AUTOMOTIVE AND LOGISTICS CLUSTERS TO DRIVE ECONOMIC COMPETITIVENESS IN JAVA, INDONESIA

by

Yudo Anggoro

A dissertation submitted to the faculty of
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in
Public Policy

Charlotte

2015

Approved by:

_____
Dr. Harrison Campbell

_____
Dr. Jean-Claude Thill

_____
Dr. Suzanne Leland

_____
Dr. Wei Zhao

©2015
Yudo Anggoro
ALL RIGHTS RESERVED

ABSTRACT

YUDO ANGGORO. Automotive and logistics clusters to drive economic competitiveness in Java, Indonesia. (Under the direction of DR. HARRISON CAMPBELL)

This study assesses the competitiveness of logistics and automotive industry clusters in Java economic corridor, Indonesia. The need for competitive industry clusters in Indonesia has emerged especially after the government launched its Master Plan for Accelerating and Developing Indonesia Economic Development in 2011. Justifications for the competitive industry clusters were largely drawn from the agglomeration literature. Special attention is given to Porter's (1990) theory of industry clusters. Porter postulates that there are four factors that influence competitiveness of industry clusters: factor (input) conditions, demand conditions, context for firm strategy and rivalry, and related and supporting industries.

This study employs both qualitative and quantitative analysis to measure the competitiveness of clusters in Java. The qualitative analysis uses in-depth-interviews to assess the effectiveness of the master plan from the stakeholders' perspectives. The quantitative analysis combines location quotients (LQ), shift-share analysis, and OLS econometric models to calculate the competitiveness of logistics and automotive industry clusters in the Java economic corridor as well as to determine what factors influence competitiveness.

The qualitative analysis concludes that the master plan has poor implementation especially in the lower level of governments. The LQ and shift-share analysis finds some top performing industries in both logistics and automotive clusters in Java, and these industries need to be maintained and develop further. The OLS econometric model runs four models in both clusters. These models find factors that affect logistics clusters are regional GDP, ports, population density, and workforce (factor condition); human development index, poverty rate, economic change, income per capita, and number of unemployed (demand condition); Herfindahl index of logistics firms and competitiveness (firm strategy, structure, and rivalry); and factor supply and cluster share (related and supporting industries). The regression models also found factors that affect competitiveness in automotive clusters are ports, productivity, and university enrollment (factor condition); income per capita and poverty rate (demand condition); Herfindahl index of automotive firms (firm strategy, structure, and rivalry); and cluster employment (related and supporting industries).

ACKNOWLEDGMENTS

I would like to acknowledge the contributions of my committee; Dr. Harrison Campbell, Dr. Jean-Claude Thill, Dr. Suzanne Leland, and Dr. Wei Zhao for their knowledge, inputs, support and guidance during the completion of this dissertation. I would also like to thank all three PPOL directors during my study period at UNC Charlotte; Dr. David Swindell, Dr. Beth Rubin, and Dr. Martha Kropf. I would also like to reserve my gratitude to Fulbright scholarship, the main sponsor that has made me possible to take a doctoral journey in the United States, something that I have never imagined before.

Lastly, I would like to thank my family for their continuous encouragement and support. My dad, mom, and my brother, Iwan, have always been there during my difficult times. My kids, Abyan Mulia Satrioyudo and Panji Bima Satrioyudo, have always been the sources of my energy and inspiration. Lastly to my wife who has shown her patience during our time in the United States.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1

1.1. Master Plan Acceleration and Expansion of Indonesia Economic Development 2011-2025 2

1.2. Study Objective 9

1.3. Significance of the topic 10

CHAPTER 2: LITERATURE REVIEW 14

2.1. Understanding Economic Development and Agglomeration Economies 14

2.2. Growth Pole Theory 18

2.3. Porter and His Theory of Industry Clusters 20

2.4. Advantages of Industry Clusters 24

2.5. Critics of Industry Clusters 27

2.6. Industry Clusters in other Developing Countries 28

CHAPTER 3: INDUSTRY STRUCTURE, INDUSTRIAL POLICY AND INDUSTRY CLUSTERS IN INDONESIA 36

3.1. Industry Structure in Indonesia 36

3.2. Industrial Policy in Indonesia 40

3.3. Industry Clusters in Indonesia 45

CHAPTER 4: RESEARCH METHODOLOGY 56

4.1. The Qualitative Approach: In-Depth Interview 58

4.2. The Quantitative Approach 62

4.3. Strengths, Weaknesses, Opportunities and Threats (SWOT): Combining qualitative and quantitative analyses. 73

CHAPTER 5: QUALITATIVE ANALYSIS 74

5.1. Discussion on the effectiveness of The Masterplan of Acceleration and Expansion of Indonesia's Economic Development (MP3EI) 75

5.2. Discussion on the condition of clusters in Indonesia 79

5.3. Discussion on strategies to improve economic competitiveness by creating industry clusters 82

5.4. Discussion on the assessment of the Diamond Model by Porter (1990) 85

5.5. Discussion on automotive clusters and logistic clusters 89

5.6. Summary of the Qualitative Section 96

CHAPTER 6: QUANTITATIVE ANALYSIS 100

6.1. Location Quotients and Shift Share Analysis 101

6.2. Explaining Cluster's Competitiveness via Regression Analysis 116

CHAPTER 7: SWOT ANALYSIS 169

7.1. SWOT Analysis for Logistics Clusters 170

7.2. SWOT Analysis for Automotive Clusters 178

CHAPTER 8: CONCLUSIONS AND POLICY RECOMMENDATIONS 185

8.1. Conclusions 185

8.2. The Research Questions 188

8.3. Policy Recommendation 193

8.4. Direction for Future Research 200

REFERENCES 202

APPENDIX A: LQ AND SHIFT-SHARE RESULTS OF LOGISTICS CLUSTERS 2077

APPENDIX B: LQ AND SHIFT-SHARE RESULTS OF AUTOMOTIVE CLUSTERS 209

CHAPTER 1: INTRODUCTION

The Indonesian economy has grown substantially in the last decade. Various indicators support this claim of Indonesia's strong economic performance. The economy is enjoying a comfortable 6.3 percent growth rate (2012); the middle class is growing; the population is dominated by the youths; and investors are considering Indonesia as a lucrative market for investment from both domestic and foreign sources.

In December 2011, Fitch Rating upgraded Indonesia's sovereign debt rating into investment grade level to reflect the country's strong and resilient economy. Another rating agency, Moody's, then followed by raising Indonesia's debt level from Ba1 to Baaa3 to reflect Indonesia's healthy economic condition and prudent macro policy. In terms of its debt-to-GDP ratio, Indonesia has a debt-GDP ratio of 23 percent which is the lowest among other G-20 economies.

Despite this promising situation and current economic conditions, Indonesia also faces serious challenges that may thwart its potential to grow. The Indonesian economy has severe long term problems in terms of infrastructure deficiencies, nationalistic industrial policy and institutional corruption. In spite of having around 17,000 islands, economic development in Indonesia has been heavily concentrated in Java Island, especially in the capital city of Jakarta and its metropolitan area. The economic and

business environment will remain unpredictable if the problems noted above persist (Economist Intelligence Unit 2013).

However, the Indonesian government perceives the current promising situation as an opportunity to grow the economy even larger. In order to accelerate national development so that Indonesia can boost its position among the developing economies in the world, Indonesia has created a comprehensive and thorough roadmap to guide its economic development. To that end, on May 27, 2011, the Indonesian government launched the Masterplan for Acceleration and Expansion of Indonesia Economic Development 2011-2025 –*Indonesian*, Masterplan Percepatan dan Perluasan Ekonomi Indonesia (MP3EI).

1.1. Master Plan Acceleration and Expansion of Indonesia Economic Development 2011-2025

MP3EI focuses on the development of six economic corridors in Indonesia, where each corridor specifically concentrates on the development of its local potentials. Each of these six corridors has its own key economic drivers so that investors may look at these corridors and choose the preferred regions that are appropriate to their business interest and specialization.

These economic corridors and their cluster specializations include: (1) Sumatra economic corridor (palm oil, rubber, coal, and steel), (2) Java economic corridor (textiles, food and beverages, transportation equipment, information technology, and defense equipment), (3) Kalimantan economic corridor (oil and gas, coal, palm oil, steel, bauxite, and timber), (4) Sulawesi economic corridor (agriculture, cocoa, fishery, nickel, oil and gas), (5) Bali-Nusa Tenggara economic corridor (tourism, fishery, animal husbandry),

and (6) Papua-Maluku economic corridor (food agriculture, copper, nickel, oil and gas, fishery). These six economic corridors can be seen in Figure 1.

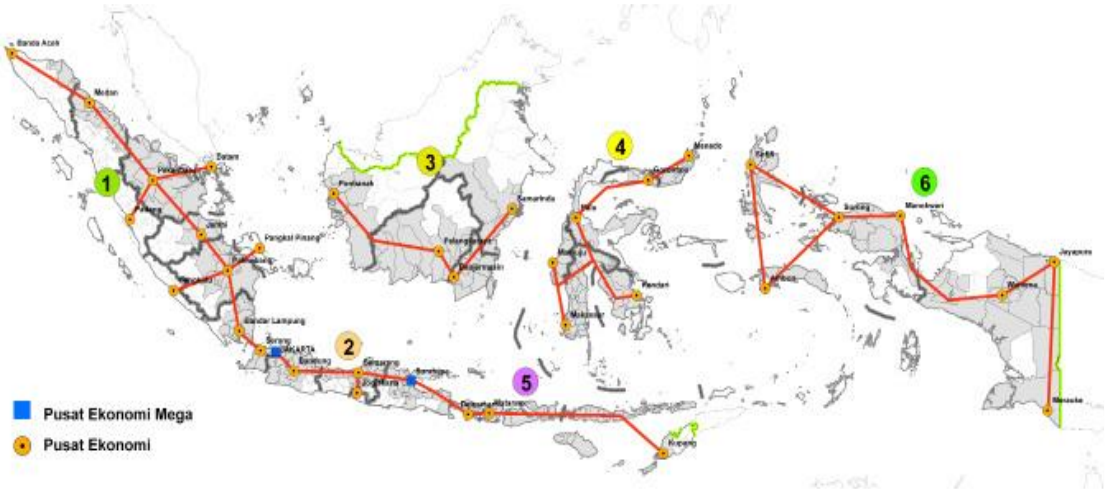

Figure 1: The Indonesia's economic corridors:
1. Sumatra EC 2 Java EC 3 Kalimantan EC 4 Sulawesi EC 5 Bali – Nusa Tenggara EC 6 Papua – Kepulauan Maluku EC

The Indonesian government launched the Master Plan for Acceleration and Expansion of Indonesia Economic Development with the intention to drive the realization of high and sustainable economic growth. The key issues behind the development of this master plan rest on the issues of growth centers and industrial clusters, the issue of connectivity through the development of a national logistic system, a national transportation system, regional development, and information and communication technology.

The Indonesian government launched this master plan as an attempt to resolve several main challenges that hinder Indonesian economic development. Those challenges are: (1) its economic structure focuses on agriculture and industries that extract and harvest natural resources; (2) a development gap between western and eastern parts of Indonesia; (3) low quality infrastructure; (4) low quality human resources; (5) rapid urbanization (53

percent of Indonesia's population lived in urban areas in 2010); and (6) global climate change.

In order to ensure the successful implementation of the master plan, there are some roles of government and business that need to be adhered, for example: (1) encouraging businesses to support investment and to boost economic growth; (2) businesses must take innovative steps in developing technology; (3) the government must provide equal and fair opportunities for business; (4) the government must create conducive macroeconomic, political, legal, and social environments to support business to thrive; and (5) government should provide basic protection and services.

The acceleration and expansion of Indonesia's economic development are based on the development of existing and new growth centers. This is where its regional development approach may work. The purpose of the development of growth centers is to optimize agglomeration advantages, to exploit regional strengths, and to reduce spatial imbalance of economic development throughout the country. As a result of this strategy, each economic region will develop its own specific advantages and distinct local products.

According to the masterplan, the development of Indonesia's economic growth centers will be realized through the development of industrial clusters and special economic zones. In addition, connectivity between growth centers (major cities) and main industrial clusters must be improved by developing infrastructure such as roads, airports, seaports, power generators, and others.

The masterplan has two key variables, acceleration and expansion, as this masterplan is hoped to accelerate and expand various development programs, including boosting

value added of the prime economic sectors, increasing infrastructure development and energy supply, as well as the development of human capital and science and technology. In order to boost economic development throughout the nation, the masterplan identifies eight main programs and 22 main economic activities, as well as six economic corridors identified as growth centers. Each of these six corridors has its own key economic drivers so that investors may look at these corridors and choose the preferred regions that are appropriate to their business interest and specialization.

The development themes for each economic corridor are as follows:

1. Sumatra economic corridor: center for production and processing of natural resources and as the nation's energy reserves
2. Java economic corridor: driver for national industry and service provision
3. Kalimantan economic corridor: center for production and processing of national mining and energy reserves
4. Sulawesi economic corridor: center for production and processing of national agricultural, plantation, fishery, oil and gas, and mining.
5. Bali-Nusa Tenggara economic corridor: as gateway for tourism and national food support
6. Papua-Maluku Islands economic corridor: center for development of food, fisheries, energy, and national mining.

The ultimate goal of the masterplan for Indonesia is to become a prosperous country with a GDP around $4-$4.5 Trillion by 2025 as well as to become the 9th largest economy in the world. These economic corridors are projected to contribute 82 percent of the GDP, or equal to $3.5 Trillion. The masterplan focuses on eight main development programs,

which are Agriculture, Mining, Energy, Industry, Maritime, Tourism, Telecommunication, and Development of Strategic Zones. These eight development programs consist of 22 main economic activities that are designed based on the potential of each economic corridors. The mapping of main economic activities in each economic corridor is given in Table 1 as follows.

Table 1: Economic activities in each economic corridor

Main Economic Activity	Economic Corridor					
	Sumatra	Java	Kalimantan	Sulawesi	Bali-Nusa Tenggara	Papua-Kep. Maluku
Steel	■		■			
Food and Beverages		■				
Textile		■				
Transportation Equipment		■				
Shipping	■	■				
Nickel				■		■
Copper						■
Bauxite			■			
Palm Oil	■		■			
Rubber	■					
Food Agriculture				■		■
Tourism					■	
ICT		■				
Coal	■		■			■
Oil and Gas			■	■		
Jabodetabek (Greater Jakarta) Area		■				
Sunda Straits National Strategic Area	■					
Animal Husbandry					■	
Timber			■			

Table 1: (Continued)

Cocoa						
Fishery						
Defense Equipment						

The elaboration of each economic corridor is given in Table 2 as follows:

Table 2: Themes in each economic corridor

Economic Corridor	Development Theme	Economic Centers	Main Economic Activity
Sumatra	Center for Production and Processing of Natural Resources as the Nation's Energy Reserves	Banda Aceh Medan Pekanbaru Jambi Palembang Tanjungpinang Pangkal Pinang Padang Bandar Lampung Bengkulu Serang	Palm Oil Rubber Coal Shipping Steel Sunda Straits National Strategic Area
Java	Driver for National Industry and Service Provision	Jakarta Bandung Semarang Yogyakarta Surabaya	Food and Beverage Textile Transportation Equipment Shipping ICT Defense Equipment Greater Jakarta Area
Kalimantan	Center for Production and Processing of National Mining and Energy Reserves	Pontianank Palangkaraya Banjarmasin Samarinda	Oil and Gas Coal Palm Oil Steel Bauxite Timber

Table 2: (Continued)

Sulawesi	Center of Production and Processing of National Agricultural, Plantation, Fishery, Oil and Gas, and Mining	Makassar Kendari Mamuju Palu Gorontalo Manado	Agricultural (Rice, Corn, Soybean, and Cassava) Cocoa Fishery Nickel Oil and Gas
Bali-Nusa Tenggara	Gateway for Tourism and National Food Support	Denpasar Lombok Kupang Mataram	Tourism Fishery Animal Husbandry
Papua-Kepulauan Maluku	Center for Development of Food, Fisheries, Eergy, and National Mining	Sofifi Ambon Sorong Manokwari Timika Jayapura Merauke	Food Agriculture Copper Nickel Oil and Gas Fishery

A massive investment is required to ensure the successful implementation of the masterplan. For example, the additional power supply needed in Indonesia by 2025 is projected to reach around 90.000 MW. The total investment needed during 2011-2014 has been identified around IDR 4.000 Trillion (± $ 400 Billion). The national government will contribute around 10 percent of this investment in the form of basic infrastructure provision. The remaining will be provided by state owned enterprises, private sector, and through public private partnerships.

Some strategies to be developed to strengthen Indonesian connectivity are: (1) connecting the centers of major economic growth based on the principle of integration and “inter-modal supply chain system”, (2) expanding economic growth through accessibility improvement from the growth centers to the hinterland, and (3) distribute the benefits of economic development by improving the quality of connectivity to the less

developed areas, isolated areas, and border areas in order to achieve equitable economic development.

1.2.Study Objective

The master plan has the long term objective of putting Indonesia in the top ten advanced economies in the world by 2025; and at the world's top six economies by 2050. In addition, the goals of Indonesia's economic corridors are to optimize agglomeration advantages, to exploit regional strengths, and to reduce spatial imbalances in economic development throughout the country. The development of Indonesia's economic corridors will be realized through the creation of industry clusters and special economic zones. In addition, connectivity between economic corridors and main industry clusters will be improved by developing infrastructure such as roads, railroads, airports, seaports, power generators, and others. In order to make a clear definition, this study uses the term "industry" to mean any economic sector, not just manufacturing. Therefore, agriculture, fisheries, and forestry is referred to as an industry.

Based on the objectives of the plan, this study aims to critically examine the development of industry clusters to support economic development in Indonesia as articulated in Indonesia's master plan for economic development (MP3EI). This study will address the following research questions:

- What are the ingredients of successful industry clusters? Does Indonesia have the right ingredients for its industry clusters to develop economic competitiveness?
- What strategies are needed to create a competitive environment among domestic firms in Indonesia's industry clusters?

To address these questions, specifically, I will engage with the existing literature on cluster-based development and compare it to Indonesia's master plan to determine the theoretical soundness of MP3EI. Secondly, based on my critical engagement with the literature, I will identify potential gaps and missing linkages via qualitative and quantitative analyses that might conceptually thwart successful implementation of the master plan in the Java economic corridor. Finally, based on the above, policy recommendations and actions will be offered to alleviate any conceptual gaps in Indonesia's cluster-based approach.

1.3.Significance of the topic

The master plan for Acceleration and Expansion of Indonesia Economic Development was created to implement the 2005-2025 Long Term National Development Plan and to create a more prosperous Indonesia. The master plan also aims to boost Indonesia's economy and national development to the same level as other advanced economies in the world. Table 3 below illustrates the current condition of Indonesia's economy versus the expected condition after the implementation of MP3EI.

Table 3: Goals of MP3EI

Parameter	Before MP3EI (2011)	After MP3EI (2025)
Population (millions)	244.2	273.1
GDP (US$ billions)	845.7	4,5
GDP per capita (US$)	3,509	14,250 - 15,500
Economic Growth (percent)	6.3	6.4-7.5
Inflation (percent)	5.9	3

By way of comparison, Table 4 shows some economic indicators from other G-20 members in 2012.

Table 4: Economic indicators of G-20 countries

No	Country	Population (Millions)	GDP (US$ Billions)	GDP per capita (US$)	Inflation Rate (%)	Economic Growth (%)
1	Argentina	40.12	474.96	11,576	10.80	1.90
2	Australia	22.33	1,541.80	67,722	2.49	3.60
3	Brazil	193.09	2,395.97	12,078	6.31	0.90
4	Canada	34.09	1,819.08	52,231	1.24	1.70
5	China	1,339.72	8,227.04	6,075	3.13	7.80
6	European Union	501.26	16,414.48	32,708		-0.4
7	France	65.45	2,608.70	41,140	1.05	0.00
8	Germany	81.76	3,400.58	41,512	1.55	0.70
9	India	1,210.19	1,824.83	1,491	12.06	3.80
10	Italy	60.36	2,014.08	33,115	1.71	-2.4
11	Japan	127.39	5,963.97	46,735	-0.6	2.00
12	Mexico	112.21	1,177.11	10,247	3.55	3.90
13	Russia	143.4	2,021.96	14,246	7.26	3.40
14	Saudi Arabia	27.12	727.30	25,084	3.90	6.80
15	South Africa	49.32	384.32	7,506	5.86	2.50
16	South Korea	50.01	1,155.87	23,112	1.32	2.00
17	Turkey	72.56	794.47	10,609	7.03	2.20
18	United Kingdom	62.04	2,440.50	38,588	2.79	0.20
19	United States	309.17	15,684.75	49,922	1.98	2.80

From the information in Tables 3 and 4, Indonesia has potential to expand its economy. Indonesia had the second highest economic growth (6.3 percent) in the world after China (7.8 percent) in 2012. Having the fourth largest population in the world, and a rising middle class (142 million) Indonesia is now a lucrative market for global producers. This is the momentum that the Indonesian government has attempted to gain through the master plan.

Based on the significance of the plan, this study aims to assess whether MP3EI is feasible to achieve all of the goals of the Indonesian government. This study focuses on an important element of industry clusters: the competitive environment among firms. This study also seeks to find out how this master plan will help to alleviate disparities that might occur with the development of industry clusters in Indonesia. In a broader perspective, this study intends to deepen our knowledge of economic development, industry clusters and the theory that informs development policy, especially in developing countries.

The Indonesian government plans to develop six economic corridors, where each corridor would be supported by industry clusters. Among the six economic corridors being highlighted in MP3EI, this study will focus on assessing logistics and automotive industry clusters in the Java economic corridor. Logistics clusters are chosen because an archipelagic nation like Indonesia needs strong logistics clusters. Automotive clusters are chosen because these clusters give the biggest contribution to the economy compared to other manufacturing industries.

The reason why the Java economic corridor is chosen is because this economic corridor represents most of the Indonesia's large and medium manufacturing industries (Kuncoro 2003). The industry clusters in Java are characterized by their tendency to seek locations in densely populated areas to enjoy both localization and urbanization economies. This tendency is not surprising given that Java is the most populous island in Indonesia where more than 60 percent of Indonesia's population resides.

The result of this study will provide policy recommendations for government about how to design industry clusters that drives economic development. This study is

important to Indonesia because there never has been a grand design that manages industry clusters in Indonesia before. A study from Kuncoro (2003) on industry clusters in Java from 1976 to 1996 concludes that firms tend to agglomerate to follow the density of population. From a theoretical perspective, this study will provide evidence on how Porter's (1990) theory of clusters may or may not work in developing countries.

Even though this study offers recommendations regarding cluster development in the Java economic region, there are limitations to the data. The data in this study is obtained from the Indonesian Bureau of Statistics and is aggregated to high degree. Therefore, some of the analysis in this study uses provincial-level data, while other analysis uses city-level data.

CHAPTER 2: LITERATURE REVIEW

Economic development is closely related to industrial development, not only because of industry's vital contribution to economic growth, but also with regard to the structural transformation of an economy. The creation of new employment opportunities and generation of income takes place directly in industrial sectors and are indirectly fostered in other sectors such as in agriculture and services through their linkages to the industry (Pansuwan and Raoutray 2010). One of the important theories in industrial development is industry cluster theory, and industry cluster theory has dominated regional economic development policy over the past two decades (Sword 2013). Originally, the theory of industry clusters received heavy influence from theories of growth centers and growth poles and it would be necessary to discuss growth pole theory before discussing theory of industry clusters.

2.1.Understanding Economic Development and Agglomeration Economies

Malizia and Feser (1998) defined economic development as the process of creating wealth through the mobilization of human, financial, capital, physical, and natural resources to generate marketable goods and services. The role of economic developer is to influence the process for the benefit of the community through expanding job

opportunities and the tax base. The above definition of economic development basically came before the cluster concept became the central component of economic development and practice (Miller 2009). In the modern theory of economic development, other considerations such as environment, quality of life, or creative communities have gained further attention.

Bartik (1990) enlists two dominant perspectives of economic development policy, the traditional approach and the new wave approach. The traditional approach focuses on job growth as the ultimate goal for regional economic development policy. Traditional economic developers believe that job growth can be obtained by focusing on the region's export base. Increasing export products for corporations is an important emphasis for traditional economic developers (Bartik 1990). The new wave perspective in economic development emphasizes innovation policies such as encouraging small businesses, developing new technology, and modernizing businesses.

One important aspect in economic development is the theory of agglomeration economies. Weber (1929) in Feser (1998) defines agglomeration economies as cost savings that accrue to a producer strictly as the direct result of increased spatial concentration of production within a single plant or across multiple plants in a given industry in a given geographic location. Previous research has classified agglomeration economies into either localization economies or urbanization economies (Feldman 2000). Localization economies are external to a firm but internal to an industry within a geographic area. On the other side, urbanization economies are effects associated with city size or density. This research will focus on agglomeration economies related to localization economies.

The concepts of economic of scale and interfirm proximity are essential to explain the economy of agglomeration. In agglomeration economies, the concentration of production within a single establishment may, under certain circumstances, generate cost savings up to some level of output (Feser 1998). Agglomeration economies may increase innovation by providing assets and activities that may either lower the cost of supplies to the firm or create greater specialization in both input and output markets (Feldman 2000).

One of the goals of agglomeration economies is to gain advantage from the minimum transportation cost (MTC) location of a given industry. An industry may incur higher costs the further it deviates from its initially determined MTC location (Feser 1998). There is a notion of *isodapane*, which is the curve connecting the geographic points at which the cost deviations are equivalent. Weber (1929) in Feser (1998) outlines two conditions for an industry to locate in proximity to one another: (1) when the plants' critical isodopanes intersect and (2) when the plants in the agglomeration produce the quantity of output necessary to realize the potential economies. When critical isodopanes of several industries intersect, those industries can get the benefit from saving the transportation cost. However, the production volume also matters so that cost savings as the advantage of agglomeration economies can be realized.

The economy of agglomeration basically consists of three stages of geographic concentration (Feser 1998): (1) the concentration of industry through expansion of a single plant, (2) the spatial juxtaposition of several plants in a particular industry, and (3) the concentration of all types of productive activity, regardless of industry. In the first and second stages, the advantages of geographic concentration would be more efficient use of production capital, labor, and organization. In the third level of agglomeration, the size of

the overall agglomeration unit increases. As a result, land values also increase, thus encouraging geographic dispersion (Feser 1998). Consequently, agglomeration economies are the net result of cost savings from the first two stages, and cost increases in the third level.

Agglomeration economies work significantly in developing countries with poor infrastructure, centralized institutions, and a heavy role of the central government (Porter 1996). The reason is that in developing economies, economic development is induced by government policy, and not by the underlying economics. Governments in developing economies tend to concentrate industries in certain location to attain the benefits of agglomeration economies.

The most important characteristic of agglomeration economies is that they are dynamic, rather than static (Porter 1996). In this sense, learning opportunities and innovation capacity should be encouraged to give added value to the economy. Some factors may contribute to the growth of agglomeration economies such as concentration of specialized knowledge, inputs, and institutions, the benefits of local competition; and occasionally the presence of local demand for products and services. Carlino (1978) in Feser (1998) also mentions the existence of a greater pool of entrepreneurial talent as an important factor in agglomeration. In agglomeration economies, geographic proximity is essential to ensure the flow of knowledge spillovers and other benefits of agglomeration. In industry clusters, Porter (1990) suggests that agglomeration economies influence competition more profoundly than in non-agglomeration economies.

However, Bartik (1990) criticizes agglomeration economies as lacking of good quantitative information on the benefits of a small increase in industry agglomeration.

The argument is on the fact that agglomeration economies are only concentrated in relatively few cities. He further argues that the importance of agglomeration in explaining small increases of industry productivity across cities is not clearly identified. Some industry-specialized services require a minimum industry concentration in a city, but once the critical mass is reached; there are no gains to further agglomeration (Bartik 1990). Only cities that are below the critical mass would benefit from agglomeration economies.

2.2.Growth Pole Theory

In the context of economic development, the growth pole approach was thought to be appropriate to induce regional economic growth (Thomas 1972, Hansen 1975). Public policy always had broad interests in using growth poles to promote economic growth. The objective of growth pole theory is oriented towards solving problems of overconcentration of people and economic activity in few urban areas, as well as problems of stagnation in some rural areas.

Historically, works on growth poles originated from the seminal work of Perroux in 1955 (Thomas 1972, Hansen 1975). Perroux explains that there are two important concepts in a growth pole: (1) a propulsive firm or industry, and (2) a key firm or industry. When a propulsive industry increases its output, it induces the expansion of outputs in other industries. When the induced growth in outputs is greater than the initial growth of the propulsive industry's output, this industry is called a key industry (Perroux 1955 in Thomas 1972).

In his definition, Perroux does not limit the notion of growth pole by a key industry to a certain localized geographical area. This notion can also work in a national economy.

However, some have argued that the growth pole theory is characterized by an ambiguous concept composed of loosely related sub-concepts. Hansen (1975) also criticizes this theory as badly in need of a thorough semantic reworking in which the concepts and the language which characterize it need more precise definition and more consistent usage.

Production, consumption, capital, population do not spread evenly in a nation or economic region. These factors tend to concentrate in growth poles. Generally there are two categories of growth poles: spontaneous and induced growth poles. Spontaneous growth poles grow without the benefit of explicit policy, while induced growth poles attempt to promote growth by using policy (Hansen 1975). In viewing of these two categories in public policy perspective, the growth pole literature tends to focus more on induced growth poles rather than on spontaneous growth centers.

Early works on growth pole theory emphasized economic variables and how to increase economic growth. Later on, the focus shifted to the relationships of growth poles to central place theory and city size distributions. This shift of focus has benefited regional economic policy because now growth pole theory puts more attention on where economic activity takes place (Hansen 1975). Growth poles are thought to foster innovation in the center. In this sense, information can be exchanged within and between centers; innovations can be diffused internally, vertically, laterally among centers; and the diffusion process occasionally operates in an upward direction, as opposed to the more likely downward direction (Hansen 1975).

Growth poles play a critical role in developing economies of urban regions. In this sense, modern growth theory states that within urban regional hierarchical systems, the

effects of economic change are transferred in order from higher to lower centers in the urban hierarchy (Hansen 1975). Therefore, innovation in large urban area is critical to developing economic growth in its surrounding area or hinterlands. Regarding the existence of hierarchy in growth center system, Lausen (1971) in Hansen (1975) argues that larger cities are the earliest adopters of innovations, which then diffuse gradually in the rest of the urban system. As a consequence of this process, the system of growth centers becomes increasingly hierarchical in nature.

Lausen (1971) in Hansen (1975) also emphasizes the importance of production processes within growth centers. He encourages the development of policies (national, regional, and local) that promote innovation, entrepreneurship, and production enhancement. Therefore, the provision of facilities warranting complete commercialization of the products: commercial credit, publicity, marketing, sales, and the know-how required to start standardized production such as licensing products, custom manufacturing agreements or research and development program are necessary ingredients to support production.

2.3.Porter and His Theory of Industry Clusters

The theory of industry clusters gains much influence from theories of agglomeration and growth centers. If growth pole theory mostly discusses how a center of growth can create economic spillover effects to its environment, industry cluster theory also discusses the relationship among government, industry, and other elements of the clusters.

Industry cluster theory has received wide attention in recent decades from scholars of various backgrounds, such as economics, regional development, public policy, and

industrial organization. Perhaps the most influential scholar in this area is Michael Porter, whose cluster theory has become the standard for policy makers to promote national, regional, and local competitiveness, innovation and growth (Martin and Sunley 2003, Swords 2013). According to Porter (1990), industry clusters are geographic concentrations of interconnected companies, specialized suppliers and service providers, firms in related industries, and associated institutions (such as universities, standard agencies, and trade associations) in particular fields that compete but also cooperate. Most industry cluster participants do not compete directly because they serve different industry segments. In this respect, they share many commonalities and opportunities, and encounter many shared constraints and hindrances to productivity. Firms within clusters may cooperate in research and development activities, product development, or producer-supplier relationship. They can get the benefits of clusters in terms of cost saving, access to labor pool, and proximity of location.

The conceptual diagram of the industry cluster theory follows the diamond model from Porter (1990) that conceptualizes factors that influence a country's competitive performance in international markets. The diamond model also captures the national and regional environment for competition, which is necessary for increasing productivity. The diamond addresses the information, incentives, competitive pressures, and access to supporting firms, institutions, infrastructure, and pool of insight and skill in a location that support productivity and productivity growth in particular fields (Porter 1990). Porter's diagram model is presented in Figure 2 as follows:

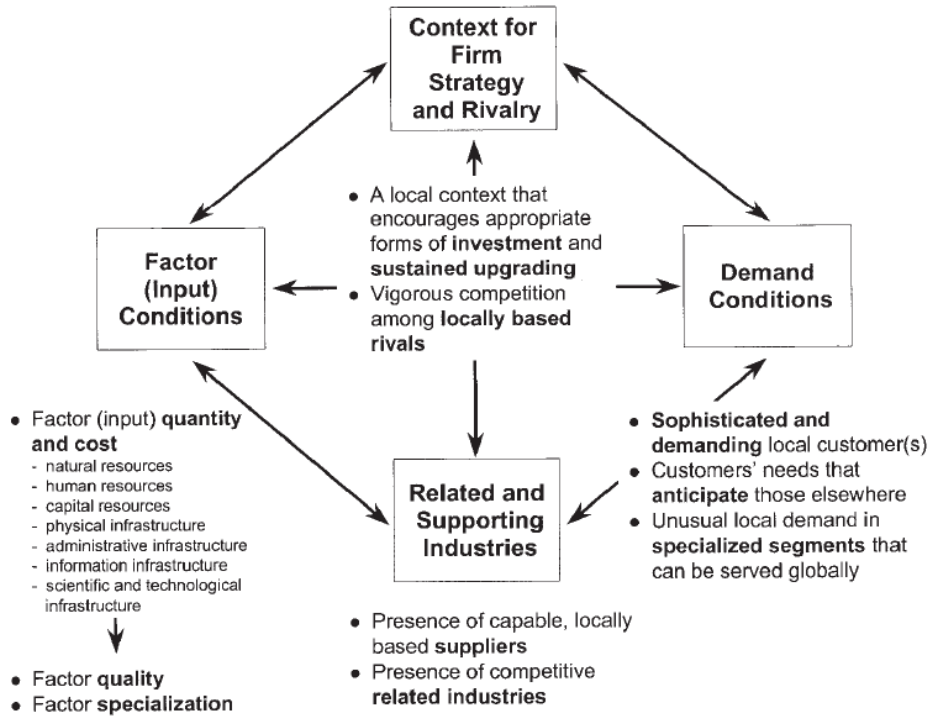

Figure 2: The diamond model
Source: Porter (1990)

In his diamond model, Porter (1990) argues that interactions in the competitive diamond are more intensive, and therefore more effective when firms operate in close proximity. This is the reason why industries form clusters for their competitive advantage. Porter (1990) also points out that clusters of firms in similar industries are "strikingly common around the world" and that a country's most globally successful firms are most likely to be clustered. Within the diamond model, industry clusters represent one aspect of the diamond, which is "Related and Supporting Industries."

However, clusters can also be perceived as a manifestation of the interactions among all four aspects of the diamond. Factor conditions in industry clusters range from tangible assets such as infrastructure to information, legal systems, universities, and research institutions. In order to increase productivity, factor inputs must improve in terms of

efficiency, quality, and specialization in cluster areas. The context for firm strategy and rivalry refers to the rules, incentives, and norms governing the type and intensity of local rivalry (Porter 2000). Note that local rivalry promotes competition and efficiency, necessary ingredients for a successful export-promotion program. Porter (2000) believes that rivalry must shift from low wages to low total cost, and this requires upgrading the efficiency of manufacturing and service delivery.

Demand conditions are related to whether firms can move from low quality products and services to competing on differentiation. In low productivity economies, the focus is on foreign markets. Advanced economies require the development of more demanding local markets. Demanding local customers force firms to improve and to provide insights into existing and future needs that are hard to gain from foreign markets (Porter 2000).

The theory of industry cluster has an instrumental role in driving regional economic development. In this regard, Swords (2013) identifies how Porter's cluster theory may help regional economic development to flourish. First, ready-made clusters that focus on relatively inexpensive interventions such as technology and training support can be appealing to foster economic development. Second, clusters provide a way to balance endogenous development and inward investment. Third, clusters take a more comprehensive approach to industrial development by focusing on integrated strategic groups rather than traditional and sectoral groups of industry. Fourth, clusters could create jobs as a regional service class emerges. Fifth, clusters allow collaboration among firms to work together doing similar things in the same place.

2.4.Advantages of Industry Clusters

Industry cluster participants enjoy the benefit of coordination and mutual improvement in areas of common concern without threatening or distorting competition or limiting the intensity of rivalry (Porter 2000). Clusters of firms can also generate competitive advantage in terms of increased productivity levels, higher innovation, and new business formation. Industry clusters offer an efficient forum for constructive dialogue among related firms and their suppliers, government agencies, and other institutions. In this regard, trust is an important element to produce sustained collaboration among economic actors within the clusters (Harrison 1991, Sheffi 2012) and strategic public and private investment can improve conditions for clusters to the benefit of cluster members.

Industry clusters also offer benefits in terms of inter-firm communication and interactive learning within the same environment. These benefits may lead to specialized flows of information and support innovation. In the regional perspective, co-location provides opportunities to watch other firms closely and compare their economic performance with others since firms in a cluster generally operate under the same condition and share the same labor market, set of local suppliers, and cost structure (Depner and Bathlet 2005). This situation creates a competitive environment to outperform others and may serve as a strong incentive for differentiating products, optimizing processes, and reducing costs. Co-location and face-to-face contacts within a cluster also gives additional advantages in terms of creating an information and communication ecology in a cluster. Marshall (1920) in Depner and Bathlet (2005) calls this ecology as industrial atmosphere.

There are vertical and horizontal dimensions of industry clusters. The vertical dimension consists of firms with complementary products and competencies that are linked through supplier and customer relations (Depner and Bathlet 2005). These firms derive benefits from intensive transactions within the cluster and form networks of traded interdependencies. Firms in industry clusters also benefit from low transaction and transportation costs, as well as economies of scale, and lead to gaining competitive advantage (Krugman 1991). These cost savings may explain why existing clusters tend to grow and create labor market specialization (Depner and Bathelt 2005).

