Asia Health Initiative" is supposing support for overseas expansion by Japanese business operators. It could be also possible to utilize such a program to promote attracting Japanese companies.

In the target area, for example, retirement facilities for foreigners have already been set up in Subic. Also, in the neighborhood of Clark airport, there are a certain number of travelers from Australia who pay a visit to avail dental treatment.

In the Philippines, the industrial road map of the health care is still underway. In addition, the current orientation of development is focusing more on real estate development. At this moment, the road map of sector development is not yet well organized. It is expected to consider introducing hospital and/or hospice, either by foreign or domestic investor, to create more job opportunities for nurses and care givers who have high skills.

5.4.10.2 Disaster prevention

"Disaster prevention" is not established as an industrial sector. As a company involved in disaster prevention, there are companies such as Japan Radio Co., Ltd. which have branches in the Philippines, for example. Typical examples of disaster-prevention goods and services include systems that monitor sensors and cameras, etc., for monitoring natural disasters such as river floods, volcanic eruptions, tsunami, etc., and issue a warning when something anomaly is detected. Unlike mass-produced products such as automobiles, household appliances, and daily use commodities, the products and systems for disaster prevention are small to moderate in terms of volume of production. Therefore, dispersing production bases in various places lowers production efficiency, so it is not suitable for international division of labor.

Currently Japan Radio Corporation has a branch in the Philippines because it carries out maintenance and inspection service of disaster monitoring system introduced through ODA by Japan. In a value chain, such maintenance function can be operated locally. In addition, climate

conditions such as typhoons and soil to be monitored are different across countries, so there is a need for on-site research and development to develop product systems tailored to local conditions. However, it is thought that investment to establish a research laboratory depends on some conditions such as possibility of market growth or the degree of fulfillment of local research resources.

5.5 Prioritization of the Industries in the Target Regions

5.5.1 Focus sectors in the targeted regions

The potential of attracting companies in each industrial sector is described in the section 5.4. In this section, focal industries in each targeted region should be discussed based on the results of section 5.4. Automotive industry, electric and electronics industry, aerospace industry, IT/BPM industry, and food processing industry are the potential industries in the two targeted regions. The large number of employment is expected in automotive industry, electronics industry, and aerospace industry including parts suppliers and other supporting industries. The employment power of food processing industry is a couple of thousand people in the processing factory, however, if the industry considers farmers as raw material suppliers, the number of employment reaches 10 million people nationwide. If the productivity of farmers and factories improves, the impact on regional economy will be very large considering the increase of their income brought by the productivity improvement. Although the number of employment seems large in food processing industry, in current situation, most of companies in food processing industry are SMEs. Furthermore, raw material suppliers might have difficulties to meet the requirements of large enterprises.

A large number of employment is also expected in shipbuilding or healthcare industry in the long run. However, the Philippine shipbuilding industry needs to fill the technical gap between current capability and required skills to build RORO ships and it seems to take long time to secure those skills. Thus, shipbuilding industry is not included in the focal sector in this project. Health industry is also not included in the focal sector due to the following reasons; i) development of roadmap of the healthcare industry has not completed, ii) the structure and the system of the industry is not clearly established yet, and iii) industry focuses on real property development for elder people, not on industrial development through attracting companies to locate in the Philippines. The expected size of the employment described herein is estimated based on the current number of employment and expected companies to be located by study team. This number can vary due to the condition of companies investing, or can fluctuate based on the promotion of

government to attract companies. The estimated number should be perceived as based on the previous project experiences of study team.

Table 90 Evaluation of each sector

Priority	Sector	Expected size of employment	Roadmap	MNC location	Main location
○	Automotive	tens of thousands *	○	○	IV-A
○	Electric and Electronics	tens of thousands *	○	○	III, IV-A
○	Aerospace	several thousand up to 10,000*	○	○	III
	Shipbuilding	several thousand*	WIP	× (○)	III
○	Food • FMCG	several thousand	(Agri)	△	III, IV-A
	Biotechnology • Pharmaceutical	Several hundred up to 1,000	N/A	× (△)	—
○	IT/BPM	tens of thousands	○	○	III, IV-A
	Garment	several thousand up to 10,000	WIP	×	III, IV-A
	Disaster Prevention	a dozen or two	N/A	(○)	—
	Healthcare	several thousand up to 10,000	WIP	×	III
	Supporting industry	several thousand up to 10,000	○	△	IV-A, III

*WIP: Work in Progress

*Including parts supply and supporting industry

Source: JICA study team

Table 91 Current employment, companies, and sales of each sector (reference)

	No. of companies	Employment	Rate	Sales (Million Peso)
Overall Manufacturing	25,064	1,185,998	100%	4,569
Electric and Electronics	514	240,691	20%	1,183
Food processing(Meat processing, sea food processing, and others)	8,190	200,752	17%	410
Garment	1,625	132,814	11%	86
Automotive and automotive parts	177	67,005	6%	258
Shipbuilding	22	19,571	2%	79
Pharmaceutical	124	13,646	1%	70
Aerospace	11	3,217	0%	7

Source : PSA

5.5.2 Focus function of supply chain

The current condition of supply chain of industries discussed in the section 5.4 can be summarized as below.

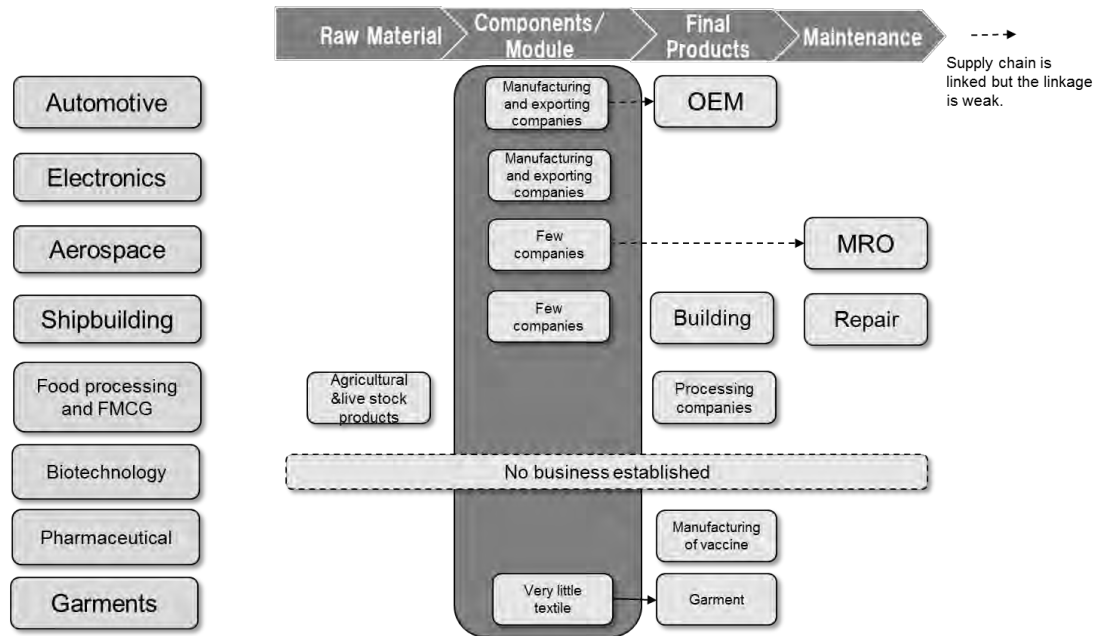


Figure 127 Current condition of supply chain of target industries

The procurement of raw materials is an issue for each manufacturing sector. Most of the raw materials depend on imports. The parts suppliers for components or modules exist, however this process is not linked to final products or assembling. This does not make the supply chain fully harmonized in the country. If the supply chain from the production up to final products is strengthened, eventually the production volume of the parts increases, there is a possibility that SMEs can be involved in supply chain. In order to enhance the supply chain, the skill of parts production and product quality should be improved. Bottom up of parts production enhances the linkage of parts supply and final products.

In non-manufacturing sector, biotechnology is seen in very limited supply chain or R&D activities at universities. Biotechnology is also not yet established as an industry sector. Central Luzon has a lot of land for farming, and agriculture is one of their priority industries. Central Luzon is located relative to Benguet area, which hosts to a number of highland vegetables. Central Luzon can procure fresh vegetables from Benguet.

However, one issue is that local vegetables and meat are mainly traded at wet markets and consumed at households. They are not efficiently delivered to larger market in Metro Manila nor involved in supply chain of mass production of large enterprises. Hence, food processing industry can include agriculture and livestock by improving their product quality as raw material by using IT or biotechnology. This should be prioritized prior to attracting processing companies.

For both manufacturing sectors and food processing sector, the industrial development is likely achieved through linking supply chains. Especially, the upstream involving raw material and parts supply in manufacturing sectors and the stable and efficient supply of agricultural products in food processing should be enhanced. The industrial cluster can be developed through enhancing supply chain followed by increasing competitiveness of entire industry through human resource development or R&D activities.

5.5.3 Focus function of value chain

In current condition of value chain of manufacturing sectors, the function of production assembly is already established. Focusing on value adding of the products is the next step for further development. In order to add values, enhancement of process in upstream is a key.

As supporting industry and suppliers aggregate, the environment where final product manufacturers and suppliers can collaborate to create new value added products, or tackle to reduce manufacturing cost will be generated. If mold manufacturers or metal working companies increase, the capacity to produce different products will be developed. The importance of the development is the capability of designing different specification of products and capacity of designing production line to produce the products.

Automotive parts manufacturing companies such as DENSO and Fujitsu-Ten, plant manufacturer such as Mitsubishi Heavy Industry and JGC Corporation (Nikki), and other mold manufacturers already locate the designing function in the Philippines. Engineers skilled in IT or CAD in which the Philippines has advantage are the key factors for industrial development.

Designing function in value chain is the key factor to step up from just being a production site ordered from regional head quarter to advanced functional site. Enhancement of designing function is expected to contribute IT/BPM to become a provider of ESO service as value added. If IT/BPM can provide ESO service for various products with small lot, the Philippines will become a place offering small lot manufacturing with lower cost in production with shorter leading time. This function will be very competitive to attract foreign companies.

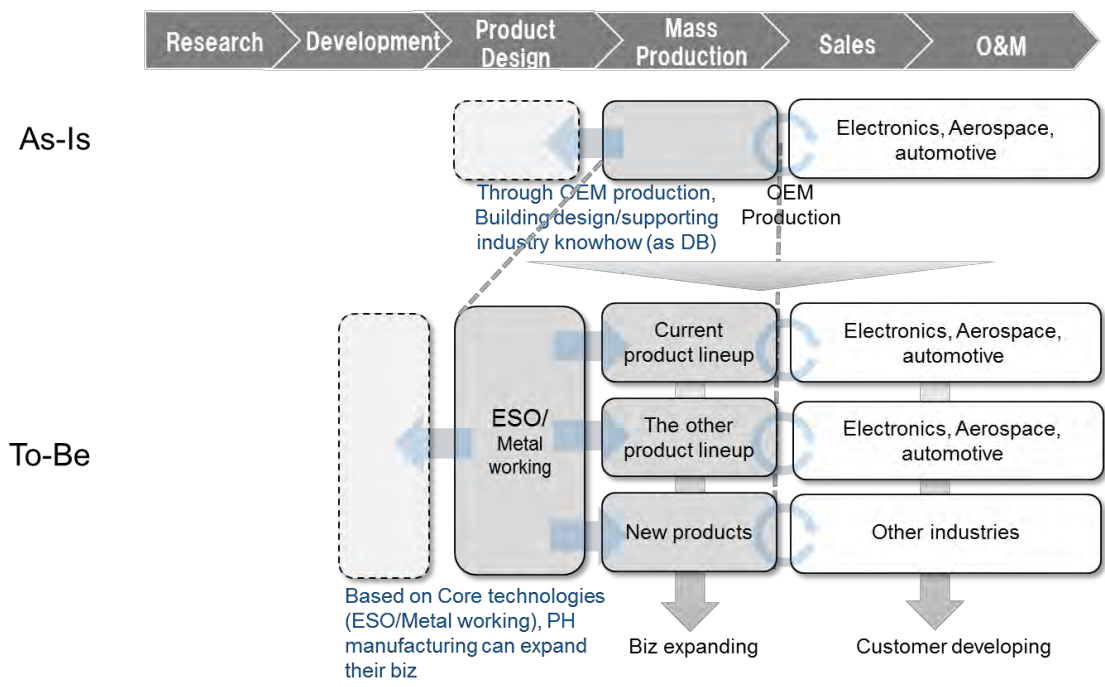


Figure 128 Current condition of value chain of the Philippine manufacturing sectors and its goal

5.5.4 Focus sectors from the regional development

In Central Luzon, development of advanced IT/BPO industry in the central business district such as CGC is expected as well as development of MRO or manufacturing of small but higher value added electronics utilizing Clark airport or Subic sea port. If trading fresh agricultural products produced in CAR at the wholesale market planned in CGC is realized, then the supply chain from CAR to Metro Manila will be linked. In order to make the linkage firmly and smoothly, the streamlining and systematizing of farmers, improvement of farming technology, stable supply and on-time delivery should be achieved. If those issues are solved, it impacts agriculture sector and food processing sector hugely.

In CALABARZON, developing and aggregating the assembling type industry such as automotive and electronics industry by utilizing existing industrial aggregation is a key factor for success. For further development, enhancing the functions of design as upstream function, or merging manufacturing sector and IT to develop ESO service is the key factor for success. In current condition, since development of infrastructure depends on private sector, most industries are located in Laguna or Cavite area which are close to Metro Manila. Areas in Batangas (such as

Lipa) can be attractive for foreign companies if infrastructure is developed further. If industrial aggregation in Batangas area develops, then the utilization of Batangas sea port will also improve.