This argument is consistent with Porter (1990) that clusters not only reduce transaction costs and boost efficiency, but also improve incentives and create collective assets in the form of information, specialized institutions, and reputation, among others. Clusters also enable innovation, speed productivity growth, and ease the formation of new businesses. Feser (1998) confirms that firms in clusters can accomplish more goals than they can individually. These goals include reducing transaction times and costs, attaining economic of scale, and generating stronger labor markets and learning.

The theory of industry clusters advocates new, constructive, and actionable roles for government and business in the pursuit of competitiveness and prosperity. In this sense, the differentiation of the role of government between *laissez-faire* and government intervention are obsolete (Porter 1990).This statement implies that governments must strive to create an environment that supports rising productivity. This role implies a minimalist government role in some areas (e.g., trade barriers, pricing) and an activist role in others (e.g., ensuring vigorous competition, providing high-quality education and

training). Governments must strive to improve the business environment; it must not limit competition or ease standards for safety and environmental impact (Porter 1990).

Industry cluster theory also suggests new roles for firms and government to enhance the supply of appropriately trained personnel, the quality and appropriateness of local university research activities, the creation of specialized physical infrastructure, and the supply of information (Porter 2000). Firms also have a role in attracting suppliers and other related service businesses so that cooperation among firms can be manifested. With respect to government relations, firms need to reinforce an open, constructive dialogue that can replace self-serving lobbying or paternalism that is commonly practiced. In order to increase productivity, it is essential for government and firms to build dialogue and to cooperate removing obstacles, reducing inefficiencies, and developing appropriate inputs, information, and infrastructure.

Marshall (1920) in Krugman (1991) provides other benefits of industry clusters that allow a pooled market for workers with specialized skills; this pooled market brings benefit both for workers and firms. In terms of spillover effects, because information flows locally more easily than over greater distances, industry clusters generate what we would now call technological spillovers or knowledge spillovers (Sheffi 2012). This argument is also in line with Bergman and Feser (1999) who mention three major drivers of industry clusters, which are: 1) strategic business opportunities derived from specific kinds of inter-firm alliances; 2) traditional regional factor market advantages (labor pools and knowledge spillovers); and 3) the role of non-business institutions such as universities, trade unions, and associations.

2.5.Critics of Industry Clusters

However, where it seems that industry cluster theory has been receiving praises among scholars, this theory also has not been far from criticism. Bergman and Feser (1999) mention that while this theory may seem plausible to be implemented in developed economies, it is difficult to concentrate resources on key industries in less developed countries or regions due to the lack of sufficient infrastructure in the region. The provision of good infrastructure is essential in industry clusters. Rosenfeld (1995) in Bergman and Feser (1999) argues as industry concentration increases, individual businesses benefit from the development of sophisticated institutional and physical infrastructure tailored to the needs of specific industry. Such infrastructure includes highways, local product showrooms, foreign sales offices or distribution centers, supply centers, and common waste treatment facilities.

Martin and Sunley (2003) criticize industry cluster theory as vague, 'chaotic', and highly generic in character. Interestingly, this criticism is similar to the critic of growth pole theory that is characterized as an ambiguous concept, composed of loosely related, vague sub-concepts (Hansen 1975). Furthermore, Martin and Sunley (2003) also have argued that rather than being a theory to be rigorously tested, the industry cluster idea has instead become accepted largely on faith as a valid and meaningful way of thinking about the national economy. In terms of industry cluster definition, Martin and Sunley (2003) believe that the lack of rigorous testing is the major source of ambiguity in this theory. To them, Porter's definition of industry clusters is also vague in terms of geographical scale and internal socio-economic dynamics. This vagueness has led to many different analysis and interpretations of this concept. Porter's original definition of industry clusters is

criticized as being too general, which made clusters so attractive to policy makers yet problematic for academics (Swords 2013).

According to critics like Martin and Sunley (2003), Porter's concept of industry clusters has stirred confusion among scholars regarding the term "geographical proximity" in the formation, performance, and identification of clusters. It is unclear how Porter (1999) limits his term of geographical proximity in industry clusters. The concept of "proximity" in industry clusters is pretty elastic, as Porter suggests that industry clusters can be found at any level of spatial aggregation such as nations, states, metropolitan regions, or cities. There is no inherent geographic unit in the clusters concept to define its spatial limit (Martin and Sunley 2003).

Another important critique of why industry clusters fail more often than succeed is that too little attention is paid to the economic and social pre-requisites that are necessary for industry clusters to work (Malizia and Feser 1998, Bergmand and Feser 1999). In this respect, political and equity considerations often dictated, through a criterion of need rather than potential, the designation of very small and peripheral towns as "growth centers" or industry clusters. Martin and Sunley (2003) also criticize Porter as largely neglecting the institutional dimension of industry clusters. In the context of international production arrangements, Depner and Bathelt (2005) criticize that industry cluster theory has the tendency to under-conceptualize the issues of power and culture.

2.6.Industry Clusters in other Developing Countries

The theory of industry clusters requires markets to be in perfect competition. This implies that government can only have limited intervention to the market. However, applying this theory into practice in Indonesia requires significant challenge since the

Indonesian market is not perfectly competitive. Government frequently intervenes and regulates the market in some areas that they think can bring benefit to many people. Therefore, it is important to look at the implementation of industry cluster in other countries that have similar market characteristics as Indonesia as a developing nation.

Some works in industry clusters in developing nations conclude that the establishment of new industry clusters cannot be jump-started through policy initiatives alone (Depner and Bathelt 2005). In the context of a developing economy, it is important to reinvestigate the relation among economic development, the strategies of multinational firms, and state intervention in this regard.

2.6.1. Industry Clusters in China

Depner and Bathelt (2005) provide evidence of the development of automobile industry clusters in Shanghai, China, in which German firms play an important role. The industry clusters in China were supported by the government in various forms and characterized by a focal, hierarchically structured production system. In the context of a developing economy like China, they find evidence that the cultural dimension plays a crucial role, especially in its relation to issues of power and institutions. The role of culture is demonstrated in the case of German firms that tap into the Chinese innovation systems.

Breshnahan, Gambardella, and Saxenian (2001) assert that government policy does not have a substantial influence on the establishment of industry clusters in China. They find that the degree of openness in regional economic relations and active searching for large external markets is the key to understand the development of successful clusters. However, Depner and Bathelt (2005) contest this argument by arguing that the situation

is different in automobile industry. The automobile industry is characterized by strong and uneven power relations. The car producers are the primary force that drives the organizations of the production system and its spatial manifestations. Their strong power enables them to urge their suppliers to establish plants in the host country when they find the host country does not have sufficient suppliers. Since the suppliers are organized around a focal company, they are responsive to the formation of clusters when they enter new market regions (Depner and Bathelt 2005). In the case of industry clusters in China, political influence is the decisive factor that drives the establishment of clusters.

There are two theories that can be used to study how industries extend their production networks to other industries: industry clusters and global commodity chains. The theory of clusters focuses on the internal structure of social relations between local and regional firms while neglecting extra-local linkages (Porter 1998, 2000). On the other side, the theory of global commodity chains emphasizes the advantages of international production organization and government structures but underestimates the territorial dimensions and the localized nature of production arrangements (Gereffi 1994, 1999). In order to bridge those two different approaches, Henderson et al. (2002) have developed a concept of global production networks that is spatially sensitive because it builds on networks of actors as well as social and territorial embeddedness.

However, Depned and Barthelt (2005) suggest that a cluster theory, if used with care, can be employed in a useful way to complement earlier work on global production networks. This theory may work in the sense that when car producers establish large production facilities in host countries that do not provide complementary capabilities and institutions, they aim to create favorable conditions themselves. They do so by acting on

suppliers to establish production facilities in the host countries, then drawing on the same institutions as in their home country's innovation system. In the case of automobile industry, this can lead to a clustering process.

The organization of automobile industry in Shanghai, around Volkswagen (VW) and General Motors (GM), is highly localized. This organization is the result of an interaction between foreign car producers that aim to extend their production base, and governmental authorities that put pressure on the car producers to establish local supplier linkages to boost the domestic automobile industry (Depner and Bathelt 2005).The development of production clusters and producer-user relations in the automobile industry in Shanghai are also more persistent than those in consumer goods industries.

The development of industry clusters in Shanghai is also more appropriate to respond the high spatial transaction costs and difficulties in realizing untraded interdependencies in an intercultural context. In this context, efficient communication processes between cluster actors may enable reproduction within a homogenous cultural and institutional environment (Depner and Bathelth 2005). However, this environment may not exist in terms of establishing production linkages in a new country. The existing cultural and institutional frameworks are substantially different between the home and host countries. Investors have to bridge these differences, developing efficient communication processes between agents with various cultural backgrounds, and adjust organizational practices that originated in the home countries to those in the host countries.

Wei et al. (2013) also found spatial differences in the agglomeration between foreign and local firms in Information and Communication Technology (ICT) industries in China. They found that foreign firms tend to concentrate in national-level development

zones, while domestic firms tend to make clusters in the inner city and the provincial-level development zones.

2.6.2. Industry Clusters in Thailand

Industry clusters in Thailand tend to concentrate in Bangkok and its vicinity, even if the Thailand Government has promoted investment policies to support and develop provincial industries in the remote rural areas (Pansuwan and Routray 2010). Capital intensive-based industries are concentrated in urban areas, while the resource-based industries are mostly found in rural areas.

In Thailand, industrialization and urbanization have been the major factors towards modernization since the early 1960s. The growth pattern of the manufacturing industry in Thailand can be divided into two sub-periods: from 1960 to 1985, and from 1986 to the present (Pansuwan and Routray 2010). Thailand had pursued the import substitution (IS) strategy in the first sub-period that relied heavily on the domestic production of imported intermediate goods such as iron, steel and plastic for raw materials by the local manufacturing industries. Later, the successive balance of payment deficits between the late 1970s and the early 1980s had led to the gradual shift of industrialization strategy from an import substitution strategy to export promotion (EP) strategy (Pansuwan and Routray 2010). During the export strategy era, the manufacturing sector grew faster than other sectors and increasing the importance of the manufacturing sector.

As a result of industrialization in Thailand, manufacturing's share of GDP increased from 23 percent in the 1980s to 39.1 percent in 2005 (Pansuwan and Routray 2010). The export orientation strategy in industrial development in Thailand had also increased the GDP per capita, from $820 in 1983 to $2,990 in 2006 (World Bank 2007). Various

factors may explain the growth of Thailand's economy, such as low wages, policy reforms that opened the country's economy, and prudent economic management that resulted in low inflation and stable exchange rate (Pansuwan and Routray 2010).

As manufacturing grew, the agricultural sector decreased since labor moved to industrial sectors. However, despite the growth of a manufacturing industry, many factories were still located in urban areas (Bangkok Metropolitan Region/BMR), and were not dispersed to the rural areas. This led to the high disparity of the per capita gross regional products (GRP) between the BMR and rural areas. As an effort to disperse the industrial activities, the Thai government in 1972 issued a policy to provide more incentives to business firms to operate in designated provincial areas. In the same year, the Industrial Estates Authority of Thailand (IEAT) was established to promote the creation of industrial estates in different regions of the country (Pansuwan and Routray 2010). However, insufficient infrastructure in rural areas encouraged the formation of industrial estates located in provinces in Bangkok in the 1970s.

In the 1980s, the Thai government used industrial decentralization to encourage private investors, both foreign and domestic, to invest in the rural areas. Using the growth pole concept, 12 provinces (Nakhon Rachasima, Khon Kaen, Ubon Ratchathani, Udon Thani, Nakhon Sawan, Phitsanulok, Chiang Mai, Saraburi, Ratchaburi, Chonburi, Surat Thani, and Songkhla) were selected to serve as secondary cities to support contribution towards rural economy and employment. The Thai government through the Ministry of Industry started to provide sufficient infrastructure and facilities to support "City of Industrial Development Center" (Pansuwan and Routray 2010). Nine cities were selected

for this purpose, which are: Nakhon Rachasima, Khon Kaen, Nakhon Sawan, Phitsanulok, Chiang Mai, Saraburi, Ratchaburi, Surat Thani, and Songla.

The effort to establish a coherent industrial zone continued in 1987 by developing three promotion zones within Thailand. Zone 1 includes the BMR; Zone 2 comprises the inner ring areas near BMR; and Zone 3 covers the outer ring areas. Thailand also established an opportunity for industrial development to be created by setting up special economic zones and tax-free zones along the borders to promote investment with the neighboring countries (Tsuneishi 2005 in Pansuwan and Routray 2010).Under the administration of former Prime Minister Thaksin, with the collaboration of the Asian Development Bank (ADB), Thailand used the advantages of each region to balance regional economic development in all provinces. Special economic zones were established in each border area.

Pansuwan and Routray (2010) show that economic development policy in Thailand has changed the distribution of industry areas in Thailand, as companies moved their industrial facilities from the BMR to the Zone 2; even though BMR still has the highest concentration of manufacturing facilities. This study used the changes in the distribution of industrial workers in Thailand from 1996 to 2005 to show the shift of industrial pattern in Thailand. Pansuwan and Routray also concluded that the resources based industries such as food, beverages, and tobacco are located everywhere, while the capital intensive industries are concentrated in the BMR.

Factors that may explain the concentration of industry in the metropolitan area are related to location decisions and policy factors, as industrial location plays the key role in determining the industry's performance. The BMR has been chosen by many industries

due to its large promising market with 10 million people and the availability of infrastructure, transportation systems, and logistic facilities for accessing raw materials and exporting goods to the world market (Pansuwan and Routray 2010). The metropolitan area in Bangkok region also offers another advantage in terms of the availability of skilled and an educated labor force.

However, Pansuwan and Routray (2010) also noted that the comparative advantage of locating industries in the BMR can be lost in favor of service businesses because of higher wages, land prices, pollution, and traffic. These factors may explain the tendency of industries to move their facilities to areas adjacent to the BMR. The intervention from the Thai government through the development of industrial decentralization policies has affected the development of rural areas in the last 15-20 years. The way that government intervenes in industrial policy of Thailand is probably also similar to the industrial development in other developing countries.

Observing the development of industry clusters in Thailand, we can see similarities with the development path of growth centers in the literature. In the literature, the growth centers started to form in urban areas, and then economic development transmitted to the suburbs. Ideally, the growth center's hinterland benefits from the spread of services, secondary jobs, and development expertise from the center, as well as from opportunities made available to hinterland residents who commute or migrate to the core (Hansen 1975). This is also the case in Thailand where industry clusters tended to be concentrated in Bangkok Metropolitan Region (BMR). The increasing need to spread economic development to other regions was the main factor that forced the Thailand national government to establish policy to create more industry clusters in rural areas.

CHAPTER 3: INDUSTRY STRUCTURE, INDUSTRIAL POLICY AND INDUSTRY CLUSTERS IN INDONESIA

This chapter will discuss the history of industry in Indonesia, more specifically the industry structure, industrial policy and the development of industry clusters in Indonesia. The industry structure part discusses the structure of industry and export in Indonesia. The critical time in the discussion is the industry structure before and after the Asian financial crisis of 1998. The industrial policy part discusses industrialization process and policies issued by the Indonesian government to expand industries in the country. The discussion includes the choice of implementing Import Substitution (IS) or Export Orientation (EO) strategy in developing industries in Indonesia. The industry clusters part talks about the development of clusters in Indonesia, as well as the regional inequality that persists in Indonesian political economy.

3.1.Industry Structure in Indonesia

Industrialization in Indonesia actually has started during the Dutch colonial period, especially after the Dutch introduced the cultivation system in the 1830s (Marijan 2007). However, modern industrialization started when President Suharto took power in 1965. At that time, the New Order government changed the Indonesian economy from an agriculture economy to an industrial economy.

As a result of the economic structural change of the 1960s, the share of the agriculture sector in the Indonesian GDP dropped drastically from 52.4 percent in 1965 to 15.2 percent in 2003 (Bird and Hill 2006, Marijan 2007). In contrast, the contribution to the manufacturing sector to the GDP rose sharply from 14.1 percent in 1965 to 45.1 in 2003 (Table 5).

Table 5: Share of Indonesian GDP by major economic sector in 1965-2003
Source: Bird and Hill (2006)

Year	Agriculture (%)	Manufacturing (%)	Non-Oil Manufacturing (%)	Services (%)
1965	52.4	14.1	n.a.	33.5
1970	45.5	21.7	n.a.	32.8
1980	30.7	30.9	9.9	38.4
1990	20.1	37.9	17.3	42
1997	14.9	43.2	22.4	42
1998	16.9	42.8	22.4	40.3
2002	15.4	45.5	24.6	39.1
2003	15.2	45.1	24.8	39.7

The rising share of industry from 1965 to 1980 was initially due to the price effect of the oil boom in the 1970s and early 1980s. The share of industry after 1997 remained stable due to the effect of Asian financial crisis in 1998, even the share number slightly dropped from 1997 to 1998. During these two year periods, the resources returned to agriculture as a crisis-survival strategy (Bird and Hill 2006).

The structural change also occurred in the industry sectors. The increasing share of industry to GDP and orientation change toward export has diversified industry sectors to labor-intensive industry sectors. Wood products expanded rapidly due to the prohibition on the export of unprocessed timber, before facing environmental issues in the 1990s (Bird and Hill 2006). Heavy industries grew rapidly in the mid-1980s due to protection

policy and some major investments. The auto industry also grew rapidly, but collapsed due to the Asian financial in 1998.

In electronic industries, although exports have increased significantly since the early 1990s, Indonesia has never been able to be a dominant player in export-oriented segment (Bird and Hill 2006). Even though Indonesia had competitive labor costs, compared to other new emerging economies, Indonesia could not offer two major commercial policy features requested by multinational corporation (MNC). The first policy is related to the ability to design efficient export-import procedures to facilitate global operations. The second policy is about ownership of equity for MNCs that operated in Indonesia. These companies expected to own 100 percent foreign equity, or at least majority foreign shares and minimal pressure for divestment (Bird and Hill 2006).

In the automotive industry, even though the industry grew rapidly since the early 1970s, the growth was mostly determined by domestic demand conditions, and not by export orientation. The lack of both economies of scale and industrial capabilities had made the Indonesian industry the least developed among the more industrialized Southeast Asian countries (Bird and Hill 2006). The slow pace of liberalization resulted in Thailand to position itself as the largest automotive producer since the 1990s.

The Asian crisis of 1998 hit the Indonesian industry hard. The total production of the automotive industry was down from 400,000 vehicles to 60,000, which is similar to the total production in the mid-1970s (Bird and Hill 2006). After the crisis, some structural adjustments were made in the automotive industry. Protection policy has been lifted, and there has been consolidation among assemblers and suppliers. Foreign investments have brought new technologies and market opportunities. Some industry sectors are

approaching international competitiveness such as certain utility vehicles, motorcycles, and machinery components. These industries indicate that some Indonesian products can be competitive in international market.

Indonesian exports emerged significantly in the mid-1980s (Bird and Hill 2006). However, much of these exports came from natural-based commodities or from "early stage" manufacturers such as textiles and furniture. Around the mid-1990s, the Indonesian exports slowed down due to some factors such as increased competition, slower productivity, and currency appreciation (Aswicahyono and Pangestu 2000). During the post-Asian crisis period, Indonesian exports grew significantly due to large exchange rate depreciation. However, this growth slowed down after 2000 due to slower global demand.

Compared to other countries in the South East Asia region, Indonesia's export structure has substantial differences. The first difference concerns the characteristic of resource-based manufactures, even though the number has been declining in recent years. The second difference is that the scale of Indonesia's manufactured export products is less than it is in neighboring countries. Malaysia is reported to have manufactured-based export 2.5 times as those in Indonesia, while Thailand has 50 percent higher export (Bird and Hill 2006). The third difference is that Indonesia has less export in electronics products compared to its neighboring countries. While electronic products are one of the fastest growing trade segments in the world, Indonesia preferred to compete in different trade segments.

3.2.Industrial Policy in Indonesia

Indonesia is considered to start having an active industrial policy after the beginning of the New Order era of General Suharto in 1966 (Marijan 2007, Aswicahyono et al. 2013, Naude 2013). Since then, the industrial development in Indonesia can be divided into four phases (Aswicahyono et al. 2013). The first phase is the rapid industrialization period following the major political and economic changes of 1966-1967. During this period of time, annual industry growth was at least 9 percent in all but two of the 27 years, 1970-1996. The principal driver of this rapid industrialization era is import substitution. In this period, industrial policies were essentially pro market in nature (Marijan 2007) such as the policy to reduce subsidies, the policy on foreign exchange regulation, and the policy of devaluation of the rupiah currency. All these policies were essentially designed to move Indonesia toward a more open economic policy after a state-intervened era under President Sukarno.

The second phase was the 1970s when there was a shift towards a more diversified industrial structure, away from the earlier dominance of simple consumer goods and resource processing (Aswicahyono et al. 2013, Naude 2013). The government also intended to shift industries to have more export orientation. As a result, major labor-intensive industries such as textiles, garments, and footwear grew rapidly and became the major drivers of this export growth. This phase was often called as the oil boom era as government gained more revenue from the increasing oil price (Marijan 2007). This period was also marked by the return of government intervention in the economy to support pro nationalist policies such as industrial licensing, import and export control, price control, and fiscal and monetary policies.

The third phase of industrialization was in the 1980s as Indonesia became a significant industrial exporter (Aswicahyono et al. 2013, Naude 2013). The 1980s was also a crucial period in the Indonesian economic history. In the early 1980s, the decline of oil prices in the international market has triggered a major reassessment of Indonesia's trade and industrial policy. In this period, technocrats dominated the policy makers, and they advocated a more liberal political economy agenda (Aswicahyono 2013). This agenda includes reduced protection, a more open posture toward foreign investment, and simplified export procedures (Soesastro and Basri 2005).

In this reform period, the share of labor-intensive products in total manufactured exports rose from around 45 percent in the mid-1980s to 61 percent in 1996. Employment also expanded significantly in the new export-oriented factories on Java Island (Aswicahyono et al. 2013). It was in this period when for the first time in its history Indonesia was considered as a major player of industrial export. However, in the 1990s, Indonesia's export performance began to slow down due to increased competition in export markets, a slackening in the reform momentum, slower productivity growth, and the Rupiah appreciation (Aswicahyono et al. 2013).

The fourth phase of Indonesian industrialization was the period of economic crisis, between 1998 to the present. Due to the Asian economic crisis, in 1998 Indonesia's economic growth slumped to minus 13 percent, while it was on average around 7 percent in previous years (Marijan 2007). In this crisis period, Indonesia received assistance from the IMF and the World Bank, and as suggested by those agencies, the Indonesian government has continued to implement the liberal economic policy to remove market constraints such as reducing subsidies and privatizing state-owned enterprises (Marijan

2007). As a consequence, the role of government in the economy has been reduced and the private sector has gained a more significant role in the economy.

Based on the market orientation of industrial products, industrial policy in Indonesia basically can be categorized into import substitution industrialization (IS) and export orientation (EO) of industrialization. The IS strategy emphasizes strengthening industries for domestic consumption, while the aim is to nurture entrepreneurial talent of the domestic industrialist (Marijan 2007). The IS strategy is characterized by high intervention of the state in the economy both through state-owned enterprises and regulation. For developing countries, the argument for implementing IS is to catch up with industrialized and developed economies. Theoretically, implementing IS will not bring industries in developing countries to compete with those in developed economies due to market mechanism.

The IS strategy in Indonesia was implemented during the Sukarno governments from 1945 to 1965. The New Order era under General Suharto also implemented IS, especially during the oil boom era of the 1970s and early 1980s (Marijan 2007). Priority was given to industries that support agricultural sectors such as fertilizer and agricultural tools, industries to support infrastructure such as cement and steel, and small medium industries. During the implementation of IS in Indonesia, the manufacturing sector grew rapidly, even though this growth was followed by inefficiency (Hill 1996). The IS strategy in Indonesia was performed to fulfill domestic demand, while the industry growth was mostly initiated by government protection.

On the other side, the EO strategy follows the neo-classical economic tradition that focuses on free market mechanism to implement industrial policy. In this respect, EO

strategy intends to encourage competition to achieve efficiency and innovation within industry and to limit state intervention (Marijan 2007). Theoretically, EO is also an answer to solve the disadvantages of IS in terms of inefficiency, high prices, and less competitive products in international market. EO also has outward-looking orientation that focuses on export, compared to IS that emphasizes domestic consumption. The outward-looking orientation of EO is also based on the fact that the market in developing countries is limited due to low purchasing power.

The EO approach in Indonesia's industries started in the early 1980s due to the decline of the oil prices in the international market that also reduced the government revenues from oil. This triggered government to find other strategies to increase revenues from non-oil exports and considered that IS strategy was no longer applicable (Marijan 2007). The EO strategy in Indonesia worked as the government attempted to reduce their intervention in the market. However, due to the nature of centralized political power in Indonesia at that time, the close relations between business corporations and political elites were inevitable. As a result, the liberalization of Indonesian economy through EO strategy had only benefited few conglomerates that had close relations with the political elites.

The implementation of EO strategy brought significant growth in non-oil and gas manufacturing sectors. For example from 1985 to 1997, the growth of manufacturing sector was about 10 percent annually (Marijan 2007). However, four years before the Asian financial crisis of 1997, the growth of the manufacturing sector slowed down to 7 percent annually. The Asian financial crisis has brought the IMF to advocate the Indonesian government to significantly reduce the intervention of government in the

economy such as reducing fuel subsidy. However, due to complex political and economic problems, the growth of the industrial sector between 1997 to the early 200s was stagnant (Marijan 2007).

The Asian financial crisis has forced the New Order government led by General Suharto to step down in 1998. After the failure of the General Suharto regime, Indonesia has attempted to implement democracy and decentralization of its political and economic development. In regional development, power was devolved to the provinces so that the economic growth no longer gravitates to Jakarta as the capital city. In the industrial sector, the government has attempted to apply a pragmatic approach to integrate both IS and EO approaches. This strategy implies that in addition to supporting domestic industries, the government also used foreign capital to expand the industries. Even during the period of EO strategy, the Indonesian government attempted to strengthen strategic industries such as aircraft, steel, ship, and defense equipments (Hill 1996). Until now, those strategic industries are owned by the government through state-owned enterprises.

In explaining industrial policy in Indonesia in general, Hill (1996) concludes that there has been no consistent and cohesive industrial policy in Indonesia. Rather, industrial policy has varied depending on the government's preferences and the current situation. The constant tension between two dominant policy groups (IS and EO) is thus the key to understand why Indonesia's industrial policy has lacked coherence (Hill 1996).

Porter's (1990) argument that industry clusters require minimum intervention from government, less regulation, and free market system can be tested in this study. As explained before, the political economy of Indonesia is slightly different than in other democratic countries such as the US. The Indonesian market does not compete as freely

as the US. Even though the Indonesian government supports strengthening export performance and inviting more foreign investment, government may sometimes intervene and regulate markets, especially in strategic areas such as energy, telecommunications, and national defense. These differences can bring significance to this study and inform policy makers about how to apply industry cluster theory in different political economy situation like in Indonesia.

From the institutional perspective, Indonesia has, since 1998, attempted to build stable and accountable democratic institutions and to achieve economic growth and equity. Implementing democratic institutions is a serious effort taken by the government after being released from a centralized authoritarian regime of General Suharto for 32 years. Although Indonesia's democracy is still in its infancy stage, the political system is remarkably open and power has been decentralized from the center to the regions and from the executive to the legislature (Saich et al. 2010). However, many fundamental institutional challenges have not yet been addressed in Indonesia, such as the practice of corruption and lacking of vision of politics, economy, and society.

3.3.Industry Clusters in Indonesia

Industry clusters play an instrumental role in developing Indonesian economy. It is estimated in 2012 that industry clusters in Indonesia generated exports valued at $ 52 Billion annually. This number is equal to 41 percent of total Indonesian non-oil and gas export in 2012. The Ministry of Industry in 2013 also reported that industry clusters in Indonesia require investment that is equal to $ 10.2 Billion annually. This investment for industry clusters in Indonesia is equal to 60 percent of the total investment required to build infrastructures in Indonesia in 2012. Industry clusters in Indonesia are estimated to

bring $ 938 million from various tax revenues, such as value added tax, income tax, and land tax.

The concept of cluster in Indonesia actually has been implemented since the period of President Sukarno in the 1950s when the government established 18 industrial centers that aimed to provide technical assistance in purchasing raw materials, marketing, and training for local industries (Marijan 2007). During the New Order era under President Suharto, industry clusters became popular term, and an industry cluster is referred as a group of at least 20 similar enterprises in particular areas (Marijan 2007).

In the early development of industry clusters in Indonesia, most small industry clusters emerged spontaneously, triggered by abundance raw materials and skilled workers, and associated with the agricultural sector (Marijan 2007). Their products aimed to supply the demands of low-income groups in rural areas. Later in the development, industry clusters in Indonesia were not only related to the agricultural sector, but also produced other goods such as clothes, crafts, and footwear products. The Indonesian government plays a crucial role in the development of industry clusters throughout the country. Some interventions were made through various subsidized credit, development of human resources, ISO quality management systems, entrepreneurship programs, partnership programs, and training and technical assistances in clusters (Dhewanto et al. 2013).

Most industry clusters in Indonesia are still concentrated in the Western part of Indonesia (96 percent), and only a few of them are located in the Eastern part of Indonesia (4 percent). In the Western part of Indonesia, Java Island is an excellent area to observe the development of industry clusters since there are many industry clusters

throughout the island (Kuncoro 2002, Marijan 2007). The Ministry of Industry reported in 2013 that even though Java Island only has 7 percent of Indonesian total area, it is the home of at least 60 percent of populations and 90 percent of industries in Indonesia.

The importance of industry clusters in Java is also reflected from the fact that in 1998, 47 percent of industry clusters receiving assistance from the government were in Java (Marijan 2007). In the first quarter of 2013 alone, industry clusters in Java Island contributed to 57.79 percent of the Indonesian Gross Domestic Product (GDP), while the remaining 42.21 percent were contributed by industry clusters outside Java. From this, we can see the regional inequality of economic development in Indonesia.

In terms of regional economy, the Indonesian Bureau of Statistics has collected data about regional GDP in all 34 provinces in Indonesia from 2004 to 2012. Those 34 provinces were categorized into five economic regions: Java and Bali Islands, Sumatera, Kalimantan, Sulawesi, and Nusa Tenggara, Maluku and Papua. If we compare regional GDP in each economic region to the national GDP, then Java and Bali economic region will have the highest proportion, about 60 percent of the national GDP (Figure 3). The economic region that has the closest regional GDP proportion to Java is Sumatera with 22 percent of the proportion. Kalimantan economic region follows with 9 percent, and Sulawesi economic region is in the fourth place with 4 percent of the proportion. The least developed economic region in Indonesia in terms of regional GDP is the easternmost part of the country that consists of six provinces in the Nusa Tenggara, Maluku, and Papua economic region. This region has 3 percent of the regional GDP proportion to the national GDP.

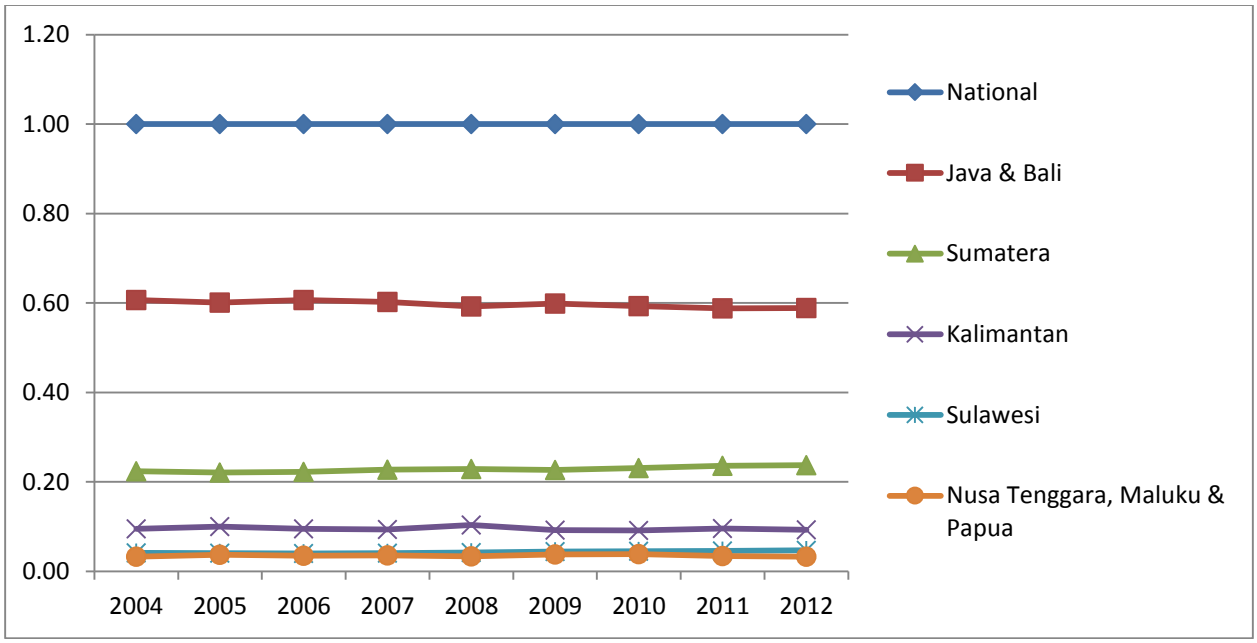

Figure 3: Regional inequality in Indonesia, 2004-2012
Source: Indonesian Bureau of Statistics (www.bps.go.id)

The data from the Indonesian Bureau of Statistics is consistent with the research from Hill et al. (2008) who study the economic geography of Indonesia. In their study, Hill et al. (2008) also divide Indonesia into five economic regions: Sumatra, Java-Bali, Kalimantan, Sulawesi, and Eastern Indonesia. The Eastern Indonesia region consists of four regions: West Nusa Tenggara, East Nusa Tenggara, Maluku, and Papua. Hill et al. (2008) compare the regional GDP of each economic region to the Indonesian national GDP in three years; 1975, 1990, and 2004 (Figure 4).

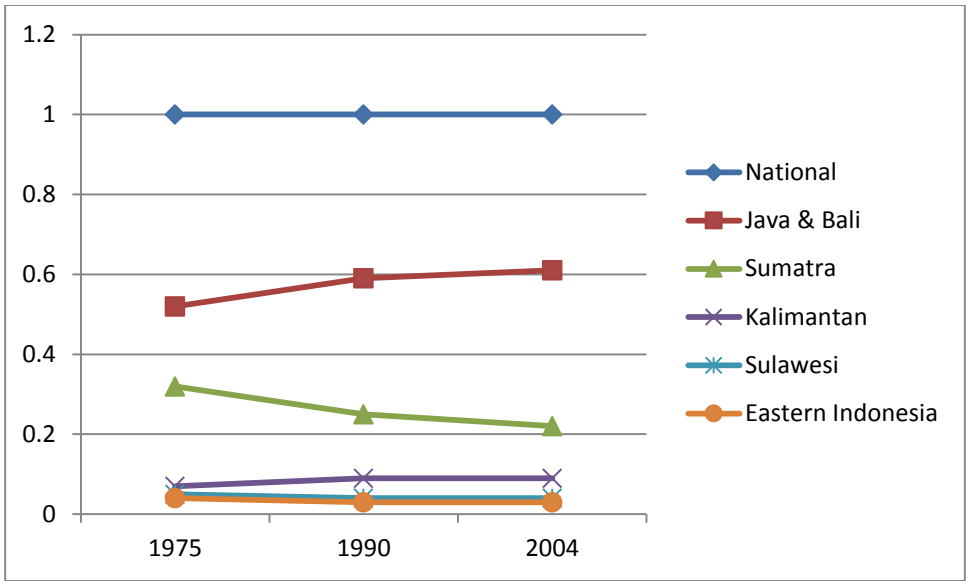

Figure 4: Regional inequality in Indonesia, 1975-2004
Source: Hill et al. (2008)

Hill et al. (2008) find that in those three points of year, Java-Bali economic region still holds the largest regional GDP proportion, sequentially followed by Sumatra, Kalimantan, Sulawesi, and Eastern Indonesia. In Java-Bali economic region itself, Jakarta as the national capital holds one sixth of the Indonesian GDP in 2004 (Hill et al. 2008). This also indicates how development in Indonesia still gravitates in Jakarta and its surrounding area. The share of GDP in Sumatra has been declining since 1975 due to the falling shares of oil and gas in the national economy, as Sumatra is one of the largest oil and gas producers in Indonesia.

According to the Indonesian Ministry of Industry in 2013, there are currently 96 industry clusters spread over 11 provinces (out of 34 provinces) in Indonesia. From those 96 industry clusters, 70 of them (72.9 percent) are located in four provinces in the Java economic corridor. Based on the area, those 70 industry clusters in Java contribute to 81.89 percent of the total area of industry clusters in Indonesia (Table 6). Based on these data, most of the industrial development in Indonesia is concentrated in Java Island; and

only small portion of development is performed in other bigger parts of Indonesia such as in Sumatera, Sulawesi, Kalimantan and Papua.

Table 6: Industry clusters distribution in Indonesia
Source: Ministry of Industry(2013)

No	Province	Numbers of Industry Clusters	Area (Ha)	%
1	Jakarta	5	2,475.00	6.37
2	Banten	19	6,729.00	17.31
3	West Java	30	17,845.00	45.90
4	Central Java	8	2,291.40	5.89
5	East Java	8	2,499.00	6.43
6	Riau Islands	18	666.94	1.72
7	North Sumatera	3	1,300.00	3.34
8	West Sumatera	1	200.00	0.51
9	South Sulawesi	2	3,124.00	8.03
10	Central Sulawesi	1	1,500.00	3.86
11	East Kalimantan	1	250.00	0.64
Total		96	38,880.34	100.00

The heavily concentrated industries in Java Island bring many challenges for the Indonesian government to create a more balanced economic development throughout the country. Currently the direction of industry clusters development in Indonesia is from the Western part of Java (Jakarta and Banten Provinces) to the cities in Central Java and East Java provinces. Java could no longer be able to support more industrial development due to limited land and resources. Building more industrial complexes in densely populated areas like in Java could also bring environmental and social problems. For these reasons, the Indonesian government plans to focus on the development of industrial areas outside Java Island.