The table below is the summary of potential sectors and promising functions of supply chain and value chain of the sectors in two targeted regions.

Table 92 Potential sectors and functions in both regions

	Supply chain					Value chain					Regions	
	Material	Tier3	Tier2	Tier1	Product	R&D	Design	Manufac-turing	Sales	Service	III	IV-A
Aerospace			✓	✓				✓		✓	✓	
Food	✓	NA	NA	✓	✓	✓	NA	✓	✓	NA	✓	
Electronics		✓	✓	✓			✓	✓		✓	✓	✓
IT/BPO	NA	NA	NA	NA	✓		✓	✓		✓	✓	✓
Automotive		✓	✓	✓	✓		✓	✓	✓	✓		✓

Source: JICA Study Team

Supply chain

Except for food processing, material supplier does not exist or processing and distributing function of material is missing. Material is such a upstream function and company will not invest unless downstream is expanded, thus investment in this function is not very prospective for the coming decade.

Parts, components and processing function for machining sectors such as automotive, aerospace and electronics will be possible. Among them, automotive and electronics have certain accumulation in the region and they will expand in the future.

In terms of production of final products, sectors that domestic market is expected to grow rapidly, such as automotive and food, have higher potentiality. For electronics, especially consumer products are becoming commodity and China, Taiwan and Viet Nam have already accumulation of industry and overwhelming advantages. It is very difficult to compete with these countries.

IT/BPO is a service sector and does not have a supply chain like manufacturing. This report defines the service of IT/BPO as final products for classification purpose.

Value chain

As for R&D, research and/or testing for quality improvement for food processing can be one possibility. For electronics and automotive, CAD operation with three dimensional data of

designing process can be expanded. If these function will change from internal off-shore operation to independent outsourcing service provider, then this function will be a part of IT/BPM.

Production function of the Philippines have cost competitiveness. As the domestic market is expanding, sales function of food and automotive is also expected. In addition, service function such as global hub for MRO of aircrafts and engineering hub for electronics has potentiality, too.

Regions

Aerospace and food processing have high potentiality in Central Luzon (Region III) whereas automotive has high potentiality in CALABARZON. Both regions have good potentiality for electronics and IT/BPO.

Chapter 6 Orientation of development and challenges

This chapter indicates the direction of future development of the target area based on the plans, current situation and potentiality of development of the target regions, compiled in Chapter 4, and the possibility of location of the promising industrial sectors which have been outlined in Chapter 5. Further challenges for realizing future development are also shown in this chapter.

6.1 Orientation of Development Concept

6.1.1 Concept of Industry Promotion

The concept is that the two most industrially developed region in the Philippines—Central Luzon and CALABARZON—, are responsible for sophistication of the Philippine industry, creating as much employment as possible and consequently contributing to the regionally balanced development of the Philippines.

The Philippine policy has shown the direction of the development, analysis of the current situation and problems of the industry, such as CNIS, roadmap and MRP and so on. From now on, it is important who and how to execute. It is necessary to strengthen cooperation through the formation of industrial clusters against the issue identified in CNIS that the cooperation between domestically located industries is weak. The area has a particularly concentrated population in the Philippines, having a high population growth rate but with a high unemployment rate. In this area, if the country does not create a place of employment against the ever-increasing labor force, the number of unemployed people will increase, which will later on become a social problem. For this reason, employment creation is important.

In deploying the economic activities concentrated in the Metro Manila to the rural areas, Central Luzon and CALABARZON can be model cases for other regions in the future. Taking advantage of the accessibility to the metropolitan area, cooperating with the public and private sector on the local development that is difficult to realize only by the private sector will be a precedent case of the nationwide development of the Philippines in the future.

6.1.1.1 Upgrading the industrial structure in the Philippines

The desirable form of industrial activity in the Philippines is for each enterprise to work actively with another, such as major domestic local companies and MSMEs. Moreover, each sector should have collaboration between foreign companies and local MSMEs. Currently, cooperation between the companies is very limited; few MSMEs are suppliers of major domestic local companies or foreign companies.

The global industrial structure has been changing. These companies (the major companies located in the country, MSMEs, foreign enterprises) need to cope with these changes and cooperate with each industrial section in order to connect the strong business relation. As a result of this, multi-level industrial relation will be formed.

It is necessary to carry out the enhancement of industrial structure as mentioned above in the target areas. As a result, Central Luzon and CALABARZON can be a good model in the Philippines.

6.1.1.2 Provide an employment as much as possible

In the Philippines, although the unemployment rate is going down, it is still high. Since there are only pockets of gainful employment in the country, some people decide to work abroad. This may lead to earn foreign currency in the short-term and contribute to the economy, however it can be said to have missed the opportunity of economic development in the long-term.

It needs to cultivate the new industries and invite the foreign company in order to fully utilize abundant of labor force and to accomplish economic development of the Philippines.

6.1.1.3 Contribute to regionally balanced development in the country

In the Philippines, there are still many rural areas other than cities such as Manila, and the ratio of the rural area to the national land is high. In Central Luzon and CALABARZON, the proportion of rural areas is also high. With the aim of becoming a developed country, there is concern that population inflows continue from the rural areas, especially into the Metro Manila. As a result, sprawl development in these regions will become a problem. It is necessary to contribute to the stability of society by promoting economic development of rural areas including two regions and promoting expansion of employment in the regions. These regions adjacent to Manila Metropolitan have high potential as a model region of equilibrium development. In these regions, it is expected that it will succeed as a model to remedy the concentration in Manila in advance, spreading it nationwide, and realize the balanced development of the nation.

6.1 2 Development Orientation for the Future

6.1.2.1. Spatial Development Orientation

(1) Central Luzon

Considering from the industrial location, the issues of Clark, Subic, Tarlac are its distance from Metro Manila, and their urban function is still fragile. As shown in the transportation roadmap, it

is necessary to improve the location potential of the industry by improving access including the elimination of road congestion in Manila and its surroundings, and the improvement of urban functions like CGC.

Resources for future development of industrial development in Central Luzon are concentrated in areas such as Clark and Subic. For this reason, it is realistic to promote infrastructure development such as industrial development in Clark - Subic - Tarlac Area and connectivity to airports, ports and Metro Manila as shown in the roadmap.

Clark, Subic, Tarlac, on the other hand, are far from being a commuter area to Metro Manila. Even in Japan where public transportation has developed, commuting from the 100- km area is not common. For example, it is necessary to develop transportation infrastructure for residential environment and commuting in developing areas such as CGC and surrounding areas.

Under the leadership of the new president, the development policy of the nation to improve the accessibility to Clark Airport from Metro Manila, which is likely realized by developing railway network. However, the concrete method is uncertain and it is not easy to complete within the current presidential term. The commuting line of the Philippine National Railway that was supported by JICA is part of this development policy. In addition, southern Bulacan Province will be part of the Manila commuter zone by MRT 7 and its associated roads.

In addition to this, strengthening the East-West axis will lead to further development of the region complying with the policy orientation of development that is further utilization of existing infrastructure indicated in PDP. The East-West axis will enhance the connectivity between industrial infrastructure in Clark, Subic, Bataan and new central business districts such as CGC. However, the North-South line directly linked to the Metro Manila area is more profitable and easier to be developed by PPP, but the east-west line takes a relatively longer time to recover investment and needs public intervention.

For the expansion of existing airports and ports, first of all it is necessary to improve usability, service operation, and proactive sales efforts, to increase usage. In addition, increase of further industry locators are needed to increase the usage of these infrastructure. If the possibility of industrial location increases, for example, it is necessary to develop facilities related to the growing sector such as cold chain logistics and bulk terminals for food processing exports.

(2) CALABARZON

For the development plan of CALABARZON, the cross-shape (quadrangle) development is shown in RDP. Now only the North-South highway between Metro Manila and Batangas has been developed. The industry is booming from Laguna to northern part of Batangas along the national highway. In recent years, companies have invested in Cavite from the expectation of road improvement in that area.

Existing industrial parks are in short of supply and it is necessary to develop roads that will induce the development of new industrial parks. Especially, the network development has seen progress in the north and south axis, but the development in the east and west axis is relatively delayed. It is expected that road infrastructure development will lead to a new industrial location so that the location of the company can be seen with the progress of road improvement in Cavite. However, similar to Central Luzon, the North-South route is directly linked to the Metro Manila is more profitable and easier to be developed by PPP, but the east-west route takes a relatively longer time to recover investment and needs public intervention.

In this region, Batangas offers as a logistics operation point, but in order to expand its usage, it is necessary to improve the efficiency of its port facility operation, to set attractive fee compared with Manila port, and to enhance shipping service. As a result, the advantage of industrial location will be further enhanced, leading to the investments of companies. Currently the cargo volume is slowly increasing, but it takes time to inspect cargoes (e.g. cars) and the hinterland of the terminal is occupied. For example, in Thailand, the port of Laem Chabang was developed together with cargo railway, inland container warehouse near the port and the establishment of customs clearance function. There is a possibility of similar development of Batangas port, since their geographical locations are similar.

For the expansion of existing seaport, firstly it is necessary to improve usability, service operation, and proactive sales efforts, to increase usage. In addition, it is necessary to increase the cargo volume by infrastructure such as roads, improvement of industrial parks and investment by enterprises.

6.1.2.2. Industrial Development Orientation

(1) Central Luzon

Existing industrial zones are located in the free trade area of Pampanga province and Zambales province. In these industrial areas, the industrial sectors specialized in certain clusters will have advantages than sectors dependent to Metro Manila.

In the cluster, industries that make good use of local resources such as tire manufacturing and agricultural processing are promising. Others include food processing based on special products, aircraft parts, science (bio-agri, life sciences, IT / BPO / ESO) and others. In addition, there are promising industries of the rubber / tire industry (Angeles City) that makes finished products, upstream industry of heavy industry (Shipbuilding industry at Zambales City), and downstream industry of petrochemicals in Bataan City.

Bamboo and logistics are indicated as existing industrial clusters prescribed in NFPP. For agricultural processing sectors, other than bamboo, such as coffee, it is necessary for DTI to support it as a strategic export item to conform international quality standards. Regarding logistics, it is necessary to enhance the system and facilities that will enhance the usability of ports and airports as well as implementation of nationwide logistics master plan.

(2) CALABARZON

From the perspective of the accumulation of industries and population, it is certain that this region will continue to be the economic growth base for the Philippines, along with the Metro Manila region. In order to develop this region, labor-intensive industries such as the garment industry will continue as well as to enhance the linkage within the region in existing industries such as automobiles and electric and electronics, to develop the assembly and processing industry. As new industrial sites proceed, it is expected that the industrial park will be developed in the south along the highway to Batangas province, and the potential usage of Batangas Port will also increase.

In addition, at the Batangas Port, there are currently locations for the iron industry and the petrochemical industry, and the location of petrochemical plants utilizing naphtha crackers is being studied in the future.

Industrial clusters in this region are restricted to road transport, but due to the restoration of the railroad and further establishment of the ICD, the formation of a logistics infrastructure complex to support international trade will be possible. Also, a nationwide logistics master plan is necessary for such a holistic development.

There is no dominant central business district in this area. A large city, with a population of one million people or more, is needed in the long run. Correspondingly, it is also effective to establish a growth bases by promoting the merger of plural existing constituent cities along SLEX.

6.2 Remaining challenges for policy making

6.2.1 Lack of materiality of policies

6.2.1.1 The lead role of the government is needed

The Philippine industrial policy and programs, described in CNIS, industry roadmaps, manufacturing resurgence programs etc, are already comprehensive and show all the necessary actions to achieve the goals. The roadmap is also provided for each sub-sector, not limited to the manufacturing industry, but also for agriculture and service sectors. The challenge are to align all programs to the strategic target. For example, in the "Manufacturing Resurgence Program (MRP)", a wide range of action plans are listed. However, actual projects are mosaic of mutually not relevant to the strategic goal..

CNIS overlooks the Philippine economic industry as a whole and has set out the importance of aiming for coordination among sectors. However, the sector-specific roadmap has been limited to summarizing the issues and future prospects within each sector, and there is no concrete action plan such as inter-industry cooperation.

6.2.1.2 Prioritization of policy measures

Although PIPP specifies target industrial sectors for attracting investments, but they are not narrowed down, and the features and strengths of the country's industrial development are unclear. Therefore, investors do not rationale for investment in the Philippines. For example, Morocco has succeeded in attracting the aircraft industry. The reason for its success was to set up human resource development agencies related to aircraft and to develop human resources according to the needs of individual companies. In Malaysia, the development of the electronics industry and IT is also a result of cultivating industrial human resources in that specific field. Even in the Philippines, achievements have already come out in priority industries such as the IT industry.

In the future, as the competition environment becomes more intense by AEC, the Philippines cannot make use of its potential and have to rely on imports unless emphasizing and focusing on narrowly identified distinct strengths and features that surpass other countries.

The government should lead industrial development along with industry. However, resources owned by the government are limited, so many programs cannot be executed at once. Therefore, it is important to prioritize important programs according to sectors, and to work on them. In

many cases programs that BOI formulated with industries have been materialized and it is necessary to steadily implement them. On the other hand, in the sectors where industry is not able to contribute to the roadmap formulation, it is necessary for the government to work closely with the industry while considering the program.

6.2.1.3 Alignment between industrial promotion related policies and programs

(1) Holistic program is needed to build industrial clusters

The CNIS proposed a cluster-based industrial strategy for the country. This is important and appropriate way of developing the industry, since if a sub-sector concentrates in a specific place then a virtuous circle will work for further accumulation of the sector.