On the other side, developing industrial areas outside Java Island brings other challenges. Most areas outside Java are lacking sufficient infrastructure such as highways, railroads, ports, and airports. Another challenge is a lack of trained and skilled

workers available outside Java. Due to insufficient infrastructure and a deficit of skilled workers, private firms and investors have not been willing to invest in constructing industry clusters outside Java. The overconcentration of development in Java Island by the Indonesian government in the past decades has made regions outside Java relatively impoverished in terms of industrial development.

The development of industry clusters in Indonesia formally started in 1974 when the government issued a Ministry regulation on the provision of land for developing clusters of industry. At that time, industry clusters in Indonesia could only be owned and be managed by state-owned companies. In 1989, the central government issued a Presidential regulation that invited private sectors and foreign investors to open industry clusters in Indonesia. The government would play their role by supervising and controlling those industry clusters.

In 2010, the government issued a specific government regulation on industry clusters. In this regulation, the government required industries to locate in industry clusters. By issuing this regulation, government shifted their orientation from land selling to service excellence. The government planned to develop each industry cluster to focus on specific industrial sector with specific concern for the environment. In doing so, the government envisioned those clusters to be supported by connected infrastructure, industrial research and development centers, and other supporting facilities such as housing, commercial districts, and green areas.

Infrastructure is vital to support the operation of industry clusters (Porter 1990; Sheffi 2012). Infrastructure inside the industry clusters would be the responsibility of the firms within the clusters including roads, drainage systems, bridges, electrical and

telecommunication systems, waste water treatment facilities, and other supporting facilities. The government (be it local, provincial, or national) would be responsible for the development and maintenance of infrastructure outside the industry clusters such as ports, highways, container processing facilities, railroads, electric generators, and research centers.

The development of industry clusters in Indonesia aims to bring economic competitiveness and export orientation, as well as to invite more investments to Indonesia. The Indonesian government takes two different approaches in developing industry clusters inside the Java Island and outside the island. Since industry clusters have long been established in Java, the focus of the development is to establish a high technology-based and innovation-driven industry clusters. For this purpose, industry clusters in West Java Province focus on machines and their equipments; industry clusters in Banten Province focus on chemical and steel; industry clusters in East Java Province focus on petrochemical and oil and gas support; and industry clusters in Central Java Province focus on labor-intensive industries such as textiles and footwear.

Outside Java Island, the development of new industry clusters is directed towards natural resources-based clusters that are aligned with the Master Plan for Acceleration and Expansion of Indonesia Economic Development (MP3EI). The focus to explore resource-based industry is due to the fact that the areas outside Java region have many natural resource potential. To name a few, palm oil, chocolate, natural gas, tin, nickel, and bauxite are available outside Java and have not been managed very well.

In 2011, the Indonesian government through Ministry of Industry has mapped six priorities for the development of industry clusters in Indonesia. Those industry cluster priorities are:

a) Manufacturing-based industry consists of: steel, cement, petrochemical, ceramics, electric and electronics devices, general machinery, textiles, and footwear.
b) Agriculture-based industry consists of: palm oil, rubber, chocolate, coconut, coffee, sugar, tobacco, fruit processing, furniture, fishery, paper, and dairy products.
c) Transportation-based industry consists of: automotives (cars and motorcycles), ship building, aerospace, and trains.
d) Electronics and Information industry consist of: electronics, telecommunication, and computers.
e) Creative industry consists of: software and multimedia content, fashion, and handicraft.
f) Small and medium enterprises consist of: jewelry, salt, ceramics and pottery, essential oil, and snacks.

Based on those industry priorities developed by the national government, 18 (out of 34) provinces have already developed their local industry roadmaps. However, in the city level, there are only five (out of $\pm$ 500) cities in Indonesia that have already developed their industry road map. Others cities are still in the process of designing their industry road map.

In 2012, the automotive industry still dominates other industrial sectors in industry clusters (Figure 5). The automotive sector has more than a 50 percent share followed by the steel sector (9.5 percent) and building material (4.9 percent).

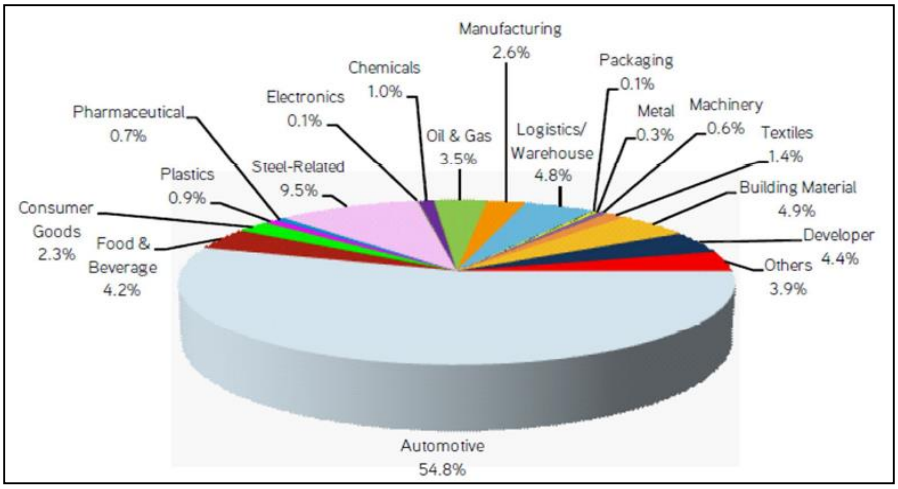

Figure 5: Percentage of industry sector in industry clusters in Indonesia
Source: Ministry of Industry (2012)

There are some fundamental obstacles to make industry clusters in Indonesia more competitive. One of those obstacles is the expensive price of land for industrial area. According to the Ministry of Industry in 2013, the approximate price of land in Java Island is US$ 200/m^2, and this price is not competitive compared to the price of land in Thailand or Malaysia, for example. One solution that the government proposed to increase the economic competitiveness of industry clusters in Java is by standardizing them. In 2014, the ministry of industry plans to standardize the industry clusters by giving certificates to 74 clusters that have minimum area of 50 ha and meet the standards in terms of service, management, infrastructure, and environment. The industry clusters standardization process is expected to attract more foreign investors to come so that the clusters can be more competitive compared to those in the neighboring countries.

In order to eliminate the regional inequality in Indonesia and to spread the economic development throughout the country, in 2011, the Indonesian government launched the Master plan of Acceleration and Expansion of Indonesia Economic Development 2011-2025. Included in this plan is the initiative to develop six economic corridors in

Indonesia, where each economic corridor will be supported by several industry clusters. Those six economic corridors are: (1) Sumatra economic corridor, (2) Java economic corridor, (3) Kalimantan economic corridor, (4) Sulawesi economic corridor, (5) Bali-Nusa Tenggara economic corridor, and (6) Papua economic corridor. Before the launching of the master plan, around 75 percent of industries in Indonesia were still concentrated in Java Island. After the implementation of the master plan, it is expected that the concentration of industries will be shifted outside Java Island so that the percentage of industries in Java will be reduced to 60 percent in 2025.

CHAPTER 4: RESEARCH METHODOLOGY

Indonesia emerged as a significant industrial exporter only in the mid-1980s (Bird and Hill 2006). However, these exports were dominated by resource-based activities, reflecting the country's natural resources endowments and the prohibition of unprocessed commodities. After the 1998 Asian financial crisis, Indonesia's export base began to widen significantly with electronics, footwear, furniture, textile, and sporting goods as the main export products.

Industry cluster theory is an economic development theory that is geared toward export orientation. In order for a cluster to persist, it must have an export orientation and serve markets external to the region (Campbell et al. 2012). Therefore, it is instructive to look at the current composition of Indonesia's exports and imports since 2003 in Table 7 below.

Table 7: Indonesia's export and import composition
Source: Indonesian Bureau of Statistics

Year	Export (Billion US $)	Import (Billion US $)
2014	176.29	178.18
2013	182.55	186.63
2012	190.03	191.69
2011	203.49	177.44
2010	157.77	135.66
2009	116.51	96.83
2008	137.02	129.19
2007	114.10	74.47
2006	100.79	61.06
2005	85.66	57.70
2004	71.58	46.52
2003	61.06	32.55

From these export and import compositions, the top 5 Indonesian export commodities are still dominated by raw or unfinished products that have low market penetration such as crude palm oil (CPO), rubber, textile products, coal, and natural gas. In the future, the industry clusters are expected to bring added value to raw materials through further processing. The top 10 destination countries for Indonesia's export products are India, South Korea, China, Vietnam, Saudi Arabia, Turkey, Malaysia, Egypt, Ireland, and Brazil. From the import side, the top 5 import commodities to Indonesia are machinery, IT equipment, textile products, petroleum products, and transportation equipment.

In the future, industry clusters must also serve as import substitutes. In this respect, Indonesia should reduce its dependency on foreign products by increasing domestic production of industrialized products. The Indonesian Bureau of Statistics in 2013 reported that Indonesia had a deficit of $ 1.6 Billion in its trade balance in 2012. From January to August 2013, this deficit jumped to $ 5.5 Billion due to an increase in fuel import and food supplies. Industry clusters aim to increase the productivity of local industrialized products, and it is expected that in the future local products can fulfill most of the demand in Indonesia.

MP3EI is a long term master plan that portrays Indonesia economic development from 2011 to 2025. Given its nascent stage of implementation, it would be hard to find measurable outcomes of MP3EI at the current time. Therefore, this study plans to compare the industry clusters in the master plan with the industry cluster theory provided in the literature. Logistics and Automotive industry clusters are chosen as those clusters are critical to Indonesia's economic development. This study seeks to identify the gaps that may occur between the master plan and theory; to identify strengths, weaknesses,

opportunities, and threats (SWOT) associated with the plan; and to provide policy recommendations to minimize the gaps.

The focus of this study is the logistics and automotive industry clusters in Java economic corridor. Java is critical to the Indonesian economy, because it has become the central of development for seven decades. Java has become the economic, social, and political center of Indonesia. Almost all automotive and logistics clusters in Indonesia are located in Java, especially in Jakarta and its metropolitan region. Another reason for choosing Java is because it provides better access to policy makers and bureaucrats, which is important for conducting in-depth interviews in the qualitative analysis.

For this purpose, this study will employ both qualitative and quantitative methods. Held (1996) also finds that cluster analysis is ideally a synthesis of both quantitative and qualitative approaches. Analysis using quantitative methods alone will not suggest policy guidance, as this approach cannot explain why such clusters formed and what policy interventions are needed to foster growth. On the other side, using qualitative analysis alone may lead to misleading results (Held 1996). In this study, the qualitative method will be performed by using in-depth interview to stakeholders, while the quantitative approach will be using location quotient, shift share analysis and regression in an econometric model.

4.1.The Qualitative Approach: In-Depth Interview

This study uses interviews of the stakeholders of industry clusters in Indonesia. The stakeholders consist of top-level government officials in the area of economy and industry; practitioners who run their businesses in industry clusters; academicians whose research interests are in the area of economic development, industrial policy, and supply

chain management; and local government leaders who have industry clusters in their area of authority.

The interview is a semi-structured interview in the sense that the interviewer only asks some critical questions and lets respondents answer the questions as freely as possible. Some follow up questions might be brought up if further exploration of the topic is needed. Each interview takes approximately an hour to complete. Invitations to participate in the interviews were sent through email to each respondent at least four weeks before the scheduled time.

Some critical questions for respondents are given as follows:

Interview Questions for Government:

- What are the short and long term goals of the Master Plan for Acceleration and Expansion of Indonesia Economic Development (MP3EI)?
- What is the background thinking behind this master plan?
- How can all economic corridors and industry clusters be integrated to increase economic productivity?
- How much investment is needed to develop industry clusters? How much can government contribute to the investment?
- How much investment alone is needed to develop industry clusters in Java's economic corridor?
- What is the investment scheme of developing industry clusters?
- How will collaboration between government and industry help foster the development of industry clusters?

- How can industry clusters and economic corridors expand Indonesia economic development?
- What are the strategies from government to increase Indonesian export?
- What are the strategies to make Indonesian products competitive in international market?
- What kind of facilities (infrastructures) will the government prepare to establish industry clusters in Indonesia?
- Can you explain the general industrial policy in Indonesia?
- What are the strategies to increase productivity in Indonesia?
- What are the strategies to spur innovation in Indonesia?
- Is competition important to increase economic productivity in Indonesia? Why/Why not?
- Is government regulation necessary to support productivity? Why/Why not?
- In which area is government regulation important to support productivity?
- Is it important to attract Foreign Direct Investment (FDI) to invest in industry clusters?
- What are the roles of FDI in developing industry clusters?
- How easy can foreign investors invest their money on firms in industry clusters?
- With the upcoming general election this year (2014), and given that the current president cannot be reelected, how likely is it the master plan will be continued under the new government?

<u>Interview Questions for Industry (firms in an industry clusters):</u>

- How can this industry cluster bring benefit to this company?

- Who are your suppliers? Are they located in this industry cluster? What is the percentage of your suppliers that are located in this industry cluster?
- How important is it to export your products, compared to selling it to local markets?
- What percentage of your products are being exported?
- What are your strategies to export your products?
- What are the necessary facilities (infrastructures) that your company needs in this industry cluster?
- Do you directly compete with other companies in this industry cluster? Why/Why not?
- Do you collaborate with other companies in this cluster? Why/Why not?
- Do you share information with other companies in the cluster? If yes, what type of information: product, process, design, marketing?
- What can you expect from government to increase business environment in industry clusters?
- Is there any dialogue forum between government and industries in this cluster? How often is the forum? Is it easy to communicate with the government? What is the best way to build communication with government?
- Are there enough trained personnel available in this industry cluster?
- Are there any universities/research centers available in this cluster? If yes, are you collaborating with those universities/research centers to conduct research and development (R&D) activities?

Interview Questions for Academician:

- How can Porter's diamond model be applied to develop industry clusters in Indonesia?
- Does Indonesia already have the right ingredients to for its industry clusters to develop economic competitiveness? If not, what are the missing ingredients?
- Is there the appropriate institutional arrangement in the government to support the development of industry clusters?
- What are the roles of academicians (or universities/research centers) to support the development of industry clusters?

4.2.The Quantitative Approach

The quantitative analysis consists of three parts: (1) a descriptive analysis of industry and cluster-specific location quotients in the Java corridor; (2) a shift-share and analysis of industry and cluster-specific location quotients in the Java corridor; (3) and econometric analysis of the shift share results drawing from shift-share results from all city regions in Indonesia. All these analyses, when combined with the qualitative information gathered in Chapter 5 will form the basis for a strengths, weakness, opportunities and threats (SWOT) analysis of the Java corridor's potential for contributing to the economic development plans articulated in the MP3EI document presented in Chapter 1.

4.2.1. Location Quotients and Shift-Share Analysis

Location quotients are simple measure to determine the relative concentration of industry. This technique also gained popularity because it requires little data and analytical skill, and can be carried out quickly and inexpensively (Isserman 1977). The location quotient technique compares the local economy to a reference economy, in the

process of identifying specializations in the local economy. The location quotient technique is based on a calculated ratio between the local economy and the economy of some reference unit. This ratio is called an industry location quotient.

Thus, an industry location quotient (LQ) is the ratio of an industry's share of the economic activity being studied to that industry's share of another economy (Isserman 1977). Let us assume that the area of study is region (*r*) of a nation (*n*), and that employment (*E*) is the measure of economic activity, then the location quotient for industry *i* can be expressed as following equation:

$$LQ = \frac{E_{ir}}{E_r} / \frac{E_{in}}{E_n}$$

Where E_{ir} represents the region's employment in industry *i*.

Interpreting the LQ is very simple since there are only three possible outcomes: LQ < 1.0, LQ = 1.0, and LQ > 1.0. A LQ < 1.0 suggests that local employment is less than was expected for a given industry. Thus, that industry does not meet local demand for a given good or service. A LQ = 1.0 implies that the local employment is appropriately sufficient to meet the local demand for a given good or service. Thus, all of this employment is also considered non-basic because none of these goods or services are exported to non-local areas. A LQ >1.0 indicated that local employment is more than expected, and implies that exporting goods or services is required to non-local areas.

In this study, the location quotient technique will be performed by comparing LQs in logistics and automotive industry clusters in the Java economic corridor in two periods of time: 2000 and 2010. Using two periods of time to compare the LQs is important to analyze the effect of industry clusters on how a region can be competitive in exporting their goods and services to non-local areas. The two year comparison also indicates the

time before and after the implementation of MP3EI in Indonesia. The data is collected from the industry survey from the Indonesia's Bureau of Statistics, database from some related ministers, and the National Team for the Acceleration of Poverty Reduction.

After calculating LQs for each logistics and automotive industry clusters in the Java economic corridor, the next step of this study is performed by conducting shift-share analysis. Shift-share analysis is a popular tool in regional economic development to describe how employment can grow or decline in a regional industry or cluster over a specific time period. This technique gains popularity for its simplicity in capturing the underlining changes in the variable under consideration (Nazara and Hewings 2004). Early works on growth centers and industry clusters have also employed shift-share breakdowns to analyze the employment change in the clusters (Hansen 1975, Campbell et al. 2012).

The Shift-share analysis allows researchers to measure the degree to which some structural characteristics accounts for differences between categories of an overall population (Fothergill and Gudgin 1979). The categories mostly are spatial ones such as regions, while the differences are usually related to economic growth, population change, or employment growth. Shift-share analysis has been utilized in political economy, retail analysis, migration analysis, and regional growth analysis. In addition, policy makers who need quick, inexpensive analysis tools that are neither mathematically complex nor data intensive also utilize shift-share analysis (Knudsen 2000).

Shift-share analysis works by disaggregating regional change to identify that part of growth, which is region-specific. This technique decomposes change into 3 parts: National Share, Industry Mix, and Regional Shift (Fothergill and Gudgin 1979, Barff and

Knight III 1988, Sentz 2011). The national share (NS) component is the expected change if the region grew at the same rate as the nation. The expected change itself is simply the national rate of growth applied to each regional industry. In calculation, the expected change is the sum of the industry mix and the national growth effects. If the nation's overall economy is growing, we may expect to see some positive change in each industry in the local region (Sentz 2011).

The industry mix (IM) component measures the extent to which the region specializes in fast (slow) growing industries nationally. It also represents the share of regional industry growth explained by the growth of the specific industry at the national level (Sentz 2011). To calculate the industry mix effect, the national growth rate of the total economy is subtracted from the national growth rate of the specific industry, and this growth percentage is applied to the regional employment in that industry.

The regional shift (RS), often called competitive shift, measures the relative performance of a regional industry. This measurement reflects comparative advantage of a region; access to markets, materials, and suppliers; and the appropriateness of industry for the region. The regional shift explains how much of the change in a given industry is due to some unique competitive advantage that the region possesses; because the growth cannot be explained by national trends in that industry or the economy as a whole (Sentz 2011). The calculation of this component is performed by taking the total regional growth of the given industry and subtracting the national growth for the same industry.

The Shift-share analysis works in this equation:

$E_t - E_{t-1} = NS+IM+RS$

where,

$NS = g_n E^{t-1}$

$IM = (g_{in}-g_n)\ E^{t-1}{}_{ir}$

$RS = (g_{ir}-g_{in})\ E^{t-1}{}_{ir}$

g = growth rate; i = industry; r = region; n = nation.

Shift share analysis is a popular tool among regional economists because this technique is simple and can use readily available data (Fothergill and Gudgin 1979, Knudsen 2000). Other advantages of this technique include relatively easy interpreting the output, and sectorally and spatially consistent. This technique is also not sensitive for industrial data aggregation in the sense that we can always aggregate or disaggregate data and still use the shift share approach to analyze data without having problem on the aggregation process (Fothergill and Gudgin 1979).

Besides its advantages, there are some disadvantages of using shift-share analysis. The first disadvantage is that this technique is unable to identify factors causing economic growth. This technique also cannot identify the capacity of a region to grow and cannot indicate how the region got where it is. Mackay (1968) in Fothergill and Gudgin (1979) gives strong objection on shift-share analysis as it underestimates the influence of industrial structure, since any change in one industry will have an effect on other industries via multiplier effects and industrial linkages. However, the study from Fothergill and Gudgin (1979) on manufacturing employment change in the UK shows that multiplier effects do not bias the result of shift-share analysis.

For the purpose of this study, shift-share analysis is conducted to assess the potential of industry clusters to drive competitive advantage in the Java economic corridor. Specifically, this study focuses on the competitive shift component of industry clusters in

Java corridor. In doing so, this study collects employment data and economic growth of each industry sector in every city in Java Island for different points of time. Then, using that national employment and economic growth as comparison, this study will calculate the National Share, Industry Mix, and Regional Shift of industry clusters in Java economic corridor.

Furthermore, the result of this stage will be compared to the result in other five economic corridors being promoted in MP3EI. This is to compare the competitiveness of the Java economic corridor compared to other economic corridors. Moreover, the result of the shift-share analysis will also be compared to the result in national level so that the differential result of industry clusters in Java economic corridor and in the national level can be analyzed further. The time span for this approach is 13 years, from 2000 to 2012, and the data is mainly gathered from the Indonesia's Bureau of Statistics.

The above analyses, though descriptive in nature provide initial insights to the competitiveness of the clusters in the Java economic corridor. For example, the table 9 below provides one example of how the two analyses can be combined to provide the first indication of competitiveness for each industry cluster in the Java corridor. The purpose of this step is to identify those sectors and clusters that are performing well, those that are lagging but are important because of their size, and sectors that might represent future growth potential. Special attention will be devoted to those industries and clusters within the Java economic corridor. Using results from both the LQ and shift-share analysis, I focus on sectors that are in some way significant. The following table provides a description as to how this will be done.

Table 8: Industry/cluster screening matrix

	Location Quotient	
Regional Shift (from Shift-Share)	High	Low
Positive	Strong export orientation; Good performer; Suggest strategies to maintain competitiveness, retain industry	Possible emerging industry; Study factors that nurture sector and promote expansion; possible import substitution sector
Negative	Lagging, declining or constrained industry, worthy of retention because of size, suggest opportunities for modernization, improved competitiveness or productivity	Limited prospects; poor performer; opportunities for future growth are low.

4.2.2. Econometric Model

The second part of the quantitative approach in this study is performed by building econometric models to explain what factors may influence the differential result in the previous shift-share analysis. The result of this econometric analysis attempts to explain what factors contribute to the competitive advantage in Indonesia. However, because such an analysis requires a large number of observations, the econometric model will use shift-share results and other explanatory variables from all city regions in Indonesia.

There are four econometric models built in this quantitative analysis. The first econometric model measures competitiveness by using cluster GDP in 2000 as the dependent variable. The independent variables in the first model are variables that represent each factor of the diamond model. Those factors are: (1) ports, university enrollment, productivity, population density, and Gross Regional Domestic Product (GRDP) that represent factor (input) condition; (2) income per capita, human development index, poverty rate, number of unemployed, and economic change that

represent demand condition; (3) Herfindahl index and competitiveness that represent context for firm strategy and rivalry and (4) cluster employment and cluster factor supply to represent related and supporting industries. The data for the independent variables is city level data in 2000. The first econometric model in the quantitative analysis is expressed on the following equation:

$$Cluster\ GDP\ in\ 2000 = \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables + \alpha_2 Demand\ conditions\ variables + \alpha_3 Factor\ conditions\ variables + \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

The second econometric model employs cluster GDP in 2010 as dependent variable. The independent variables are similar to those in the first model; the difference is on the time frame. The data for the second model are city level data in 2010. The second econometric model is expressed in the following equation:

$$Cluster\ GDP\ in\ 2010 = \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables + \alpha_2 Demand\ conditions\ variables + \alpha_3 Factor\ conditions\ variables + \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

The third econometric model uses the change in cluster GDP between 2000 and 2010 as dependent variable. The independent variables in the third model are variables that represent each factor of the diamond model. Those factors are: (1) ports, university enrollment, productivity, population density, cluster GDP in 2000, and Gross Regional

Domestic Product (GRDP) that represent factor (input) condition; (2) income per capita, human development index, poverty rate, number of unemployed, and economic change that represent demand condition; (3) Herfindahl index and competitiveness that represent context for firm strategy and rivalry and (4) cluster employment and cluster factor supply to represent related and supporting industries. Therefore, the third econometric model is expressed in the following equation:

$$Change\ in\ cluster\ GDP = \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables + \alpha_2 Demand\ conditions\ variables + \alpha_3 Factor\ conditions\ variables + \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

The fourth econometric model employs the competitive/regional shift results (RS_{ir}) as dependent variable. The independent variables of this model are the socio economic data that represents every part of the diamond model by Porter (1990). This data might include employment data by industrial sector, income per capita, education, economy growth, number of industries available in clusters, and other socioeconomic data.

Structurally, the econometric model, estimated with data for all city regions in Indonesia takes the following form:

$$RS_{ir} = \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables + \alpha_2 Demand\ conditions\ variables + \alpha_3 Factor\ conditions\ variables + \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

where,

RS_{ir} = Regional Shift per worker in industry *i* in region *r* from a shift-share analysis of all Indonesian city regions, and

Local Context, Factor Inputs, Support Industries, and Demand Conditions are defined below.

In general, the independent variables in the regression model can be divided into four sets of variables (Hill and Brennan 2000). Following Porter's Diamond, the independent variables can be classified as those relating to (1) Local Competition and Context; (2) Factor Inputs; (3) Support Industries, and (4) Demand conditions. Proxy measures for each are presented in Table 9.

Table 9: Proposed independent variables

Factor/Variable	Expected Sign	Rationale
Local Competition and Context		
Herfindahl Index	Neg	Industry Concentration
FDI per Capita	Pos	Attractiveness to investment
City share of province population	Pos	Centrality
Factor Inputs		
Number of universities	Pos	Human capital investment
Ports Dummy	Pos	Access
Gross Regional Domestic Product (GRDP)	Pos	Economic output
Population	Pos	Human capital investment
Workforce	Pos	People input
Support Industries		
% employed in Automotive/Logistics services	Pos	Ability to serve external markets
City employment	Pos	Ability to support industry

Table 9: (Continued)

Share of cluster's contribution to city economy	Pos	Cluster's economic power
Demand Conditions		
% economic change (2000-10)	Pos	Overall local demand
Per Capita Income (2000)	Pos	Demand for higher-order goods and services

Results from the econometric analysis can then be applied to in the Java economic corridor to provide a first approximation about the extent to which Java possesses the proper ingredients to sustain competitive advantage in its targeted industrial clusters. Here the objective to will be to determine the extent to which the competitiveness in Java's industry clusters is adequately captured by the econometric model. Comparisons of expected competitiveness, determined by applying Java-specific data to the cross-section model parameters, are compared to the actual competitive shift and differences between the two can be traced to various explanatory variables in the model.

There are some limitations regarding the data used in the quantitative analysis. The first limitation is that the data are highly aggregated, especially for determining what industries constitute a cluster. Because of this limitation, the LQs and shift-share analyses are performed by using provinces as the unit of analysis, while the regression models use city level data as the unit of analysis. Another limitation is that this study uses the classification of clusters from the International Standard Industrial Classification from the United Nations. It is difficult to determine classification of industries based on empirical finding given the quality of data in this study.

4.3. Strengths, Weaknesses, Opportunities and Threats (SWOT): Combining qualitative and quantitative analyses.

This discussion highlights the advantages and disadvantages among industry clusters and the industries that comprise them in the Java corridor with respect to future growth and development. SWOT assessment draws from both the qualitative and quantitative portions of the study. Examples SWOT considerations include:

- Strengths: Human capital and labor resources, geographic location, natural resources, existing infrastructure, various institutions that are important to the region and state, large middle class, youth populations.
- Weaknesses: Low wages, lack of aggregate purchasing power, per capita income below regional averages, persistent unemployment, lack of cultural, recreational, educational amenities and facilities, low educational attainment, remote location, access, lack of infrastructure (highways, ports, airports), centralized development in Java (especially in Jakarta as the capital city), lack of connectivity among regions.
- Opportunities: Linkages with existing business/sectors, strategic location, underutilized resources (human, natural, institutional), foreign investment, increased domestic consumption.
- Threats: Dependence on a small number of sectors, lack of industrial diversification, migration patterns (net out-migration or low rates of in-migration), dependence on particular income sources (unearned income), discontinuity of development program after the upcoming election in 2014.

CHAPTER 5: QUALITATIVE ANALYSIS

This section presents the qualitative analysis of this study. The qualitative part uses in-depth interview to explore respondents' opinions about the questions asked. Thirty people were interviewed in this stage. Those respondents consisted of policy makers in economic and industrial development, businessmen, executives in the automotive and logistic industries, and academicians that have a research focus on industrial policy and economic development. Specifically, respondents for this study can be seen on Table 10 below:

Table 10: Respondents of the study

Government Officials	Business Practitioners	Academics
Minister of Economics	CEO of General Electric Indonesia	Professor of Economics at University of Indonesia
Minister of State-Owned Enterprise	CEO of Indonesia Port Corporation	Professor of Economic Development at University of Indonesia
Minister of Trade	CEO of Jababeka Group	Professor of Logistic and Supply Chain at Bandung Institute of Technology
Minister of Industry	Chairman of Matsushita Global	Professor of Production Systems at Bandung Institute of Technology
Vice Minister of Economics	Commissioner of Indonesia Infrastructure Guarantee Fund (IIGF)	Professor of Industrial Policy at Bandung Institute of Technology
Vice Minister of Finance	Technical Director of Toyota Motor Indonesia	Professor of Entrepreneurship at Bandung Institute of Technology
Vice Minister of National Planning	Chairman of the Indonesia Businessmen Association	Professor of Transportation at Bandung Institute of Technology
Head of Statistics Division at Ministry of Industry	Chairman of the Indonesian Industrial Area Association	Professor of Sustainable Development at Bandung Institute of Technology

Table 10: (continued)

Government Officials	Business Practitioners
Head of Industrial Area Department at Ministry of Industry	Director of Karawang International Industrial City
Assistant to the Head of President's Delivery Unit	General Manager of Karawang International Industrial City
Economic Assistant to the Head of President's Delivery Unit	Owner of a large textile industry in Bandung, West Java

Specifically, the interviews performed in this study aim to answer two big research questions as follows:

- What are the ingredients of successful industry clusters? Does Indonesia have the right ingredients for its industry clusters to develop economic competitiveness?
- What strategies are needed to create a competitive environment among domestic firms in Indonesia's industry clusters?

In order to answer those research questions, this qualitative analysis will be divided into several discussions related to the development of industry clusters in Indonesia. The discussion covers analysis of the effectiveness of the MP3EI from the Indonesian central government, the implementation of the masterplan, and SWOT analysis of the industry clusters in Indonesia. The discussion also includes analysis of two prominent clusters in Indonesia, automotive and logistic clusters.

5.1.Discussion on the effectiveness of The Masterplan of Acceleration and Expansion of Indonesia's Economic Development (MP3EI)

The development of the MP3EI in 2011 by the government aimed to reduce economic imbalances among regions in Indonesia. Statistics from the Ministry of Economics in 2011 show that Java Island alone accounts for 57 percent of Indonesia's overall economy.

This number has been reduced to 49 percent in 2014. Regarding the benefits of the MP3EI, some respondents gave their responses:

- "This masterplan has the goals to expand our economy throughout the nation. Java could no longer bear the burden of the Indonesia's economy. The Island has been overpopulated, there is not enough land to open new economic activities such as industries, ports, airports, or sufficient housing. Other regions need to be developed, especially the eastern parts of Indonesia".
- "The masterplan has spirit to expand and to expedite our economic growth. We want to be a developed nation by the year of 2025. We could not wait any longer, we have to catch the momentum. We have all the potentials to do that. Our middle class is increasing, and the population is dominated by youths who are in their productive age. This can be considered as demographic bonus for us. Our economy has been growing, on average, 5.8 percent in the last five years. If we cannot accelerate the economy now, we will lose the momentum".

Respondents who gave their positive responses on the benefits of the masterplan are dominated by those who hold top position in the government. Regarding the background thinking behind the masterplan, one top government official who was involved in the creation of the masterplan added:

- "In the last six decades, our economy has been characterized by the economy of extraction. It implies that we only extracted all natural resources that we have in our country, then just sold it to the foreign countries without processed it further. We did not put more value on the resources that we sell. We played on the supply side, as long as the cost is low, then we can get the profit. The consequence of the economy of extraction is that we depend on mass-labor industries. All we need is to provide more jobs to our people. However, the era has changed. Now technology takes place and revolutionizes the way people work. We need innovation, put more value and technology to our products. As a consequence, we need more educated people, more qualified human capital, those who can operate high technology in the industry. We could not apply labor intensive industries any longer, what we aim now is manufacture-based industries. This is the reason why we created the MP3EI three years ago, to prepare our people to be ready facing globalization. We want Indonesia to be more competitive in the global economy."

The masterplan itself was created based on the concepts of growth centers and agglomeration economies. Some respondents, especially those who come from academic

background, were excited to see how these concepts are going to be implemented. For example:

- "I think growth center and the economy of agglomeration that underline the masterplan are appropriate to be implemented in Indonesia. Indonesia is a big country, and don't forget that we are an archipelagic nation. It means that our economy spreads from west to east in those thousands of islands. This is another challenge by government to distribute the economy equally so that every people in every island, no matter how remote it is, can get the benefit of the development. However, that is the theory. The reality is, our economy is concentrated in one island, not to mention that it is also concentrated in some small number of elites. The growth centers of Indonesia are most likely in Java, or in Jakarta and its surrounding to be exact. We have to change this. If this condition remains, people in the remote part of Papua cannot get the fruit of our development. So, we need to create more growth centers throughout the nation. We need to create more industrial centers in other parts of Indonesia. If those centers can be created, economy will be distributed more equally."
- "Let us look at some facts in Indonesia. The economy gravitates in Jakarta and its surrounding, and so does our population. A big country like Indonesia only has one so-called world-class port. We have infrastructure problems, so no wonder our transportation cost is high. If we can build more roads, railroads, ports, airports, bridges in other regions in the country, the economy is going to work more efficiently. That is one of the benefits of developing more economic centers in other regions. New growth centers also means new jobs and other spillover effects to those who live in the region."

However, not all respondents are excited with the prospect of what the masterplan can offer to the people. Some respondents who come from business background remain skeptical about how the masterplan can really improve the Indonesian competitiveness. They perceive the masterplan as another lip service from the government. Those who have doubts about the masterplan express their opinion as follows:

- "Well, I believe the masterplan is another wishy-washy plan by the government. I have been in business for the last 30 years and I know exactly how the government behaves. They always can talk nicely about their programs, but when it comes to the implementation stage, the realization is null. I believe this one does not have any differences."
- "I will not be surprised if it turns out that this masterplan is another lip service from the government.

- "The masterplan is good, nicely written and contains good theory. However, I can only smile at it."
- "There are no extra efforts done by government to implement the masterplan. I mean, the top rank government officials who formulated the plan might understand the urgency of it. However, those who are in the lower rank did not have clear idea on how to translate the plan into action programs."

One respondent, a government official criticized the masterplan as the product of top-down policy approach by the government. He added:

- "What I don't really like about the masterplan is that because this plan is using a heavily top-down approach by the government. It only involved elites and did not listen to the reality in the grass root level. The initiative of the plan came from the President, then he hired renowned consultants to help government to design the masterplan. This team only asked the opinion from elites and top businessmen but did not see the reality. It is funny because we, who implemented the masterplan, did not understand the goal of the plan. Those who designed the masterplan need to talk to us who execute the plan in the lower level. "

There is another respondent who voiced his concerns on the implementation and realization of the masterplan. A Professor of Economics at University of Indonesia who was actively involved in the formulation of the masterplan criticized how people often misunderstand the essence of the masterplan. He added:

- "People often misinterpreted the masteplan. They thought that this masterplan is purely a list of infrastructure projects in Indonesia. Yes, we enlisted many projects such as airports, ports, power plants, highways, and railroads. Don't get me wrong, those projects are essential to develop Indonesia's economy in the future. But the main target when we formulated the masterplan is to strengthen human capital in Indonesia.This includes the mindset shift on how to accelerate our economy. You can read this mindset shift discussion on Chapter 2 of the Masterplan. People mistakenly skipped this Chapter. They read the introduction then jumped to Chapter 3 where all the infrastructure projects enlisted. This is wrong. The main goal is to make Indonesian people to become more competitive in the global world. This goal would only be possible through innovation and the empowerment of people."

Another professor of economics at University of Indonesia criticized the masterplan as having wrong conception. He mentioned several misconceptions and errors of thinking of the masterplan as follows:

- "One of the iconic projects of the MP3EI is the Sunda Strait bridge that will connect Java Island and Sumatra Island. I believe this is not the right move. Indonesia is blessed with great resource endowments: more than 17,000 islands and sea that has twice the area of land. We must perceive sea as our strength factor, not as our weakness. What we need to strengthen is sea transportation, including ports, ships, containers, and port facilities. Modernization of ports throughout the nation is critical to integrate our domestic economy. Sunda Strait Bridge would not be able to significantly reduce the cost of logistics since transporting goods using ships is cheaper and may contain more goods than transporting those goods using trucks."
- "Who would finance those projects enlisted on MP3EI? For example, the Sunda Strait Bridge alone may cost at least $20 Billion. The government does not have enough funds in their regular budget. Else, financial institutions would not be eager to finance those projects without guarantee from the government."
- "The MP3EI is not the first step to propel Indonesia to be in the top 10 developed nations in the world in 2025 through high, inclusive, just, and continuous development, as what the document has claimed. How can we have inclusive development if people are ignored? For example, the document mentioned about a large scale development of central of farming and food development in corridor 6. Government forgets that t the majority of Indonesian people are farmers. There is no strategy to empower those farmers so that their future can sustain and be more independent."
- "The design of economic development as stated by the MP3EI relied heavily upon the role of government as the leading sector, supported by business, is an unrealistic and obsolete model of development. A more realistic model is by utilizing all stakeholders that include governments (central and local), business, cooperation, universities, and communities. In the masterplan, people and communities were seen as the object of development, instead of the subject. "

5.2.Discussion on the condition of clusters in Indonesia

The discussion in this section examines the development of industry clusters in Indonesia. This discussion includes the role of industry clusters to drive economic competitiveness, the ingredients of industry clusters, and whether Indonesia has the right

ingredients to develop its industry clusters. The discussion also covers the current assessment of industry clusters in Indonesia, as a manifestation of the masterplan.