However, investment promotion policy heavily relies on fiscal incentives. It is not necessarily designed to lead in building industrial clusters. One example is the aerospace industry of which Tier 1 supplier to Boeing is located in Baguio, MRO is located in Central Luzon and Metro Manila, and Tier 2 and 3 suppliers in CALABARZON. Human resource training for the aerospace is centered in Central Luzon. Those resources are scattered and not forming a cluster. To establish a robust industrial cluster, relevant resources should be gathered in a specific area. In addition, attracting investment should not focus only on large companies but also on relevant MSMEs and support for human resource development and technology development shall be linked together for the narrowly targeted sectors. Even infrastructure development can be aligned with the spatial development orientation of the targeted industrial cluster.

(2) Increase relevance between national policy and local plan

There is a gap between the national industrial policy and the direction of regional and LGU industrial development plans. It is seen that in the national industrial policy, an orientation aimed at realizing desired goal, including attracting FDI to strengthen industrial competitiveness, employment creation, and exports promotion. Meanwhile, it seems that the industrial policy and industrial development in the region have an impression that it is only picking up existing sectors as a priority industries, and there is a lack of methodology for strengthening international competitiveness and realizing inclusive growth.

For example, in the cluster strategy in Roadmap Localization, Regional Development Plan (2011-2016) and the National Framework of Physical Plan (2000-2030), the following industries are emphasized as strategic targets in each region. It does not seem that these plans are consistent. In addition, it is not clear how these target sectors are complying with the sectors in national industrial policy. This is mostly because that RDP (2011-2016) and NFPP (2000-2030) were

formulated before CNIS or roadmap localization are introduced. However, target sectors should be carefully selected with unified criteria with policy orientation, such as protection of sectors that have resources but weak or enhancement of sectors that have comparative advantages.

Table 93 Focus sectors in different plans of Central Luzon and CALABARZON

	Roadmap Localization	Regional Development Plan (2011-2016)	National Framework of Physical Plan (2000-2030)
Region III	Aerospace, Furniture, Petrochemical and processed food	Agriculture, Tourism, Mining	Bamboo, logistics
Region IV-A	Automotive, Electronics, Petrochemical, IT/BPM	Tourism, Agriculture, IT-BPO, Creative Industry	ICT, ICT outsourcing, logistics

There are concepts in national industrial policy, but concrete measures are lacking. Regional governments and LGUs can only deal with the current issues on the ground. It is important to localize the national industrial road map with bottom up approach (i.e., plans from LGUs and region will form the national roadmap). In addition, it is important for the national government to identify what kind of industry in which region, and show concrete measures with budget for implementation.

(3) Increase relevance between industrial policy and industrial infrastructure development Plans and orientation of both hard and soft infrastructure development contributing to industrial development is insufficient, since the national industrial policy does not clearly state which industrial sector to be focused in which region or area.

In Region IV-A industrial parks are concentrated along SLEX. In anticipation of road improvement, Ayala group is going to develop an industrial estate in Cavite. Likewise, the road from Manila has been the cause of the construction and investment of industrial estates. If Region IV-A is to be considered as a target area for processing and assembling industries in the future, it will be needed to improve the usability of Batangas Port and to enhance its access as a logistics hub of the region and Metro Manila. It is necessary to develop infrastructure and human resource that is consistent with industrial policy and foreign direct investment policy.

6.2.2 Insufficient organizational structure for policy making

(1) It covers the whole country with a limited budget

DTI is implementing a lot of industrial support, including the SME Agency under DTI. Each program has limited budget, and it is done little by little in various places. Provincial governments and LGUs are dependent on national programs because they do not actively promote industrial development. However, the central government needs to support micro enterprises and protect consumers and cannot afford to do a new industry development program.

(2) The current state of industry is not grasped in detail

In order to strategically implement policies and programs under a limited budget, it is necessary to grasp the realities of industries in detail and accurately based on statistical information and to prioritize policies. However, at present, information is lacking, no reliable detailed statistical information on industries that are regarded as priority industries as DTI, such as garment and supporting industry.

(3) The policies of different organizations are not consistent

For example, regarding industrial human resource development, although DTI has some concerns, the training for industrial technology is conducted by DOST, skill training is operated by TESDA, school education is implemented by DepEd and CHED, and so on. Each effort is not necessarily carried out by aligning to the whole picture, not focusing on the priority industries in each region.

(4) Human resource development in administration is necessary

Currently, in BOI, human resource development is in progress, such as setting up industrial experts (champions), formulating a roadmap, and strengthening relationships with industrial organizations and some individual companies. However, in the provinces and LGUs, where companies actually operate, there is a shortage of human resources to analyze the current state of the industry and to make and execute industrial policy. Also, depending on the industrial sector, statistical information is lacking, and there is also an issue with appropriate policy planning based on the current situation. In cooperation with the Philippine Bureau of Statistics, it is necessary to enhance the ability to collect and analyze industrial statistical data.

6.3 Remaining Challenges for industrial development support

The Philippine industry is still in the process of growth. As mentioned in Chapter 5, even electronics and garment industries, which are important export items of the Philippines, are not

highly competitive internationally. As the global competition becomes severe, policy intervention for industry support is necessary. Sustainable industrial development cannot be achieved by protecting weak sectors. Producing highly competitive industries one after another will lead to the creation of new employment.

The Industry Promotion Program in the Philippines is proactively promoted, but there are following challenges.

6.3.1 Insufficient local supporting industry

The industrial policy and programs of the Philippines, such as CNIS, MIR, MRP, CARS programs, almost all of them are aiming for “Inclusive Growth”. Underlying this policy is that, regardless the achievement of FDIs promoted by BOI, PEZA and other investment promotion agencies, these foreign owned multinational corporation (MNCs) does not cooperate with local companies and thus, the local industry has not been developed. Promotion of FDI has focused on creation of employment and attracting exporting companies to acquire foreign currency, but a different orientation of policy is necessary for domestic enterprises to participate in the global value chain.

DTI is implementing industrial support in each region with very limited budget such as improvement of business environment, improvement of financial access, support for market development, support for improvement of productivity and efficiency, promotion of local industries. However, support that leads to strengthening the competitiveness of local industries in the international competitive environment has not been realized. In particular, support programs specializing in manufacturing companies have not been implemented.

The fact that there are few supporting industries is a serious issue in order to realize high added value of industry in the Philippines. Foreign affiliated companies are seeking collaboration with local companies in order to improve competitiveness by reducing costs and shortening lead times, but in the Philippines in many cases they cannot procure from local companies. About 70% of local enterprises are service industries such as retailing, restaurant service, repair work, etc., manufacturing industry is as small as about 10%. In the manufacturing industry, 90% are micro enterprises, composed of many simple food processing and traditional craft items; only few local companies can cooperate with foreign MNCs in PEZA industrial parks.

Since there is no statistical data, the number of supporting companies is unknown. However, the CEO of local SME (process repair parts for MNC’s equipment for production line) interviewed by the study team said, "There are no more than ten companies holding machining lathes and

milling machines in this region and only three companies are holding NC machines". In interviews with several Japanese companies in Philippines, it was pointed out that "There are very few supporting companies and it is quite short compared to other ASEAN countries."

In the supporting industries, the number of employees of individual companies is not large. However, by accumulating, it creates big employment. Also, unlike MNCs, the possibility of closure or relocation due to changes in the business environment is low, and it is rooted in the region. It is necessary to create and nurture many of these local supporting companies in order to increase the value added of the industry and to expand employment.

In addition, if supporting industries accumulate, it will be possible to collaborate with multinationals located in PEZA, and the competitiveness of both sides will be strengthened.

6.3.2 Enhancement of Industrial Human Resource Development⁵⁹

In the IT / BPO sector, American affiliated companies closely communicate with universities and TESDA, they are conveying requests for curriculum and as a result, universities are carrying programs that reflect industry needs. However, in the manufacturing industry, a few universities have contact points with MNCs such as Toyota, but only superficial collaboration such as donation of equipment and internship. In the manufacturing sector, there is no cooperation on education, such as reflecting issues and needs of the manufacturing industry in the curriculum. It is also the issues that the faculty's abilities and facilities are outdated from the business of the manufacturing industry.

6.3.2.1 Enhancement of Higher Education Institutions

Based on the collected information, challenges of higher education are analyzed as follows.

(1) University (engineering and industrial technology colleges) curricula do not sufficiently reflect the needs of companies.

Until now, foreign chambers of commerce and industry in the Philippines have proposed to the government to improve industrial human resources development. However, there is no progress. Industry-academic dialogue is necessary to reflect the intentions of industrial organizations in the instruction guidelines set by CHED. In order to reduce the gap between ways of thinking of industry and university, explanations and facilitation by outside parties are necessary.

⁵⁹ The information and facts collected by JICA's "Data Collection Survey on Industrial Human Resource Development in the Philippines" are included.

There are cases where corporate members are participating in the curriculum review committee of each school, but it is unclear whether it is representative of the opinion of each company's management. For example, in order to reflect the opinion of Japanese corporate management on the revision of the curriculum of a particular university, facilitation that enables Japanese companies to have more opportunities to speak up for more detailed discussion on curriculum development is necessary.

(2) Industry-academic collaboration remains superficial

Universities and companies share the points of interest such as equipment donation (companies simply participating in donation ceremony), student OJT (with HR and general affairs divisions of companies as a contact point), and sending representative delegates on university curriculum review committees (though it is unclear if opinions of management are represented and reflected in the curriculum). Nevertheless, industry-academic collaboration is still superficial.

The university especially wishes to strengthen cooperation with MNCs in the export processing zone. But they cannot have a dialogue opportunity since they do not know how to make a contact. As for the contents of the OJT and the revision of the curriculum of the university, a facilitation of an outside person is necessary to obtain specific comments from MNCs.

(3) Lack of the opportunities for faculty members of Engineering and Industrial Technology to continuously learn the latest technology.

In order to raise the quality of the students and reflect the needs of the company side in the curriculum etc., opportunities for dialogue between teachers and companies to be increased, and faculty members need opportunities for company visits and training.

(4) There are few results of collaborative research between colleges and companies.

Academic training development has been implemented, but it has not been practiced. It is necessary to match the needs of collaborative research among universities or between universities and companies. In order to promote matching, facilitation function that connect universities and companies is lacking.

6.3.2.2 Enhancement of Vocational Training Institutions

Below are issues based on the survey results for vocational training institutions.

(1) Develop higher TESDA qualifications and certifications (NC III, NC IV, diploma) in response to industry needs.

Based on the needs of the company side and the trend of the labor market, identify which course needs higher level TR development. Furthermore, it is necessary for companies to confirm and examine whether TR contents are sufficient or not. To set The Diploma Course, including the role setting of Diploma Course in the PQF, consultation with DepEd and CHED is necessary.

(2) Create multiple TESDA qualifications in a bundled package in response to industry needs.

In order to acquire useful skills in practice, it is necessary to acquire knowledge, skills and skills systematically. However, it is fragmentary now. Based on the needs of the company side and the trend of the labor market, it is necessary to have a highly effective TESDA's qualification.

(3) To strengthen industry-university collaboration within the region.

Industry-academia collaboration needs to be strengthened by establishing and revitalizing the Industry Board / Industry Training Council.

In the Industrial Human Resource Plan, the national government have influence on the region level, but at the province, city, town level, the influence of the local government is strong. At high schools, universities and technical vocational training institutions, it is necessary to reorganize the curriculum based on regional industrial policy and corporate needs and strengthen cooperation with local companies. However, at present, industrial development and industrial human resource development are not conducted at the LGU level.

In addition to reviewing TR, reinforcement of industry-university collaboration is essential for development of higher-level TRs and packaging of TESDA qualifications. If Japanese companies are interested in TR development and packaging in a specific field, it is necessary to participate in discussions so that opinions can be reflected.

6.3.3 Insufficient infrastructure

There are some challenges of development in Central Luzon, for example, disaster risk by overflow of the river affected by the ejecta from eruption of Pinatubo volcano. Physical distance is also a challenge that from Manila to commute, or from CALABARZON industrial area to make

industrial linkages, ports and airport such as Clark, Subic are located 100km from the heart of Manila.

Challenge in CALABARZON, on the other hand, further infrastructure development can support the industrialization. Existing industrial parks have high occupancy. For example, because Laguna Techno Park already has no extensive leeway for land, developers are proceeding new development in Cavite. New industrial park is planned to locate along the major high-way. It is suggested to consider the development of road infrastructure from/to west-east of the region, not only north-south axis, to expand the potential area of industry park, in order to support the supply chain within the region.

6.3.4. Commitment of LGUs for Industrial Development

The DTI regional offices are involved in the formulation of the regional roadmap, but the actual program is focused mainly on support such as protection of fragile micro companies and consumer protection. When the construction of the industrial complex is announced, the provincial government and the LGUs will ask the developers of the complex to about requirements on human resources to promote recruitment of the residents. However, local governments do not necessarily conduct human resource development by themselves.

Strategies for industrial development, development plans for each sector, issues to be addressed, etc. are described in strategy, plans and programs, but there is no concrete initiative taker or no budget backup for those plans and programs. In order to promote the industrial location to the rural areas from the centralized Metro Manila, it is necessary to promote the development of industrial infrastructure of hard and soft in rural areas, and to improve the location environment. However, in the current situation, infrastructure construction with PPP is done in highly profitable places. In addition, provincial governments and LGUs are not involved in industrial development and infrastructure construction.

Chapter 7 Suggestions on further industrial development in the targeted areas

This chapter shows recommendations on industrial policy and infrastructure development for industrial development in the target area. Regarding industrial policy, first of all, the direction of response to challenges on policy making and then suggestions on concrete industry promotion measures are indicated. Then, based on the industrial location of the target area and the current infrastructure development situation, the direction of infrastructure development in the future will be presented.