On the importance of industry clusters in Indonesia, some respondents give their support:

- "Actually industry clusters in Indonesia have been developed several years ago. The problem is that there have not been serious commitments from government to develop those clusters. We might call those clusters as organic clusters. They grow independently by themselves, without the support from government. Those clusters are not formally institutionalized. Most of the clusters are small and medium scale industries that have main problem to get capital. Those cluster such as craft clusters in Yogyakarta and Solo, clay clusters in Central Java, or IT clusters in Bandung or Bali have never grown to be big without comprehensive support from government."

Besides lacking of government support, some of the problems that remain exist on the development of clusters in Indonesia. Those problems are mentioned by some of the respondents as follows:

- "The main problem that hinders the development of clusters in this country is the lack of infrastructure. Clusters need sufficient roads, highways, easy access to ports and airports, railroads, and many more. Take an example, the palm oil cluster in Sei Mangkei in North Sumatra. This cluster was designed to support the palm oil industry in this country. This cluster has also succeeded to invite Unilever to establish their palm oil factory there. However, the surrounding area of the cluster is still lacking of qualified infrastructure. Many other industries are still reluctant to relocate their factories there due to this problem."
- "Other acute problem faced by government to open new industry clusters, or to build new infrastructure projects, is land clearance. This is especially true in Java Island, where 58 percent of Indonesian populations live. Java is too crowded so that every new development must clear the land and evict those who live on that area. The problem is worsening when people who live there ask for a high compensation. Then negotiation should take place and it may take longer time to complete. If this happens, the target to complete the project would be delayed. This happens in many development cases in Indonesia."
- "We may also find problems in the coordination among governments in different levels. I give you an illustration. We have one central government that is headed by a President. He has 34 ministers to help him run the government. There is no problem when President asks his ministers to coordinate with him for every important policy. But there will be problems when ministers coordinate among

themselves. There will be more problems when ministers need to coordinate with governors in all 34 provinces. Going down to the lower level, the problems would be bigger. This is the cost of coordination, so that all instruction from the President would be perceived differently in the execution level."

Even though the progress of industry clusters development in Indonesia is not too promising, there are some success stories found in some clusters that have already been established. Those established clusters mostly are those industries located in an industrial complex. Most of those industries are foreign industries and operate in middle to large scale of business. Some of the business practitioners of the successful industry clusters gave their opinion regarding what is needed to establish successful clusters. Their suggestions are:

- "When I started to build the first industrial complex in Indonesia in 1989, I had to convince the government that we need to provide number one facilitate those investors who would like to invest in Indonesia. At that time the government did not really pay attention to my idea, but I kept going. So I opened land, then built spaces for warehouses and factories. I provided the road and access to highway, electricity, water, and waste treatment. Then foreign companies started to come to fill my industrial complex. Now I have more than 2,000 industries in my area, and most of them are foreign companies from more than 30 countries. This industry complex provides jobs for more than 600,000 workers and 2,500 expatriates. We help the economy of this region with the presence of our industry complex."
- "Our industrial area is specifically for automotive industries. We have Toyota, Honda, Isuzu, Yamaha, and Daihatsu in this area. Several automotive support industries are also here such as spare parts, tires and glass. We provide everything by ourselves, all those facilities, infrastructure, electricity, phone lines, internet, roads, warehouses, water and waste treatment. We also provide service for those industries who would like to proceed all the administrative things before they open new business here. Now the government realizes the benefit of this industrial complex because we also attract more investors to come to fill up our area. "
- "We could not rely on the government when we started our business here. The government just wanted to see the result first, then they believed the benefit of this industrial area. So we just started by ourselves, inviting those foreign investors to come, convincing them that Indonesia has sufficient infrastructure for them to put their investment here. Of course we had to build these infrastructures first so that they can be convinced. I tell you that in this industrial area business, the private sector plays a more active and dominant role than the government."

The government does not seem to have significant role in the development of industry clusters. Most of industry clusters, be it the organic cluster or planned cluster, grow and struggle by themselves before government realize their potential. In the development of planned clusters, private sector plays more active role in providing the area for planned clusters, building sufficient infrastructure to support the daily operations of the industries inside the clusters, and inviting foreign investors to build their factories in the clusters.

In the organic clusters, the role of government becomes less visible. The small and medium industries are forming a cluster naturally, due to similarities in their business or proximity of their locations. These organic clusters usually do not last in the long run due to some problems in the management, or lacking of capital to grow their business.

5.3.Discussion on strategies to improve economic competitiveness by creating industry clusters

In this discussion, some strategies to improve the competitiveness in the cluster will be elaborated. These strategies are specifically to improve the condition of the clusters in Indonesia, which have not been developed very well in the past. Regarding the strategies to develop the clusters, some of the respondents gave their suggestions about streamlining the bureaucracy of the government:

- "Government should change the rules and regulation that sometimes hinder the development. If we can change our mindset, and we really want to be competitive, private sectors are interested in investing their resources in Indonesia. Other essence of this masterplan is what we call as debottlenecking. It means that government should streamline the regulation and bureaucracy that may adapt to change. The quality of bureaucracy in this country is very poor. Many public projects are stopped because nobody has the sense of responsibility. If the projects stop, there would be a bottlenecking process. We need to break this barrier. Many infrastructure projects stopped due to land clearance problems. Who should solve this problem? Everybody is pointing their hands to others. "

Other respondent voiced his concern on the provision of public infrastructure. The availability of infrastructure is inevitable for the clusters. Without sufficient infrastructure, industry clusters would not be able to work efficiently. He added:

- "Another factor that is also important is public service provision. We need sufficient infrastructure and other public service projects. The question is, who will finance these projects? In this case, the role of the private sector is more important because government does not have enough money to finance all public projects. They need money from the private sector and foreign investors to ensure the availability of all necessary public services. In this case, we need special institutional arrangements that govern the relation between government and private sector in providing public service. "

While public infrastructure provision is critical to support industry clusters, other questions emerged on how to finance the infrastructure construction. Government clearly does not have sufficient funds to finance all the projects. One responded reminded the importance of fiscal policy from the government, especially spending on infrastructure. He gave his idea:

- "I cannot believe why our government only spent 3 percent of our GDP for funding the infrastructure. Other countries spend more than that number for infrastructure. India spent up to 8 percent of their GDP for infrastructure provision, while Malaysia spent 9 percent and Thailand spent 6 percent of their GDP. We have been implementing wrong fiscal policy for years. Instead of providing infrastructure, government spent $30 Billion alone for energy subsidy. That includes subsidy for gasoline and electricity. Who enjoyed this subsidy? Only rich people who can afford cars and other electronic appliances. My suggestion is to remove this energy subsidy and reallocate the money to fund infrastructure projects all over the country."

Improving public infrastructure seems to be inevitable for Indonesia to gain a more competitive position in global economy. While infrastructure is critical to support the economy, the problem lies on how to finance the construction of the infrastructure.

Government clearly does not have sufficient funds to invest in all infrastructure projects. Some respondents suggest the Public-Private Partnership (PPP) scheme to invite private sector to involve in providing public infrastructure.

- "This country needs massive investment to improve public infrastructure. If the government cannot fund the whole project, they should make partnerships with the private sector or investors to ensure public facilities are there for people."
- "I think this is the right moment for us to see an increasing role of the private sector in the economy. Our economy has been dominated by government for more than six decades while the private sector only had small role. But we must also need to understand that an economy dominated by government would not be efficient and competitive enough. Now private sector has the momentum and capital to take the lead in our national economy. If private sectors want to invest in public infrastructure, I think government needs to allow them to come in through public-private partnership scheme. "

Some respondents also believed that developing industry clusters in some of the economic regions in Indonesia is one of the strategies to improve the nation's competitiveness. They provide several reasons why clusters can help increasing competitiveness.

- "Our economy now is in deficit. We need to push our export performance harder. That also means to push our local products to compete with other products from other countries in the region. If our products can survive in the global market, our economy would be more competitive. This is why we need to establish several industry clusters that have export orientation. Clusters promote local potential in the region; therefore, local products can be promoted as well. You can imagine if all regions in Indonesia can bring their products to compete in global market, the economy of the whole nations will be more competitive."

Respondents also remarked that another strategy that needs to be implemented by the government is to formulate policy that can attract investors to come and invest their money to build industry in Indonesia. This strategy is important because most industries that form clusters in Indonesia are foreign-based industries. Some business practitioners gave their view on how to attract those investors:

- "With the current promising economy, we cannot doubt that Indonesia is one of the major investment and manufacturing destination countries in Asia. However, given the broad interest from foreign investors to invest in Indonesia, the government needs to implement structural economic reforms that may include further relaxation of foreign investment rules."
- Manufacturing industries will have an increasing role in Indonesia, especially since we want to increase our oil and gas export. Many home works should be done by government. However, I would suggest that government should take our labor problems as a main priority. Our labor now is often launching strike to force government and employers to meet their demands. This may cause lost in productivity. How many hours of working are wasted because of this act? Investors will not invest if labor keeps protesting. Government needs to sit down together with employers and labor unions to find the solution of this problem."

5.4.Discussion on the assessment of the Diamond Model by Porter (1990)

Porter (1990) explains there are four factors that can determine the competitiveness of a country. Those factors are factors conditions, demand conditions, firm strategy and rivalry, and related and supporting industries. Those four factors were portrayed in a diamond model that explains the effect of clusters on competition. This discussion explains the findings of this research related to the four factors of the diamond model in Indonesia's clusters.

1. Factor Conditions

Factor conditions are the basic inputs that are necessary for competition. They can be tangible assets such as infrastructure or intangible things such as information or intellectual capital. Related to the industry clusters in Indonesia, factor conditions may include tangible assets such as vast natural resources and young population to intangible assets such as human capital. Some respondents discussed their assessment on the current factor conditions in Indonesia as follows:

- "I would say the biggest tangible assets that we have now is our abundance natural resources. This country is blessed with great natural resources that we can use to maximize people's welfare. You name it, we have oil and gas, palm oil,

until farming products such as coffee, corn, cassava, and chocolate. These natural resources are our strengths in which other nations may not have them."

- "Besides our tremendous amount of natural resources, please don't forget that we are the fourth populous country in the world. The population of around 250 million people gives us strength in human resources, be it for skilled workers or unskilled workers. Our population now is also dominated by young people in their productive age. If we can maximize this strength in terms of people, our economy can grow bigger."
- "Our large population does not only give us strength as production means, but it also gives as advantage in terms of large market. Of course producers would look a 250 million of population as a lucrative target market. Not to mention the fact that the middle class has increased in the last decade. Now we have more than sixty percent of middle class in the population, those who already fulfill their basic needs and are ready to spend more to enjoy their life better. The promising market in Indonesia is also supported by the tendency of our economy to consume more than to produce. We are a consumptive society, and producers will look at this fact as a promising opportunity."
- "The archipelagic geography of our country is actually an advantage to our economy. Yes, I don't deny that it also disperses our demography to thousands of islands that we have. However, I want to underline the advantage of water transportation as a mean to connect our economy. Water transportation has always been the cheapest transportation among other modes. It also has the advantage to carry more loads than trains or trucks. If we can maximize this maritime transportation, we can gain economic advantage from it."
- "Please don't forget Foreign Direct Investment (FDI) that has a strong presence in our factor condition. Given the looming global economy since the 2008 crisis, more investors now are looking at Asia as their prospective market. We can gain advantage here since our economy has been growing significantly in the past decade. In Asia alone, our economic growth now is the second highest after China. Of course producing our own products will be good, but FDI is an inevitable factor of our economy."
- "However, even though we have potentials in our factor condition, I would say that we can only use 40 percent of it so far. This is because of the problems that we have in our economy that can hinder our growth."

2. Demand Conditions

Demand condition refers to how firms can position themselves in a competitive market, and not just putting their position as followers or imitators. This also has something to do with how government can create policies to stimulate competitive environment. The demand condition in Indonesia's industry clusters is driven by high

consumption and the increasing economic growth in the last 10 years. From the government side, the demand condition is also reflected in the efforts to drive innovation and to develop creative industries in Indonesia. Some respondents have their evaluation on the recent demand condition in Indonesia:

- "My assessment on the demand conditions in Indonesia is mostly based on our increasing trend in the economy in the last 5 to 10 years. Our demand condition is also reflected on the increasing income per capita of our people. Our income per capita was $2,200 ten years ago, and it almost reaches $3,600 this year. The increase in income per capita indicates that demand for goods is also increasing. The middle class is also going up with around sixty percent of the population now is considered as middle class. The middle class now is demanding better products in their life, and not just a basic product. This shift of needs requires firms to create better and more innovative products in order to meet the demand and to sustain."
- "Demand conditions can also be reflected on the change of our population. We have the fourth largest population in the world, and it indicates the large demand that we have. Our large demand is also supported by the fact that the economy is still characterized by consumption, therefore, the need to consume is still large in this country. "
- "Firms need to formulate better strategies in order to make their products or services competitive in global market. They have to be creative and innovative to design, produce, market, and sell their products and services. An indicator that is commonly used to measure the competitiveness of a product or service is by looking at the export activities of a firm. For a nation, export can also be a good predictor on how competitive a country is. In Indonesia, our export performance cannot be said satisfying in the past two years. Our trade balance is in deficit in the sense that we import than we can export. If we have more competitive products in the market, we can boost the export so that we would have a positive trade balance."
- "Governments need to formulate policies that initiate the development of local products. They also need to create environment that allows local products to grow and sustain in global competition. Some policies such as soft loans to open new business, incentives, or training for small and medium entrepreneurs are what is needed to strengthen our local products. Government also needs to ensure that inclusive institutions, clean governance practice, and ethical business practice are implemented in the business. All bad practices such as bribery, corruption, or nepotism should be abandoned if we want to have strong economic background."
- "Innovation and creativity are two important elements in order to make competitive products. It is good to be noted that our creative industry has been growing significantly in the past ten years. Until now, the creative industry has contributed a share of 7.2 percent of our GDP and opened new jobs for people.

We hope that the creative industry can be our country's source of innovation and creativity in the future."

3. Firm Strategy, Structure, and Rivalry

Firm strategy, structure, and rivalry refer to the norms, rules, and regulations that manage the context for competition. Those include macroeconomic policy, political stability, tax system, labor market policy, and antitrust policy. In Indonesia, the condition for this factor is quite promising in some parts such as transparency and microeconomic policy. However, some parts of the context for rivalry are still poor such as intellectual right and labor market policy. Some respondents provided their views on this matter:

- "In the context of rivalry, I think we can be proud of some progress we have made on certain areas. We established the Anti Corruption Committee in 2004 and since then the corruption practice has been reduced significantly. Transparency and good corporate governance has been implemented whether in government institutions or in firms. Some government institutions now are providing the best services for public, and some big corporations such as Garuda, Pertamina, KAI, and PGN have been lauded for their transparent practice. I would say that in the context of rivalry, we have reached 60 percent of our goals."
- "Political stability is critical to the context of rivalry. It gives guarantee that all economic activities can run smoothly without any sudden change in the halfway. We are glad that even though we started to experience pure democracy in 1998, but we don't experience any political riot. All elections went fair and smooth and all people can accept the results. The government can work without any instability in the politics. This stability creates a sense of security for any investors to come to invest their money in Indonesia."
- "In the context of maintaining fair competition in Indonesia, I think we still perform poorly on protecting intellectual property and copyright. We can find many piracy practices happen clearly in public space without any punishment for this wrongdoing. If we want to be competitive, we need to ensure that all property rights should be protected. Another thing that can decrease our competitiveness is the labor problem, where labors keep looking opportunities to strike. There should be dialogue between government, private sector, and labor unions to solve this problem.

4. Related and Supporting Industries

Related and supporting industries refer to the presence of related industries that form a cluster. Therefore, suppliers, service industries, education institution and others should

be present for a cluster to perform. The condition of this related and supporting industries factor in Indonesia is not really well developed. This is because most of the related industries are still concentrated in Java. Some respondents assessed this factor as follows:

- "Most of our clusters are concentrated in Java. It is quite reasonable because development has not been spread very well all over Indonesia. Sixty percent of the Indonesian populations are living in Java, while fifty six percent of the economy are still concentrated in Java as well."
- "Why industries prefer to locate themselves in a cluster in Java? It is because infrastructure is there so that the cost of transportation can be minimized. Government should spread out the development by building sufficient infrastructure outside Java.

5.5.Discussion on automotive clusters and logistic clusters

This discussion addresses two industry clusters that are critical to support the Indonesian economy: the automotive manufacturing and the logistics clusters. The automotive clusters are selected in the discussion because the automotive sector dominates other industry sectors in the cluster. Data from the Ministry of Industry in 2012 shows that the automotive sector alone holds more than 50 percent of the share in industry clusters, followed by steel industries and electronic industries.

Meanwhile, the logistics clusters are selected for discussion in this study due to the importance of these clusters in the masterplan. In the masterplan, the government aims to improve the connectivity of the nation. As an archipelagic nation that has more than 17,000 islands, the connectivity in Indonesia only can be obtained through strong logistics clusters.

Some of the respondents in this study also mentioned those two clusters as two of the most vital industries in Indonesia. Those people express their opinion on some industry sectors that give significant contribution to the Indonesian economy as follows:

- "Another industry that I think is critical is automotive industry. It is because the automotive industry dominates the manufacturing sector in our country. Even though this industry is dominated by foreign owned companies, but the automotive industry has given significant contribution to our country; from the jobs creation, knowledge transfer, and further investment. "
- "There are some industries that give large contributions to the Indonesian economy. Automotive, electronic, steel, and palm oil are among of those industries. You can see the influence of those industries in the everyday economy of Indonesia. Cars, electronics, construction are things that cannot be separated from our daily lives."
- "I see an industry that is crucial given the fact that we have thousands of islands. It is a logistic industry. I believe the role of the logistics industry is increasingly critical in the future. We need to move goods smoothly around this nation, and this is not an easy task given our geographic and infrastructure condition. Logistic industry needs to cope with this challenge."
- "One industry that can improve our competitiveness is the logistics industry. You can see how vital a logistic industry is by looking at the Logistic Performance Index (LPI) score by the World Bank. Our competitiveness is still low because our LPI score is also low. Improving the logistics industry in Indonesia will in turn improve our competitiveness."

1. The Automotive cluster

The automotive cluster in Indonesia has been the backbone of Indonesia's economy since 1960s. Even though dominated by foreign manufacturers, the industry keeps going as it reached the total production of 1 million units in 2012 and 1.2 million units in 2013 (KPMG report, 2014). Data from the Ministry of Industry in 2012 also shows that among all industries that form clusters, automotive industries contribute to 54 percent of the clusters. The importance of the automotive industry in Indonesia's economy was stressed by some of the respondents as follows:

- "Why does the automotive industry matter to our economy? First, it provides jobs to millions of people, to the employees, suppliers, and to communities that got the spillover effects. Second, it will give benefit in terms of knowledge transfer to local people. The automotive industry requires fully advanced technology, and local people who work on this industry will get the knowledge, skill, and experience from this industry. Third, the automotive industry is one of the drivers of our export. In the last two years, we have seen that this industry exported more than one million of cars. In Southeast Asia alone, we are the largest exporter of cars. Strong performance in export implies that this industry is competitive."

Regarding the importance of automotive industries to form clusters in Indonesia, a respondent who works in the top management of a renowned auto manufacturing industry believed that clusters will bring benefit to the industry, especially in the form of cost reduction. Other respondents who work with other automotive factories also gave their views on the benefit of the automotive clusters:

- "I think the automotive industry will get benefit if being placed in a cluster specialized in automotive. We can save cost significantly if our suppliers are located in the same area as we are. This is also what we do here. Our principal is in another country, and when they established this industry in Indonesia few decades ago, they also invited their suppliers to relocate their factories here. So we can get more benefit too."
- "Other benefit that can be gained by establishing an automotive cluster is that we can stimulate local industries, especially the auto parts industries, to grow. Our company produces the body and engine in our own factory, but other parts like windshield, tires, or brakes are made by our suppliers. We cannot deny that most of the suppliers in our company are still foreign owned. However, we are still open for establishing relationship with smaller suppliers that can produce small parts such as bolts, wires, or seats. This is the opportunity for local industries because the business of small suppliers is also big."
- "What benefit can our industry get for being in an automotive cluster? I would say that we got supply of skilled labor from the vocational school located within the cluster. Those laborers received sufficient training during their school time so whenever they graduated, they were ready to work here. This school is actually funded by industries that form this automotive cluster.

However, even though the companies that form automotive clusters got the benefit of clusters, they still find many disadvantages that can ruin their industry's competitiveness. Those industries believed that it is the responsibility of government to fix of the disadvantages so that industries can operate best within the clusters. The representatives of those industries identified the existing problems as follows:

- "As a manufacturing industry that resides in a cluster, we have some serious problems on how to transport our products smoothly. Road infrastructure has always been the main problem. We are located approximately 50 kilometers from

the main port of Jakarta. Several years ago, it took only 1 hour to transport our cars from factories to the port. Now it takes up to 6 hours to do the same. Road infrastructure and traffic are the main problem here. We need more highways that can connect our location to the port without any major interruption."

- "Other critical problem that we face here is the port handling capacity. The capacity of our main port in Indonesia can no longer meet the demand. What is happening is that the handling time of containers keep increasing. Dwelling time for ships to load and unload those containers is also going up. Currently it takes at least 5 to 8 days for a ship to load and unload the containers. This would not be good for our business as other major ports in the region may take only two or three days to load and unload things."
- "I think we also need to pay attention to our custom process. We need to speed up the clearance so that we do not waste our time in the port. Investing in technology and new procedure would be the solution to maximize the clearance process."

Those are problems commonly encountered by automotive industries in the clusters. While infrastructure is inevitable for their business, no significant improvements have been made by the government on this matter. In order to handle this unfavorable condition, some industries have made some efforts to solve the problems by themselves. Those efforts include building their own industrial area, facilities, roads, and electric power plants. Some industries even built their own dry port as a buffer for the main port. Some respondents explained their efforts.

- "We cannot wait for government to make improvement soon, instead, we have to start by ourselves. Therefore, all of the industries here shared our contribution to build infrastructure for ourselves such as roads, electric power plants, waste and water treatment, and other facilities. If we expect the government to start the action, we would be waiting forever."
- "Our company has realized the importance of ports to support our business. However, the main port that this country has now is at full capacity and cannot meet the increasing demand in this nation. It can take much longer days to export our products, as well to import products. Therefore, several years ago we had idea to build a dry port located near to our industry location. This dry port serves as buffer to the main port of Jakarta. We can send our containers to the dry port before sending them to the main port. "

The idea of some industries to build a dry port that functions as a buffer to the main port is actually a response from the private sector for the inability of government to solve the problem that can hinder the economic growth. Whenever the government fails to respond promptly, then the private sector has the urge to jump in to find the solution.

2. The Logistics cluster

Logistics business is a growing business in Indonesia in the last ten years. McKinsey Global Institute in their report in 2013 indicated that the current economic trend would create a $1.8 trillion market opportunity in consumer services, agriculture and fisheries, resources, and education by 2030. This also creates opportunity for logistics businesses to grow, especially given the fact that Indonesia is an archipelagic nation that spreads among thousands of islands. A Chairman of the biggest port authority in Indonesia gave his view on the opportunity of logistic business in the country:

- "Indonesia lies in the heart of future world's global trade; this is one of the reasons why transportation and logistics will become more crucial in the future. Domestically, the inter-island trade also rises significantly in the past five years."

Regarding the scope of the logistics business, several business practitioners gave their views that the business should cover various kinds of businesses, from the flow of goods from the point of origin to the point of consumption in order to meet some requirements of customers. They specifically added:

- "Logistic business should include all the activities from the goods leaving the point of origin to the point where the goods received by consumers. Those businesses may include transportation, production, material handling, packaging, inventory, and warehousing."
- "All manufacturing activities require logistic business to support their supply chain. That means that logistics cover inventory and warehousing, transportation, and material handling."

In Indonesia, logistic clusters usually persist around the major ports. Around those ports we can find companies that serve in transportation, warehousing, packaging, and supply chain businesses. Even though logistics businesses gain a more respectable position during the growing of Indonesia's economy, the performance of logistics in Indonesia is still in poor condition. The latest Logistic Performance Index (LPI) created by the World Bank confirms the weakness of Indonesian logistics. Other indicators that are also commonly used to measure logistic performance are the ratio of logistic cost to a country's GDP and The Global Competitiveness Rank. Some logistic business practitioners also voiced their concerns on the country's logistic performance as follows:

- "If we are talking about our logistic performance, we must discuss about the cost of logistics in our country. Currently the cost of logistics in Indonesia is 24.5 percent of its GDP. It means that almost a quarter of our economy spent on how to deliver our goods from producers to consumers. This number is surely not efficient. In Southeast Asia, Singapore has logistic cost ratio of 8 percent, while Malaysia has the ratio of 13 percent. Even a country like Vietnam has a better ratio than us, 20 percent. This is totally a waste to our economy. It is no wonder that the cost of importing goods from foreign countries is cheaper than it is to transport similar goods to other region in Indonesia."
- "The common indicator that people usually refer to when talking about logistics is the Logistic Performance Index. This index reflects overall logistic performance in a country. We can say that our index is not that satisfactory. From the measurement of hard infrastructure such as roads, highways, ports, and railroads, we are sure that we are lagging behind quite far. From the soft infrastructure, our performance is also not satisfying. Indicators such as customs, logistic quality, tracking, and timelines are still poor. The worst is in custom clearance process. If we want to improve our logistic, we have to fix all those indicators in the LPI index."
- "Logistics determines the competitiveness of a country. We can see that from the Global Competitiveness Rank that measure logistic indicators such as roads, port, air transport, and railroad. Among all of those indicators, we are still lagging in Southeast Asia behind Singapore, Malaysia, Brunei, and Thailand."

Besides those problems of logistic infrastructure, another acute problem which is related to human capital is the bribery problem. The practice of bribing government

officials in the ports or trucking business is quite common as bribery alone contributes to 1.3 percent of total production cost in Indonesia.

Related to all of those problems, some strategies need to be formulated to improve logistic business and logistic clusters in Indonesia. Those strategies range from improving procedures of the government, investing more on infrastructure projects, and improving technology. Some respondents gave their view on how to improve problems in logistic clusters:

- "I know the problems that we face are complicated, but I think we need to improve the bureaucracy and the work procedures first before we move to more sophisticated solution. For example, customs clearance in the port, why should it take longer time if we can make it shorter and more efficient? Why should we take complicated process if we can make it simpler? We need to have single window policy to ensure every process is efficient. Implementing this policy implies that all custom clearance procedures should be done in one window."
- "My concern is on the human capital side, it is the people who work in the administration side of the logistics system. It is a common knowledge that logistic sector in Indonesia is closely linked to corruption practice and bribery. It is also known that at least 1 to 2 percent of total production costs are spent to bribe the officials. We can reduce this practice by implementing electronic transaction so that no physical money involved during the transaction. This is the technology approach to solve the problem."
- "Some infrastructure projects have been done to speed up the logistics process throughout the nation. The idea is for all goods to move smoothly from the points of origin to the points of destination. We are now constructing trans Java toll road, double track railroad across Java, and after that trans Sumatera toll road, trans Kalimantan toll road, and trans Sulawesi toll road. This is our effort to realize connectivity across Indonesia."
- "We know that ports are a vital element for logistics and trading activity. The main port in Tanjung Priok now is no longer able to meet the increasing demand of either international or domestic trade. This port can only handle 7 million TEUs of containers. Compare it to the Port of Singapore or Port Kliang in Malaysia that can handle 15 to 20 million TEUs of containers. This is not efficient or competitive. Big shippers from America, Europe, or Asia need to transit to those ports in Singapore and Malaysia first, load the containers to smaller ships, then go to Indonesia to load those containers. Currently we are building a new port of Tanjung Priok that can handle up to 20 million TEUs of containers. It is expected that this new port can start to operate by 2017."

Those respondents implied that the problems in logistic clusters in Indonesia basically require two approaches: the soft approach and the hard approach. The soft approach puts human capital as the key driver of performance excellent. Therefore, improving logistic performance also includes improving people's performance through training, education, and technology utilization. Meanwhile, the hard approach requires massive investment in the form of provision of public infrastructure such as ports, highways, roads, and railroads.

5.6.Summary of the Qualitative Section

This section summarizes some important findings from the qualitative section that need to be highlighted for further development of industry clusters in Indonesia. The summary ranges from pros and cons among stakeholders related to the masterplan from the government to the need of a thorough workforce development plan and policy to improve the quality of human capital in Indonesia.

1. Pros and cons regarding the masterplan

There are some disagreements among stakeholders regarding the masterplan from the government to accelerate and to expand the Indonesian economy. Those who support the need of the masterplan are mostly coming from the top officials of the current government. It is reasonable since the idea to create such as masterplan was coming from the President, and then he communicated his idea to his top government officials. People who endorse the masterplan think that government's role is essential in the economy, and that government should be involved in every decision to improve the economy.

However, those in the lower level of government do not fully support the idea since they see the lack of clarity on how to bring the masterplan into the implementation stage.

These lower level officials believe that the masterplan is an example of top-down approach by the government without considering inputs from the people in the lower level. As a result, lack of coordination in implementing the masterplan has become common practice. To make it worse, all levels of government do not have clear communication and coordination. It is no wonder to see the masterplan has been implemented differently in each economic region in Indonesia.

The disagreement regarding the masterplan also comes from the business practitioners. They believe that the masterplan is another useless agenda by the government. While they agree that the concept is good and well written, however, they are skeptical about the commitment from the government to involve the private sector in the implementation of the process. These practitioners are those who believe that the private sector should be given a more important role in the economy and they also believe that government is actually part of the problem.

Related to the pros and cons of the masterplan, it is also worth to see what Porter (1990) says about the institutional arrangement of clusters. Porter suggests that government should provide guidance, policy and rule in the economic development. Government does not need to be involved heavily in the economy and should let the private sector do the detail activities. However, Porter also says that it is a part of government responsibility to provide basic public facilities in order to make the economy runs. Therefore, providing primary infrastructure such as roads, railroads, highways, and electricity also belongs to government's role.

2. What constitutes a cluster?

This study focuses on two important clusters in Indonesia: the automotive manufacturing and the logistics cluster. Therefore, it is necessary to define what industries constitute the automotive and logistics clusters. Since Porter (1990) defines cluster as a geographic concentration of interrelated firms, then several industries may form a cluster. It is also important to define what industries to make a cluster since those industries will be calculated in the quantitative analysis of this study.

The automotive manufacturing cluster may consist of main industries that produce automotive product and its main element such as the body and engine, and other auto parts industries whose products support the main industries. Those auto parts industries include industries that produce windshield, tires, and brakes. While the main automotive industries in Indonesia are dominated by foreign firms, many local auto parts industries fill up the lower layer of the supply chain.

Related to the Diamond Model by Porter (1990), it is necessary for cluster to involve local firms into supply chain of FDI firms. Those local firms may serve as supporting and relating industries in the Diamond model. Another reason why involving local firms to form a cluster is to make local products become more competitive. As local products are competitive enough, they can serve both for domestic consumption and for boosting export performance. In the deficit trade that Indonesia currently has, driving export performance can be a strategy to reduce the deficit.

For the logistics cluster, it may consist of industries that ensure the flow of goods from the point of origin to the point of destination. Those industries include transportation, production, material handling, packaging, inventory, and warehousing. As

explained before, logistics cluster and its supporting businesses are increasingly important to form connectivity in Indonesia's economy.

3. Human Capital and Workforce Development

Some respondents implied the need for more educated people and more qualified human capital to improve Indonesia's economy. From the government side, these goals have also been stated on Chapter 2 of the masterplan. The need for a more qualified human capital implies the need for a comprehensive work force development policy and plan.

A workforce development policy aims to provide those who are in disadvantaged situation with necessary education and training to improve their educational level and skills that by the end would improve their earnings and life quality (Holzer 2008). Providing basic education for all children, increasing public investments in improving early education opportunities, reforming school practices, and improving access to higher education are among the policies that were designed in work force development.

In relation with the development of industry clusters in Indonesia, a comprehensive workforce development policy should also cover the education and training to provide skillful workforce to work in industries. Therefore, government, schools, universities, and the private sector should collaborate together to formulate scheme and career pathways for those labors who prefer to be educated at vocational schools. With the potential of 250 million people, Indonesia has more than enough resources to be developed to create a competitive products and services. Industries should also consider the work force development as a lucrative opportunity to develop their own qualified and skilled workers that later will contribute to work in their industries.

CHAPTER 6: QUANTITATIVE ANALYSIS

The quantitative analysis in this study uses two approaches. The first approach utilizes location quotients (LQ) and shift-share analysis. Location quotients determine the concentration of industry in a local area compared to those at national level. Shift-share analysis is a decomposition technique to assess the competitiveness of a geographic region. This technique is also useful to analyze differences between growth in a local economy and growth at the national (or other reference area) economy (McLean and Voytek 1992). The second part of the quantitative analysis makes use of regression analysis to determine factors that influence competitiveness of an industry cluster.

This chapter begins with calculating location quotient and shift-share analysis to justify industry concentration and competitiveness. The regression analysis performed in this chapter consists of four regression models. The first regression model uses cluster GDP in 2000 as dependent variable; the second model employs cluster GDP in 2010 as dependent variables; the third regression model uses change in GDP between 2000 and 2010 as dependent variable; and the last regression model uses competitive shift from shift-share analysis as dependent variables.

6.1.Location Quotients and Shift Share Analysis

The LQ calculation in this study uses Regional GDP data instead of employment data. The LQ takes the difference between the region's share of the total production of the products of a certain industry available to the nation and the region's share of the nation's consumption. Therefore, if the difference is positive then the region produces a greater share of the nation's production than it consumes and the excess is assumed to be exported (Isserman 1977).

According to Isserman (1977), some assumptions must be held in the LQ calculation. First, it is necessary to assume identical productivity per employee in a given industry as in the nation. Second, there must be identical consumption per capita of the products of a certain industry in the region and the nation. Third, for the difference between the region's share of production and consumption to indicate exports, it is necessary to assume that the region consumes only local production of the products which it exports. Fourth, the assumption that there are no net exports, either positive or negative, by any industry in the nation.

Similarly, shift-share analysis in this study is performed to measure the competitiveness of the automotive manufacturing and logistics clusters in Java economic region. There are three components of the shift-share: a National Share (NS) reflecting trends in the national economy of which the local area is a part; an Industry Mix (IM) reflecting industry specific factors; and a Competitive Shift (CS) or Regional Shift (RS) that measures the performance of a regional industry.

Shift-share analysis has advantage to note variations in the local effect across industries that may signal strengths and weaknesses of the local economy (McLean and

Voytek 1992). Other advantage of shift-share analysis is that this technique is not sensitive to scale or to aggregation so that we could simply sum up the shift-share component in some local areas to make a higher level of shift-share component. For example, the industry mix effect for an area economy as a whole is simply the sum of the industry mix effects for all the individual industries (McLean and Voytek 1992).

This study interprets each component of shift-share analysis (NS, IM, and CS) for analyzing the logistics and automotive clusters in the Java economic corridor. Therefore, NS component aims to identify trends in both industry clusters if those industries grow and decline at the same rate as the national GDP growth rate. IM is calculated to identify the performance of both industry clusters at the national area, and CS aims to reflect local competitive influence on industry performance. The study puts special focus on CS component as it is going to be used as a dependent variable in the econometric model that follows shift-share analysis.

The data for shift-share analysis is based on the Indonesia's regional GDP data in 2000 and 2010 performed by the National Bureau of Statistics. The definition and the classification of all economic activities in the data are following the definition at the International Standard Industrial Classification (ISIC) data published by the United Nations. The calculation of shift-share in this study uses the regional GDP in each city in Indonesia. For the location quotient and shift-share, the unit of analysis is the city.

Before analyzing the shift-share in automotive and logistics clusters in Java economic regions, it is necessary to classify which industries constitute automotive and logistics clusters. Based on the interviews in the qualitative assessment and on data availability, automotive clusters consist of industries that produce auto bodies and engines, and auto

parts such as windshield, tires, brakes, bolts, wires, and seats. The logistic clusters consist of industries that support goods from points of origin to the points where consumers receive those goods. Those industries might include transportation, warehousing, material handling, packaging, and inventory.

Since the referred data from the Indonesia's Bureau of Statistics does not provide detailed definition of each industry sector, this study refers to the definition provided by the International Standard Industrial Classification of All Economic Activities (ISIC) by the United Nations. The ISIC is basically the international reference classification of productive activities. Its main purpose is to provide a set of activity categories that can be utilized for the collection and reporting statistics according to such activities (ISIC 2008).

The ISIC has provided guidance for major countries around the world to classify their national activity. It also has been used widely to classify data according to kind of economic activity in the fields of economic and social statistics (statistics on national accounts, demographic of enterprises, employment and others). The economic activities classification in ISIC are subdivided in a hierarchical, four-level structure of categories. The categories at the highest level are called sections, which subdivides all productive activities into groups such as "Agriculture, forestry and fishing (section A), "Manufacturing" (section C) and "Information and communication" (section J). The classification of all economic activities is based on the inputs of goods, services and factors of production, the process and technology of production, the characteristics of outputs, and the use to which the outputs are put.

6.1.1. Logistic Clusters

Logistics clusters are geographically concentrated sets of logistics-related-companies, distributors, and the logistics functions of retailers and manufacturers (Sheffi 2012). The interviews with stakeholders in logistics industries conclude several industries that can be categorized in a logistics cluster. Those industries are transportation, production, material handling, packaging, inventory, and warehousing. The data from the Indonesian Bureau of Statistics indicates that industry sectors corresponding to this category of cluster include: (1) railroad, (2) road and highway, (3) water transportation, (4) river and lake transportation, (5) air transportation, and (6) transportation services.

The classification of logistics industries by the Indonesian Bureau of Statistics refers to the industry description and classification from the International Standard Industrial Classification of All Economic Activities (ISIC) by the United Nations. This classification describes logistics industries as the activities that include the provision of freight transport, whether scheduled or not, by rail, road, water or air and associated activities such as terminal and parking facilities, cargo handling, storage, etc. (ISIC 2008). Other activities included are postal and courier activities.