7.1 More concrete policy making

In order to realize the future development scenario of the target area, it is necessary to i) promotion of regional industrial policy, ii) promotion of foreign investment attracting consistent with industrial policy, and iii) strengthening alignment between industrial policy and infrastructure development. In order to further advance the industrial development, promote FDIs on target industries and make connection with domestic companies. To that end, planning and promotion of regional industrial policy is necessary. In order to make effective use of the limited budget, it is necessary to select appropriate high priority industries for each region, select promotion measures to strategically advance industry development, and implement them with priority.

7.1.1 Materializing industrial policy

As mentioned in the challenges of making industrial policy in Chapter 6, there are already policies concerning industrial promotion such as CNIS, roadmap and manufacturing resurgence program, but who will take the initiative and what should be implemented by when is not quite clear. More concrete action plan should be developed for implementation and details of each project, schedule (deadline), budget etc. to be specified.

For example, with regard to the automotive industry, under the support of JICA, DTI is developing an automotive industry promotion plan by updating the manufacturing roadmap. In the promotion plan, DTI will derive a draft policy for strengthening the competitiveness of the Philippines, define the demarcation of the role of the concerned parties, the necessary budget, and concrete implementation period.

7.1.2 Improvement of organizational structure for policy making

7.1.2.1 Clarification of the demarcation between the national and local governments and reflection of national industrial policy in local plans

Owing to NEDA's strong leadership, the coordination between the country and the region is consistent, but the consistency between the country and LGU plans is weak, sometimes discrepancies occur. It is unclear how LGU incorporates or refers to regional and national plans.

In LGUs under the region, industries (especially FDI and control over industrial parks are weak. These foreign direct investment and industrial parks create large amounts of employment and are directly involved in poverty reduction, it is an important factor in development. In the current situation, local industrial policy is rather passive to investment and investment attracting activities are not carried out by them. This is partly because that these industrial developments are by private sector, but LGUs do not have direct communication channel with those private companies.

Various industrial policies and programs are being implemented at the regional level, but they are all through national institutions (such as NEDA, DTI and PEZA) and are hardly reflected in policies and plans of the LGUs. For this reason, there are differences and duplications of policy objectives between the provincial government and the DTI province office. In the provincial plan, the "inclusive growth" of the old and new administration and the creation of employment are important, and measures (programs and projects) that realize it are required to be synchronized with those of the national level.

In the Philippines, decentralization is progressing, but in order to enhance policy effect, the government and local governments should work together to tackle challenges regarding industrial policy.

7.1.2.2 Creating innovation ecosystem in various level of industry activities

Strenuous efforts for innovation is the key for sustainable development. Innovation is required in improvement of quality of products, efficiency of operation, profitability of business model, creating new business and so forth. However, innovation needs resources such as knowledge, technology and funds. Institute such as MIRDC of DOST is contributing to industry in supporting technology development, but the achievement and coverage of MIRDC is limited due to limited resources.

Universities and colleges are also expected to support industrial development, but those higher education institutions tend to limit their activities within academic work and education. In

Thailand, for example, National Economic and Social Development Board and Ministry of University offered competitive research funds for universities and colleges, which are granted to research projects aiming to contribute to technology development and will be applied to small and medium enterprises. DTI, DOST and CHED may cooperate together to design such competitive funds to promote contribution of academic institutions.

Promoting dialogue between industry and higher education institutions will also be effective, not only for human resource development but also for collaboration towards innovation.

7.1.2.3 Promoting dialogue between industry and local governments

Currently, there is weak communication channel between LGU such as provincial, city, town and industrial sector (especially foreign affiliated companies). It is said that PEZA is the window for FDI, and one stop service is established where there is no contact point with LGU.

Many FDI companies go through more than 10 years since they started operation, and they are also paying taxes and offer jobs to local people. Therefore, FDI companies should make a communication not only with PEZA but also with LGU where they are located. In addition, the LGU as a representative of the inhabitants needs to understand the needs of companies and rectify the problem. If such a channel is constructed, it will also be mutually beneficial for risk management and bring about a sustainable development effect.

7.1.2.4 Support system for regional industrial policy by local government

An incentive system for policies making use of regional uniqueness is important to the local government and regional offices from the national government. In Japan, before, the Act on the Promotion of New Industrial City Construction Promotion Act (established in 1962), the New Industrial City Construction Promotion Act (established in 1983), the Act on Promotion of Collection of Specified Projects (established in 1989), The establishment of local bases cities and the promotion of location of industrial facilities (established in 1992) were enacted, corrected concentration in Tokyo, and fostered development of new industry. The central government supported financial and human aspects of the planning of local governments, and financial aspects of implementation. As a result, in Japan the policy development capacity and execution power of the local government increased. In the Philippines, there are many parts that differ from the relationship between the national ministries and local governments in Japan, but in order to enhance the policy planning capabilities of local governments and to increase the feasibility of the policy formulated, it is effective to give incentives to the local government.

Table 94 Legal example that raised the policy-making capacity of local governments in Japan

Law	Contents
Act on the Promotion of New Industrial City Construction Promotion Act (Established in 1962)	This law prevents population and industrial concentration in large cities and corrects regional disparities. Also, to stabilize employment, improve industrial infrastructure and urban facilities, encourage the construction of new industrial cities as the core of regional development. This aimed at balanced development of national land and development of national economy. The central government took the initiative and formulated a plan and carried out it in cooperation with the local government.
New Industrial City Construction Promotion Act (Established in 1983)	Local governments formulate development guidelines and development plans. The central government supported the formulation and, when approved by its development plan, implemented subsidy measures. Furthermore, in order to implement the plan, organizations that implement software projects such as technology development, exchange, human resource development training by industry, academia and government are established. Local governments strengthened regional identity while receiving support from the central government. Specifically, the central government implemented infrastructure development, establishment of national research institutions, tax incentives, financial support for the establishment of a new organization, human support (such as dispatching), etc. In order to increase the feasibility of the plan, the central government and the local government consulted from the planning stage. The consultation was an advice to the local governments on planning, improving planning skills.
Act on Promotion of Collection of Specified Projects (Established in 1989)	This law was enacted in order to distribute from big city to rural areas with eight industries such as software, design and engineering projects designated. This was also planned by the local government, approved by the central government, financial support for the approved areas.
The establishment of local bases cities and the promotion of location of industrial facilities (established in 1992)	This law was enacted to transfer urban functions and industrial business functions to the core cities of rural areas as one concentration in Tokyo and the declining population of rural areas are progressing. This is not a local government at the prefecture level, local government administration at the municipal level starts planning, and is the mechanism which becomes the subject.

Source: JICA study team

7.2 Promotion and implementation of industrial policy

As industrial promotion measures, effective approaches are; strategic attraction of FDI based on industrial policy and improvement of business environment for the specific sector, construction of linkage between foreign companies and local industry, nurturing and strengthening local industry, and nurturing domestic industrial human resources. These measures should not be implemented separately and sporadically but organically combined to selected target sectors and implemented with an effective scale will produce a synergistic effect and provide more effective results.

7.2.1 Promotion of Foreign direct investments

7.2.1.1 Promotion of foreign investment consistent to the industry policy

In terms of attracting FDI, a lot of multinational companies have entered to the Philippines due to incentives. Foreign investment promotions have been done to attract wide range of industries, not targeting on a specific industry. Current policy measures to attract investment depend solely on the provision of fiscal incentives and have not yet led to the formation of industrial clusters. In the investment program, it is necessary to consider attraction policies in consideration of industrial cluster formation.

Existing FDI is mainly an assembly process type and industrial location utilizing inexpensive labor force. In order to further advance the industry, it is necessary to enhance sectors that will grow by expanding domestic demand, such as shipbuilding or food processing that will increase the value added to abundant agricultural products. It is only recent that the government has initiated strategic program (named CARS program), which narrowly focused target industry.

For the viewpoint of potential foreign investors, they need the unique reasons to invest in the Philippines because global competition has become more significant. Accordingly, it is more effective to attract targeted investment like CARS program. Although not yet materialized, DTI is considering shipbuilding industry as a candidate for a new program similar to CARS. ESO is also listed as a candidate. In the shipbuilding industry, the SRNH program promotes the domestic shipping industry by means of RORO ship and the like, and the newly built shipbuilding of old and retired vessels is promoted in the retired ship program (Act No. 9295) to new domestic demand.

ESO is another candidate for targeted industrial development. For BPM, PEZA is already proceeding with the installation of EPZ for BPM, but ESO may be also included in the BPM and should become the target of FDI attraction. If it is an ESO to offer services to local companies, further incentive or tax reduction scheme may be installed.

As a benchmark case for implementing successful investment promotion program, the BOI of Thailand used to define targeted sectors such as "electrical and electronic" and "production machines and tools". Currently they are promoting the super cluster strategy with a detailed priority products. It is necessary to boost investments focusing on specific target industries, as well as developing the human resources and infrastructure required for the industry.

7.2.1.2 Improvement of investment environment

Until today, the development of industrial parks has been conducted mainly by private enterprises receiving PEZA's Special Economic Zone Certification. While PEZA has been focusing on positioning as many foreign-affiliated companies as possible, it is necessary to promote the development of industrial parks based on the concept of "building industrial clusters" from now on.

It is necessary to develop industrial parks while trying to align with infrastructure development such as highway, harbor and aviation which are currently underway. Actual development has been undertaken by private enterprises, but PEZA and private enterprises will continue to cooperate in the development of industrial parks in the future. In doing so, it is necessary to promote the formation of industrial clusters while taking into consideration the infrastructure development, the industrial characteristics of the area, and the location of industrial support organizations, etc. Specifically, in the vicinity of Clark's industrial estate for the aeronautical industry, and in CALABARZON, industrial complexes that accept the supporting industries will be effective.

7.2.1.3 Effective designing of incentive scheme

Companies invest overseas, as a matter of course, because the investment is necessary to realize their global strategy. For example, during the latter half of the 1980s and 1990s, assembling manufacturing sector in Japan faced a sharp appreciation of the Japanese yen and needed to migrate their production to Southeast Asia and China to reduce costs, to hire excellent workforce, and to be suitable for exporting to Europe, the United States and Japan. Cost competitiveness was very important if other conditions were constant, and a strong incentive can be a location induction factor at that time.

However, compared to 1995, the Japanese currency is currently depreciated by more than 30% against the dollar, and the location is not determined by mere cost factors alone. Although incentives are indispensable for winning competition for attracting investment with other countries, it is necessary to objectively evaluate the investment environment of their own country, design the content of incentives appropriately from the viewpoint of companies investing.

For example, in the Philippines, although shipbuilding industry accumulates to some extent, with only strong incentives, companies cannot make decision of investments. As seen in Chapter 5, world demand for large vessels which the Philippines has advantage declines and it is difficult to expect investment profitability for the moment. Meanwhile, RORO type of ships are experiencing a large number of domestic demand. However, the design and construction

technologies of large vessels and medium-sized vessels such as RORO ships are very different. So even existing companies who are producing large ships cannot make decisions of new investment into such mid-sized ships merely by financial incentives.

Regarding the automotive industry, although the CARS program is being developed, it is said that the 200,000 cars of new models of vehicles, which are conditions for providing incentives, are not necessarily matched to the situation of domestic market and the export environment. It can only be realized with the interaction of comprehensive initiatives such as prevention of illegal import of used cars, efforts to expand the market, nurturing high-quality, low-cost supporting industries in Japan, etc.

When designing investment incentives, it is necessary to understand the characteristics of the target industry, the situation where the Philippines is located, feasibility of investment decision making and post-investment operation. Therefore, it is necessary to enhance the knowledge and ability of industry specialists of BOI and continuously strengthen cooperation with industry.

To be more specific, zoning system of incentive will be effective to allocate industry outside Manila NCR. In Thailand, incentive zoning system were effective to direct investments to the Eastern region. The concept of this system was to offer more favorable incentives to investments in areas father away from Bangkok. There are three provinces in the East region; Chachoengsao (adjacent to Bangkok) and Chonburi provinces were designated as zone 2 and Rayong province was designated as zone 3. When this incentive scheme was introduced, Eastern Seaboard was developed as the industrial location with well-organized complex of infrastructure. As a result, there have been many investments into the region and export oriented companies such as Mitsubishi motor was located in the East region.

Table 95 Number of companies of automotive industry in Thailand by region

Region	-1960	1961-75	1976-85	1986-99	2000-14	Total
Bangkok	18	75	102	293	133	621
Vicinity	4	64	72	297	129	566
Central	0	5	4	69	22	100
East	0	16	12	202	99	329
Northeast	1	1	2	17	5	26
North				3	1	4
South				4		4
Total	23	161	192	885	389	1,650

Source: Ikuo Kuroiwa (2017) “Thai Jidosha Sangyo No Value Chain To Sangyo Shuseki (Value chain and industrial cluster of automotive sector in Thailand)” (presentation material)

In terms of incentive scheme reform, making a bridge between PEZA companies and domestic companies is another issue. Suggestion on this issue is indicated later (in 7.2.2.2).

7.2.1.4 Enhancement of organization for investment promotion

Although PEZA and BOI are active in FDI centering on major companies, it is also effective to strengthen the promotion of SMEs' entry into the Philippines, as well as continuing and strengthening local SMEs. Overseas expansion of Japanese SMEs is becoming active rather than the expansion of major companies overseas; attracting small and medium enterprises is also important. In addition, the supporting industries such as the automobile industry and the electric and electronics industry are composed of SMEs. Since the supporting industries are lacking in the Philippines, it is necessary to intentionally target foreign SMEs in supporting industries.

A concrete method is the implementation of seminars for foreign SMEs to the Philippines. PEZA and BOI have held seminars for SMEs cooperating with Organization for SME support. However, it is held in large cities in Japan such as Tokyo and Osaka. Japanese SMEs are not only in major cities but also in rural cities. It is a promising means to raise the frequency of seminars targeting SMEs in rural areas that have cooperated with local governments in Japan. For example, BOI of Thailand and the Ministry of Industry have concluded MOU with local governments such as Mie prefecture and Fukui prefecture. BOI Thailand started attracting investment, and is now promoting various collaborative projects. Such efforts by other countries will be helpful.

Promotion of FDI requires improvement by evaluating past activities. Because SMEs fall short in number of talented persons who do not have overseas business staff, the president himself often prepares for overseas expansion. The president is good in technology, but he is not necessarily good at English, resulting to reluctance in pursuing overseas expansion. Therefore, providing correspondence in Japanese, Korean and/or Chinese is important for attracting SMEs from Japan South Korea, or Taiwan in the future. For example, in BOI Thailand, there are several staffs who speak Japanese and Korean. Because English is the business language in the Philippines, multilingual correspondence is delayed compared to other ASEAN countries. Currently, BOI has few personnel that can handle Japanese inquiries. In the future, multilingual correspondence is necessary to win the competition with ASEAN countries. In addition, it is important to handle procedures that other ASEAN countries are not addressing, such as multilingual correspondence even for procedure documents for foreign capital expansion.

In the Philippines, PEZA has been successful to attract investments. Investors appreciate efficient way of doing business of PEZA such as one stop service, quick response, reasonable decision

making and reliable operation. Other investment promotion agencies are also expected to support investors as efficient as PEZA is operating.

7.2.2 Enhancement linkage between foreign and local companies

7.2.2.1 Promoting matching

Most local manufacturing companies are small and the number is very limited compared to other major ASEAN countries such as Thailand or Indonesia. In order to be included in a global value chain, they have to catch up with the cutting edge technologies but they do not have machines, facilities and/or resources to introduce such advanced technologies. It is necessary for local manufacturing companies to collaborate with foreign-affiliated companies to introduce technologies and facilities to be upgraded to global players. Also, in many cases, for foreign affiliated companies needs cooperation with local companies for entering into the Philippines market.

In order to strengthen business matching between foreign-affiliated enterprises including Japan and local companies, it is thought that creating a database of local companies and distributing the list or publishing it on a website will be effective. Already in the target areas of this project, there are initiatives at DTI's regional offices to develop databases of local companies, but this sort of activity should be accelerated.

DTI and LGUs are expected to play a catalytic role of matching support between foreign-affiliated companies and potential local companies. Holding exhibitions and reverse-exhibition in which buyers show their interests so that suppliers can understand what is expected by potential customers could be effective ways of the matching.

7.2.2.2 Promotion of special economic zone system supporting domestic industrial linkage

PEZA's incentive and excellent investment support system have been successful in attracting investment by export - oriented enterprises. However, the condition for accreditation is that 70% or more of the production to be exported. Under this scheme, materials necessary for production that are imported can be bonded-processed, but for items procured local company, VAT is levied. Although there is a mechanism whereby taxes (VAT) are refunded when finally being exported as a product, there are many cases that the tax paid was not refunded. For this reason, incentives for domestic procurement are not getting worse for companies that have received PEZA certification.

7.2.3 Local Supporting industries

7.2.3.1 Excellent local company certification and aggressive promotion

DTI is promoting the development of a local company database mainly by regional offices. The database organizes the business contents of local companies. While utilizing the database, government agencies such as DTI will approve firms that have remarkable growth and companies that are doing distinctive efforts, and will proactively promote them to public.

For example, in Japan, the SMEs agency has recently certified 300 excellent companies and is conducting a wide range of promotion activities on its website and booklets. Awarded companies also use the awards as a PR to develop new customers and improve relationships of trust from existing customers and to increase performance.

In Vietnam, JETRO is the main entity issuing brochure introducing excellence companies in supporting industries, 210 companies in the northern and central regions and 157 companies in the southern region, reaching a total of 367 companies. The content of the booklet is only Japanese version, but the index is published in English version and Vietnamese version. The contents are not only company name, contact address, company size, business details but also good skills and possessed equipment. Products and equipment are also introduced in the photographs. Japanese companies looking for partner companies in Vietnam find such materials very useful. JETRO created a case study on a Vietnamese company that is likely to be able to supply parts of quality level required by Japanese companies. JETRO summarized the results of visiting and interviewing the company.

Even in the Philippines, it will be effective to establish an enterprise database that is promising for trading of Japanese companies and Korean companies in cooperation with JETRO and KOTRA, as well as accreditation of excellent SMEs (at least 300).

Table 96 Excellent SMEs in Japan

Category	Contents
Energetic Manufacturing SME 300	SME with excellent technology. Implemented between 2006 and 2009
SME 300 do its best	SMEs are working to revitalize regional economies and actively develop sales channels abroad through innovative product development, provision of creative services, etc. SMEs to grasp the characteristics and needs of the area and make efforts to devise creative ingenuity. Implemented between 2014 and 2015
SME 300 flap wings	Enhance international competitiveness through innovative product development, service creation, revitalization of regional economy, aggressive

sales channels abroad etc., efforts to utilize human resources such as female managers, initiatives that grow with proprietary technologies and services SMEs are active in various fields such as doing. Performed in 2016

Source: JICA Study Team

業種: 製造業 主要加工: プレス 地域: Phu Tho省

COSMOS INDUSTRIAL COMPANY LIMITED

社名: ベトナム語: CÔNG TY TRÁCH NHIỆM HỮU HẠN CÔNG NGHỆ COSMOS
略名: COSMOS

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主要製品

No	主要製品	No	主要製品
1	バイク部品	5	
2	プレス金型(単発、順送)	6	
3	ゴム成形金型	7	
4	器具部品	8	

加工工程

No	加工分類	No	加工分類
1	板金形成(プレス、曲げ)	5	溶接
2	板金形成(絞り、せん断等)	6	金型設計・製造
3	機械加工(一般)	7	
4	機械加工(CNC)	8	

主要設備

機械種別	型式	台数	メーカー	製造国
プレス機	H文字	100	Seyi, Chingfon	台湾
溶接機	ロボット、CO2、スポット	300	Panasonic, Daihen OTG	日本
ワイヤー曲げ機	CNC	08	XINDA	台湾
パイプ曲げ機	CNC	07	Various	台湾
旋盤	CNC	多数	Victor	台湾
金型製造機		50	Seibu, DMG, Amada, Victor等	日本、台湾、ドイツ
測定器		多数	Mitutoyo, Shimazu, Faro, Bruker	日本、シンガポール

会社概要

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概要	設立年	2005年	従業員数	1,800名	工場面積	64,000m ²	
	資本金	28,000,000 USD	年商	48,500,000 USD	生産能力	3,000,000個/月	
	取扱素材	SPHC, SPCC, SGCC, SECC, SS400, SLD, SKD, STAM390, SUS304等			稼働率	90%	
	素材調達先	Honda Trading, HSC等			最低発注数	1,000個	
主要顧客	Honda Vietnam	95%			資本形態	国営	%
	その他	5%				民間	ベトナム
標準規格	ISO	9001:2008	DNV	JIS	5S		%
		14001:2004		<input type="radio"/>	<input type="radio"/>		
輸出入	輸出国	日本		輸出品	建設部品		
	輸入国	台湾、日本		輸入品	設備機械、原材料		

Source: JETRO web (<https://www.jetro.go.jp/world/asia/vn/company/>)

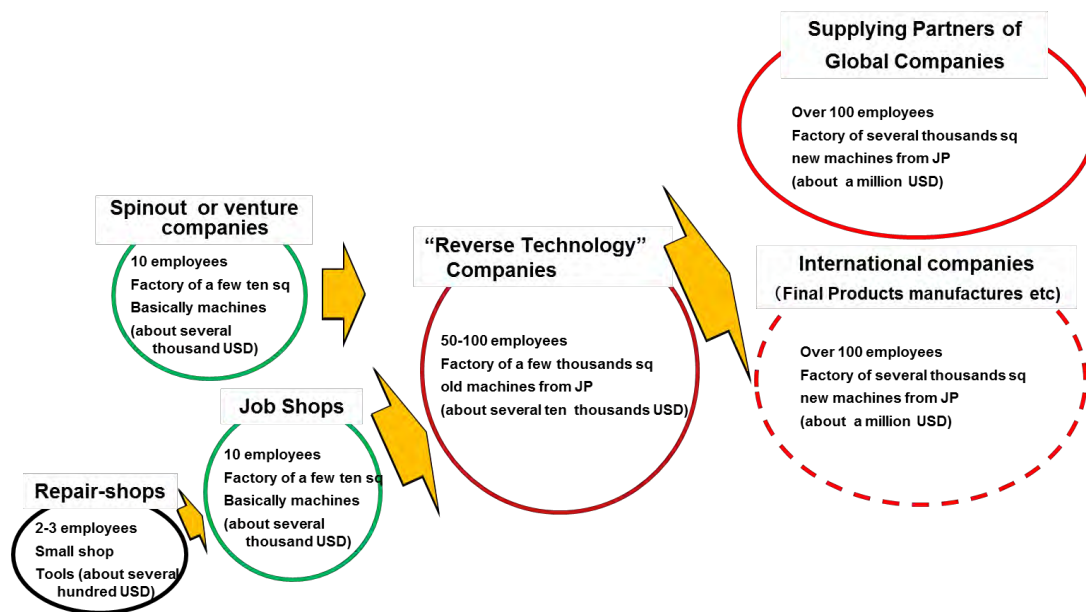
Figure 129 Example of local company introduction of Vietnam Supporting Industry "Excellent Company" (1 page for each company)

7.2.3.2 Success model (Create the companies that PEZA companies can cooperate with)

There are few local manufacturing companies in the first place, so it is difficult for PEZA companies to find local cooperating companies. PEZA companies will be able to shorten lead times and logistics costs if components are nearby. However, PEZA enterprises are not interested in actively locating and nurturing local companies because importing of parts materials is more cost effective (zero tariff). As a result, local manufacturing companies are not promoted. In other countries, the repair shop begins with processing repair parts, parts processing, and starts selling as aftersales parts, and thereafter often becomes a partner company of foreign companies. In addition, there are many cases where those who possess technology from universities and research institutes spin out as a startup. In the Philippines, a similar system is necessary. Therefore, a mechanism is needed for PEZA companies to discover local partner companies and nurture them.

As mentioned above, since there is no corporate support program specialized in manufacturing companies at DTI, in order to create and nurture local manufacturing enterprises in manufacturing, it is necessary to establish existing measures for financial support and technical support at the site of manufacturing. It is also pointed out in an interview with local companies that it is difficult for small and medium enterprises to secure funds for capital investment, as one of factors that MSMEs do not develop easily. Certain metal fabrication manufacturers have improved processing precision by introducing the latest processing machines and now have grown into suppliers to Tier 1 companies of aircraft parts. However, there were opinions that such investment would affect management, as it requires a large amount of funds to invest in such advanced machinery and a high interest may be a burden. Improvements to financial access that promote investment for growth are required.

In order for local companies to be able to collaborate with foreign enterprises, it is necessary to raise the level of the quality and delivery of products and management skills of local companies. To that end, certification of excellent companies that can collaborate with foreign companies, nurturing them into companies with particularly high competitiveness in specific fields, and enhancing business development support organizations to realize them (Provide technology, finance and management services, soft service such as strengthening of functions and transaction support, and hardware projects such as test research institutes or shared equipment centers) will be needed.



Source: Study team

Figure 130 Development Pattern of Manufacturing Companies

7.2.3.3 Support on upgrading quality of products

Famous Secret Precision Machinery is a good example of MSME to upgrade their technology by introducing cutting edge machine tools. By utilizing such tools, they improve their quality of products so that they are procured by tier 1 aerospace manufacturer. There are also a few other similar cases that introduction of high end machines made MSME to become suppliers to global companies. However, for majority of MSMEs, those machines are very expensive and they cannot afford to acquire them. In Japan, for example, there have been policy measures to promote investments into such state of the art machineries. It could be subsidies, tax incentives or accelerated depreciation of the facility introduced.

7.2.3.4 Promotion of Local Industry Promotion Policy

At the moment, the Inclusive growth the concept of the national development plan is not necessarily linked with industrial policies, measures, actions, etc. Local governments, in many cases, they do not grasp the industrial activities including PEZA companies that are located within their areas. First of all, it is necessary to grasp the industrial activities carried out within the region and to plan planning for industrial upgrading within the region based on the current situation. In planning, it is essential to consider policies based on the idea of domestic and foreign market demand as a starting point, rather than product-out business of which companies sell product only they are producing. In order to realize that, it is necessary for the national and regional partnerships to cooperate with each other to achieve consistency of industrial policies and to implement them.

For the time being, based on the future image and policy proposal suggested in this project, it is important to discuss within the local government, and with the concerned national government agencies such as DTI and NEDA, the industry and industry human resource training institution etc. Through such discussion, it is necessary to consider the direction of the region, and the policies that can be undertaken in the region.

In addition, although existing foreign companies want to improve the local procurement rate, even in interviews with Japanese companies, there are few companies that are candidates for suppliers in the first place. It is much smaller even compared with other ASEAN countries. Even at DTI, although it is engaged in corporate support, it is not a manufacturing company but a retail industry and a service industry as a main objective. From now on, it is necessary to consider a support program specialized for manufacturing companies. In other countries, the repair shop starts manufacturing by repairing parts, then gradually, selling processed parts, and afterwards, they will become a supplier to foreign-affiliated companies.