The ISIC (2008) explains activities that can be categorized in railroad are transporting goods and freight using railroad rolling stock on mainline networks, usually spread over an extensive geographic area. Freight transport on mainline rail networks as well as short-line freight railroads is also considered here. Road and highway activities include logging haulage, stock haulage, refrigerated haulage, heavy haulage, bulk haulage including haulage in tanker trucks, haulage of automobiles, and transport of waste and waste materials without collection or disposal. Water transportation includes transportation of

goods and freight over water. Such services of water transportation include transport of freight over sea and coastal waters, and transport by towing or pushing of barges, oil rigs, etc.

River and lake transportation are transporting freight via rivers, canals, lake, and other inland waterways including inside harbors and ports. Air transportation involves transportation of goods and freight by air or via space. The services of this activity include transport freight by air over routes and on regular schedules, non-scheduled transport of freight by air, launching of satellites and space vehicles, and space transport. The service also includes renting of air-transport equipment with operator for the purpose of freight transportation.

Transportation service includes of warehousing and support activities for logistics such as activities of transport agencies and cargo handling. Transportation service also includes operation of storage and warehouse facilities for all kind of goods such as operation of grain silos, general merchandise warehouses, refrigerated warehouses, storage tanks, etc. Support activities for logistics include operation of parts of the transport infrastructure or activities related to handling freight immediately before or after transport or between transport segments. The operation and maintenance of all transport facilities is included. Other activities in this category include forwarding of freight, arranging or organizing of transport operation by rail, road, sea, or air, organization of group and individual consignments, issue and procurement of transport documents and waybills, activities of custom agents, activities of sea-freight forwarders and air-cargo agents, and good-handling operations.

The screening matrix in Table 11 illustrates the competitiveness of logistic clusters in Java based on LQ and shift-share calculations. Industry sectors that have LQ > 1 are considered as high, while industry sectors with LQ ≤ 1is considered as low. Each of the industry sectors is presented in abbreviation to make it simple. RR is for railroad, RH is for road and highway, WT is for water transportation, RL is for river and lake transportation, AT is for air transportation and TS as transportation service.

Table 11: Screening matrix of logistics clusters in Java economic corridor

	Location Quotient	
Regional Shift	High	Low
Positive	WT Jakarta TS Jakarta AT Yogyakarta RH Banten RL Banten	RH Jakarta AT West Java WT Central Java RL Central Java WT East Java RR Banten
Negative	RR West Java RR Central Java RH Central Java RR Yogyakarta RH Yogyakarta AT East Java TS East Java AT Banten TS Banten	RL Jakarta AT Jakarta RH West Java WT West Java RL West Java TS West Java AT Central Java TS Central Java TS Yogyakarta RR East Java RH East Java RL East Java WT Banten

The LQ and shift-share analysis for logistics clusters are presented in Table 12 This table presents the calculations of LQ in every sector of the logistics cluster in 2000 and 2010, the percentage of change of LQs between those two years, and the calculation of three elements of shift-share analysis (NS, IM, and CS).

Table 12: LQs and shift-share calculation for logistics clusters in Java economic corridor

Industry Sectors	LQ 00	LQ 10	% of change	NS (Million IDR)	IM (Million IDR)	CS (Million IDR)
Railroad	1.45	1.25	-0.14	0.74	-0.62	-0.0005
Road and Highway	0.97	0.86	-0.11	15.14	-3.51	-1.44
Water Transportation	0.86	0.79	-0.08	3.33	-1.76	-0.14
River and Lake Transportation	0.13	0.11	-0.15	0.14	-0.10	-0.0003
Air Transportation	0.66	0.62	-0.05	1.5	11.34	-0.26
Transportation Service	1.08	1.01	-0.07	5.32	-0.07	-0.29

a. Location Quotient Analysis for Logistics Clusters

Similar to the location quotient in automotive clusters, the LQ for logistics clusters in Java also indicates a declining concentration in all industry sectors between 2000 and 2010. All six industry sectors showed decline in concentration. The biggest decline occurs in river and lake transportation (15 percent decline), followed by railroad (14 percent). The declining concentration of logistics clusters in Java between 2000 and 2010 had also been reflected on the Logistics Performance Index (LPI) compiled by the World Bank. The LPI which explains the logistics performance of a country gave a score of 3.01 in 2007 and 2.76 in 2010 for Indonesia (the index is ranging from 1 for low performance to 5 for high performance). Some of the factors that cause the declining logistics performance of Indonesia include the deficiency of public infrastructure, inefficiency of the custom clearance process, and quality of logistics service (The World Bank 2014).

If we look deeper to the provincial level, all the six industry sectors that form logistics clusters in Java also show declining trend in concentration, with the average decline of 10 percent in all provinces. Specifically, the declines are mostly notable in river and lake transportation in Jakarta (91 percent decline), water transportation in West Java (86 percent), and river and lake transportation in West Java (85 percent). Despite of the declining trend in industrial concentration, some industry sectors show their positive trends such as air transportation in Yogyakarta (80 percent increase), air transportation in West Java (61 percent), and road and highway in Jakarta (15 percent).

Air transportation for logistics in Yogyakarta and West Java showed progress in concentration due to the opening of some new airports in those areas following the deregulation of the airline business in Indonesia in 2000. The deregulation of the airline business triggered the opening of some new airlines that also led to the opening of several logistics companies in Java, especially in the Jakarta metropolitan area and in Yogyakarta. The central government also built new airports and expanded existing ones to anticipate the growing of passengers and logistics business.

The increasing concentration of logistics business in the area of road and highway in Jakarta resulted from the construction of new roads and toll roads that surround Jakarta metropolitan area. The construction of highways in Jakarta has specifically been concentrated on the construction of roads that connect Jakarta’s main port and several business districts in Jakarta. The construction of those highways to the main port is one of the efforts from the government to solve the inefficiency of logistics performance in Indonesia, especially in Jakarta where the main port is located.

b. Shift-share Analysis for Logistics Clusters

The National Share indicator of the logistics clusters in Java show positive values for all industry sectors (Table 12). These positive values imply that if the logistics industries grow at the same rate of the nation's economic growth, then road and highway are the industry sectors that get the highest value of national share, while river and lake transportation have the least national share value. This is true since the government have been focusing on the construction of highways in Java while lake and river transportation has not been developed very well in the past decade.

The industry mix component of the logistics industry indicates how Java specializes in declining logistics sectors nationally. The absolute values of industry mix (Table 12) and the percentage change of industry mix (Table 13) both show negative values for all industry sectors but air transportation. Only the air transportation sector is considered as a growing industry sector nationally. Again, the deregulation and liberalization of airline business in the year of 2000 has made the air transportation industry grow nationally.

Table 13: Percentage Change of Shift-share Component in Logistics Clusters

Industry	NS	IM	CS
Railroad	87.90%	-70.50%	-12.20%
Road and Highway	87.90%	-12.60%	-13.57%
Water Transportation	87.90%	-31.07%	-7.27%
River and Lake Transportation	87.90%	-56.84%	-15.24%
Air Transportation	87.90%	181.62%	-5.71%
Transportation Service	87.90%	-0.70%	-5.84%

However, if we look at the competitive shift value both in absolute values and in percentage change, all industry sectors show negative values, indicating that all sectors in logistics clusters in Java are not competitive. Though small in comparison to road and highway or air transportation, river and lake transportation are the most uncompetitive

sector, while air transportation has the least uncompetitive values. What do these negative numbers imply? They imply that logistics clusters in Java are still not able to compete with other clusters in other region. Industries that form logistics clusters in Java do not have orientation to export or spirit to compete with other players outside the region. Even in air transportation where the industry operates in growing region (based on industry mix), but still it is not competitive enough.

6.1.2. Automotive Clusters

The LQ and shift-share analysis look at the industry concentration and competitiveness of automotive clusters in all thirty three provinces in Indonesia. There are three components of shift-share analysis to be assessed: National Share (NS), Industry Mix (IM), and Competitive Shift (CS). Among the industries listed in the regional GDP data gathered by the Indonesian Bureau of Statistics (BPS), automotive industry clusters consist of several industries in the group which are: (1) textile, leather, and footware; (2) paper and printing; (3) fertilizer, chemical, and rubber; (4) basic,metal, iron, and steel; (5) transportation, machinery, and tools; and (6) other products.

In order to rationalize the choice of industry sectors that make up automotive clusters, it is necessary to check with ISIC industry classification by the United Nations. Manufacture for textile, leather, and footwear cover industries that include: (1) manufacture for made-up furnishing articles such as head liners, upholstery, loose covers for cars, tire covers; and (2) manufacture of automotive trimmings. Manufacture paper and printing include industries for labels and commercial printing. Manufacture for fertilizer, chemical, and rubber includes industries such as plastics, paints, printing ink, lubricants, glass, tires, and tubes. Industries for basic metal, iron, and steel include metal

parts like radiators, plates, nuts and bolts, and electronics. Industries than belong to transportation, machinery, and tools are manufacturers engines, gears, bearings, clutches, shaft couplings, and transmissions. Manufacture of motor vehicles for transporting passengers or freight also belongs to this industry group. Industries that belong to other products include repair and maintenance for vehicle engines.

The screening matrix that assesses the competitiveness of each industry sector in automotive clusters in Java is presented in Table 14. To make it simple, each industry sector is presented in abbreviation. TLF is for Textile, Leather and Footware; PP is for Paper and Printing; FCR is for Fertilizer, Chemicals, and Rubber; BIS is for Basic Metal, Iron, and Steel; TMT is for Transportation, Machinery, and Tools; and OP is for Other Products. This screening matrix categorizes industry sectors that have LQ $\leq$ 1 as low and an LQ >1 as high.

Table 14: Screening matrix of automotive clusters in Java

	Location Quotient	
Regional Shift	High	Low
Positive	TLF West Java TMT West Java OP West Java TLF Central Java PP East Java FCR Banten	PP Jakarta OP Jakarta FCR Central Java BIS Central Java TMT Central Java OP Central Java FCR Yogyakarta FCR East Java
Negative	TMT Jakarta FCR West Java OP Yogyakarta OP East Java TLF Banten PP Banten BIS Banten	TLF Jakarta FCR Jakarta BIS Jakarta PP West Java BIS West Java PP Central Java TLF Yogyakarta PP Yogyakarta

The shift-share calculation and analysis for the automotive cluster in the Java economic corridor was performed by calculating all shift-share components (NS, IM, and CS) in every province in Java Island. There are six provinces that constitute an economic corridor in Java: Jakarta, West Java, Central Java, East Java, Yogyakarta, and Banten. The LQ and shift-share calculations are presented on Table 15.

Table 15: Location quotients and shift-share analysis in automotive clusters in Java corridor

Industry Sectors	LQ 00	LQ 10	% of Change	NS (Million IDR)	IM (Million IDR)	CS (Million IDR)
Textile, Leather, and Footware	1.60	1.51	-0.06	26.12	-20.39	-0.23
Paper and Printing	1.40	1.30	-0.08	9.37	2.62	-0.69
Fertilizer, Chemical, and Rubber	1.33	1.23	-0.07	19.50	-4.78	-0.74
Basic Metal, Iron, and Steel	1.40	0.99	-0.29	8.29	-5.11	0.41
Transportation, Machinery & Tools	1.68	1.48	-0.12	40.65	54.80	-10.42
Other Products	1.61	1.37	-0.15	3.16	-1.50	-0.20

a. Location Quotient for Automotive Clusters

In general, the location quotient measurements in the automotive cluster industries in Java show a declining concentration from 2000 to 2010. The declines are evident in all sectors of automotive clusters, with basic metal, iron, and steel industries suffering the largest concentration decline (29 percent) while textile, leather, and footware industries have the smallest decline (6 percent).

The declining trend of industrial concentration also persists in all six provinces in Java economic corridor. The average change of industrial concentration in all provinces

in Java shows a 11 percent decline in all sectors of automotive clusters. The biggest declines occur in several sectors of industry such as transportation, machinery, and tools in Yogyakarta (46 percent decline); paper and printing in Banten (70 percent); and transportation, machinery, and tools in Banten (68 percent). Despite the declines of most of the industrial concentration in automotive clusters in Java, some industries show positive increases. These increases are evident in fertilizer, chemical, and rubber industry in Central Java (29 percent increase); other products in Central Java (28 percent); and fertilizer, chemical, and rubber in Yogyakarta (29 percent).

Some industries in automotive clusters in Java should be given priority due to their high concentration characteristic. Those industries include textile, leather, and footware in West Java and Central Java; transportation, machinery, and tools in West Java; other products industries in West Java; paper and printing in East Java; and fertilizer, chemical, and rubber in Banten. These industries have actually been established for quite a long time especially during the industrial development era under the "New Order" administration of General Suharto in the 70s and 80s.

b. Shift-share Analysis for Automotive Clusters

As noted above, shift-share is designed to reflect those industries with a competitive (dis)advantage in the economy, particularly is the CS component. Industry Mix can also be revealing to the region's economic structure. National share is simply the national growth rate applied to regional industries. The expected change itself is simply the national rate of growth applied to each regional industry. Among the six industry sectors that form automotive clusters in Java, transportation, machinery, and tools industries have the biggest national share, followed by textile, leather, and footware; and fertilizer,

leather, and rubber (Table 15). This implies that if the automotive clusters grow at the same rate as national GDP, industries that will get the most growth are transportation, machinery, and tools. If we look at the national share in all sectors of automotive clusters, all industries have positive values nationally, indicating that those industries should grow if they followed the national trend in GDP.

Table 16 shows the percentage change of each industry sector for each shift-share components in automotive clusters in Java.

Table 16: Percentage change of shift-share component in automotive clusters

Industry	NS	IM	CS
Textile, Leather, and Footware	69.21%	-44.20%	-2.75%
Paper and Printing	69.21%	11.18%	-6.99%
Fertilizer, Chemical, and Rubber	69.21%	-11.10%	-4.98%
Basic Metal, Iron, and Steel	69.21%	-47.80%	-32.12%
Transportation, Machinery & Tools	69.21%	47.08%	-18.07%
Other Products	69.21%	-25.84%	-16.02%

While the percentage change of the National Share component in each industry sector is the same (69.21 percent), at the provincial level, industries that receive the biggest portion of national share vary in each province according to the size of industry: transportation, machinery and tools receive the biggest portion in Jakarta and West Java; while textile, leather, and footware get the highest national share in Central Java and Banten provinces. Basic metal, iron, and steel have the biggest national share in Yogyakarta, and paper and printing industries are in the top position of industries that receive the biggest national share in East Java. The size of NS component simply reflects the size of these regional industries.

Other shift-share analysis indicator, an industry mix, measures the extent to which the region specializes in fast (slow) growing industries nationally. It represents the share of

regional industry growth explained by the growth of the specific industry at the national level. If we look at the industry mix of automotive clusters in Java, it seems that some industries such as textile, leather, and footware; fertilizers, chemicals, and rubber; basic metal, iron, and steel, and other products are declining. These industry sectors might need the attention of policy makers to assure they are sufficiently modern and efficient to support the automotive clusters. Only two industry sectors, paper and printing, and transportation, machinery, and tools that have positive industry mix values, indicating that these industries are growing faster than overall GDP. At the provincial level, paper and printing and also transportation, machinery, and tools also indicate growth pattern.

Based on the percentage change, basic metal, iron, and steel are sectors that are suffering most because these industry sectors decline 47.80 percent during the last decade. Textile, leather, and footware are also declining 44.20 percent. This percentage implies that nationally these sectors are also declining.

The last shift-share analysis indicator, competitive share, measures the relative performance of a regional industry. This measurement reflects comparative advantage of a region; access to markets, materials, and suppliers; and the appropriateness of industry for the region. The competitive share also explains how much of the change in a given industry is due to some unique competitive advantage that the region possesses.

In Table 15, some interesting findings are revealed related to the value of the competitive shift and its relation with industry mix. First, the values of competitive shift in almost all industry sectors are negative. These negative values imply that all the industry sectors in automotive clusters in Java are not competitive. Industry sectors such as textile, leather, and footware; fertilizers, chemicals, and rubber; basic metal, iron, and

steel; and other products are industries that are declining in Java and not competitive relative to other industries. An interesting finding is found in paper and printing and transportation, machinery, and tools sectors as the industries are growing in Java while they are not competitive (the competitive shift values are negative).

Based on the percentage change (Table 16), basic metal, iron, and steel are the most uncompetitive industries in Java, followed by transportation, machinery, and tools; and other products. The uncompetitive values of the local factor here imply that these local industries may not be able to compete with other similar industries in the region and do not have orientation to export. The competitive shift values for each industry sectors indicate that there are no strong performers for automotive clusters in Java economic region. This reinforces the findings concerning industry mix.

6.2.Explaining Cluster's Competitiveness via Regression Analysis

Porter (1990) in his Diamond model explained that agglomeration economies in the form of industry clusters profoundly influence competition. Thus, regional clusters grow because of four factors: (1) firm strategy, structure, and rivalry; (2) demand conditions; (3) factor conditions; and (4) related and supporting industries. All four factors in the Diamond model are utilized as the independent variables in this study.

This study uses four econometric models for measuring competitiveness of automotive and logistics industry clusters in Indonesia. The first econometric model utilizes the size of cluster regional GDP in the year of 2000 as dependent variable, while the second model employs cluster GDP in 2010 as dependent variables respectively. The goal for using these first two models is to measure the effect of each Porter's four factors in the diamond model to the cluster regional GDP in 2000 and 2010. The independent

variables to explain cluster GDP in 2000 are the diamond model variables in 2000. Similarly, the independent variables to explain cluster GDP in 2010 are the variables of diamond model in 2010.The equation for the first econometric model can be expressed as follows:

$$Cluster\ GDP\ in\ 2000 = \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables + \alpha_2 Demand\ conditions\ variables + \alpha_3 Factor\ conditions\ variables + \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

While the equation for the second econometric model can be expressed as follows:

$$Cluster\ GDP\ in\ 2010 = \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables + \alpha_2 Demand\ conditions\ variables + \alpha_3 Factor\ conditions\ variables + \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

The independent variables for the first and second econometric model -including their definitions, expected signs, and sources- are presented in Table 17.

Table 17: The independent variables to explain cluster GDP

Variable Name	Definition	Unit of Measurement	Expected Sign	Source of Data
Context for Firm Strategy and Rivalry				
Herfindahl Index	An index that measures the size of firms in their relation to the industry and the competitive performance among them.	Index	-	Indonesian Bureau of Statistics
Competitiveness	Competitive shift of a cluster based on shift-share calculation	Million IDR	+	Indonesian Bureau of Statistics
Related and Supporting Industries				
Logistics (Auto) employment	The number of people who are working in particular industry clusters	People	+	Indonesian Bureau of Statistics
Logistics (Auto) factor supply	The factor supply in particular clusters; it is industry mix divided by regional GDP	Million IDR	+	Indonesian Bureau of Statistics
Factor (Input) Condition				
Ports	Dummy variable, 1 if the city has port, 0 if city does not have port	Unit	+	Indonesian Bureau of Statistics
University Enrollment	The number of students who are enrolled in higher education	Students	+	Ministry of Education
Productivity	The output produced by each employees in a city; it is the GRDP divided by employment	Million IDR/person	+	Indonesian Bureau of Statistics
Population Density	The number of people who live every square kilometer; it is total population divided by total area of a city	Square kilometer	+	Indonesian Bureau of Statistics
Gross Regional Domestic Product (GRDP)	A subnational gross domestic product for measuring the size of a region's economy.	Million IDR	+	Indonesian Bureau of Statistics

Table 17: (Continued)

Demand Condition				
Income per capita	The income per capita in a city; resulted from regional GDP divided by population	Million IDR	+	Indonesian Bureau of Statistics
Human Development Index	A tool to measure an area's social and economic dimensions. In this study, the HDI consists of life expectancy rate, literacy rate, years to complete school, and income per capita.	Index	+	National Team for the Acceleration of Poverty Reduction
Poverty Rate	Percentage of the number of people who fall below the poverty line from the total population of a city	%	-	National Team for the Acceleration of Poverty Reduction
Number of unemployed	Number of people unemployed in their productive age in a city	People	-	National Team for the Acceleration of Poverty Reduction
Economic Change	The percentage change of the GRDP of a city between 2000 and 2010	%	+	Indonesian Bureau of Statistics

The independent variables for the first and second econometric models make up four factors in Porter's diamond model. The model is depicted in Figure 6.

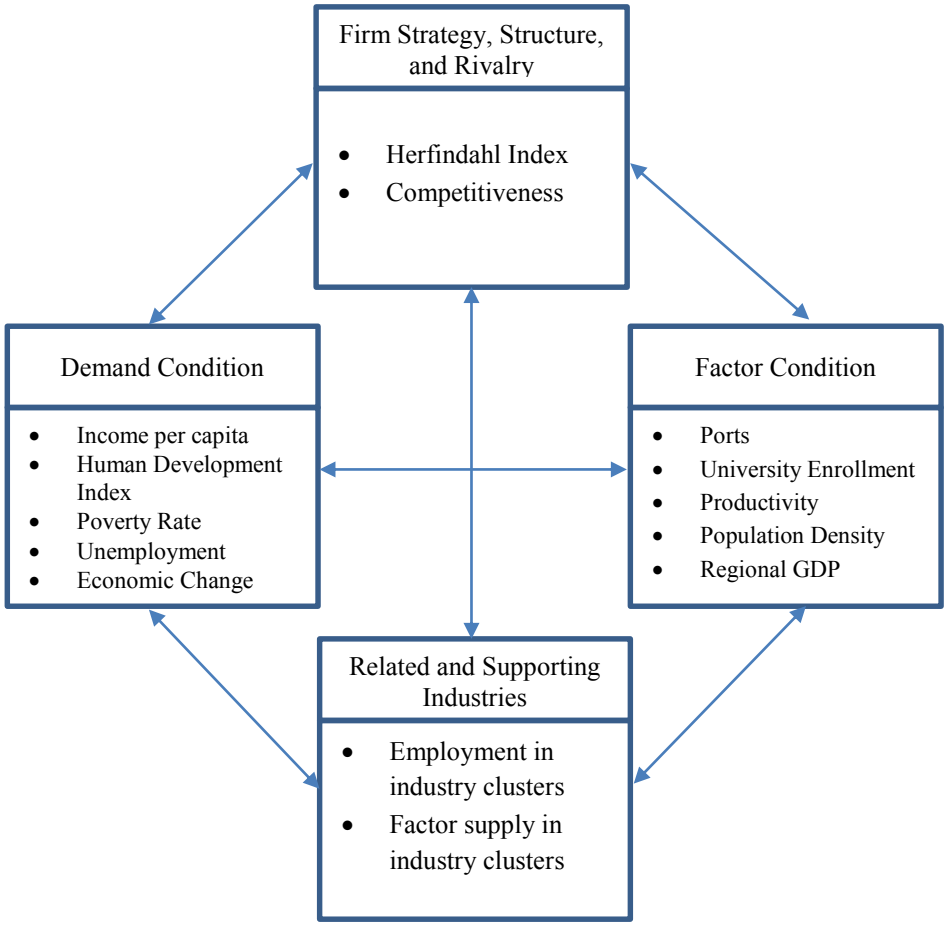

Figure 6: Independent variables to explain cluster GDP

The third econometric model employs change in GDP clusters between 2000 and 2010 as dependent variable. The idea of introducing the change of cluster size is based on the income convergence literature. Income convergence literatures postulate that poorer regions' per capita incomes grow faster than richer regions (Tamura 1991). As a result, all regions converge in terms of income per capita. The equation of the third model is given as follow:

$$Change\ in\ cluster\ GDP$$
$$= \alpha_0 + \alpha_1 Cluster\ GDP\ 2000$$
$$+ \alpha_2 Firm\ strategy, structure, and\ rivalry\ variables$$
$$+ \alpha_3 Demand\ conditions\ variables$$
$$+ \alpha_4 Factor\ conditions\ variables$$
$$+ \alpha_5 Related\ and\ supporting\ industries\ variables + \varepsilon$$

The independent variables for this model are similar with the independent variables of the previous two models, with the addition of cluster GDP 2000 variable in the model.

The fourth econometric model competitive shift resulted from shift-share analysis as dependent variable. The equation for the fourth econometric model is given as follows:

$$Competitive\ Shift$$
$$= \alpha_0 + \alpha_1 Firm\ strategy, structure, and\ rivalry\ variables$$
$$+ \alpha_2 Demand\ conditions\ variables$$
$$+ \alpha_3 Factor\ conditions\ variables$$
$$+ \alpha_4 Related\ and\ supporting\ industries\ variables + \varepsilon$$

The independent variable for the fourth econometric model is depicted in Figure 7.

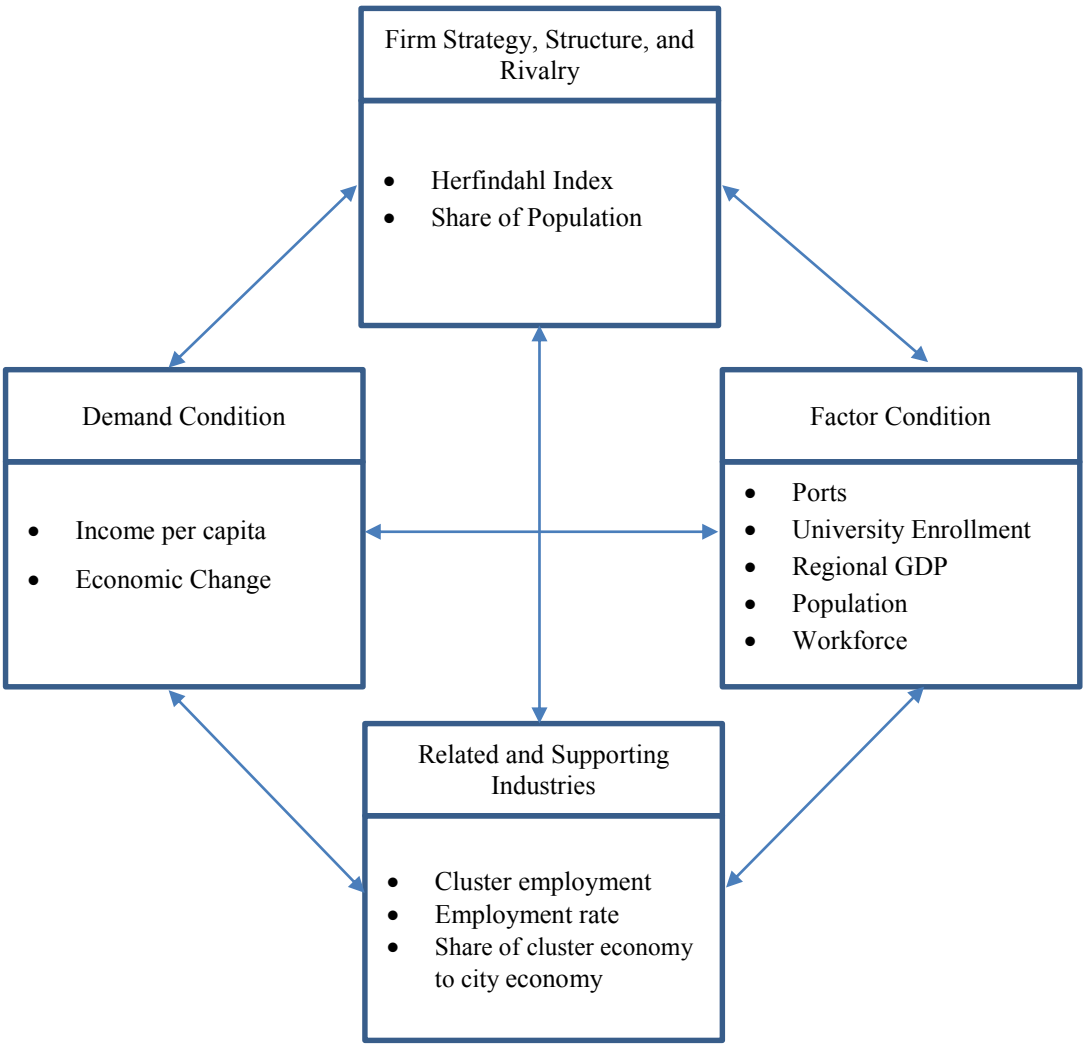

Figure 7: Independent variables to explain competitiveness

The definition, unit of measurement, expected sign, and source of data for the fourth model are presented on Table 18.

Table 18: Independent variables to explain competitive shift

Variable Name	Definition	Unit	Expected Sign	Source of Data
Context for Firm Strategy and Rivalry				
Herfindahl Index	An index that measures the size of firms in their relation to the industry and the competitive performance among them.	Index	-	Indonesian Bureau of Statistics
Share of Population	Share of city population to province population	%	+	Indonesian Bureau of Statistics
Related and Supporting Industries				
Logistics (Auto) employment	The number of people who are working in particular industry clusters	People	+	Indonesian Bureau of Statistics
Employment rate	The rate of employment in a city (employment/population)	%	+	Indonesian Bureau of Statistics
Logistics (Auto) share	Share of cluster's economy to overall city economy	%	+	Indonesian Bureau of Statistics
Factor (Input) Condition				
University Enrollment	The number of students who are enrolled in higher education	Students	+	Ministry of Education
Ports	Dummy variable, 1 if the city has port, 0 if city does not have port	unit	+	Indonesian Bureau of Statistics
Gross Regional Domestic Product (GRDP)	A subnational gross domestic product for measuring the size of a region's economy.	Million IDR	+	Indonesian Bureau of Statistics
Population	The total population of a city	People	+	Indonesian Bureau of Statistics
Workforce	The number of people who are working in their productive age	People	+	Indonesian Bureau of Statistics

Table 18: (Continued)

Demand Condition				
Income	The income per capita in a city; resulted from regional GDP divided by population	Million IDR	+	Indonesian Bureau of Statistics
Economic Change	The percentage change of the GRDP of a city between 2000 and 2010	%	+	Indonesian Bureau of Statistics

6.2.1. Results for the First Econometric Model: Using Cluster GDP in 2000 as Dependent Variable

This section discusses the results from the first econometric model that employs cluster GDP in 2000 as dependent variable. The regression results from logistics clusters are being presented before results from automotive clusters,

- Logistics Clusters

The descriptive statistics for all variables to explain cluster GDP in 2000 for logistics clusters are presented in Table 19 as follows.

Table 19: Descriptive statistics for cluster GDP 2000 model for logistics clusters

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Log of cluster GDP 2000	5.12	5.48	1.16	1.36	0	6.19
HDI	69.93	70.42	5.39	29.06	47.74	79.29
Logistics Factor Supply	0.02	0.004	0.09	0.008	-0.03	1.46
Poverty	16.29	13.93	10.63	112.99	0	51.91
Economic Change	46.42	48.75	47.72	2277.28	-81.33	567.14
Competitiveness	246.72	249	140.81	19827.13	1	489
Log of Unemployment	5.17	5.47	0.97	0.95	0	6.17
Herfindahl Index	0.68	0.69	0.23	0.052	0.24	1
Ports	0.39	0	0.49	0.24	0	1
Population Density	160.01	160	86.67	7513.26	1	316

Table 19: (Continued)

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Log of RGDP	5.21	5.51	0.97	0.95	0	6.20
Log of University Enrollment	4.85	5.08	0.912	0.832	0	5.87
Productivity	235.28	235	134.85	18185.77	1	468
Income per capita	7.24	4.56	9.80	96.16	0	100.02
Employment in Logistics	226.47	227	127.93	16368.05	1	447

Regression result for cluster GDP 2000 model for logistics clusters is presented in Table 20.

Table 20: Regression result to explain cluster GDP 2000 in logistics clusters

Log of Cluster GDP 2000	Coefficient	Std. Error	t	P>ItI	VIF	Beta
HDI	0.047***	0.013	3.05	0.002	1.92	0.186
Logistics Factor Supply	1.770***	0.556	-3.18	0.002	1.02	-0.141
Poverty	-0.004**	0.006	2.29	0.022	1.86	0.137
Economic Change	0.01***	0.001	1.64	0.001	1.18	0.078
Competitiveness	0.6***	0.0003	-2.78	0.006	1.11	-0.129
Log of Unemployment	-0.072	0.052	-1.38	0.168	1.03	-0.061
Herfindahl Index	-0.036**	0.244	0.80	0.023	1.23	0.039
Ports	0.895**	0.113	1.73	0.045	1.21	0.083
Population Density	-0.0004***	0.0005	-0.83	0.007	1.03	-0.036
Log of RGDP	-0.050	0.051	-0.98	0.329	1.01	-0.043
Log of University Enrollment	-0.036	0.056	-0.64	0.523	1.03	-0.028
Productivity	-0.0004	0.0003	-1.07	0.285	1.03	-0.047
Employment in Logistics	-0.0001	0.0004	-0.04	0.965	1.04	-0.001
Income per Capita	0.0026	0.005	-0.47	0.640	1.18	-0.022
Constant	3.133	1.121	2.79	0.005		
Number of Observation	497					
R-squared	0.0718					
Adjusted R-squared	0.0449					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

Using cluster GDP in 2000 as dependent variable, the R-squared of the model is 0.0718. This implies that 7.18 percent of the variance in logistic cluster GDP in 2000 can be explained by all independent variables, combined. Similarly, the adjusted R-squared of 0.0449 indicates that 4.49 percent of the variance in logistics cluster GDP in 200 can be explained by all independent variables, after adjusting the number of independent variables.

There are eight significant independent variables to explain logistics cluster GDP in 2000: Human Development Index, poverty rate, logistics factor supply, economic change, ports, competitiveness, Herfindahl index, and population density. The coefficient of variable human development index is 0.0047. This coefficient indicates that on average, as human development index increases by one unit, log of logistics cluster GDP in 2000 increases by 0.0047. This number is equal to IDR 1.004 Trillion of logistics cluster GDP in 2000. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable logistic factor supply is 1.770. This coefficient indicates that on average, as logistics factor supply increases by one unit, log of logistics cluster GDP in 2000 increases by 1.770. This number is equal to IDR 5.870 Trillion of logistics cluster GDP in 2000. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable poverty rate is -0.004. This coefficient indicates that on average, as poverty rate increases by one percent (2.08 million), log of logistics cluster GDP in 2000 decreases by 0.004. This number is equal to IDR 1.004 Trillion of logistics

cluster GDP in 2000. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable economic change is 0.01. This coefficient indicates that on average, as economic change increases by one percent (IDR 14.4 Trillion), log of logistics cluster GDP in 2000 increases by 0.01. This number is equal to IDR 1.010 Trillion of logistics cluster GDP in 2000. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable competitiveness is 0.6. This coefficient indicates that on average, as competitive shift increases by one million rupiah, log of logistics cluster GDP in 2000 increases by 0.6. This number is equal to IDR 1.822 Trillion of logistics cluster GDP in 2000. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl index is -0.036. This coefficient indicates that on average, as Herfindahl index increases by one unit, log of logistics cluster GDP in 2000 decreases by 0.036. This number is equal to IDR 1.036 Trillion of logistics cluster GDP in 2000. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This finding suggests that logistics cluster GDP in 2000 would be larger if there were more firms that compete in the cluster. More firms that compete fairly would forbid the practice of monopoly, and therefore give chance to more firms to obtain the benefit of the economy. In monopolistic market, this is impossible to happen as only a single economic agent that gains the benefit of the economy.

The coefficient of variable ports is 0.895. This coefficient indicates that on average, city that has port has 0.895 larger log of logistics cluster GDP in 2000, compared to city that does not have port. This also implies that on average, city that has port has IDR 2.447 Trillion larger of logistics cluster GDP in 2000 compared to city that does not have port. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient. The finding supports the notion that the availability of port is inevitable in logistics clusters. A city that has port would have better opportunity to ship its local products to the outside region. An export-orientation port would also get the benefit of exporting local products to other country so that local products would have a chance to compete with other products in the region.

The coefficient of variable population density is -0.0004. This coefficient indicates that on average, as population density increases by one person per square kilometer, log of logistics cluster GDP in 2000 decreases by 0.0004 or IDR 1 Trillion in logistics cluster GDP in 2000. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This finding suggests that the more crowded the population of a city, the less economic benefit that city can get. This may be true in Indonesia as government attempts to spread the economic and industrial development to the regions outside Java that are less populated. Developing clusters to less populated regions would give better opportunity for other people who live outside populated region to enjoy the benefit of development, and therefore can increase their economic welfare.

- Automotive Clusters

The descriptive statistics for all variables to explain cluster GDP in 2000 for automotive clusters are presented in Table 21.

Table 21: Descriptive statistics for cluster GDP 2000 model for automotive clusters

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Log Cluster GDP 2000	4.47	4.76	0.96	0.92	0	5.46
HDI	71.48	71.34	3.45	11.91	58.68	79.29
Automotive Factor Supply	-0.004	-0.0001	0.03	0.0009	-0.208	0.130
Poverty	14.29	14.26	6.57	43.19	0	31.94
Economic Change	50.09	53.4	39.26	1542.09	-74.66	208.95
Competitiveness	112.45	123.5	70.75	5005.02	1	242
Unemployment	8505.29	4222.5	11451.29	13100000	124	66961
Herfindahl Index	0.49	0.43	0.23	0.05	0.2	1
Ports	0.33	0	0.47	0.22	0	1
Population Density	104.12	102	56.69	3214.08	2	206
Log of RGDP	4.5	4.799	0.97	0.94	0	5.48
Log of University Enrollment	5.38	5.48	0.993	0.987	1.94	8.08
Productivity	41.60	20.32	71.11	5057.13	5.03	718.71
Employment in Automotive	6.81	4.225	9.03	81.64	73	78.87

Regression result for cluster GDP 2000 model for automotive clusters is presented in Table 22.

Table 22: Regression result to explain cluster GDP 2000 in automotive clusters

Log of Cluster GDP 2000	Coefficient	Std. Error	t	P>ItI	VIF	Beta
HDI	0.025	0.022	1.16	0.248	1.65	0.093
Automotive Factor Supply	2.621	2.114	1.24	0.216	1.20	0.085
Poverty	-0.022**	0.012	1.82	0.040	1.71	0.150
Economic Change	0.002	0.001	1.14	0.255	1.35	0.083
Competitiveness	0.0004	0.0009	0.46	0.650	1.21	0.031
Unemployment	-0.000008	0.000057	1.43	0.155	1.17	0.097
Herfindahl Index	-0.41**	0.287	-2.45	0.015	1.24	-0.171
Ports	0.731**	0.134	0.98	0.050	1.11	0.064
Population Density	-0.0004	0.001	-0.43	0.669	1.12	-0.028
Log of RGDP	-0.022	0.065	-0.34	0.727	1.11	-0.022
Log of University Enrollment	0.0679**	0.074	-0.91	0.032	1.46	-0.069
Productivity	0.096***	0.001	-2.64	0.009	5.42	-0.386
Employment in Automotive	-0.002**	0.0009	-2.22	0.027	1.03	-0.142
Income per capita	0.19**	0.015	1.84	0.028	5.12	0.261
Constant	3.165	1.70	1.86	0.004		
Number of Observation	232					
R-squared	0.1393					
Adjusted R-squared	0.0837					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

Using cluster GDP in 2000 as dependent variable, the R-squared of the model is 0.1393. This implies that 13.93 percent of the variance in automotive cluster GDP in 2000 can be explained by all independent variables, combined. Similarly, the adjusted R-squared of 0.0837 indicates that 8.37 percent of the variance in automotive cluster GDP in 2000 can be explained by all independent variables, after adjusting the number of independent variables.

There are seven significant independent variables to explain automotive cluster GDP in 2000: poverty rate, Herfindahl index, ports, log of university enrollment, productivity, employment in automotive clusters, and income per capita. The coefficient of variable

poverty rate is -0.022. This coefficient indicates that on average, as poverty rate increases by one percent (2.08 million of people), log of automotive cluster GDP in 2000 decreases by 0.022. This number is equal to IDR 1.022 Trillion of automotive cluster GDP in 2000. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl index is -0.41. This coefficient indicates that on average, as Herfindahl index increases by one unit, log of automotive cluster GDP in 2000 decreases by 0.41. This number is equal to IDR 1.506 Trillion of automotive cluster GDP in 2000. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This finding suggests that the economic benefit can be achieved if firms are allowed to compete fairly in the market. In this sense, no dominant player allowed to push its power in the market.

The coefficient of variable ports is 0.731. This coefficient indicates that on average, a city that has port has 0.731 bigger log of automotive cluster GDP in 2000, compared to city that does not have port. This also implies that a city that has port has IDR 2.077 Trillion larger of automotive cluster GDP in 2000, compared to a city that does not have port. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient. This finding confirms the importance of ports in automotive clusters. As automotive clusters in Indonesia have export orientation, therefore the availability of port that is closed in proximity to the clusters is inevitable.

The coefficient of variable log of university enrollment is 0.0679. This coefficient indicates that on average, as log of university enrollment increases by one unit, log of automotive cluster GDP in 2000 increases by 0.0679. In other word, as university

enrollment increases by 2.71 student, automotive cluster GDP increases by IDR 1.070 Trillion. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient. This finding suggests the importance of education for economic development. The economy needs more educated young generation, and university enrollment represents the supply of those educated people. University enrollment can also function as pool of talent for automotive industry, especially the vocational schools that provide skilled workers who are ready to work in industry.

The coefficient of variable productivity is 0.096. This coefficient indicates that on average, as productivity increases by one million IDR per person, log of automotive cluster GDP in 2000 increases by 0.096. This number is equal to IDR 1.070 Trillion of automotive cluster GDP in 2000. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable employment in automotive clusters is -0.002. This coefficient indicates that on average, as employment in automotive clusters increases by one person, log of automotive cluster GDP in 2000 decreases by 0.002. This number is equal to IDR 1.002 Trillion of automotive cluster GD in 2000. The direction of the variable coefficient is positive, which is not in line with the expected direction of the variable coefficient. The variable coefficient direction which is different from the expectation suggests that technological advancement and automation have played crucial role in automotive manufacturing in Indonesia. The automation system can replace jobs that were formerly done by many workers. The automotive industries in Indonesia that are dominated by foreign-based global manufacturers implemented advanced technology

and automation in their plants in Indonesia as well. This may explain why the coefficient of employment in automotive clusters is negative.

The coefficient of variable income per capita is 0.19. This coefficient indicates that on average, as income per capita increases by one million rupiah per person, log of automotive cluster GDP in 2000 increases by 0.19. This number is equal to IDR 1.209 Trillion of automotive cluster GDP in 2000. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient. The finding suggests that as people get wealthier, the automotive cluster GDP also goes up. As people gets richer, they consume more so that it drives the consumption factor in automotive GDP too.

6.2.2. Results for the Second Econometric Model: Using Cluster GDP in 2010 as Dependent Variable

- Logistics Clusters

The descriptive statistics for all variables to explain cluster GDP in 2010 for logistics clusters are presented in Table 23 as follows.

Table 23: Descriptive statistics for cluster GDP 2010 model for logistics clusters

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Log of Cluster GDP 2010	5.13	5.48	1.14	1.31	0	6.19
HDI	69.93	70.42	5.39	29.07	47.74	79.29
Logistics Factor Supply	0.007	0.0031	0.02	0.0004	-0.015	0.26
Poverty	16.29	13.93	10.63	112.99	0	51.91
Economic Change	46.41	48.75	47.72	2277.28	-81.33	567.14
Competitiveness	246.72	249	140.80	19827.13	1	489
Log of Unemployment	5.17	5.47	0.97	0.94	0	6.16
Herfindahl Index	0.68	0.69	0.22	0.051	0.26	1
Ports	0.39	0	0.49	0.24	0	1

Table 23: (Continued)

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Population Density	1078.67	141	2877.39	8279406	1	35153
Log of RGDP	6.59	6.61	0.19	0.039	5.96	6.89
Log of University Enrollment	4.85	5.08	0.91	0.83	1	468
Productivity	235.28	235	127.93	16368.05	1	447
Income per Capita	7.9	5.68	9.42	88.79	0.83	113.91
Employment in Logistics	226.47	227	127.94	16368.05	1	447

Regression result for cluster GDP 2010 model for logistics clusters is presented in Table 24 as follows.

Table 24: Regression result to explain cluster GDP 2010 in logistics clusters

Log of Cluster GDP 2010	Coefficient	Std. Error	t	P>ItI	VIF	Beta
HDI	0.086***	0.013	3.13	0.002	2	0.193
Logistics Factor Supply	1.596***	2.542	-3.63	0.000	1.03	-0.161
Poverty	-0.011**	0.006	2.10	0.036	1.86	0.125
Economic Change	0.098**	0.001	1.73	0.044	1.13	0.080
Competitiveness	0.047***	0.0003	-2.87	0.004	1.11	-0.132
Log of Unemployment	-0.047	0.0523	-0.91	0.363	1.04	-0.040
Herfindahl Index	-0.023**	0.246	0.75	0.036	1.25	0.036
Ports	2.98**	0.113	1.40	0.033	1.23	0.067
Population Density	-0.00001***	0.00001	-0.90	0.019	1.25	-0.044
Log of RGDP	-0.079	0.2531	-0.31	0.753	1.02	-0.013
Log of University Enrollment	-0.033	0.055	-0.60	0.548	1.03	-0.026
Productivity	-0.0003	0.003	-0.79	0.428	1.05	-0.035
Income per Capita	-0.002	0.006	-0.05	0.958	1.24	-0.019
Employment in Logistics	-0.00002	0.003	-0.39	0.697	1.04	-0.002
Constant	3.13	1.99	1.57	0.018		
Number of Observation	497					
R-squared	0.0792					
Adjusted R-squared	0.0525					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

Using cluster GDP in 2010 as dependent variable, the R-squared of the model is 0.0792. This implies that 7.92 percent of the variance in logistic cluster GDP in 2010 can be explained by all independent variables, combined. Similarly, the adjusted R-squared of 0.0525 indicates that 5.25 percent of the variance in logistics cluster GDP in 2010 can be explained by all independent variables, after adjusting the number of independent variables.

There are eight significant independent variables to explain logistics cluster GDP in 2010: Human Development Index, poverty rate, logistics factor supply, economic change, ports, competitiveness, Herfindahl index, and population density. The coefficient of variable human development index is 0.086. This coefficient indicates that on average, as human development index increases by one unit, log of logistics cluster GDP in 2010 increases by 0.086. This number is equal to IDR 1.089 Trillion of logistics cluster GDP in 2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable logistics factor supply is 1.596. This coefficient indicates that on average, as logistics factor supply increases by one unit, log of logistics cluster GDP in 2010 increases by 1.596. This number is equal to IDR 4.933 Trillion in logistics cluster GDP in 2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable poverty rate is -0.011. This coefficient indicates that on average, as poverty rate increases by one percent (2.3 million people), log of logistics cluster GDP in 2010 decreases by 0.011. This number is equal to IDR 1.011 Trillion of

logistics cluster GDP in 2010. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable economic change is 0.098. This coefficient indicates that on average, as economic change increases by one percent (IDR 21.1 Trillion), log of logistics cluster GDP in 2010 increases by 0.098. This number is equal to IDR 1.102 Trillion of logistics cluster GDP in 2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable competitiveness is 0.047. This coefficient indicates that on average, as competitive shift increases by one million IDR, log of logistics cluster GDP in 2010 increases by 0.047. This number is equal to IDR 1.048 Trillion of logistics cluster GDP in 2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl index is -0.023. This coefficient indicates that on average, as Herfindahl index increases by one unit, log of logistics cluster GDP in 2010 decreases by 0.023. This number is equal to IDR 1.023 Trillion of logistics cluster GDP in 2010. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This result also suggests that as the number of firms that compete fairly in logistics business increase, the regional GDP also increase. This finding also suggests that competition if favorable, while monopoly practice is unfavorable.

The coefficient of variable ports is 2.98. This coefficient indicates that on average, a city that has port would have 2.98 larger log of logistics cluster GDP in 2010, compared to city that does not have port. This also implies city that has port would have IDR

19.687 Trillion larger logistics cluster GDP in 2010 than city that does not have port. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient. The finding suggests that port is an important factor in driving the economic performance of logistics clusters. Ports would make the flow of goods and services run smoothly, and subsequently, would help the economy runs well. This is why the development of ports and other infrastructure is inevitable for Indonesia to gain competitive advantage for its economy.

The coefficient of variable population density is -0.00001. This coefficient indicates that on average, as population density increases by one person per squared kilometer, log of logistics cluster GDP in 2010 decreases by 0.00001. This number is equal to IDR 1 Trillion of logistics cluster in 2010. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This finding suggests that the denser the population of an area, the less economic advantage a logistic cluster can get in that area. This finding is interesting especially to acknowledge that the Java economic corridor has the densest population compared to other economic corridor, and that industrial developments are still concentrated in Java. This finding also suggests that spreading development to less dense area would bring economic benefit for the development of logistics industry.

- Automotive Clusters

The descriptive statistics for all variables to explain cluster GDP in 2010 for automotive clusters are presented in Table 25 as follows.

Table 25: Descriptive statistics for cluster GDP 2010 model for automotive clusters

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Log of Cluster GDP 2010	4.46	4.75	0.957	0.916	0	5.451
HDI	70.98	70.83	3.65	13.32	58.68	78.24
Automotive Factor Supply	-0.004	-0.0001	0.025	0.0006	-0.194	0.0796
Poverty	14.29	14.265	6.57	43.19	0	31.94
Economic Change	50.09	53.4	39.26	1542.096	-74.66	208.95
Competitiveness	122.45	123.5	70.75	5005.021	1	242
Log of Unemployment	8505.29	4222.5	11451.29	131000000	124	66961
Herfindahl Index	0.49	0.43	0.233	0.055	0.2	1
Ports	0.33	0	0.47	0.22	0	1
Population Density	1734.05	464	3857.71	14900000	6	35153
Log of RGDP	5.86	5.88	0.196	0.038	5.24	6.16
Log of University Enrollment	5.39	5.48	0.993	0.987	1.95	8.09
Productivity	61.13	30.13	116.20	13502.62	7.32	1261.49
Income per Capita	8.36	5.705	11.31	128.01	0.83	113.91
Employment in Automotive	117.86	117.5	67.69	4581.67	1	234

Regression result for cluster GDP 2010 model for automotive clusters is presented in Table 26 as follows:

Table 26: Regression result to explain cluster GDP 2010 in automotive clusters

Log of Cluster GDP 2010	Coefficient	Std. Error	t	P>ItI	VIF	Beta
HDI	0.096***	0.018	0.52	0.003	1.27	0.036
Automotive Factor Supply	4.28	2.66	1.61	0.109	1.22	0.112
Poverty	-0.012**	0.011	1.70	0.031	1.50	0.131
Economic Change	0.001	0.001	0.98	0.330	1.28	0.069
Competitiveness	0.00013	0.0009	0.14	0.890	1.18	0.009
Unemployment	0.000006	0.000005	1.06	0.292	1.23	0.073
Herfindahl Index	-0.01**	0.285	-2.16	0.032	1.22	-0.149

Table 26: (Continued)

Log of Cluster GDP 2010	Coefficient	Std. Error	t	P>ItI	VIF	Beta
Ports	0.436***	0.132	1.02	0.009	1.07	0.066
Population Density	0.00003	0.00001	1.54	0.125	1.59	0.122
Log of RGDP	0.079	0.322	0.25	0.807	1.09	0.016
Log of University Enrollment	-0.052	0.071	-0.73	0.464	1.36	-0.053
Productivity	0.0018**	0.0017	-2.16	0.032	1.90	-0.450
Employment in Automotive	-0.0012**	0.0009	-1.93	0.046	1.03	-0.123
Income per capita	0.037**	0.016	1.49	0.037	1.33	0.287
Constant	3.619	2.557	1.42	0.008		
Number of Observation	232					
R-squared	0.1373					
Adjusted R-squared	0.0817					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

Using cluster GDP in 2010 as dependent variable, the R-squared of the model is 0.1373. This implies that 13.73 percent of the variance in automotive cluster GDP in 2010 can be explained by all independent variables, combined. Similarly, the adjusted R-squared of 0.0817 indicates that 8.17 percent of the variance in automotive cluster GDP in 2010 can be explained by all independent variables, after adjusting the number of independent variables.

There are seven significant independent variables to explain automotive cluster GDP in 2010: Human Development Index, poverty rate, Herfindahl index, ports, productivity, employment in automotive clusters, and income per capita. The coefficient of variable human development index is 0.096. This coefficient indicates that on average, as human development index increases by one unit, log of automotive cluster GDP in 2010 increases by 0.096. This is equal to IDR 1.100 Trillion of automotive cluster GDP in

2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable poverty rate is -0.012. This coefficient indicates that on average, as poverty rate increases by one percent (2.3 million people), log of automotive cluster GDP in 2010 decreases by 0.012. This number is equal to IDR 1.012 Trillion of automotive cluster GDP in 2010. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl index is -0.01. This coefficient indicates that on average, as Herfindahl index increases by one unit, log of automotive cluster GDP in 2010 decreases by 0.01. This is equal to IDR 1.010 Trillion of automotive cluster GDP in 2010. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This finding suggests that automotive clusters in 2010 gain economic benefit if there are more firms compete fairly in the market. This also suggests that a single or few firms in automotive clusters would not make the cluster competitive. This finding is critical to be noted as currently firms that operate in automotive clusters in Indonesia are predominated by few foreign-based automotive manufacturers.

The coefficient of variable ports is 0.436. This coefficient indicates that on average, a city that has port has 0.436 bigger log of automotive cluster GDP in 2010, compared to city that does not have ports. This implies that city that has port has IDR 1.546 Trillion larger of automotive cluster GDP in 2010, compared to city that does not have port. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This finding suggests the importance of ports to

support the competitiveness of automotive clusters. Automotive clusters that have export orientation will surely need a port to export their products outside the region. This is also the reason why the Indonesian government plans to develop 23 new ports across the country to help boosting the nation's economic performance.

The coefficient of variable productivity is 0.0018. This coefficient indicates that on average, as productivity increases by one million IDR per person, log of automotive cluster GDP in 2010 increases by 0.0018. This number is equal to IDR 1.001 Trillion of automotive cluster GDP in 2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable employment in automotive is -0.0012. This coefficient indicates that on average, as employment in automotive increases by one person, log of automotive cluster GDP in 2010 decreases by 0.0012. This is similar to IDR 1.001 Trillion of automotive cluster GDP in 2010. Even though this variable is significant, however, the direction of the variable coefficient is negative, which is not in line with the expected direction of the variable coefficient. An explanation that can be given to this finding is the nature of automotive industry that is full of advanced technology and automation. Machines and robot replace the jobs that were conducted by human before so the numbers of jobs performed by workers are declining. This might be true in Indonesia given the fact that most of automotive industries that are operating in the country are foreign-based firms that already used advanced technology on their production line.

The coefficient of variable income per capita is 0.037. This coefficient indicates that on average, as income per capita increases by one million rupiah per person, log of automotive cluster GDP in 2010 increases by 0.0037, similar to IDR 1,037 Billion of

automotive cluster GDP in 2010. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient. The finding suggests that as people get wealthier, the GDP of automotive clusters in 2010 also increases. As people gets wealthier, they tend to consume more and this affect the GDP of automotive clusters since consumption is also part of GDP calculation.

6.2.3. Results for the third Econometric Model: Using Change in Cluster Size as Dependent Variable

The third model for this study is using change in the cluster size to explain competitiveness of industry clusters in Indonesia. The change in cluster size is simply the change of Regional GDP in particular cluster between 2000 and 2010. The result presentation, followed by discussion of the results, will be explained for each industry clusters.

- Logistics Clusters

The descriptive statistics for the third model for logistics clusters is given in Table 27 as follows:

Table 27: Descriptive statistics for logistics clusters using the third model

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Change in Log Cluster Size	0.01	0.25	1.31	1.74	-5.49	5.82
Log of GDP 2000	5.12	5.48	1.17	1.36	0	6.19
HDI	69.93	70.42	5.39	29.07	47.74	79.29
Logistics Factor Supply	0.02	0.004	0.09	0.008	-0.03	1.47
Poverty	16.29	13.93	10.63	112.99	0	51.91
Economic Change	46.42	48.75	47.72	2277.28	-81.33	567.14
Competitiveness	246.72	249	140.81	19827.13	1	489
Log of Unemployment	5.17	5.47	0.97	0.95	0	6.17
Herfindahl Index	0.69	0.69	0.23	0.05	0.24	1

Table 27: (Continued)

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Ports	0.39	0	0.49	0.24	0	1
Population Density	160.01	160	86.68	7513.26	1	316
Log of RGDP	5.21	5.51	0.98	0.95	0	6.21
Log of University Enrollment	4.86	5.09	0.91	0.83	0	5.87
Productivity	235.28	235	134.86	18185.77	1	468
Employment in Logistics	226.47	227	127.94	16368.05	1	447

After running regression analysis, result for the third model is given in Table 28.

Table 28: Regression result to explain change in cluster size in logistics clusters

Change in Log Cluster Size	Coefficient	Std. Error	t	P>ItI	VIF	Beta
Log of RGDP 2000	-0.2***	0.0420	-16.22	0.000	1.08	-0.60
HDI	0.04**	0.0120	2.20	0.028	1.96	0.11
Logistics Factor Supply	1.6030***	0.5270	-3.04	0.003	1.02	-0.11
Poverty	-0.012**	0.0061	2.24	0.026	1.86	0.10
Economic Change	0.001**	0.0010	1.42	0.035	1.18	0.05
Competitiveness	0.0006**	0.0004	-1.85	0.033	1.13	-0.07
Log of Unemployment	-0.0776**	0.0490	-1.46	0.045	1.05	-0.05
Herfindahl Index	-0.0417**	0.2301	0.18	0.026	1.24	0.00
Ports	0.1020	0.1077	0.95	0.344	1.23	0.03
Population Density	-0.0003	0.0006	0.53	0.593	1.03	-0.01
Log of RGDP	-0.0406	0.0491	-0.83	0.409	1.02	-0.03
Log of University Enrollment	-0.0272	0.0529	-0.51	0.608	1.03	-0.01
Productivity	-0.0003	0.0004	0.98	0.327	1.03	-0.03
Employment in Logistics	0.0002	0.0004	0.60	0.548	1.05	-0.03
Constant	2.2740	1.0692	2.13	0.034		
Number of Observation	497					
R-squared	0.3707					
Adjusted R-squared	0.3524					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

In the regression result, R-squared is the proportion of the variance in the dependent variables explained by all independent variables. The R-squared in the model is 0.3707, it means 37.07 percent of the variance in the change in logistics cluster size can

be explained by all independent variables, combined. The adjusted R-squared indicates that 35.24 percent of the variance in the change in logistics cluster size can be explained by all independent variables, after adjusting the number of independent variables in the model.

There are eight significant variables that explain change in the logistics cluster size. Those variables are Log of RGDP 2000, Human Development Index, Logitics Factor Supply, Poverty Rate, Economic Change, Competitiveness, Log of Unemployment, and Herfindahl Index. Those significant variables represent each factor on Porter's Diamond model.

The coefficient of variable Log of cluster GDP 2000 is -0.2. This coefficient indicates that on average, as log of cluster GDP 2000 increases by one unit, log of change in logistics cluster size decreases by 0.2 unit. This is similar to say that as cluster GDP increases by IDR 2.7 Trillion, the change in cluster size increase by 1.2 Trillion IDR. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Human Development Index is 0.04. This coefficient indicates that on average, as human development index increases by one unit, log of change in logistics cluster size increases by 0.04. This number is similar to IDR 1.04 Trillion of change in cluster size. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Logistics Factor Supply is 1.6030. This coefficient indicates that on average, as Logistics Factor Supply increases by one unit, log of change in logistics cluster size increases by 1.6030. This is similar to IDR 4.96 trillion of change

in cluster size. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Poverty Rate is -0.012. This coefficient indicates that on average, as Poverty Rate increases by one percent (2.8 million of people), log of change in logistics cluster size decreases by 0.012. This is similar to IDR 1.012 Trillion of change in cluster size. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Economic Change is 0.001. This coefficient indicates that on average, as Economic Change increases by one percent (IDR 14.4 trillion), log of change in logistics cluster size increases by 0.001. This is similar to IDR 1.001 Trillion of change in cluster size. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Competitiveness is 0.0006. This coefficient indicates that on average, as Competitiveness increases by one million IDR, log of change in logistics cluster size increases by 0.0006. This is similar to IDR 1 Trillion of change in cluster size. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Log of Unemployment is -0.0776. This coefficient indicates that on average, as Log of Unemployment increases by one unit, log of change in logistics cluster size decreases by 0.0776. This is similar to say that as unemployment increases by 2.7 percent, change in cluster size increases by IDR 1.08 Trillion. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl Index is -0.0417. This coefficient indicates that on average, as Herfindahl Index increases by one unit, log of change in logistics cluster size decreases by 0.0417. This is similar to IDR 1.04 Trillion of change in cluster size. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient. This result implies that lowering concentration of firms might lead to the increase of regional GDP. Furthermore, this also implies that competition among firms, and not monopolistic practice, (as indicated by lower Herfindahl Index) might increase the economy of a region. Therefore, it is important to generate more entrepreneurs in the local area so that they can compete in a fair environment. This is where entrepreneurship policy from the government may take part to encourage more people to establish their own firms in logistics business.

- Automotive Clusters

The descriptive statistics for automotive clusters is given in Table 29 as follows:

Table 29: Descriptive statistics for automotive clusters using the third model

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Change in Log Cluster Size	-0.006	0.16	1.21	1.47	-5.32	3.91
Log of GDP 2000	4.47	4.76	0.95	0.92	0	5.45
HDI	71.48	71.34	3.45	11.91	58.68	79.29
Automotive Factor Supply	-0.005	-0.0001	0.03	0.0009	-0.21	0.13
Poverty	14.29	14.265	6.57	43.19	0	31.94
Economic Change	50.09	53.4	39.27	1542.09	-74.66	208.95
Competitiveness	122.45	123.5	70.75	5005.02	1	242
Unemployment	8505.29	4222.5	11451.29	1.31	124	66961
Herfindahl Index	0.49	0.43	0.23	0.26	0.2	1
Ports	0.33	0	0.47	0.22	0	1
Population Density	104.13	102	56.69	3214.09	2	206
Log of RGDP	4.5	4.79	0.97	0.94	0	5.49
Log of University Enrollment	5.39	5.49	0.99	0.98	1.94	8.09

Table 29: (Continued)

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Productivity	41.6	20.32	71.11	5057.13	5.03	718.71
Employment in Automotive	117.86	117.5	67.69	4581.67	1	234
Income per Capita	6.81	4.23	9.03	81.64	0.73	78.87

The regression result to explain change in cluster size for automotive clusters is given in Table 30.

Table 30: Regression result to explain change in cluster size in automotive clusters

Change in Log Cluster Size	Coefficient	Std. Error	t	P>ItI	VIF	Beta
Log of RGDP 2000	-0.292***	0.0646	-13.29	0.000	1.08	-0.6794
HDI	0.0197	0.0224	0.88	0.378	1.67	0.0563
Automotive Factor Supply	2.5308	2.0969	1.21	0.229	1.20	0.0651
Poverty	-0.097***	0.0120	1.65	0.001	1.72	0.1064
Economic Change	0.0016	0.0018	0.93	0.353	1.36	0.0535
Competitiveness	0.0003	0.0009	0.41	0.685	1.21	0.0220
Number of Unemployed	-0.0009***	0.0005	1.26	0.008	1.18	0.0675
Herfindahl Index	-0.59**	0.2881	-2.16	0.032	1.26	-0.1193
Ports	0.1337	0.0009	1.00	0.317	1.11	0.0520
Population Density	-0.0005	0.0011	-0.43	0.665	1.12	-0.0227
Log of RGDP	-0.0159	0.0653	-0.24	0.808	1.12	-0.0127
Log of University Enrollment	-0.0525	0.0740	0.71	0.479	1.47	-0.0424
Productivity	0.05**	0.0019	-2.51	0.013	5.45	-0.2883
Employment in Automotive	-0.009**	0.0009	-2.16	0.032	1.04	-0.1082
Income	0.001**	0.0150	1.67	0.042	5.15	0.1871
Constant	2.8866	1.6908	1.71	0.039		
Number of Observation	232					
R-squared	0.4754					
Adjusted R-squared	0.4390					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

In the regression result, R-squared is the proportion of the variance in the dependent variables explained by all independent variables. The R-squared in the model

is 0.4754, it means 47.54 percent of the variance in the change in automotive cluster size can be explained by all independent variables, combined. The adjusted R-squared indicates that 43.90 percent of the variance in the change in automotive cluster size can be explained by all independent variables, after adjusting the number of independent variables in the model.

There are seven significant variables that explain change in automotive cluster size. Those variables are Log of RGDP 2000, Poverty Rate, Number of Unemployment, Herfindahl Index, Productivity, Employment in Automotive Clusters, and Income per Capita. Those significant variables represent each factor on Porter's Diamond model.

The coefficient of variable Log of RGDP 2000 is -0.292. This coefficient indicates that on average, as log of RGDP 2000 increases by one unit, log of change in automotive cluster size decreases by 0.292. This is similar to say that as cluster GDP increases by IDR 2.7 million, the change of cluster GDP decreases by IDR 1.042 Trillion. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Poverty Rate is -0.097. This coefficient indicates that on average, as Poverty Rate increases by one percent (2.8 million of people), log of change in automotive cluster size decreases by 0.097. This number is similar to IDR 1.101 trillion of change in cluster GDP. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Number of Unemployment is -0.0009. This coefficient indicates that on average, as Number of Unemployment increases by one person, log of change in automotive cluster size decreases by 0.0009. This is similar to IDR 1 Trillion

of change in cluster size. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl Index is -0.59. This coefficient indicates that on average, as Herfindahl Index increases by one unit, log of change in automotive cluster size decreases by 0.59. This is similar to IDR 1.8 Trillion of change in cluster size. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Productivity is 0.0049. This coefficient indicates that on average, as Productivity increases by IDR one million per person, log of change in automotive cluster size increases by 0.0049. This is similar to IDR 1.004 Trillion of change in cluster GDP. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Employment in Automotive is -0.009. This coefficient indicates that on average, as Employment in Automotive increases by one person, log of change in automotive cluster size decreases by 0.009. This number is similar to IDR 1.009 Trillion of change in cluster size. The direction of the variable coefficient is negative, which is not in line with the expected direction of the variable coefficient.

The coefficient of variable Income per Capita is -0.001. This coefficient indicates that on average, as Employment in Automotive increases by one person, log of change in automotive cluster size decreases by 0.001. This is similar to IDR 1.001 Trillion of change in cluster GDP. The direction of the variable coefficient is negative, which is not in line with the expected direction of the variable coefficient.

6.2.4. Results for the Fourth Econometric Model: Using Competitive Shift as Dependent Variable

This section presents regression results and interpretations after running the fourth econometric model that employs competitive shift as dependent variable. The model is run for two industry clusters in Indonesia, logistics and automotive. The first results and interpretations are for logistics clusters.

- Logistics Clusters

The descriptive statistics for all variables in the competitive shift model for the logistics cluster are given in Table 31.

Table 31: Descriptive statistics for competitiveness model for logistics clusters

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Competitive Shift	246.72	249	140.8	19827.13	1	489
Population Share	6.84	4.86	6.29	39.55	0.21	47.23
University Enrollment	5.58	1	14.33	205.33	0	132
Employment	67.53	67.39	10.82	117.14	0	98.88
Economic Change	46.42	48.75	47.72	2277.279	-81.33	567.14
Logistics Share	4.75	3.76	4.13	17.13	0	24.77
Workforce	249	249	143.62	2062.5	1	497
Ports	0.39	0	0.49	0.24	0	1
Employment in Logistics	226.47	227	127.94	16368.05	1	447
Log of Income per capita	1.62	1.51	0.74	0.55	-.37	4.6
Log of Population	5.21	5.51	0.97	0.95	0	6.21
Herfindahl Index	0.69	0.69	0.23	0.05	0.24	1
Log of RGDP	5.21	5.51	0.98	0.95	0	6.21

Regression result for competitive shift model for the logistics cluster is presented in Table 32.

Table 32: Regression result to explain competitiveness in logistics clusters

Competitive Shift	Coefficient	Std. Error	t	P>ItI	VIF	Beta
Share of Population	7.6060**	1.0240	2.54	0.011	1.18	0.1163
University Enrollment	0.3764	0.4696	0.80	0.423	1.29	0.0385
Employment Rate	13.48**	58.6010	-2.33	0.020	1.1	-0.1095
Economic Change	3.8449***	0.1343	6.29	0.000	1.16	0.2863
Logistics Share	4.7535***	1.5823	-3.00	0.003	1.17	-0.1391
Workforce	5.1179***	0.0492	2.81	0.005	1.02	0.1204
Ports	10.0532	13.8998	0.72	0.470	1.27	0.0349
Employment in Logistics	-0.0726	0.0474	-1.53	0.127	1.04	-0.0655
Log of Income per Capita	18.8920**	9.1228	2.07	0.039	1.26	0.0999
Log of Population	-8.9659	6.3071	-1.42	0.156	1.08	0.0999
Herfindahl Index	-7.4180***	30.1738	-0.25	0.006	1.3	-0.0120
Log of Regional GDP	-7.7706	6.4035	-1.21	0.226	1.04	-0.0522
Constant	830.1237	264.9060	3.13	0.002		
Number of Observation	489					
R-squared	0.1535					
Adjusted R-squared	0.1321					

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

In the regression results, R-squared is the proportion of the variance in the dependent variables explained by all independent variables. The R-squared in the model is 0.1535, meaning 15.35 percent of the variance in competitiveness in logistics cluster can be explained by all independent variables, combined. The adjusted R-squared indicates that 13.21 percent of the variance in competitiveness logistics cluster can be explained by all independent variables, after adjusting the number of independent variables in the model.

There are seven significant variables that explain competitive shifts in logistics cluster size: Share of Population, Employment Rate, Economic Change, Logistics Share, Workforce, Log of Income per Capita, and Herfindahl Index. Those significant variables

are represented in each factor on Porter's Diamond model. Workforce represents factor condition; income per capita and economic change represent demand condition; Herfindahl index and share of population represent firm strategy, structure, and rivalry; and employment rate and cluster share represent related and supporting industries.

The coefficient on the variable Share of Population is 7.6060. This coefficient indicates that on average, as Share of Population increases by one percent, competitive shift in logistics cluster increases by 7.6 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Employment Rate is 13.48. This coefficient indicates that on average, as Employment Rate increases by one percent (2.09 million people), competitive shift in logistics cluster increases by 13.48 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Economic Change is 3.8449. This coefficient indicates that on average, as Economic Change increases by one percent (14.44 Trillion IDR), competitive shift in logistics cluster increases by 3.8449 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Logistcs Share is 4.7535. This coefficient indicates that on average, as Logistcs Share increases by one percent (IDR 14.4 Trillion), competitive shift in logistics cluster increases by 4.7535 million IDR. The direction of the variable

coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Workforce is 5.1179. This coefficient indicates that on average, as workforce increases by one person, competitive shift in logistics cluster increases by 5.1179 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Log of Income per Capita is 18.8920. This coefficient indicates that on average, as log of income per capita increases by one unit (income per capita raises by 2.7 million IDR), competitive shift in logistics cluster increases by 18.8920 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl Index is -7.4180. This coefficient indicates that on average, as Herfindahl Index increases by one unit, competitive shift in logistics cluster decreases by 7.4180 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The next results discussion and interpretation for the competitive shift model is for the automotive cluster.

- Automotive Clusters

The descriptive statistics for all variables in the competitiveness model for automotive clusters is given in Table 33 below.

Table 33: Descriptive statistics for the competitive shift model for automotive clusters

Variable Name	Mean	Median	Standard Deviation	Variance	Min	Max
Competitive Shift	122.45	123.5	70.75	5005.02	1	242
Population Share	6.11	4.09	5.67	32.19	0.21	36.88
University Enrollment	8.41	3	19.26	370.99	0	132
Employment	66.84	67.79	11.55	133.54	0	92.4
Economic Change	50.09	53.4	39.27	1542.09	-74.66	208.95
Automotive Share	7.45	1.61	12.28	150.89	0	79.99
Workforce	122.54	121.5	69.77	4868.29	2	243
Ports	0.33	0	0.47	0.22	0	1
Employment in Automotive	117.86	117.5	67.68	4581.67	1	234
Log of Income per capita	1.57	1.44	0.71	0.51	-.31	4.36
Log of Population	4.5	4.79	0.96	0.92	0	5.49
Herfindahl Index	0.49	0.43	0.23	0.26	0.2	1
Log of RGDP	4.5	4.79	0.97	0.94	0	5.49

Regression results for the competitive shift model for the automotive clusters is presented in Table 34.

Table 34: Regression result to explain competitive shift in automotive clusters

Competitive Shift	Coefficient	Std. Error	t	P>ItI	VIF	Beta
Share of Population	0.039**	0.8448	-1.65	0.036	1.18	-0.1118
University Enrollment	0.064**	0.2837	1.21	0.028	1.29	0.0938
Employment Rate	46.6890	57.9440	0.81	0.421	1.1	0.0565
Economic Change	0.5938***	0.1347	4.41	0.000	1.16	0.3226
Automotive Share	-0.1575	0.4144	-0.38	0.704	1.17	-0.0264
Workforce	-0.0056	0.0688	-0.08	0.935	1.02	-0.0055
Ports	0.3860**	10.0207	0.14	0.030	1.27	0.0092
Employment in Automotive	-28.656**	0.0672	0.98	0.030	1.04	0.0625
Log of Income per Capita	0.3837**	7.3811	-0.73	0.047	1.26	-0.0543
Log of Population	2.9306**	4.8356	0.61	0.045	1.08	0.0398
Herfindahl Index	-16.5937**	21.2379	-0.31	0.016	1.3	-0.0209
Log of Regional GDP	-6.4255	4.8153	-1.33	0.183	1.04	-0.0881
Constant	-790.0497	255.4169	-0.31	0.027		

Table 34: (Continued)

Number of Observation	227
R-squared	0.1476
Adjusted R-squared	0.0998

*** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level

In the regression result, R-squared is the proportion of the variance in the dependent variables explained by all independent variables. The R-squared in the model is 0.1476, meaning 14.76 percent of the variance in competitiveness in automotive cluster can be explained by all independent variables, combined. The adjusted R-squared indicates that 9.98 percent of the variance in competitiveness automotive cluster can be explained by all independent variables after adjusting the number of independent variables in the model.

There are eight significant variables that explain competitiveness in automotive cluster size. Those variables are Share of Population, University Enrollment, Ports, Employment in Automotive, Log of Income per Capita, Log of population, and Herfindahl Index. Each of those significant variables is represented in Porter's Diamond model. Population, ports, and university enrollment are parts of factor condition. Income per capita and economic change are parts of demand condition. Herfindahl index and share of population are variables that represent firm strategy, structure, and rivalry. Finally, cluster employment is part of related and supporting industries.

The coefficient of variable Share of Population is 0.039. This coefficient indicates that on average, as Share of Population increases by one percent, competitive shift in automotive cluster increases by 0.039 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable University Enrollment is 0.06432. This coefficient indicates that on average, as university enrollment increases by one student, competitive shift in automotive cluster increases by 0.3432 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Economic Change is 0.5938. This coefficient indicates that on average, as Economic Change increases by one percent (IDR 14.4 Trillion), competitive shift in automotive cluster increases by 0.5938 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Ports is 0.3860. Variable ports is a dummy variable, so this coefficient indicates that on average, a city that has a port has a 0.386 million IDR higher competitive shift than a city that does not have a port. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Employment in Automotive clusters is -28.656. This coefficient indicates that on average, as employment in automotive increases by one person, competitive shift in automotive cluster decreases by IDR 28.656 million. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Log of income per capita is 0.3837. This coefficient indicates that on average, as log of income per capita increases by one unit (income per capita increased by IDR 2.7 million), competitive shift in automotive cluster increases by

0.3837 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Log of population per capita is 2.9306. This coefficient indicates that on average, as log of population increases by one unit (population increase by 2.7 people), competitive shift in automotive cluster increases by 2.9306 million IDR. The direction of the variable coefficient is positive, which is in line with the expected direction of the variable coefficient.

The coefficient of variable Herfindahl Index per capita is -18.5937. This coefficient indicates that on average, as Herfindahl index increases by one unit, competitive shift in automotive cluster decreases by 18.5937 million IDR. The direction of the variable coefficient is negative, which is in line with the expected direction of the variable coefficient.

6.2.5. Synthesizing Regression Analysis Results Based on Three Econometric Models

This study utilizes four econometric models for each industry clusters to explain factors in Porter's diamond model that may affect competitiveness of clusters in Indonesia. Using Indonesia's socio economic data in 2000, the first model defines competitiveness of clusters as the cluster GDP in 2000. The second model interprets competitiveness as the cluster GDP in 2010 while using socio economic data in 2010. The third model employs the change in cluster size in Indonesia between 2000 and 2010 to measure cluster competitiveness. Lastly, utilizing socio economic data in 2000 and 2010, the fourth econometric model defines competitiveness as the competitive shift variable resulted from shift-share analysis that has been performed previously.