7.2.4 Industrial Human Resource Development

It is necessary to cultivate industrial human resources that support corporate activities, and to improve the policy-making capacity of local governments. In the IT / BPO industry, industries, universities and TESDA cooperate in many human resource development, but training of engineers for the development of the manufacturing industry is not sufficient. In the Philippine manufacturing industry, there are many simple workers, and attraction is low from highly educated people. Because the government does not clarify the development vision of manufacturing industry, students' interest is also low. Recently, there are increasing numbers of foreign companies and graduates of engineering graduates in CALABZON where manufacturing industry is active. There is a need for industries to develop human resources capable of enhancing ESO and development functions, production management and design for high added value even in production processes. Going forward, the government will show clear vision of high added value of manufacturing industry; industries and educational institutions must work together to expand curriculum and engineer development opportunities. For example, in Thailand, Japanese companies entering the country and related organizations such as government agencies worked together to establish the Thai-Nichi Institute of Technology. While referring to the case of Thailand, it is necessary to strengthen engineer training by collaborating with administrative organizations such as CHED, TESDA, DOST, educational institutions such as universities and industries

LGU needs to develop personnel capable of planning the industry according to local characteristics. Even now, although there are human resource development programs from LGUs, there are few programs concerning industrial policies requiring a viewpoint of the industry competing internationally. JICA experts support industrial policy planning, personnel exchanges with overseas administrative organs, dispatch to overseas administrative human resources development agencies, etc., and try to nurture local administrative personnel.

7.3 Specific policy actions for selected industry sectors

7.3.1 Aerospace Sector

The policy orientation for aerospace sector will be an “ASEAN hub for MRO business”. To realize this goal, the most important policy measure will be promoting MRO and parts suppliers to MRO business by investment promotion. This will be undertaken by both national department, agencies as well as LGUs.

Human resource and technology development specifically tailored to aerospace industry should be offered by TESDA, DOST and DTI with support from the industry.

MRO business tends to locate at airports such as Clark and Subic but part suppliers may be located from CAR in the north to CALABARZON. Thus road network connecting those regions will contribute to parts supplying logistics and locating parts manufacturers.

7.3.2 Electronics Sector

The policy orientation for electronics sector would be a “high-tech innovation for electronics.” In terms of technology development, promotion of R&D relevant to existing business and/or new targeted areas such as IoT, AI and EDA should be undertaken by both national institutes and academic institutions, supported by DOST, CHED and DTI. This will be effective if the Philippines will be able to attract foreign direct investments relevant to IoT, AI or other high technologies, since it will be difficult to develop those state of the art technology and contribute to the industry by only domestic resources.

To promote such high technologies for electronics, human resource development, especially highly skilled engineers are indispensable. Training engineers will take a long time and the government has to start fostering human resource as early as possible to promote the electronics sector.

7.3.3 Automotive Sector

Among all manufacturing sectors, automotive should be the top priority and public resources should focus on this sector, since the government has already invested financial resources and the sector has a very large potentiality of creating jobs, upgrading technologies, fostering supporting industries and increase exports.

The top most policy measure for automotive sector is CARS program and continuous support for the sector to become annual production of one million CBUs. Production of one million units is a sort of rule of thumb of the sector to attract more parts suppliers and supporting industry.

The other hurdle to promote automotive parts suppliers is to promote designing of the car in the Philippines. If the car being manufactured in the Philippines is designed in foreign country, then many of the parts suppliers tend to be designated in that country. Designing and development process is quite important for develop automotive parts manufacturing in the Philippines. Thus, promoting a model of car which has a large domestic demand and unique in the Philippines (for example, compact sports utility vehicle), will be effective, since no other country will undertake such specific model.

On the basis of continuously increasing local production (towards one million units per annum) and local development of the Philippine original model, upstream companies will be interested in operating in the Philippines. Holistic policy approach towards auto parts suppliers and supporting industry, including human resource development, fiscal incentive and infrastructure development specifically targeting the sector will be necessary.

7.3.4 IT/BPM sector

Urgent issue for IT/BPM is to increase value added of the services. Shifting from simple operation process outsourcing such as call center to knowledge process outsourcing will be needed. It could be IT system integration, e-commerce, or service provision to manufacturing sector.

For system integration, some US companies are already conducting such sort of business and there may be chances to deal with Japanese or Indian companies. For the service provision to manufacturing sector, India will be the model case. Several IT outsourcers upgraded their services to manufacturing sector. They have many senior engineers who have experiences in the manufacturing sector.

In the Philippines, some manufacturing companies such as plant builders, auto parts manufacturers, are doing designing and testing activities. Promoting those R&D type of activities and fostering highly skilled engineers for manufacturing will also contribute to IT outsourcing business.

7.3.5 Food Processing Sector

The most critical issue for the food processing sector is to organize farmers for modern business trading. Individual farmers are fragmented and not necessarily accustomed to deal with large scale production. Food processing companies need stable supply of qualified agricultural products. Farmers sometimes have to improve their products suitable for mass production but they do not know how to do so.

One possible solution could be a food market which will directly deal with individual farmers. There is an idea in Clark to establish such market. Also promoting investments of food processing companies will contribute to develop the sector. In general, large company may generate many job opportunities, however, they tend to operate a large scale operation and need a stable and large amount of supply of raw materials. If they judge they cannot procure such large amount from fragmented individual farmers, they may not invest in the Philippines. However, middle sized food processing company may operate differently. In fact, some Japanese companies have invested in the Philippines and organize farmers and logistics by themselves.

Policy action on quality improvement of agricultural products may also contribute to the development of the sector, including food hygiene management process and research support for quality improvement for agricultural products.

7.4 Stronger linkage between industry policy and infrastructure development

7.4.1 Coordination between agencies for infrastructure and industrial development

In order to develop the industry and strengthen the value chain and supply chain, both soft and hard infrastructure need to be developed. There is a case that improvement of transportation lead to development of industries; one is the development of industrial park in Cavite foreseeing construction of a new highway nearby. In addition, looking at some cases of other countries, the industry human resource development focusing on specific industries attracted investments. First of all, developing the hard and soft infrastructure to promote the investment of next industries is

important. Based on this, it is considered to be realistic to expand the capacity of port, if the increase in the cargo volume is expected. In any case, it is important to have consistent plan for the infrastructure necessary for the industry development.

Cooperation between infrastructure agencies and industrial policy agencies is necessary for that realization. Industrial Development Council (IDC) has already been set up to consider the maturity of the plan and the securing of the budget. It is important to calculate the economic effect of infrastructure development to implement industrial policy up to the effect of raising taxes and realize the budget. For this, it is necessary to establish a cooperative meeting by high-level officials of relevant ministries and agencies.

7.4.2 Development of Central Business Districts

It is also important to establish a central business district that will take on new industries such as BPO, ESO, energy industry, and will disperse economic activity from Metro Manila. In order to realize this, it is necessary to develop infrastructure such as railroad network between Metro Manila and the proposed central business district, and to improve communication infrastructure.

It is necessary to realize the potential CGC as a central business district in Central Luzon, while identifying a central business districts in CALABARZON. PEZA's Special Economic Zone already exists, but it is a mechanism that promotes only the target development site, and cannot cooperate with regional development. A central business district is not a building but a holistic regional improvement. It is necessary for the LGU, the national government, and the private sector to cooperate plan, and develop. In the past, local governments and the national government jointly promoted planning and development based on the Technopolis law and the brain location law in the past. Even in the Philippines, local governments, the national government, and even private enterprises are united and efforts are necessary. The Philippines have already experience with development by BCDA and CDC. Local governments may take an initiative by referring to those national agencies achievement.

In the national land planning and policy of Japan, the central business district is developed as a considerable extent of areas outside the twenty three wards of Tokyo. Currently fifteen urban areas are designated as central business districts. Supporting measures such as general project bonds can be issued for the core facilities (listed below).

- 1) Research facility,
- 2) Information processing facility
- 3) Telecommunication facilities / broadcast facilities

- 4) Exhibition facilities / Trade fair facilities
- 5) Training facilities / Conference facilities
- 6) Transportation facilities
- 7) Intelligent building
- 8) Distribution service facility
- 9) Cultural facilities
- 10) Sports and Recreation Facilities
- 11) Facilities having various functions such as sports, music, exhibition.

In order to distribute the capital function, it is necessary to clarify the districts and their function, and in the new PDP, a regional centers are designated. As mentioned above, these are large and important cities following provincial capital cities, but not all cities are adequate to become a central business districts. In this survey, as the city of over 700,000 population, the Clark region (Angeles City, San Fernando City, Mabalacat, Porac and Bacolor with a total population of about 1.12 million people) in the Central Luzon region, and in CALABARZON, from the north along the SLEX, Binana, Sta. Rosa, Cabuyao and Calamba (Cabuyao and Calamba have total population of about 750,000 people) are proposed to become central business districts and some incentives on development of such districts should be provided by the national government.

7.5 Mechanism required for infrastructure development of wide area transportation network

It is very important to develop a logistic master plan currently being studied by the Philippine government and to establish an implementation organization. For that purpose, the following four mechanisms are required to be developed.

- 1) Soft-infrastructure of a logistics master plan development
- 2) The coordination mechanism
- 3) Role sharing between the public and private sectors
- 4) Financing mechanism

1) Soft-infrastructure of a Logistics master plan development

The development of the logistics master plan needs the accurate data accumulation system and the well-chosen analysis method. Its realization requires three factors, namely, the implementing organization, the adjustment system and human resources.

Implementing organization

It needs the input from external organizations such as the Japanese Ministry of Land, Infrastructure and Transport.

Adjustment system

The inter-agency adjustment mechanism is required for developing and authorizing the logistics master plan. The establishment of the adjustment mechanism needs the revision of the legal and regulation system.

Human resources

The logistics master plan development needs the planning thinking and scientific analysis capability based on the accurate data. The capability about the data analysis and processing method is required.

2) The coordination mechanism

The purpose of the logistics development is to reduce the total transportation time and costs. The reduction of those needs the connectivity among each transportation mode.

Fundamentally, terminal infrastructure such as a port should be developed close to the access infrastructure such as a road and a railroad. However, there exists a time-lag to develop each transport infrastructure in Philippine. The development time-lag brings the wasted maintenance cost, and the logistics infrastructure development also requires a huge development cost.

The coordination mechanism for the comprehensive logistics infrastructure development should be established urgently under the development budget constraint.

3) The role sharing between the public and private sector

The private sector has a role of the logistics service provider/operator fundamentally. On the other hand, the public has a role to regulate and guide the private sector to promote healthy competition, safety, and consumer protection, among others.

The government should foster the private sector as a logistics service provider/operator and take into consideration the role of regulator of logistics service.

4) Financing mechanism

In order to attain sustainable economic growth, the large-scale investment in logistics infrastructure is indispensable.

In Japan, the financing scheme of infrastructure development supporting the economic growth after the war was under a loan by government credit (debt from people) and loan from the World Bank. The saving rate is at a low level in Philippine, and it is difficult to finance the debt from the people. Therefore, it is thought that the transportation infrastructure development in Philippine could be developed by the government loan at present.

For that purpose, the effective and efficient planning of the logistics infrastructure development and the implementation are required.

In general, the PPP scheme as a current major of infrastructure development scheme in the Philippine prefers to the project profitability rather than the social benefit criteria. The broad transportation infrastructure might contribute to the regional industrial development as social benefit rather than the project profitability in general. On the other hand, the inter-city transportation infrastructure might fit the PPP scheme because of high project profitability in the short-term. The inter-region and broad transportation infrastructure including the social benefit in the long term and in the broad area comparing to the inner-city transportation infrastructure prioritizing the short-term project benefit might be needed to developed by the public.

7.5.1 Proposal of the Direction of Logistics Infrastructure development

This section is to propose the direction of logistics infrastructure development with a view to the mitigation of traffic congestion in Manila Metropolitan area as an urgent issues and enhancement for industrial activity and the sustainable regional development covering the target area in this study.

Based on the above the concrete projects, the desirable development policy about inter-regional transport infrastructure is examined with the aim of realization of industrial potential and needs from the point of spread view from Manila Metropolitan area to the target areas (Region III and Region IV-A).

Form the regional development point of view, the economic corridor adopted by the Roadmap will be applied to the transport infrastructure development policy. The Manila Port, the Subic Port, the Batangas Port and the Clark International Port as transportation nodes are very important as

industrial and logistics infrastructure, and the north-south corridor, Manila-Clark corridor, and Manila-Subic corridor consisting of road and railway as transportation link are also very important for establishing the efficient transportation network in the target area.

Currently, the Philippine Government has taken on the PPP scheme with private funding for the development of regional transportation network. The PPP scheme is useful for only the restricted area network such as inner city e.g., Manila Metropolitan area, because the private companies generally apt to prioritize the profitability of the project. On the other hand, with the aim of establishment of wide-spread transport network that is not positive of the financial feasibility in general, the PPP might not be useful even if the economic feasibility would be positive. The economic corridor is useful concept for industrial development in the widespread area.

Based on the overview of the transport infrastructure development progresses, it doesn't seem to implement efficient development progress to each other as an inter-regional connectivity function. For the realization of efficient inter-regional and intermodal transport system, each transport mode, e.g., road, rail, port, air, inland warehouse, etc., should be organically and physically-bonded status to each other as an integration system. However, the development of each transportation mode is being developed individualistically in fact.