Table 35 below compares the econometric models and their significant variables resulted from the regression calculation for logistics clusters. All factors in Porter's diamond model is represented by significant variables in each model.

Table 35: Comparing econometric models for logistics clusters

	Dependent Variable			
	Model 1: Cluster GDP 2000	Model 2: Cluster GDP 2010	Model 3: Change in Cluster Size	Model 4: Competitive Shift
	Independent Variables			
Factor Condition	Ports	Ports	RGDP	Workforce
	Population Density	Population Density		
Demand Condition	Human Development Index	Human Development Index	Human Development Index	Income per Capita
	Poverty Rate	Poverty Rate	Poverty Rate	
	Economic Change	Economic Change	Unemployment	Economic Change
			Economic Change	
Firm Strategy, Structure, and Rivalry	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index
	Competitiveness	Competitiveness	Competitiveness	Share of Population
Related and Supporting Industries	Factor Supply	Factor Supply	Factor Supply	Employment rate
				Cluster share

The four regression models in Table 35 offer different perspective in analyzing competitiveness of clusters in Indonesia. However, those there are some variables that are consistently significant after being run in all three econometric models. Each of these significant variables represent each factor of Porter's diamond model. Therefore, these variables are variables that build the Porter's diamond model in analyzing the competitiveness of logistics clusters in Indonesia. The variables that made up the

competitiveness model for logistics clusters in Indonesia can be seen in Figure 8 as follows:

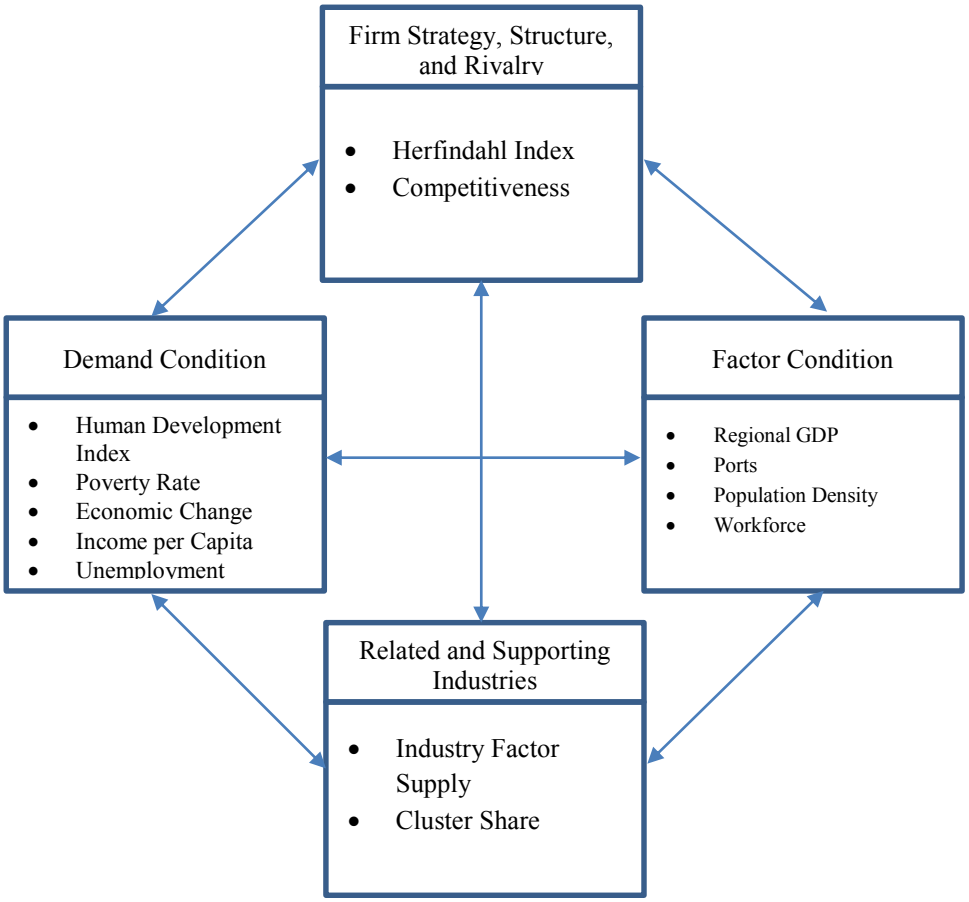

Figure 8: Factors affecting competitiveness in logistics clusters in Indonesia

Similarly, Table 36 compares all models to explain competitiveness in automotive industry clusters.

Table 36: Comparing econometric models for automotive clusters

	Dependent Variable			
	Model 1: Cluster GDP 2000	Model 2: Cluster GDP 2010	Model 3: Change in Cluster Size	Model 4: Competitive Shift
	Independent Variables			
Factor Condition	Ports	Ports	RGDP	Population
	University Enrolment	Productivity	Productivity	Ports
	Productivity			University Enrollment
Demand Condition	Income per Capita	Income per Capita	Income per Capita	Income per Capita
	Poverty Rate	Human Development Index	Poverty Rate	Economic Change
		Poverty Rate	Unemployment	
Firm Strategy, Structure, and Rivalry	Herfindahl Index	Herfindahl Index	Herfindahl Index	Herfindahl Index
				Share of Population
Related and Supporting Industries	Cluster Employment	Cluster Employment	Cluster Employment	Cluster Employment

From all the variables that explain competitiveness in three regression models, there are some variables that keep appearing in each model. These variables also represent each factor of Porter's diamond model. Therefore, these variables are variables that explain competitiveness of automotive clusters in Indonesia. These variables can be seen in Figure 9 as follows:

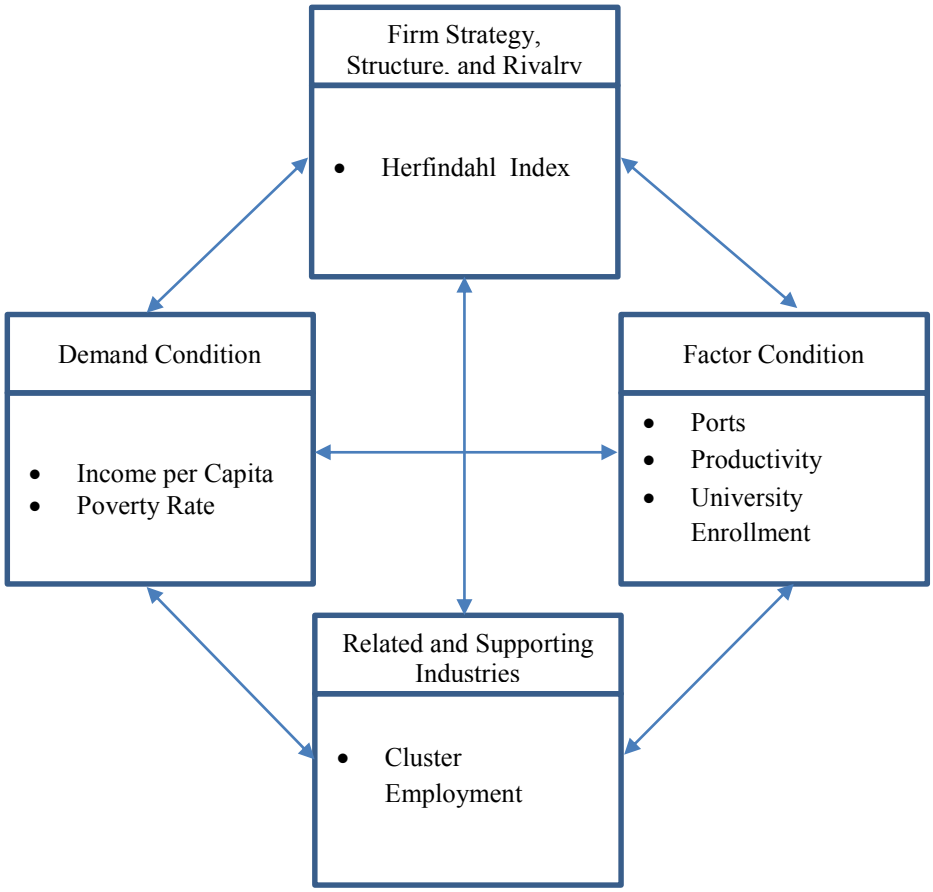

Figure 9: Factors affecting competitiveness in automotive clusters in Indonesia

6.2.6. Assessing Industry Clusters in Java Economic Corridor

This section performs an analysis of the competitiveness of logistics and automotive industry clusters in the Java economic corridor. The competitiveness of industry clusters in Java is calculated by using the equation estimated from the regression analysis for each cluster in the nation-wide sample. The resulting provides constant parameter estimates derived from all cities using regional GDP data from the Indonesia Bureau of Statistics.

This section starts by analyzing the competitiveness of logistics clusters in Java. The analysis begins with the calculation of cluster competitiveness in all four econometric models, then continues to the comparison between actual vs predicted results, and ends with the assessment of cluster ingredients in logistics clusters in Java.

- Logistics Clusters

In the previous section, factors that form the competitiveness of industry clusters in Indonesia has been determined in four econometric models. After running the OLS regression and getting the result, the equation for all four models in logistics clusters can be expressed as follows:

$$Log\ of\ Cluster\ GDP\ in\ 2000$$
$$= 0.047(HDI) + 1.77(Logistics\ Factor\ Supply)$$
$$- 0.004(\ Poverty\ Rate) + 0.01(Economic\ Change)$$
$$+ 0.6(Log\ of\ Competitiveness) - 0.036(Herfindahl\ Index)$$
$$+ 0.895(Ports) - 0.004(Log\ of\ Population\ Density) + 3.133$$

$$Log\ of\ Cluster\ GDP\ in\ 2010$$
$$= 0.086(HDI) + 15.961(Logistics\ Factor\ Supply)$$
$$- 0.011(Poverty\ Rate) + 0.098(Economic\ Change)$$
$$+ 0.047(Log\ of\ Competitiveness) - 0.023(Herfindahl\ Index)$$
$$+ 2.98(Ports) - 0.00001(Log\ of\ Population\ Density) + 3.13$$

$$Change\ in\ Log\ of\ Cluster\ Size$$
$$= -0.2\ (Log\ of\ GDP\ 2000) + 0.04\ (HDI)$$
$$+ 1.60\ (Logistics\ Factor\ Supply) - 0.012\ (Poverty\ Rate)$$
$$+ 0.001\ (Economic\ Change) + 0.0006\ (Competitiveness)$$
$$- 0.08\ (Log\ of\ Unemployment) - 0.04\ (Herfindahl\ Index) + 2.27$$

$$Competitive\ Shift$$

$$= 7.6(Share\ of\ Population) + 13.48(Employment\ Rate)$$

$$+ 3.85(Economic\ Change) + 4.75(Logistics\ Share)$$

$$+ 5.12\ (Workforce) + 18.89(Log\ of\ Income\ per\ Capita)$$

$$- 7.77(Herfindahl\ Index) + 830.12$$

The competitiveness of logistics clusters in the Java economic corridor can be calculated by solving the above equations with Java-specific data. It is important to note that not all cities in Java make up logistic clusters. Only several cities that can be considered as having logistics clusters. The comparison of all four econometric models in calculating the competitiveness of logistics clusters in Java is presented in Table 37.

Table 37: Competitiveness of logistics clusters in the Java economic region

Model	Dependent Variable	Actual Competitiveness (Million IDR)	Predicted Competitiveness (Million IDR)	Absolute Difference (%)
Model 1	Cluster GDP 2000	16,622,600.40	13,662,016.20	17.81
Model 2	Cluster GDP 2010	30,150,425.84	27,154,523.45	9.94
Model 3	Change in Cluster Size	1.81	2.12	17.13
Model 4	Competitive Shift	950,219.84	972,932.57	2.39

Table 37 shows various results of competitiveness in logistics clusters based on four econometric models. The actual competitiveness refers to the competitiveness of clusters based on manual calculation using actual regional GDP data. The predicted competitiveness refers to the cluster competitiveness based on the model estimations. The absolute difference indicates the difference between actual and predicted calculation in percentage. Table 37 also implies that model 4, using competitive shift as dependent

variable, has the smallest percentage difference between actual and estimated model (2.39 percent). The largest percentage difference is model 1, using cluster GDP in 2000 as dependent variable (17.81 percent).

The next analysis is to determine whether logistics clusters in Java have the right ingredients for successful clusters. Therefore, it is important to compare the ingredients of clusters in Java with the ingredients of clusters in Indonesia. By comparing each component of clusters between Java and Indonesia, it can be revealed whether logistics clusters in Java have the ingredients or lacking of the ingredients.

The comparison of cluster ingredients is performed by comparing the proportion of ingredients between Java and Indonesia, and the proportion of cluster ingredients between cluster area to Java overall. If the proportion in the cluster is larger than it is in the nation, then the cluster has excess ingredients. On the contrary, if the proportion in the cluster is smaller than it is in the nation, then the cluster has lack of ingredients. However, for the variables that have negative sign, the above rules apply otherwise. If the proportion in the cluster is closed to it is in the nation, the cluster has sufficient ingredient. The comparison of cluster ingredients is presented in Table 38.

Table 38: Logistics cluster ingredients between Indonesia and clusters in Java

Cluster Ingredients	Indonesia	Corridor	Excess/Lack of Ingredients
Population Share	0.74	1.27	Excess
Employment Rate	1.00	0.98	Sufficient
Economic Change	1.30	1.15	Lack
Logistics Share	0.98	1.00	Sufficient
Workforce	0.59	0.27	Lack
Income per Capita	0.96	1.37	Excess
Herfindahl Index	1.15	0.97	Excess

Table 38: (Continued)

Cluster Ingredients	Indonesia	Corridor	Excess/Lack of Ingredients
University Enrollment	0.97	1.15	Excess
HDI	1.03	1.05	Sufficient
Factor Supply	1.22	0.55	Lack
Poverty Rate	0.87	0.75	Excess
Competitive Shift	0.33	0.27	Sufficient
Population Density	10.14	1.47	Excess
Productivity	1.08	1.55	Excess
Unemployment Rate	1.18	1.25	Sufficient
Cluster Employment	0.61	0.36	Lack
Labor Supply	1.07	1.29	Excess
Number of University	0.52	0.54	Sufficient

Table 38 shows that from 18 variables being measured, logistics clusters in Java have 8 excess ingredients, 4 lacking ingredients, and 6 sufficient ingredients. Among those 4 lacking variables, 3 variables are related to employment issues. Interestingly, logistics clusters in Java also lacks in competitive shift compared to overall logistics clusters in Indonesia.

The next analysis is to calculate the competitiveness of automotive clusters in Java. Similar to the logistics clusters, the analysis touch issues of automotive competitiveness, actual vs predicted results, and cluster ingredients in Java.

- Automotive Clusters

The equation of all econometric models in automotive clusters in Indonesia can be expressed below:

$$Cluster\ GDP\ in\ 2000$$

$$= -0.022(Poverty\ Rate) - 0.41(Herfindahl\ Index)$$

$$+ 0.731(\ Ports) + 0.068(Log\ of\ University\ Enrollment)$$

$$+ 0.096(Productivity) - 0.002(Cluster\ Employment)$$

$$+ 0.19(Income\ per\ Capita) + 3.165$$

$$Cluster\ GDP\ in\ 2010$$

$$= 0.096(HDI) - 0.012(Poverty\ Rate) - 0.01(Herfindahl\ Index)$$

$$+ 0.436(Ports) + 0.018(Productivity)$$

$$- 0.0012(Cluster\ Employment) + 0.037(Income\ per\ Capita) + 3.13$$

$$Change\ in\ Log\ Cluster\ Size$$

$$= -0.292\ (Log\ of\ GDP\ 2000) - 0.097(Poverty\ Rate)$$

$$- 0.0009\ (Number\ of\ Unemployed) - 0.59\ (Herfindahl\ Index)$$

$$+ 0.05\ (Productivity) - 0.009\ (Cluster\ Employment)$$

$$+ 0.001(Income\ per\ Capita) + 2.89$$

$$Competitive\ Shift$$

$$= 0.039(Share\ of\ Population) + 0.064(University\ Enrollment)$$

$$+ 0.59(Economic\ Change) + 0.39(Ports)$$

$$- 28.66\ (Cluster\ Employment) + 0.38(Log\ of\ Income\ per\ Capita)$$

$$+ 2.93(Log\ of\ Population) - 18.59(Herfindahl\ Index) - 790.05$$

The competitiveness of automotive clusters in Java economic corridor based on the calculation of all four econometric models is presented in Table 39.

Table 39: Competitiveness of automotive clusters in the Java economic region

Model	Dependent Variable	Actual (Million IDR)	Prediction (Million IDR)	Absolute Difference (%)
Model 1	GDP 2000	4,146,124.57	3,451,294.72	16.76
Model 2	GDP 2010	5,988,908.76	5,318,383.70	11.20
Model 3	Change in Cluster Size	1.48	1.96	32.60
Model 4	Competitive Shift	-788,596.27	-469,878.69	40.42

Table 39 shows that Model 2, using cluster GDP in 2010, gives the best estimate among other models. The absolute difference between the actual result and the prediction is the least (11.20 percent) compared to the other three models. On the other hand, the competitive shift model performs poorly (40.42 percent difference). In order to find out whether Java has the right ingredients for successful automotive clusters, then it is important to compare each cluster ingredients in Java to they are in Indonesia. Table 40 presents the comparison of automotive cluster ingredients.

Table 40: Automotive cluster ingredients between Indonesia and Java economic corridor

Cluster Ingredients	Indonesia	Corridor	Excess/Lack of Ingredients
HDI	1.00	1.05	Sufficient
Poverty Rate	1.05	0.60	Excess
Herfindahl Index	0.92	0.93	Sufficient
Productivity	1.16	2.80	Excess
Cluster Employment	2.11	0.85	Lack
Income per Capita	1.04	7.07	Excess
Population Share	0.77	1.48	Excess
Employment Rate	1.02	0.96	Sufficient
Economic Change	1.23	1.03	Lack
Automotive Share	1.58	2.08	Excess
Workforce	1.74	0.83	Lack
University Enrollment	1.08	0.82	Lack

Table 40: (Continued)

Cluster Ingredients	Indonesia	Java	Excess/Lack of Ingredients
Factor Supply	1.40	8.00	Excess
Competitive Shift	0.81	23.09	Excess
Population Density	1.95	2.21	Lack
Unemployment Rate	1.18	1.41	Lack
Labor Supply	1.05	1.53	Excess
Number of University	1.50	2.56	Excess

From 18 ingredients of successful automotive clusters in Indonesia, the Java economic corridor has 9 ingredients that are larger than the ingredients in Indonesia. This indicates the strong ingredients that Java possesses to develop automotive clusters. Most of the strong indicators that Java possesses are related to human capital such as productivity, supply of labor, and human development index. Interestingly, some ingredients that Java is lacking of are related to population and density issues. It is not a surprising since Java has been the backbone of Indonesia's economy in the past six decades. This is also an indicator for the central government that spreading development of clusters outside Java is essential, not only to address economic imbalances, but also to address population imbalances.

CHAPTER 7: SWOT ANALYSIS

The objective of this dissertation is to assess the effectiveness of logistics and automotive industry clusters in Indonesia, especially in the Java economic corridor. Based on the results from qualitative and quantitative analysis, this study performs SWOT analysis to evaluate the strengths, weaknesses, opportunities, and threats of those industry clusters to support Indonesia's economic development.

SWOT analysis is a popular tool in strategic planning that has origins in the work of business policy academics from the 1960s onwards (Hill and Westbrook 1997). The essence of SWOT analysis lies on the idea that good strategy means ensuring a fit between the external situation and internal qualities. Strengths and Weaknesses represent internal qualities, while Opportunities and Threats represent the external situation.

SWOT analysis of the industry clusters in Indonesia in this study is divided for each logistics and automotive cluster. The SWOT analysis is also performed to combine results from qualitative and quantitative analysis in previous chapters. In this SWOT analysis, strengths represent internal factors that can support the competitiveness of clusters. Weaknesses are internal factors that hinder the development of clusters or thwart the competitiveness of clusters. Opportunities are external factors that can be exploited to boost cluster potential, while threats refer to the external factors that can harm cluster development.

7.1. SWOT Analysis for Logistics Clusters

SWOT analysis for logistics clusters is summarized in Table 41 below.

Table 41: SWOT analysis of logistics clusters

Strengths	Strong commitment from government to build infrastructure
	Supply of human capital and labor resources
	Stable political, economic, and social condition
Weaknesses	Poor infrastructure
	Government's bureaucratic structure
	Remote location
	Lack of connectivity
	Centralized development in Java
	Corruption and bribery practices
	High poverty rate in some undeveloped areas
	Inefficiency in logistics practice
	Lacking of human capital outside Java
Opportunities	Rise of the middle class
	Youth Population
	As an archipelagic nation, sea transportation has the cheapest cost compared to other modes of transportation
	Economic growth provides room for business expansion
	New port development in some cities
	ASEAN Economic Community 2015 provides new opportunity to play in the region
	An emerging digital and technology-driven nation
Threats	Intense competition with other countries in the region (Singapore, Malaysia, Thailand)
	Technological advancement is faster than the ability to adopt it

- Strengths of logistic clusters

This study found that government has a strong commitment to build strong logistics clusters throughout the nation. A strong logistics industry is critical for an archipelagic nation as Indonesia, as it can reduce logistics and transportation costs significantly. The inefficiency of the logistics industry's performance in Indonesia has become evident as reflected from the Logistics Performance Index (LPI) report by The World Bank. In

2014, The World Bank reported that the Logistics Performance Index of Indonesia ranks 53 out of 160 countries being surveyed. The rank of Indonesia's LPI has been slightly improved, compared to its 59th rank in 2012 and 75th rank in 2010. However, compared to its 43th LPI rank in 2007, Indonesia's LPI performance is experiencing a setback.

Other evidence of the poor performance of Indonesia's logistics is seen in the high logistics cost. High logistics costs are a serious hindrance to a higher economic growth of Indonesia. Bahagia et al. (2013) estimated that the logistics costs of Indonesia account for some 24 percent of the GDP, and this number is higher than in neighboring countries. The high costs of logistics have made business inefficient across Indonesia. Cutting down the costs and improving the quality of logistics and transport systems would significantly improve Indonesia's access to international markets and increase trade (Bahagia et al. 2013).

The MP3EI master plan, devised by the previous administration, has as one of its goals to improve Indonesia's connectivity. In line with this goal is the commitment to foster Indonesia's logistics industries in some strategic clusters in the country. The spirit to improve the nation's logistics industries has been continued by the current government. When elected in 2014, the new administration of President Joko Widodo had a vision to build several logistics clusters, including the development of 24 new and existing ports from the western part to the eastern part of Indonesia.

In terms of human capital, Indonesia is predicted to have what scholars often call "a demographic bonus" in the next 10 to 15 years. The demographic bonus is a situation when the population is dominated by youth in their productive age (between 15 and 65 years old). This situation ensures Indonesia has enough supply of human capital to

support the economic development. Oberman et al. (2012) in their McKinsey Global Institute report estimated that there are 55 million skilled workers in Indonesia. Data from the National Planning Agency in 2014 also shows that in 2010, the productive age group was 66.5 percent proportion of the population. This percentage will increase to 68.1 percent between 2028 and 2031.

When the supply of human capital is sufficient, it depends on the policy from the government to boost industries and other economic sectors in order to be able to absorb this productive group of population. The momentum to utilize the productive age group to work in productive sectors does not last long. The National Planning Agency predicts that this situation will only last until 2035, and after that the proportion of the population in the productive age cohort declines significantly. If the government can devise some policies to maximize this demographic advantage, the national economy can grow significantly. This implies that the government only has 20 years to make significant progress.

The next strength factor for logistics industries in Indonesia is the stable political, economic, and social environment in the country. In the political sector, Indonesia is the third largest democratic country in the world, after the US and India. The people of Indonesia directly elect their national and local leaders, as well as directly elect their representatives in the parliament. The last national election in 2014 went smoothly without any serious incidents and 75.11 percent of the voters casted their votes during the legislative election, while 70 percent of voters did the same in the presidential election.

In the economic sector, Indonesia has experienced stable economic growth in the past decade. Economic growth has been above 5 percent since 2004, and reached its peak of

6.3 percent in 2013. Even during global financial crisis in 2008, Indonesia survived and has the third highest growth in the world after China and India. The promising economic environment has been made Indonesia attractive to foreign investment in some sectors such as infrastructure, telecommunications, and energy. In the social sector, even though inequality is getting larger (the Gini coefficient reached 0.41 in 2014), the government has devised some social welfare programs in health and education to ensure citizens in lower income classes receive the benefits of development.

- Weaknesses for the logistics cluster

The main problem for the economic development in Indonesia lies in its poor infrastructure. In terms of quantity, Indonesia does not have sufficient roads, highways, bridges, ports, airports, and railroad to connect all regions in the country. In terms of quality, the existing infrastructure in Indonesia, on average, is in poor condition. Only major cities in Java can enjoy adequate infrastructure in terms of quantity and quality. The endemic infrastructure problem leads to other subsequent problems such as lack of connectivity, longer traveling time, and higher transportation cost. For logistics industries that rely heavily on infrastructure, this problem is unfavorable.

The poor quality of Indonesia's infrastructure is reflected on the infrastructure indicator on the Logistics Performance Index by the World Bank (2014). The infrastructure indicator measures satisfaction of respondents on the quality of infrastructure in their country such as ports, airports, roads, rail, warehousing and transloading, and information and communication technology. Indonesia's infrastructure quality ranks 56th out of 160 countries being surveyed in 2014, slightly improved from the 75th position in 2012 and 69th position in 2010, but falling compared to its 45th

position in 2007. In order to improve its economy, Indonesia needs major investments to build more ports, power plants, highways, and railroads so that the archipelago nation can transform to a manufacturing and competitiveness phase.

Actually, the geographical nature of Indonesia with its many islands and uneven distribution of population and development have put enormous challenges in developing infrastructure and tackling regional disparities (Bahagia et al. 2013). The lack of infrastructure has hampered efforts to develop and realize national and regional economic potential. Efficient logistics clusters and comprehensive national logistics system are critical factors to support Indonesia's economic development.

Related to poor infrastructure that hinder the emergence of logistics clusters in Indonesia, there is also inefficiency in practicing logistics business. For example, the dwelling time for containers in the main port of Tanjung Priok in Jakarta has increased from 4.8 days in October 2010 to 8 days in 2013 (Bahagia et al. 2013). Compared to the dwelling time in other major ports in the region, this practice is clearly not efficient. For example, dwelling time in Singapore port is 1.5 days, Port Kliang in Malaysia is 3 days, and while in Thailand is four to five days. The inefficiency of logistics practice creates bottlenecks for Indonesia's exports and imports. The inefficiency can be caused by many factors, such as inefficiency in port bureaucracy, lack of technology, and bribery practice that is still commonly found among officials. Bahagia et al. (2013) found that even opening up the port to 24 hours a day, 7 days a week, has not translated yet into faster processing time of goods or documents.

In terms of human capital, while the Java economic corridor has sufficient supply of human capital, the areas outside Java are suffering from the lack of qualified people.

Uneven development and the concentration of economy in Java in the last decades have caused people to move inside Java to earn better life. Not only for seeking jobs, people outside Java moved in for seeking better education. The quantitative analysis on this study confirmed this finding and shows how regions outside Java need more labor supply, factor supply, productivity, and education institutions (universities). If development can be distributed more evenly, this problem of lacking of human capital outside Java can be solved.

- Opportunities for logistic clusters

Apart from its internal strengths and weaknesses, the logistics clusters in Indonesia should seize its external opportunities in order to be able to be competitive. The opportunity for logistics clusters come from the big size of the market. As having the fourth largest population in the world (250 million in 2013), Indonesia offers opportunities for businesses to flourish. Not only does the population offer a promising market opportunity for business, the Indonesian population is currently dominated by the middle class and the youths.

The Asian Development Bank (2010) defines those who are in middle class as people who have per capita consumption of $2-$20 per day. The proportion of Indonesia's population in the middle class keeps growing: it was 37.7 percent in 2003, 46.3 percent in 2005, and 56.5 percent in 2010. It is expected that the number of middle class will reach 141 million people in 2030. It is estimated that the middle class grows by 7 million every year. The middle class is essential to the economy as it drives consumption and boosts economic development. As consumption goes up, the flow of goods and services are

going up as well, and this is an opportunity for logistics industries to expand their operation.

The youth also dominate the Indonesian population. Indonesia's young and expanding population could total 280 million by 2030, an increase from 240 million today (Oberman et al. 2012). The youths are driving the consumption as well as fueling the economy to grow. Unlike the aging demographic trends in many economies in the world-including some in Asia- the growing youth population in Indonesia is expected to remain positive and contribute an annual 2.4 percent to overall economic growth until 2030.

Opportunity also comes from the new growth centers in Indonesia. Not only in Jakarta as the capital city, many other cities are now growing rapidly as new growth centers. The fastest-growing urban centers are large and mid-sized middleweight cities with more than two million inhabitants, which have posted annual average growth of 6.4 percent since 2002, compared to Jakarta's 5.8 percent growth (Oberman et al. 2012). Cities such as Medan, Bandung, Surabaya, and Balikpapan are now growing and could attract logistics industries to expand their business to those cities.

Other opportunities that can be maximized include the opening of ASEAN Economic Community by the end of 2015. The Association of South East Asian Nations (ASEAN) consists of ten dynamic economies that make up more than 600 million people. If ASEAN were a single country, it would be the seventh-largest economy in the world with a combined GDP of $2.4 trillion in 2013 (Vinayak et al. 2014). In the ASEAN Economic Community, almost 60 percent of total growth since 1990 has come from productivity gains, as sectors such as manufacturing, retail, telecommunications, and transportation

and logistics grow more efficient. The logistics clusters in Indonesia must have an export focused orientation, and an opportunity to play a more crucial role in the region should not be passed.

The next opportunity is the advancement of technology in this digital age. Over the next decade, Indonesia will become a digital and technology-driven nation (Oberman et al. 2012). Internet and mobile technology have become mainstreams in Indonesia. There are 220 million mobile subscriptions and internet access is expected to reach 100 million users in 2016. Technology can help to make business efficient and logistics clusters can benefit from the emerging presence of technology in Indonesia.

- Threats to logistic clusters

Despite maximizing opportunities to support logistics clusters to grow, there are some threats that cannot be taken lightly to ensure the clusters remain competitive. Intense rivalry with other countries in the Southeast Asia region can be a threat if logistics industries in Indonesia want to have export orientation. In terms of ports, the main port of Tanjung Priok in Jakarta cannot match the capacity, efficiency, and technology of ports in Singapore, Malaysia, and Thailand. Global shipping lines will surely choose ports that have bigger capacity, shorter dwelling times, better technology, and are free of bribery practice as their main hub in South East Asia region, and ports in Indonesia are still unable to offer those competitive advantages.

The next identified threat for the development of logistics clusters in Indonesia is the speed of technological advancement in logistics business might be faster than the ability of people to absorb and adapt to those technology. In this sense, improvement of workforce skills among those who operate in logistics businesses need to be enhanced.

Technology might help to make logistics businesses in Indonesia more efficient, and the ability to excellently operate the technology is critical.

After discussing SWOT analysis for logistics clusters in Indonesia, the discussion on the next section focuses on SWOT analysis for automotive clusters. Strengths highlight the stable economic condition in Indonesia; weaknesses discusses the disadvantages that are faced by industrial development in the country; opportunities explain external factors that can support automotive clusters; and threats focus on external factors that can disrupt the development of automotive clusters.

7.2. SWOT Analysis for Automotive Clusters

SWOT analysis for automotive clusters can be seen on Table 42.

Table 42: SWOT analysis of automotive industry

Strengths	High economic growth
	Stable Rupiah (the currency)
	Stable car prices
	Strong local demand
	The biggest car market in the region
	Increasing automotive exports
	Low labor cost
Weaknesses	Poor infrastructure
	High transportation cost
	Rise of fuel price due to the cut of subsidized fuel by the government
	The minimum down payment regulation (30 percent) slowed down sales
	Automotive industries are dominated by foreign-based companies (Japanese cars comprise 95.2 percent of the market)
	No proactive industrial development policy
	Not much progress on localization
	Lacking of competition
Opportunities	New middle class creates demand for local low cost cars
	Environment concern drives demand for eco cars
	Small car segment is the opportunity for local automotive industries
	Low tax on small engine vehicles
	Production base for small and midsize MPVs for regional market

Table 42: (Continued)

Threats	Intense rivalry with other car producer nations in the region (mostly with Thailand)
	The slowdown of global economy might weaken market
	Increase in dependence of imported parts from Thailand

- Strengths for automotive clusters

The strengths for automotive clusters mainly come from stable economic situation in Indonesia in the last decade. That includes high economic growth, stable rupiah as the nation's currency, stable car price, and strong local demand for automotive products. In terms of economic growth, Indonesia has enjoyed relatively strong economic growth in the past decade. Table 43 below shows Indonesia's economic growth since 2010 and its projection to 2017.

Table 43: Indonesia's economic growth, 2010-2017
Source: The World Bank

Year	2010	2011	2012	2013	2014	2015	2016	2017
Growth (%)	6.2	6.5	6.3	5.8	5.1	5.2	5.5	5.5

In recent years the firm pace of economic expansion has been accompanied by reduced output volatility and relatively stable inflation (Elias and Noone 2011). Indonesia's economic performance has been shaped by government policy, the country's endowment of natural resources and its young and growing labor force. Alongside the effort to industrialize its economy, Indonesia's trade openness has increased over the past half century (Elias and Noone 2011).

Another factor that helps automotive industries to perform well is the gradual process of industrialization and urbanization that started 50 years ago. From 1967 to 2009, the manufacturing share of GDP increased by 19 percent while the agricultural share declined by 35 percent (Elias and Noone 2011). The industrialization process has also

affected exports of automotive products. In 2013 alone, total exports of automotive products reached $ 4.43 Billion, and there was a 28.35 percent increase of automotive products from 2009 to 2013. The top five destinations for Indonesian automotive exports are Thailand, Saudi Arabia, the Philippines, Japan, and Malaysia. From January to March 2014, total exports of automotive industries reached $1.25 Billion, a 13.09 percent increase compared to the same period in the previous year (Ministry of Trade Press Release, June 2014).

In terms of the automotive market, it has grown at an annual average rate of 17.2 percent since 2011 (Bernando 2014). Indonesia also surpassed Thailand in 2012 as the biggest automotive market in Southeast Asia as it reached 1 million car sales (KPMG 2014). In terms of production, Indonesia reached 1 million in car production in 2012 (Yamamoto 2012). As a comparison, the size of car market in Southeast Asia reached 2.51 million in 2011, and it is predicted that the regional market will expand to reach 3.33 million cars by 2017 (Yamamoto 2012).

- Weaknesses for automotive clusters

One of the goals of industry clusters is to help local industries reach their competitiveness by playing a more important role at the regional level. That being said, industry clusters are expected to have a more export orientation. In the case of automotive industries in Indonesia, however, 95.2 percent of cars sold in the market are Japanese cars, while the remaining are other foreign cars (Yamamoto 2012). Almost none of cars produced in Indonesia are local cars. Toyota, a Japanese car, alone has up to 36 percent of the car market share in Indonesia (KPMG 2014).

This situation might look promising for foreign automotive firms and the development of automotive sector. However, local industries seem unable to break the dominance of major global automotive firms in their own home country. This happens also because there is no proactive industrial development policy from government regarding localization and support for local industries. Back in the 1970s, the government introduced strict controls over the domestic automotive industry, including the banning of imported CBU (completely build up) vehicles (KPMG 2014). Foreign firms were also prohibited from investing directly in assembly and distribution activities.

In the 1990s, the central government launched deregulation and removed foreign ownership restrictions on automotive industries. This was when foreign automotive industries were welcomed to operate their business in Indonesia. During that period, the government actually attempted to accelerate development of local industry by supporting the trademark holding sole agent model to boost the production of vehicles containing high content of locally manufacturing parts (KPMG 2014). This effort ultimately failed, and in the 1999 deregulation freedom was given to import automotive vehicles in CBU form and many companies began to import vehicles. As a result, local sole agents were left with only a distribution role, while foreign companies controlled the production in Indonesia. The quantitative analysis in this study confirmed this situation as the Herfindahl Index for automotive clusters is quite high, indicating concentration of industry in small number of firms.

Other policy that might hurt automotive industries in Indonesia was the government decision to lift subsidies on fuel and electricity gradually since the second half of 2013. Although the decision was made to release the burden on the national budget, this policy

has caused fuel prices to rise and slowed the automotive market. However, it is predicted that the slowing down due to rise in fuel prices will only occur in the short run and the market will go back to normal again.

From the financial policy side, in 2012 the government launched new regulations regarding the ownership of vehicles. The Ministry of Finance together with the Central Bank of Indonesia introduced a new regulation that requires consumers to make a down payment of 30 percent when taking a vehicle ownership loan from a bank, or a payment of 20 to 25 percent when borrowing from a financing company (KPMG 2014). This policy is often called Loan to Value (LTV) policy. Previously, consumers enjoyed more relaxed policy as they can make a 10 percent down payment to own a vehicle. The LTV policy has a goal to curb excessive growth in both the mortgage and automotive segments that happened at that time (Sipahutar 2015). While it seemed that this LTV policy has been successful at putting the brakes on excessive credit, it also has the side effect of slowing down the automotive industry.

As mentioned before, underdeveloped infrastructure is another weakness that makes automotive clusters in Indonesia not competitive. Underdeveloped infrastructure such as bridges, roads, highways, and ports drive up transportation cost for both people and goods. This high cost weakens the development of automotive clusters.

In terms of competition among firms, automotive clusters in Indonesia have been dominated by foreign-based industries, mainly from Japan. Almost no local industries can compete in the market, even in their own home country. The regression analysis in this study confirms this finding by showing that automotive clusters in Indonesia, specifically in Java has a high Herfindahl Index. This indicates that industries are

dominated by a small group of powerful economic agents. This condition is not good for the development of clusters as local industries do not have power to compete against big industries. It is also not surprising to note that exports in automotive products are dominated by these big players. The central government needs to stimulate and nurture small firms to take their part in the market. More firms in the market means more fair competition can be created.