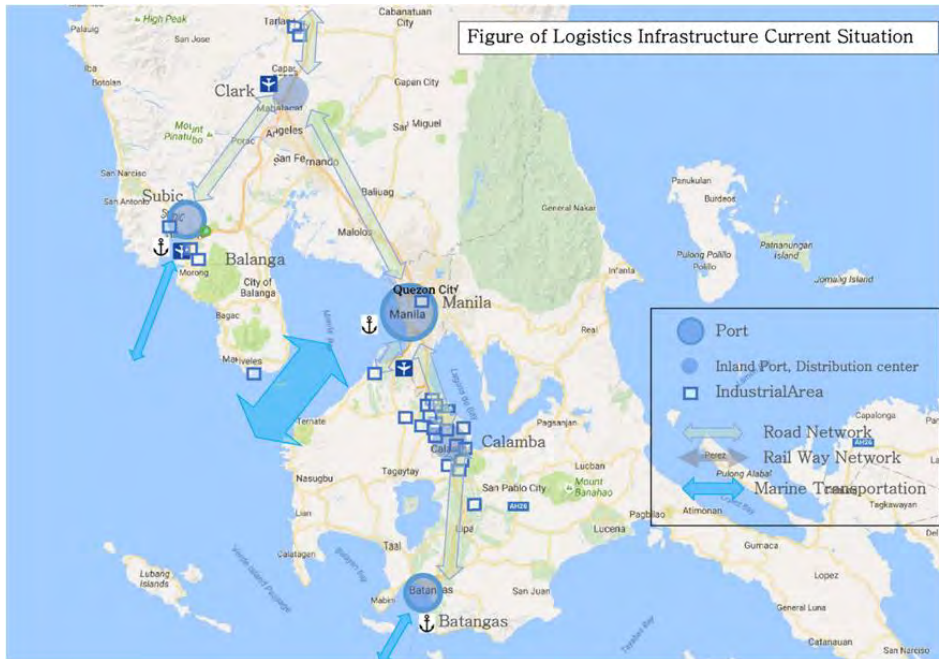
The development process of the transport infrastructure is implemented individualistically by itself. In Philippine, the PPP scheme is expanding in the field of transport infrastructure development under the Government budget constraint. Because of that, the efficient inter-regional and intermodal transport system for the mitigation of the traffic congestion and the regional development would be not realized under the individual development between the transport modes. The development timing is not organized among each transportation mode. For instance, if the part of the road and the port has been developed by its condition, the inter-regional and intermodal system could not be realized. In addition, the benefits and good effect from the developed transport infrastructure might not appear by itself.

7.5.2 Concept of streamlining of logistics

The scenario of the logistics efficiency development harmonizing the mitigation of inner-city congestion in Manila Metropolitan and regional industrial development through the realization of the inter-city transportation network is shown as follows.

The following figures (Figure 131) show the comparison between the current condition and the future image of the logistics in the target area.

■ Current



■ Future

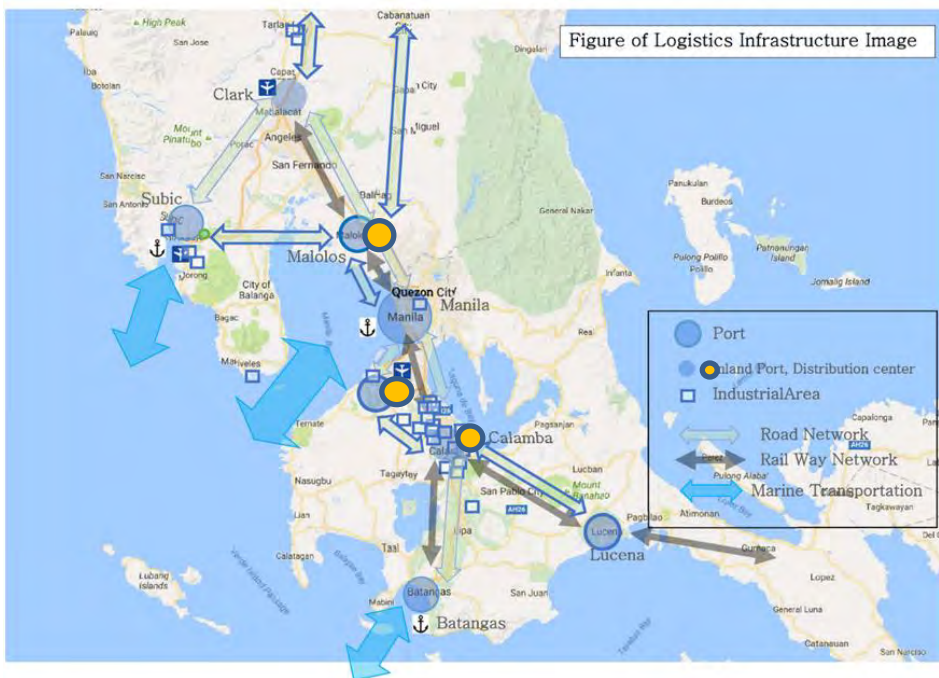


Figure 131 Comparison of logistics image between current and future

The direction of the logistics efficiency in the future and development scenario of the transportation scenario on the ground of the industrial potentiality in the target area mentioned in previous section (Chapter 5).

1. Precondition (Industry Potential)

- Central Luzon: Agri-business potential, export processing industry, etc.
- CALABARZON: Manufacturing industry development, Attraction of Investment, etc.

2. Direction of logistics efficiency for industrial development

- Congestion mitigation in Manila Metropolitan and optimization of logistics function
- Transport infrastructure development with the aim of harmonization between city and industrial development

3. Concept of transportation infrastructure development

The development scenario of the transport infrastructure using three keyword, 1) decentralization of transport base, 2) Strengthen of connectivity and 3) Strengthening of transport function, based on the direction of logistics efficiency mentioned in the previous chapter is showed as follows.

Table 97 Development Scenario of Transport Infrastructure

Keyword	Concept	Target Infra	Scenario
Decentralization of Transport Base	Decentralization Of Seaport Cargo	Major International Seaport	The development based of the qualification of each role; the congestion mitigation in Manila Port; Usage promotion of Subic and Batangas Port. (a), b)
		Batangas Port	Port function strengthening considering industrial potential (manufacturing, investment attraction, etc) in the hinterland (a), h)
		Subic Port	Port function strengthening considering industrial potential (agribusiness, food processing, etc) in the hinterland (a), g), h)
	Decentralization of inland base	Relocation of Truck Terminal	Relocation of truck terminals from inner-city to the outside Manila (b), i)
		Relocation of logistics facilities (warehouse, CFS, etc)	Relocation of logistics facilities (warehouse, CFS, etc) from inner-city to the outside Manila (b), i)
		Dry port Development	Recentralization of handling cargos by the development of dry port near the industrial bases (f)
Strengthening of Connectivity	Connectivity among mode and inter-mode	Master Plan/ Implementation body	Development of Logistics Masterplan and establishment of the implementation body (a)~j)
	Connectivity between link and node	Port access road	Strengthening of connectivity between trunk roads and port facilities (the development of last one mile) (d), g)

	Connectivity of industrial base	Access road to Industrial base	Improvement of attraction level of the city due to the avoidance of cargo truck from the urban district...e)
Strengthening of Transport Function	Seaport function strengthening	Seaport	Activation of domestic agricultural produce through the adding of RORO function with the seaport...j)
	Airport function strengthening	Airport	Improvement of convenience due to the development of hub-function in the east-south Asia...c)

Source: JICA study team

a) The ports—Manila, Subic and Batangas—and the airport—NAIA and Clark—as center of logistics in the target areas should be further developed in accordance with the defined industry and regional characteristics and prevailing conditions.

b) The regional logistics hub as a strong collection point of cargo is needed in each target area, because each area holds more than ten million population. Subic Port and Batangas Port should play a logistics hub in each region, and the Port of Manila should perform as an inter-regional hub. It should be necessary to develop each port based on the population and economic scale in each region.

The function of the Port of Manila could require specialization of the gateway of the imported consumption goods, durable goods, food processing, etc., by means of the upgrade, e.g., one-stop-service, computerization, intermodal facilities of the port function.

c) The air transport market has relatively small demand compared to the land transport. However, the air transport has function of transportation mode as a single mode, namely “hub and spoke system”. The Philippines has geographical advantage which is located as a center of ASEAN. If the airport network in the Philippines would establish “hub and spoke system” utilizing its geographical advantage, the system might attract new investment and business, e.g., global transport business, cold chain business, BPO business, R&D business, etc. Especially the Clark Airport should be developed utilizing the geographical advantage. Fortunately, the Clark Airport has large spare area in the surrounding area of the airport for new business investment.

d) In regard to the seaport link, the access road avoiding inside the city to the Port of Manila should be developed urgently, and the business function should be improved by the mitigation of traffic congestion. In addition, the outer ring road should be developed urgently as well. Industrial collaboration should be expanded and improved between regions. On the other hand, in case of

Subic and Batangas Ports, the access road from the trunk road should be developed urgently and the accessibility between the region and the port should be improved.

e) Railway development is important countermeasure for the reduction of waste gas such as CO₂, NO_x, etc., from traffic congestion and logistics activities in the Manila. Considering the current plan and on-going project of the railway, the combined between traffic and cargo and the cargo dedicated truck should be developed based on the demand forecast and feasibility study. Especially, the railway development between Manila and Calamba must be high priority project to lessen of traffic congestion in Manila.

f) Supplemental facilities such as inland container terminal, inland port, etc., is needed for smoothing inter-regional cargo distribution in the inland area. Especially, many PEZA companies, foreign industries, Japanese companies and so on are in CALABARZON, these companies transport their cargo daily to the Port of Manila. However these companies also are gradually shifting the cargo Batangas Port. Because the access time to Port of Manila is longer than that of Batangas Port, several companies changed Batangas Port as a way-stop. For the purpose of mitigation of traffic congestion and improvement industrial activity in that area, new inland container terminal function, e.g. bonded, warehouse, temporary storing of empty container, etc., in Calamba and Cavite should be developed, and accelerate the shift of cargo to Batangas Port.

Table 98 shows the comparison of rail freight transport in ASEAN. The table indicates that currently, the Philippines has minimal operations for rail freight transport, but in the past this was offered. The existing rail between Manila and Donobang can be used for rail freight transport if any logistics facilities, e.g., inland port, container terminal, etc., would be developed or rehabilitated, and this rail freight system might be very useful.

Table 98 Comparison of Rail Freight Transport in ASEAN

Country	Route	Distance (km)	Transaction volume (year) of Container at port TEU's	Transaction volume(year) of Container by Freight train TEU's	Percentage of Transaction volume of Freight train	Source
Cambodia	Phnom Penh-Sihanoukville	300	391,819	29,149	7.44%	Sihanoukville Autonomous Port (PAS) http://www.pas.gov.kh/en/page/statistics 2015
Bangladesh	Dhaka- Chittagong	320	1,700,000	60,000	3.5%	Bangladesh Railway
Thailand	Laem Chabang Port-Rakkaban ICD	120	6,000,000	1,600,000	26.67%	Thailand Port Authority

Philippines	Subic Port- Manila	160	116,168	No freight train	None	Source : Subic Bay Metropolitan Authority (SBMA) 2015
	Batangas Port - Manila	108	133,262	No freight train	None	Source: PMO Batangas Port 2015
	Manila Port = Manila North & South Harbor and MICT		3,975,752	No freight train	None	Source: Philippine Ports Authority (PPA) 2015

Note: TEU (Twenty Foot Equivalent Unit) Container

Source: JICA Study Team

g) National policy of new administration includes the betterment of domestic procurement rate of the domestic produces. Central Luzon has huge agricultural potential; however, the accessibility to the market and upgrade function is lacking now. Two useful strategy can be pointed out. One is an import replacement of agricultural goods from the foreign to domestic supplier by means of improvement of accessibility to the market in Manila, and another is to create value-added agricultural goods by means of an upgrade of export bases of Clark International Airport and Subic Port and Airport. For instance, the development of an advanced public wholesale market such as Japanese market would be better to be developed.

The improvement of accessibility to the market in Manila is needed to developed a collection and wholesale function of agricultural goods. On the other hand, the creation of value-added agricultural goods is needed to develop a cold chain function in the surrounding area of the airport in Clark and the seaport in Subic. In addition, the expanding of bulk cargo handling facilities for fertilizer and feeding stuff should be developed with the aim of upgrade and cultivation of livestock business.

h) The less necessity cargo using the Port of Manila, e.g., construction materials, timber, gravel, coal, etc., should be shifted to the Subic Port, and the accessibility between these two ports should also be improved. It can be thought that the Manila Port should specialize in high value-added consumption goods, and the low value-added materials and semi-production goods should be shifted to the Batangas Port. The diversification of the construction goods and raw materials from the Manila Port to the Subic and Batangas Port might contribute to not only the mitigation of traffic congestion in Manila but also the enhancement of industrial promotion in the target area. For shifting the port handling cargo from the Manila Port to the Subic and Batangas Port, it might be effective to develop the logistics facilities, e.g., dry port, truck terminal, etc., at a halfway between the Manila Port and Batangas Port due to the advanced evidence as same experience in Thailand where the Lat Krabang ICD had been developed at a halfway between the Bangkok city

and Laem Chabang Port. That has contributed to the mitigation of traffic congestion in Bangkok by mean of the shifting the port handling cargo from the Bangkok Port to the Laem Chabang port.

i) In line with mentioned recommendations, it should be necessary to relocate the logistics facilities, e.g., the existing warehouse, CFS, truck terminal, etc., from the surrounding area of the Port of Manila to the target areas. Furthermore, the redevelopment of Metro Manila can have better implementation if such function will be transferred. Later, the business function in Manila could be improved by decreasing logistics vehicles plying within the capital.

j) Domestic RORO shipping network is needed with the goal of a creating job opportunity by means of inter-island transportation network. Comparing the logistics cost between the Port of Manila to the USA and the Port of Manila to the Mindanao, it is said that the logistics cost to USA as an international transport would be cheaper than that of Mindanao as a domestic transport. The domestic inland water network should be improved to connect efficiently.

Table 99 Suggestions for Demarcation of Roles among International Seaports in the Philippines

	Manila Port	Subic Port	Batangas Port
The role of the port (The feature of the ports)	The central port in whole Luzon island (Import port of consumption goods)	The hub port in the Region3 (International `trade port of agriculture, forestry and fishery goods)	The hub port in the Region4A (The international trade port of industrial goods, a linkage port with other islands)
The main hinterland	hole Luzon island (Centered on the Metro Manila)	Central Luzon	CALABARZON
Major cargo	Consumption goods (food, daily necessities, garments, etc.) <u>Container</u>	Consumption goods (Feed and fertilizers, agricultural and food processing goods) <u>* Bulk cargo and Container</u>	Industrial goods (finished car, machinery, etc.) <u>* Bulk cargo and Container</u>
Others	General cargo centering on the above-mentioned cargo (Except dirty cargo)	Construction materials (Wood, gravel, sand and stone, construction material, etc.) Industrial goods (construction goods, petroleum products etc.) Other cargo (Used car, used machine, etc.) In addition, consumption goods from the hinterland	Consumption goods (Food processing goods / beverage materials, etc.) Construction materials (Wood, gravel, sand and stone, construction material, etc.) In addition, consumption goods from the hinterland
Port facilities	Container terminal	Container terminal Bulk terminal (Feed and fertilizers terminal, RORO Terminal)	Container terminal Bulk terminal (RORO terminal)
Function near the port	Warehouse, Storage, CFS	A warehouse, a roughly built shelter, CFS,	Warehouse, Storage, CFS Factory

		Grain silo, refrigeration and cold storage Factory	
Issues	Relocation of cargo volume	Increase of cargo volume	Increase of cargo volume

Consumption goods; agriculture goods, forestry and fishery product, coal, food processing goods, daily consumption goods, the combination goods, etc.

Industrial goods: steel, machinery, oil and coal product, chemical goods, paper and pulp, fiber and fabric, etc.

Construction goods: wood, gravel, sand and stone, nonmetallic mineral, metal, pottery-industry goods, waste disposal, etc.

Source: JICA Study Team

The development term of the link function such as road and rail network is longer than that of the node such as port and airport, and the development cost of the link is more expensive than that of the node in general. Furthermore, the link development might be more highly public than that of the node, and the contribution ratio to inter-regional industrial activity of the link might be higher than that of the node through the individual cooperation.

The existing transport infrastructure projects were re-evaluated in terms of the realization of industrial potential in the target areas in the future and the mitigation of traffic congestion in the Metro Manila by network infrastructure development. The re-evaluation criteria are as follows.

- Mitigation of traffic congestion in Metro Manila
 - (Strengthening of the network between the Manila Port and Batangas/Subic Port)
- Enhancement of industrial activity in the target area
 - (Strengthening of north-south network)
 - (Strengthening of east-west network)

The contrast figures between the current condition and future state of the logistics infrastructure using the concept of economic corridor are shown in the next section.

7.5.3 New Project Proposal based on the Industrial Potential

Based on the result of the reevaluated project, new related project was examined with the aim of the acceleration of the efficient regional network establishment additionally.

(1) Central Luzon

In the industrial analysis of this survey, in Central Luzon, in addition to existing electronic components, aircraft parts supplying to MRO, IT /BPO and design development functions in central business districts (or regional centers), such as CGC are anticipated to grow. It is also expected that the development of agribusiness will be triggered by the development of distribution

facilities at CGC. Based on the PDP's policy of effectively utilizing existing industrial infrastructure, expansion of the following infrastructure is considered effective in promoting the location of these industries.

(Direction of transport infrastructure development)

- Infrastructure development adapted to research and business agglomeration
- Infrastructure development corresponding to high-value-added agriculture, forestry and fishery industry

Infrastructure development for efficient supply chain to Metro Manila

(New project proposal based on the priority analysis)

① Subic Port

- Accumulation of agricultural distribution center (refrigeration / freezing facilities)

(Supply of high-value-added agricultural goods to the world market and domestic agricultural products to Manila)

- Development of bulk cargo (feed and fertilizers, etc.) handling facilities (e.g., deep-water quay, feed and fertilizers silo, etc.)

n.a.

- Development of the handling facility of a long picture and heavy load cargo (e.g., RORO quay, vast yard, etc.)
- Saucer of the dirty cargo from the Manila port

② Clark airport

- Attraction of an air-cargo as an aviation hub in ASEAN
- Development of the warehouse for air cargoes, and insure of relevant industrial area

③ Rail

- Development of the combined use function between Clark and Manila railway
- Development of inland depot and inland port

④ Others

- The support facilities for the industrial exploitation of agribusiness (e.g., wholesale facilities, collection-and-delivery system, refrigeration / freezing facilities, etc.)
- The improvement of access between Manila and Subic (e.g., new road development along the shore)

(2) CALABARZON

In the industrial analysis of this survey, especially in the area of CALABARZON, in addition to existing electronic components, automotive and its parts sector supported by CARS program, higher value added business of IT/BPO, which will be a fusion area of IT and manufacturing

(such as factory IoT, AI etc.) are expected to further develop. Based on the PDP's policy of effectively utilizing existing industrial infrastructure, expansion of the following infrastructure is considered effective in promoting the location of these industries.

(Direction of transport infrastructure development)

- Infrastructure development for the increase in efficiency of the existing industrial (e.g., electron, electricity, etc.) accumulation
- Infrastructure development towards new industrial generating
- Goods supply system development by utilizing of the existing transport infrastructure

(New project proposal based on the priority analysis)

① Batangas Port

- Container Extension (e.g., quay, yard, CFS, etc.)
- Reservation of industrial space (e.g., easy processing, wrapping process, etc.)
- Enhancement of a RORO capacity (especially domestic agricultural products from Mindanao Island)
- Development of the refrigeration and the cold storage warehouse in the backyard of the port
- Strengthening of Accessing function to Calabarzon area (e.g., development of access road to the port)

② Rail

- Development of the freight rail function between Manila and Calabarzon
- Development of inland depot and an inland port
- Development of cargo rail function from Calamba east

7.6 Way forward to promote industrial policy

This survey examined the direction of industrial development and the direction of regional development for Central Luzon and CALABARZON. This final section describes points that are considered to be particularly important for future policy promotion.

(1) Policy packaging

Even if individual measures are implemented fragmentarily, it is difficult to achieve the ultimate goal. For example, if automotive sector is set as a target for policy support, it is necessary to adjust and implement various efforts such as infrastructure development, cultivating supporting industry and human resource development to very specific needs of the sector for further development.

(2) Close cooperation and communication with industry

The development of industry is basically a matter of the industry or company. However, there are issues that cannot be solved by individual companies and/or industry organizations. In addition, sometimes business environment needs to be improved. It is important to strengthen cooperation with the industry and to identify the role of the public sector toward future industrial development and reflect it in the industrial policy.

(3) Collaboration among ministries and agencies

As already pointed out repeatedly, it is important for the relevant ministries and agencies of the countries to cooperate towards industrial development, packaging related measures and implementing them. In addition, participation of local governments will be indispensable, especially for the regional industry development. Since industrial policy has been promoted mainly at the national level so far, local governments may need support for financial and human resources. It is required that the country and the region cooperate and commit to industrial development.

The government's role in industrial development is the improvement of the environment, especially for the development of industries in specific regions, infrastructure development in the region is indispensable. Industry policy and regional development, especially infrastructure development for industry are inseparable and need to be executed as both wheels of the car.

Comprehensive approach is the key for successful industrial development policy. All policies should be aligned to the focused sector. All players, institutions and policy measures are related to each other. To achieve successful goal, holistic approach for industrial development policy is the key.

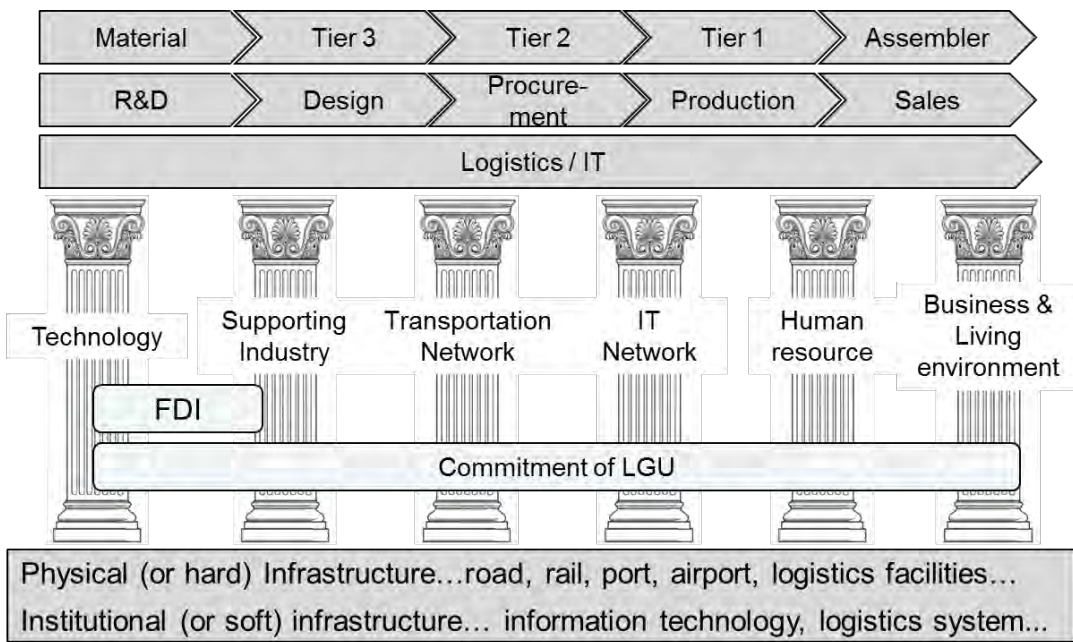


Figure 132 Comprehensive approach towards building an industrial cluster

Table 100 Industrial policy framework and strategic program plan

The measures described below are not independent of each other, they affect each other, and it is necessary to study and implement as an integrated program.

Policy	Measures	Contents
1. More concrete policy making	Materializing industrial policy	<ul style="list-style-type: none"> - Develop more concrete and detailed policies based on requests from industry and international trends. - Clarify the role sharing between the central government and local governments. - Increase the effectiveness of the plan by establishing consistency between national policy and local policy - Develop industrial policies based on needs and desires of the industry and increase concreteness and effectiveness - Prioritize target areas in industrial policy and develop policy by industry. - Establish industrial policy that takes advantage of local characteristics based on national industrial policy. Make use of features, develop and develop policies with distinct features in each place, and to be able to execute. In doing so, we will clarify the budget and schedule and execute it
2. Making and implementing industrial promotion measures based on industrial policy	1) Promotion of FDIs	
	Strengthening FDI of target industry	<ul style="list-style-type: none"> Formulation of FDI policy designed specifically for each target industry sector Formulation of FDI policy to build an industrial cluster
	Improvement of investment environment	<ul style="list-style-type: none"> Infrastructure development for industry Development of SEZ and industrial estates
	Enhancement of investment promotion organization	<ul style="list-style-type: none"> Simplifying investment procedure Enhancement or organization and capacity for investment promotion (such as evaluation of past activities of investment attraction, operation in multi languages, targeting on attracting MSEs)
	2) Enhancing linkage between foreign affiliates and local companies	
	Matching support	Building database, support matching and reverse exhibition
	Sales development support	Information provision of exhibition, holding various international exhibition
	Re-designing of investment incentive scheme	Current investment incentive scheme of PEZA for processing export should be reviewed to promote procurement of local contents in addition to export oriented processing.
	3) Cultivating local suppliers	
Capacity improvement for BDS to domestic companies	Improvement of support services provided by DTI SME Center on productivity improvement, technology improvement, market information, product and market development, financing etc.	

	Improvement of access to finance	Improvement of access to finance for MSMEs
	Strengthening information collection and analysis	Improvement of collection and analysis ability of industrial statistical data by government agencies
	4) Human resource training for industry	
	Strengthen training at each level : Engineer / management / technician / worker	<ul style="list-style-type: none"> ·Strengthen collaboration with industrial sectors while enhancing industrial human resources such as engineers and managers who are responsible for industrial activities ·Provide a systematic and effective program in cooperation with related agencies such as TESDA, CHED and DOST, based on the needs of the industry, though training of industrial human resources are individually implemented by various organizations today. <p>Note: Training industrial human resources is a mid- to long-term initiative, and it is necessary to consider the supply of human resources to targeted industries of industrial and investment policy, in addition to reflect the opinions of existing industry.</p>
3. Strengthen collaboration between industrial policy and infrastructure development	Collaboration between agencies in charge of infrastructure and industrial policy	Effectiveness of the Industrial Development Council (ICD), ICD should be increased; ensuring feasibility of plan and securing budget for that. Securing budget by estimating economic effect on tax revenue increase by development of infrastructure to realize industrial policy in order to secure budget.
	Development of central business districts	Establish central business districts where BPO, ESO, energy industry and other new industries will be located. Also, infrastructure development such as railroad to accelerate its realization.
	Smooth logistics network development	Development of cold chain and/or inland depot for decongest Manila including port and airport and promoting industry locations outside Metro Manila. Port access road: Strengthening of connectivity between trunk roads and port facilities (development of the last one mile)