- Opportunities for automotive clusters

Opportunities to expand the development of automotive clusters come from the new middle class segment that is consumptive and creating demand for low cost cars. In Indonesia, this demand for low-cost cars is reflected in the sales of small and midsize Multi Purposes Vehicles (MPV) that make around 65 to 70 percent of total domestic sales (Bernando 2014). The dominance of small vehicle segment is also visible to see in the sales of 4x2 type of cars that reached 94.2 percent in 2012, compared to other segments, sedan (4.4 percent) and 4x4 type (0.9 percent).

Other opportunities that can be developed include the increasing concern for environmentally-friendly vehicles. In order to anticipate this trend, the government released new regulations on Low Car Green Car (LCGC). This regulation is basically an incentive for LCGC producers that is comprised of a reduction of import and luxury tax for LCGC vehicles, and a requirement to involve 40 percent of local parts for LCGC in the first year and 80 percent thereafter. This is an opportunity to urge localization and transfer of technology to local companies.

- Threats to automotive clusters

Despite its large market size for automotive, the slowing of global economy can be a threat for the automotive industry in Indonesia. A widening trade deficit has contributed to a weakening of the Indonesian rupiah and lower economic growth in 2013 of 5.7 percent (KPMG 2014). It is also predicted that GDP growth for 2015 to 2017 might be slower than it was before. This threat is what the automotive players must continue to monitor closely.

Intense rivalry in the region as the biggest car producer and market in Southeast Asia region has long occurred between Indonesia and Thailand. Indonesia has surpassed Thailand in terms of production and sales of cars in 2012, and it is projected that car sales will increase from a little over a million units in 2012 to 1.3 million units in 2015 (KPMG 2014). This projection compares to the sales of 1.28 million units of cars in Thailand.

Indonesia's automotive industry largely operates through vehicle assemblers, and this is why automotive parts play critical role in the value chain process. Unfortunately, the landscape of automotive parts in Indonesia has largely been dominated by imports. It is estimated that up to 70 percent of auto parts and components are imported (KPMG 2014). The main types of parts being imported are engines and transmission systems from Japan and Thailand. The reason for importing such a large automotive parts and lacking of domestic parts production is the scarcity of raw materials available in Indonesia.

CHAPTER 8: CONCLUSIONS AND POLICY RECOMMENDATIONS

8.1.Conclusions

The purpose of this dissertation is to assess the competitiveness of logistics and automotive industry clusters in the Java economic corridor, Indonesia. The need for competitive industry clusters in Indonesia has emerged especially after the government launched its Master Plan for Accelerating and Developing Indonesia Economic Development in 2011. Justifications for the competitive industry clusters were largely drawn from the agglomeration literature. Special attention was given to Porter's (1990) theory of industry clusters. Porter postulates that there are four factors that influence competitiveness of industry clusters: factor (input) conditions, demand conditions, context for firm strategy and rivalry, and related and supporting industries.

This study employed both qualitative and quantitative analysis to measure the competitiveness of clusters in Indonesia. The qualitative analysis used in-depth-interviews to assess the effectiveness of the master plan in developing industry clusters in Indonesia from the stakeholders' perspectives. The quantitative analysis combined location quotients, shift-share analysis, and OLS econometric models to calculate the competitiveness of logistics and automotive industry clusters in Java economic corridor as well as to determine what factors influence competitiveness. Data for the study was

gathered mainly from regional GDP data in 2000 and 2010 from the Indonesian Bureau of Statistics and the National Team for the Acceleration of Poverty Reduction.

The qualitative analysis finds that the master plan, while containing some essential vision to develop clusters throughout the nation, is no more than government's jargon. The vision to reduce economic imbalance through the development of clusters is good, but the implementation is poor. Only those in the top level of government understand the master plan, but those who are in the lower level have different interpretations. The good side of the master plan is that some of the projects listed in it now are being carried out.

The LQ and shift-share analysis found that there are six industry sectors within automotive clusters in Java economic corridor that can be considered as good performers, competitive and having export orientation. Therefore, these industries need to be maintained and to be developed further. Those industry sectors are textile, leather and footware in West Java; transportation, machinery and tools in West Java; other products in West Java; textile, leather and footware in Central Java; paper and printing in East Java; and fertilizer, chemical and rubber in Banten. The LQ and shift-share analysis also found five industry sectors within logistics industry clusters in Java economic corridor that are competitive and need to be developed further. Those industries are water transportation in Jakarta, transportation service in Jakarta, air transportation in Yogyakarta, road and highway in Banten, and river and lake transportation in Banten.

There are some industry sectors that have positive competitive shift and low location quotient. This indicates that these sectors are emerging industries. These sectors need to be nurtured and expanded further. These industries are also candidates for import substitution sectors. Sectors such as paper and printing in Jakarta or fertilizer, chemicals

and rubber in Central Java are emerging sectors in automotive clusters, while sectors such as road and highway in Jakarta and rail road in Banten are emerging industries in logistics clusters in Java.

The regression result used four models to explain competitiveness: the first uses cluster GDP in 2000 as dependent variable, the second model employs cluster GDP in 2010 as dependent variable, the third model uses change in cluster size as the dependent variable, and the fourth model uses competitive shift from the shift-share analysis as the dependent variable. After running and synthesizing those four regression models, this study found factors that affect logistics clusters are regional GDP, ports, population density, and workforce (factor conditions); human development index, poverty rate, economic change, income per capita, and the number of unemployed (demand conditions); Herfindahl Index and competitiveness (firm strategy, structure, and rivalry); and factor supply and cluster share (related and supporting industries).

This study also found factors that affect competitiveness in automotive clusters are ports, productivity, and university enrollment (factor condition); income per capita and poverty rate (demand condition); Herfindahl Index (firm strategy, structure, and rivalry); and cluster employment (related and supporting industries).

One question that arises concerns the generalizability of this study, whether this study can be conducted on other clusters or in other developing countries. In this regard, Porter (1990) points out that industry cluster theory may work best in developed economies where competition can be performed fairly in the market. Industry clusters also perform best when governments can effectively do their role in regulating the market and in providing public goods. This study found that some ingredients of competitive clusters

are evident in the Java economic corridor, while other ingredients are still missing. Sufficient infrastructure, fair competition and good governance practice are the three most ingredients that are needed to create competitive clusters in Java.

This study can be replicated in other clusters in Indonesia since the characteristics of other clusters in Indonesia are similar. The problems of infrastructure, fair competition, and the role of government also occurred in other clusters. Similar problems also happen in other developing countries. Section 2.6 highlighted the practice of industry clusters in China and Thailand. Especially in Thailand, the practice of clusters in other developing countries also faces similar problems. Thailand also has problems of over-concentrated development in the capital city, lack of infrastructure, and the involvement of government in the market. Therefore, this study can also be performed in other developing countries, given similar characteristics between clusters in Java, Indonesia and other clusters in other developing countries.

8.2.The Research Questions

This section highlights the answers to the research questions in the study. There are two main research questions that need to be answered in this research. The first research question is answered by reviewing literatures on agglomeration and industry clusters and by combining results from the qualitative and quantitative analysis. Similarly, the third research question is answered based on results from the qualitative and quantitative analysis.

- Research Question 1: What are the ingredients of successful industry clusters? Does Indonesia have the right ingredients for its industry clusters to develop economic competitiveness?

Porter (1990) proposes four determinant factors of successful industry clusters. These four attributes shape the environment for local firms to compete and to achieve competitive advantage. The first attribute is factor conditions, which is the nation's position of production such as skilled labor or infrastructure, important to compete in a given industry. The second attribute is demand conditions, which is the nature of local demand for an industry's goods or services. The third attribute is related and supporting industries, which is the availability of supplier industries and related industries that are internationally competitive. The fourth attribute is firm strategy, structure, and rivalry that explains the condition in the nation governing how firms are created, organized, and managed, and the nature of domestic rivalry (Porter 1990).

Successful industry clusters depends on the relation among those four attributes that often called the diamond model. In this notion, strong demand condition, for example, will not lead to competitive advantage unless related and supporting industries are sufficient. Additionally, two other attributes that can influence the competitiveness of industry clusters are chance and government. Porter (1990) defines chance as developments outside the control of firms such as innovation, political outbreak, or swift shift in foreign market demand. Government plays critical role in determining the competitiveness of clusters. Government designs policy that influences the relationships of all four attributes in the diamond model. Investment in infrastructure and improvement in national education system are two examples of how government can affect the diamond.

Specifically, Sheffi (2012) addresses several factors that determine successfulness of logistics clusters. According to Sheffi, location is a central attribute to determine how

logistics clusters can be competitive. Strategic location of logistics clusters is ideal to mobilize all logistics operation so that the businesses within the clusters still can be competitive (Rivera et al. 2014). This is also a reason why most major logistics clusters are agglomerated around locations with both a significant port and a large airport (Sheffi 2010).

The qualitative and quantitative analysis in this study attempted to answer whether Indonesia has the right ingredients for its industry clusters. The in-depth-interview in the qualitative analysis found that Indonesia has serious infrastructure problems. Ports, highways, bridges, railroad, and power plants are some infrastructure required to make industries run their operations. Unfortunately, only in the Java economic corridor does sufficient infrastructure exist.

Besides the problem of severe infrastructure, Indonesia also has a human capital problem. Clusters need qualified human capital to develop industries within the clusters. Clusters also function as talent pools for skilled and knowledgeable labors who are ready to work at industries within the clusters. If qualified human capital is not available in sufficient quantity, then industry clusters might not function well.

The interviews also found that government support is something that industry clusters in Indonesia are missing. Porter (1990) and Sheffi (2012) believe that government's role is needed in providing regulation, rules, and basic infrastructure, however, the government's initiative to develop clusters is still weak. Only the top level of government has vision to spread development through industry clusters. When it comes to lower levels of government, this vision is not being successfully translated.

Findings from the quantitative analysis also confirm the finding of qualitative analysis. The location quotients and shift-share analysis confirm that only few industry sectors within logistics and automotive clusters in Java are competitive and need to be retained. Industries such as textile, leather and footware in West Java; transportation, machinery and tools in West Java; and paper and printing in East Java are those that can be categorized as good performers and have export orientation.

Four econometric models from the quantitative analysis offer factors that determine Indonesia's industry cluster competitiveness. In logistics clusters, those factors are Herfindahl Index, competitive shift, human development index, poverty rate, economic change, income per capita, unemployment, factor supply, cluster share, regional GDP, ports, population density, and workforce. For automotive clusters, those factors are Herfindahl Index, income per capita, poverty rate, cluster employment, ports, productivity, and university enrollment.

Analysis on logistics and automotive clusters in the Java economic region reveals some ingredients that the region strongly possesses and other ingredients that the regions lack. For logistics clusters, Java has better ingredients than Indonesia on the following factors: population share, logistics share, income per capita, Herfindahl Index, university enrollment, human development index, poverty rate, population density, productivity, labor supply, and the number of universities. For automotive clusters, Java is stronger than overall Indonesia on the following indicators: human development index, poverty rate, productivity, income per capita, population share, automotive share, factor supply, competitive shift, labor supply, and number of universities.

- Research Question 2: What strategies are needed to create a competitive environment among domestic firms in Indonesia's industry clusters?

Based on the interview and analysis, some strategies can be developed to create a competitive environment among domestic firms in industry clusters. First, government needs to solve the pressing problems that hinder the development of competitive clusters. Infrastructure needs to be provided. Highways, bridges, power plants should be available in the most parts of the country. Second, human capital needs to be reinforced through basic education and establishment of vocational schools. Basic education should be available for all kids in the country, and vocational schools are important to prepare students with necessary skills in industry. University enrollment should be increased to prepare young generation to be ready to compete in global environment.

Third, Indonesia needs more entrepreneurs to develop the economy. Entrepreneurs are needed to open more small and medium businesses so that more firms can participate in the economy. More firms to run the economy indicates that the market is more efficient. This is also important to avoid monopoly practice and the use of more power by one or few economic agents on the others in the economy.

Another strategy that can be formulated to create a more competitive environment is by spreading the development outside Java. Analysis on clusters in Java indicates that the region has an excessive amount of human capital related such as productivity, labor supply, and factor supply. However, other regions in Indonesia are lacking those factors. If the economic development can be distributed fairly to other regions, then many opportunities can be created and many firms can compete fairly in the market.

8.3.Policy Recommendation

Based on the results of this study, there are some policies that can be recommended to develop industry clusters in Indonesia, especially in Java economic region. Those policy recommendations are divided into three main areas: policies about the role of government in providing basic infrastructure, cluster policies and economic development, and human capital and workforce development.

8.3.1. The need for infrastructure and the role of government

One major problem facing the development of industry clusters, and the economy overall, in Indonesia is the lack of infrastructure. Basic infrastructure such as roads, highways, ports, and railroads are critical to run the economy. Indonesia needs major development to provide its citizen with basic infrastructure throughout the country. Since more than 60 percent of development has been concentrated in Java, the area outside Java has severe condition of infrastructure. It is no wonder that the transportation costs go up to transport goods from Java to the eastern part of Indonesia, or the other way around.

Porter (1990) argues that it is a part of government responsibility to provide basic public facilities in order to maintain and strengthen economic performance. This role implies a minimalist government role in some areas (e.g., trade barriers, pricing) and an activist role in others (e.g., ensuring vigorous competition, providing high-quality education and training). Governments must strive to improve the business environment; it must not limit competition or ease standards for safety and environmental impact (Porter 1990). Therefore, providing primary infrastructure such as roads, railroads, highways, and electricity is the government's responsibility. There is also another issue regarding the funding of infrastructure projects. Government does not have enough money to fund

all infrastructure projects across Indonesia, and this is one of the reasons why the infrastructure deficiency persists being a major problem in the country.

This is actually where the private sector can take their part in economic development. Since gaining independence in 1945, the Indonesian economy has not recognized the involvement of the private sector to provide basic public needs. All public projects are owned by government. However, the severe problem of infrastructure may allow government to let the private sector take part (perhaps not in full) ownership in providing public facilities. A collaboration scheme such as public-private partnership can be a solution to synergize government and private sector's role in the economy. An example of public project that can involve the private sector's participation is by involving private firms in road and highway construction. Those firms can charge tolls on the highways once they finish construction. In order to increase productivity, it is essential for government and firms to build dialogue and to cooperate removing obstacles, reducing inefficiencies, and developing appropriate inputs, information, and infrastructure.

8.3.2. Cluster policies and economic development

This study finds that in general, industry clusters in Indonesia are not competitive. However, there are still some strong performing industry sectors in both automotive and logistics sectors such as machinery in West Java and air transportation in Yogyakarta. Government needs to provide sound guidance, policy and rules in the development of these industries. Porter (1990) suggests that government does not need to be involved heavily in the economy and should let the private sector do the detail activities.

This also holds for other economic activities. The Indonesian economy is sometimes characterized by the involvement of government in the market. While this action seems to

protect the local economy, in the long run this makes local products not competitive. Government protection inhibits innovation so that local products cannot compete directly in regional market. This is also a reason why not many Indonesian products can be seen in global markets.

The regression result to explain competitiveness shows that Herfindahl Index is a significant variable of competitiveness and it has negative sign. A higher value of Herfindahl index means that the market is monopolized by a single or few economic agents. In order to spur innovation and create competitive products, government needs to provide clear guidance and let economic agents (or private sectors) compete fairly in the market.

This has become evident in automotive clusters, as the market is dominated by foreign-based manufacturers. This situation creates a dilemma for the Indonesian government, as FDI is critical to support the industrial development in the country. On the other hand, the presence of foreign firms in the market will hinder the emergence of local-based manufacturers. The central government needs to create a policy that balances the influx of FDI with import substitution strategy. In automotive clusters, domestic content policies can be an option as the government may requires automotive products that are domestically produced to have certain level of domestic contents.

8.3.3. Human capital and workforce development

Competitive industry clusters can create and function as labor pools. Industry clusters allow a pooled market for workers with specialized skills and this pooled market brings benefit both for workers and firms. This implies that employers in the clusters can find experienced and knowledgeable workers to work in their industry. Labor pooling in

industry clusters can work effectively under one condition: good human capital. Unfortunately, in the case of Indonesia, this is not what happens in the market.

The low quality of labor in Indonesia is reflected on the poor performance of Indonesia's human development index (HDI). The HDI - which is significant in the model to explain competitiveness in this study- measures standard of living, education attainment, and welfare of a country. From all those indicators, Indonesia falls behind other countries in the region.

This should be an alarming indicator for the Indonesian government to develop policies to ensure the next generation in Indonesia has an improved index. Education is important, and this is also a finding of this study where university enrollment is significant to explain competitiveness. Government needs to ensure all children receive basic education and have the right to continue their education until university level. Specifically, the government needs to develop workforce development policies to prepare its young generation to be ready to compete not only at the local level, but also in regional and global stage.

8.3.4. Policies to spur innovation and to create entrepreneurs

All four OLS regression models in the quantitative analysis reveal a single variable that was significant in all models. The variable is Herfindahl Index. This index basically is an indicator of the amount of competition among firms in the market. A larger Herfindahl Index indicates less competition and more market power exercised by a few economic agents in the market. Therefore, in order to make the market more competitive, it is important to stimulate the creation of entrepreneurs who start their small and medium-size business.

Based on Doing Business 2015 report by the World Bank, Indonesia ranks 114th on the ease of doing business, out of 189 countries being surveyed. Compared to other neighboring countries, this rank is still low, Malaysia ranks 18th, China is in 90th position, and Philippines ranks 95th. In all indicators of doing business, only protecting minority investors (43th) that has the highest score. The remaining indicators perform poorly: starting a business (155th), resolving insolvency (75th), enforcing contracts (172th), trading across borders (62th), paying taxes (160th), getting credit (71st), registering property (117th), and dealing with construction permits (153th).

In order to stimulate more entrepreneurs to start their own business, government needs to take serious action. It is currently inefficient to start a new business in Indonesia. In terms of procedures of opening business, for example, there are 10 procedures to be followed, while on average there are only 7.3 procedures in East Asia and pacific countries and 4.8 procedures in OECD countries. It also takes 52.5 days to open new business in Jakarta, compared to 34.4 days in other Asia Pacific countries and 9.2 days in OECD countries.

Stimulating more entrepreneurs to run their business will create new opportunities in other regions in Indonesia. This is beneficial to spread economic development more evenly to other area in the country. Some policies that can stimulate the raise of entrepreneurs should be considered such as providing loans and credits to those who want to open new business, cutting down unnecessary procedure, providing tax incentive, and introducing entrepreneurship curriculum in the universities.

8.3.5. Local Governments and Inter-Government Relation Policy

One weakness related to cluster development in Indonesia is when the vison and plan from the central government are not translated well into effective policies in the lower levels of governments. The case of the MP3EI is an example of how the master plan from the central government was perceived differently after being brought to the provincial or city and municipal level.

Actually the central government has made some attempts to make a balanced intergovernmental relation as well as to make local governments to assume an increasingly role in the provision of public services. Those attempts include the issuance of laws and regulations regarding intergovernmental relation and decentralization. For an example, Law No. 5 of 1974 provides a legal framework for the distribution of responsibilities between levels of government. In intergovernmental relations, an important highlight is on the decentralization of government expenditure and revenue authority (Shah et al. 1994).

There was also a reform on intergovernmental fiscal relations that is expected to contribute to more efficient provision of public services. Public service provision should allow a better matching of expenditures with local priorities and preferences. This is where the problem occurs. Priorities and preferences in local governments are sometimes different from those in central government. In the case of MP3EI, the central government expects the master plan as a guidance to promote a more equal economic welfare among regions, while local governments perceive it as a long list of infrastructure projects.

Lack of communication seems to underline the confusion that happens between central government and local governments regarding the implementation of the master

plan. The main principle in intergovernmental relation related to the provision of public services is that local public services such as health and education, local roads, water and sanitation are the responsibility of local governments due to closer attention and responsiveness to local needs (Shah et al. 1994). On the other hand, services in greater scope such as defense, foreign affairs, and national transport networks are provided by central government. An important condition to ensure the smoothness relation of the inter-government is the possession of sufficient institutional capacities in both parties. These institutional capabilities seem to be the factors that the governments do not sufficiently possess.

8.3.6. Alleviating Disparities in Indonesia

One of the goals of MP3EI is to alleviate economic disparities in Indonesia. As the Java economic region has been the backbone of the country's economic development for several decades, the developments in other regions were often neglected. This issue is actually not the main point of this study, however, some of the findings in the quantitative analysis may indicate whether the economic gap in Indonesia has improved in the past decades or not. Table 46 shows the competitive shift of automotive and logistics clusters in each economic corridor in Indonesia. Since industrial development has been concentrated in Java, it is clear to see that Java has the biggest magnitude of competitive shift in both clusters, followed by Sumatera and Kalimantan economic corridors. Meanwhile, the eastern part of Indonesia, the Papua-Maluku economic corridors, showed the lowest magnitude of competitive shift, indicating that the area is not competitive because almost no economic development persists there.

Table 44: Competitive shift in each economic corridor

Economic Corridors	Automotive (Million IDR)	Logistics (Million IDR)
Sumatera	211,113.37	2,993,835.43
Java	-20,676,982.54	-3,189,891.33
Kalimantan	1,855,596.54	752,541.79
Sulawesi	722,451.25	1,255,865.42
Bali-Nusa Tenggara	319,062.14	-1,810,559.01
Papua-Maluku	722,451.25	1,255,865.42

Regarding economic disparities, the third econometric model, the change in cluster GDP model, found that change in cluster GDP between 2000 and 2010 in both logistics and automotive clusters are negatively affected by the cluster GDP in 2000. This confirms to income convergence phenomenon that poorer regions' per capita incomes grow faster than richer regions (Tamura 1991). As a result, all regions converge in terms of income per capita. This finding may indicate that development has spread outside poorer region outside the Java economic region.

8.4.Direction for Future Research

There are some directions for future research in industry clusters in Indonesia. The first possible future research is to measure competitiveness in other clusters in Indonesia. Automotive and logistics clusters were the focus on this study because of their large contribution to cluster development in Indonesia and because of their importance in the masterplan. It is also necessary to conduct similar study in other economic corridors in Indonesia. There are five more corridor outside Java that have not been measured. Given the goal from the Indonesian government to spread the economic development to other corridors, this kind of study is important.

Another possibility for future research is by adding more techniques to measure competitiveness in clusters. Some possible techniques are network analysis, spatial dependence, and multi-level analysis. Network analysis is useful to examine the structure of relationships between actors in the clusters. For example, this technique is necessary to assess the relationship of producers and suppliers in the supply chain of clusters. Spatial dependence is necessary to see the spatial relationship of variables or locations. For example, it is difficult to differentiate clusters in two almost identical and adjacent locations such as West Java and Central Java. Accounting for spatial dependence using spatially lagged variables can tackle this difficulty. Multi-level analysis such as hierarchical linear modeling is useful when the data is organized in more than one level. Multi-level analysis can be useful in this study because this study employs various level of analysis where the LQs and shift-share analysis are performed aggregately in provincial level, while regression analysis is performed in city level.

Overall, this study provides a useful starting point for the analysis of other clusters in other corridors of Indonesia; further, the methods employed here might be useful in analyzing industry clusters in other developing countries. In other words, the methodology can be replicated in other corridors and countries, and the resulting analysis should provide useful policy information to decision makers at all levels of government.

REFERENCES

Acemoglu, D. and Robinson, J.A. (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York, NY: Crown Business.

Asian Development Bank (2010). *Key Indicators for Asia and the Pacific*. Mandaluyong City: Asian Development Bank.

Aswicahyono, H, and Pangestu, M. (2000). Indonesia's Recovery: Exports and Regaining Competitiveness. *Developing Economies*, 38, 4, 454-489.

Aswicahyono, H., Hill, H., and Narjoko, D. (2013). Indonesian Industrialization: A Latecomer Adjusting to Crises. In Szirmai, A., Naude, W.A., and Alcorta, L, *Pathways to Industrialization in the Twenty-First Century.* (pp. 193-222). Oxford University Press: UK.

Arvis, J., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., Raj, A. (2014). *Connecting to Compete 2014, Trade Logistics in the Global Economy: The Logistics Performance Index and Its Indicators.* Washington, DC: The World Bank.

Bahagia, S.N., Sandee, H., and Meeuws, R. (2013). *State of Logistics Indonesia 2013*. Jakarta: The World Bank.

Barff, R.A. and Knight III, P.L. (1988). Dynamic Shift-Share Analysis. *Growth and Change*, 19, 2, 1-10.

Bartik, T.J. (1990). The Market Failure Approach to Regional Economic Development Policy. *Economic Development Quarterly*, 4, 4, 361-370.

Bergman, E.M. and Feser, E.J.(1999). *Industrial and Regional Clusters: Concepts and Comparative Applications*. Morgantown, WV: WVU Regional Research Institute Web Book.

Bernando, F.R. (2014, August 12). Automobile Market in Indonesia: Demand Drivers and Outlook. *The Jakarta Post,* pp. 14.

Bird, K. and Hill, H. (2006). Indonesian Industrial Policies: Before and After the Crisis. In Y. Zhu and H. Hill, *The East Asian High-Tech Drive* (pp. 335-375). Edwar Elgar Pub: UK.

Campbell, H.S. Jr., Watkins, E.M., and Kunkle, G.M. (2012) Targeting vs Connecting in Biotechnology. *Papers of the Applied Geography Conferences*, 35, 299-307.

Depner, H. and Bathlet, H. (2005). Exporting the German Model: The Establishment of a New Automobile Industry Cluster in Shanghai. *Economic Geography,* 81, 1, 53-81.

Dhewanto, W., Herliana, S., Ratnaningtyas, S., and Triana, M.I. (2013). Towards and Innovation Cluster in Indonesia-A Literature Study and Research Agenda. *Jurnal Manajemen Teknologi*, 12, 1, 75-87.

Economist Intelligence Unit (2013). www.country.eiu.com/Indonesia.

Elias, S. and Noone, C. (2011). The Growth and Development of the Indonesian Economy. *Bulletin of Reserve Bank of Australia December Quarter*, p33-44.

Feldman, M.P. (2000). Location and Innovation: The New Economic Geography of Innovation, Spillovers, and Agglomeration. In G. L. Clark, M. P. Feldman, & M. S. Gertler, *The Oxford Handbook of Economic Geography* (pp. 373-394). NY: Oxford University Press.

Feser, E.J. (1998). Enterprise, External Economies, and Economic Development. *Journal of Planning Literature*, 12,3, 283-302.

Fothergill, S. and Gudgin, G. (1979). In Defence of Shift-Share. *Urban Studies*, 16, 309-319.

Gereffi, G. and Korzeniewicz, M (1994). *Commodity Chains and Global Capitalism*. Westport, CT: Praeger Publishers.

Gereffi, G. (1999). International Trade and Industrial Upgrading in the Apparel Commodity Chain. *Journal of International Economics*, 48, 37-70.

Giugale, M.M. (2014) *Economic Development: What Everyone Needs to Know*. New York: Oxford University Press.

Hansen, N.M. (1975). An Evaluation of Growth-Center Theory and Practice. *Environment and Planning A*, 7, 821-832.

Harrison, B. (1991). Industrial Districts: Old Wine in New Bottles? *Regional Studies*, 26 (5), 469-484.

Held, J.R. (1996). Clusters As An Economic Development Tool: Beyond The Pitfalls. *Economic Development Quarterly*, 10, 3, 249-513.

Herzog, H.W.,Jr. and Olsen, R.J. (1977). *Shift-share Analysis Revisited: The Allocation Effect and The Stability of Regional Structure*. Regional and Urban Studies Section Energy Division, Oak Ridge National Laboratory. Oak Ridge, TN.

Hill, H. (1996). Indonesia's Industrial Policy and Performance: "Orthodoxy" Vindicated. *Economic Development and Cultural Change*, 45, 1, 147-174.

Hill, E.W. and Brennan, J.F. (2000). A Methodology for Identifying the Drivers of Industrial Clusters: The Foundation of Regional Competitive Advantage. *Economic Development Quarterly,* 14, 1, 65-96.

Hill, H., Resosudarmo, B. and Vidyattama, Y.(2009) Economic Geography of Indonesia: Location, Connectivity, and Resources, in Y. Huang and A.M. Bocchu, *Reshaping Economic Geography in East Asia*. World Bank Publications.

Hill, T. and Westbrook, R. (1997). SWOT Analysis: It's Time for a Product Recall. *Long Range Planning,* 30,1, 46-52.

Isserman, A.M. (1977). The Location Quotient Approach to Estimating Regional Economic Impacts. *Journal of the American Institute of Planers,* 43, 1, 33-41.

International Standard Industrial Classification of All Economic Activities. New York, NY: United Nations.

Knudsen, D.C. (2000). Shift-Share Analysis: Further Examination of Models for the Description of Economic Change. *Socio-Economic Planning Sciences,* 34, 177-198.

KPMG (2014). *Indonesia's Automotive Industry: Navigating 2014.* KPMG

Krugman, P. (1991). *Geography and Trade*. Cambridge, MA: MIT Press.

Kuncoro, M. (2003). Why Manufactuing Industry Persisted to Cluster Spatially in Java? *Gadjah Mada International Journal of Business,* 5(2), 1-39.

Malizia, E.E. and Feser,E.J. (1998). *Understanding Local Economic Development*. Rutgers, NJ: CUPR Press.

Marijan, K. (2007). Industrial Policy, Industrialisation, and Cluster Industries in Indonesia: An Overvieew. *UNISIA,* 30, 64, 103-121.

Martin, R. and Sunley, P. (2003). Deconstructing Clusters: Chaotic Concept or Policy Panacea? *Journal of Economic Geography,* 3, 5-35.

McLean, M.L. and Voytek, K.P. (1992). *Understanding Your Economy: Using Analysis to Guide Local Strategic Planning.* Chicago, IL: Planners Press.

Miller, M.M. (2009). What Exactly is "Economic Development?" *Applied Research in Economic Development,* 6, 1.

Ministry of Trade of the Republic of Indonesia (2014). Ministry of Trade Support Toyota to Increase Automotive Export Contribution. *Ministry of Trade Press Release,* June 2014.

Naude, W. (2013). Why Indonesia Needs a More Innovative Industrial Policy. *ASEAN Journal of Economics, Management, and Accounting*, 1, 1, 48-65.

Oberman, R., Dobbs, R., Budiman, A., Thompson, F., Rosse, M. (2012). *The Archipelago Economy: Unleashing Indonesia's Potential.* McKinsey Global Institute.

Porter, M. E. (1990). *The Competitive Advantage of Nations.* New York, NY: Free Press.

Porter, M.E. (1996). Competitive Advantage, Agglomeration Economies, and Regional Policy. *International Regional Science Review*, 19, 1&2, 85-94.

Porter, M. E. (2000a). Location, Competition, and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly, 14* (1), 15-35.

Porter, M. E. (2000b). Locations, Clusters, and Company Strategy. In G. L. Clark, M. P. Feldman, & M. S. Gertler, *The Oxford Handbook of Economic Geography* (pp. 253-274). NY: Oxford University Press.

Rock, M.T. (1999). Reassessing the Effectiveness of Industrial Policy in Indonesia: Can the Neoliberals be Wrong? *World Development,* 27, 4, 691-704.

Rivera, L., Sheffi, Y., and Welsch, R. (2014). Logistics Agglomeration in the US. *Transportation Research Part A*, 59, 222-238.

Saich, A., Dapice, D., Masoud, T., Perkins, D., Pincus, J., Rosengard, J., Vallely, T., Wilkinson, B., & Williams, J. (2010). *From Reformasi to Institutional Transformation: A Strategic Assessment of Indonesia's Prospects for Growth, Equity and Democratic Governance.* Cambridge, MA: Ash Center for Democratic Governance and Innovation.

Sentz, R. (2011). Understanding Shift Share. www.economicmodeling.com.

Shah, A., Qureshi Z., Bagchi, A., Binder, B., and Zou, Heng-fu. (1994). Intergovernmental Fiscal Relations in Indonesia: Issues and Reform Options. *World Bank Discussion Papers No. 239.*

Sheffi, Y. (2010). Logistics Intensive Clusters. *Epoch, 20(1-2),* 11-17.

Sheffi, Y. (2012). *Logistic Cluster: Delivering Value and Driving Growth*. Cambridge, MA: MIT Press.

Sipahutar, T. (2015, April 23). OJK, BI mull revision of loan-to-value policy. *The Jakarta Post*, pp. 13.

Soesastro, H. and Basri, M.C. (2005). The Political Economy of Trade Policy in Indonesia. *CSIS Working Paper No. 92.*

Swords, J. (2013). Michael Porter's Cluster Theory as a Local and Regional Development Tool: The Rise and Fall of Cluster Policy in the UK. *Local Economy*, 28(4), 369-383.

Tamura, R. (1991). Income Convergence in an Endogeneous Growth Model. *Journal of Political Economy,* 99, 2, 522-540.

The World Bank (2014). *Doing Business 2015: Going Beyond Efficiency*. Washington, DC: The World Bank.

Thomas, M. D. (1972). Growth Pole Theory: An Examination of Some of Its Basic Concepts,in Niles Hansen (ed.) *Growth Centers in Regional Economic Development*, New York: The Free Press: 50-81.

Vinayak, H.V., Thompson, F., and Tonby, O. (2014). *Understanding ASEAN: Seven Things You Need to Know*. McKinsey and Co.

Yamamoto, H. (2012) .Asean Automotive Market Outlook and Challenges and Opportunities for Suppliers. *HIS Automotive.*

APPENDIX A: LQ AND SHIFT-SHARE RESULTS OF LOGISTICS CLUSTERS

No	Provinces	Industry Sectors	LQ 00	LQ 10	NS (IDR)	IM (IDR)	CS (IDR)
1	Jakarta	Railroad	1.17	1.18	118,214.67	-84,601.61	20,446.32
		Road and Highway	0.65	0.75	2,009,483.39	462,823.71	1,376,833.47
		Water Transportation	1.72	1.67	1,320,582.42	-94,394.12	150,640.24
		River and Lake Transportation	0.11	0.01	22,022.29	-10,847.15	-42,697.02
		Air Transportation	0.03	0.02	14,732.71	50,151.04	-43,585.82
		Transportation Service	1.31	1.29	1,279,190.21	543,407.33	245,336.71
2	West Java	Railroad	2.07	1.54	179,430.15	-128,411.13	-83,009.70
		Road and Highway	1.07	0.92	2,845,953.12	655,479.21	-1,015,004.81
		Water Transportation	0.28	0.04	184,411.28	-13,181.56	-405,046.34
		River and Lake Transportation	0.01	0.00	2,117.04	-1,042.75	-3,827.33
		Air Transportation	0.29	0.47	112,661.44	383,506.36	438,281.79
		Transportation Service	0.30	0.24	249,220.90	105,870.47	-130,947.03
3	Central Java	Railroad	1.54	1.35	78,554.74	-56,218.55	-17,564.32
		Road and Highway	1.30	1.25	2,024,538.26	466,291.14	-143,034.20
		Water Transportation	0.79	0.79	303,249.77	-21,676.04	7,320.63
		River and Lake Transportation	0.00	0.00	89.03	-43.85	4.61
		Air Transportation	0.10	0.09	22,511.86	76,631.74	-11,213.46
		Transportation Service	0.28	0.24	139,908.20	59,433.81	-65,813.97
4	Yogyakarta	Railroad	6.08	4.12	36,340.69	-26,007.61	-23,931.77
		Road and Highway	2.28	2.22	418,202.43	96,320.28	-68,156.70
		Water Transportation	0.00	0.00	0.00	0.00	0
		River and Lake Transportation	0.00	0.00	0.00	0.00	0
		Air Transportation	0.79	1.42	21,169.55	72,062.43	94,646.59
		Transportation Service	0.40	0.36	23,221.76	9,864.73	-10,210.10
5	East Java	Railroad	1.03	0.92	92,373.03	-66,107.76	-10,469.34
		Road and Highway	0.88	0.50	2,411,197.78	555,346.47	-2,808,275.17

APPENDIX A: (CONTINUED)

No	Provinces	Industry Sectors	LQ 00	LQ 10	NS (IDR)	IM (IDR)	CS (IDR)
		Water Transportation	0.45	0.49	304,298.97	-21,751.03	110,933.24
		River and Lake Transportation	0.15	0.14	27,594.55	-13,591.79	-4,168.32
		Air Transportation	1.21	1.06	486,963.31	1,657,652.58	-232,357.52
		Transportation Service	1.94	1.75	1,683,137.80	715,006.58	-278,837.69
6	Banten	Railroad	0.54	0.81	10,949.31	-7,835.99	11,723.25
		Road and Highway	1.34	1.46	828,452.51	190,808.97	321,636.55
		Water Transportation	1.34	0.96	206,471.55	-14,758.41	-139,291.69
		River and Lake Transportation	1.04	1.31	42,590.96	-20,978.32	27,174.37
		Air Transportation	4.33	3.57	392,790.06	1,337,081.14	-343,879.99
		Transportation Service	1.70	1.45	332,220.60	141,129.22	-113,546.81

APPENDIX B: LQ AND SHIFT-SHARE RESULTS OF AUTOMOTIVE CLUSTERS

No	Provinces	Industry Sectors	LQ 00	LQ 10	NS (IDR)	IM (IDR)	CS (IDR)
1	Jakarta	Textile, Leather, and Footware	0.73	0.49	2,990,003.33	-1,767,931.31	-1,656,224.81
		Paper and Printing	0.38	0.47	636,879.57	199,759.04	634,494.39
		Fertilizer, Chemical, and Rubber	1.05	0.74	3,869,087.24	-194,731.48	-2,377,743.01
		Basic Metal, Iron, and Steel	0.74	0.52	1,093,210.69	-710,625.78	-501,420.97
		Transportation, Machinery & Tools	2.00	1.54	12,187,837.95	10,972,392.62	-7,250,915.03
		Other Products	0.44	0.46	217,375.57	-63,297.38	62,054.28
2	West Java	Textile, Leather, and Footware	3.30	3.34	11,612,228.12	-6,866,086.55	748,064.01
		Paper and Printing	1.08	0.80	1,554,620.09	487,610.88	-1,128,270.05
		Fertilizer, Chemical, and Rubber	1.94	1.24	6,163,549.84	-310,211.97	-5,513,204.02
		Basic Metal, Iron, and Steel	0.41	0.23	525,763.22	-341,764.77	-438,856.61
		Transportation, Machinery & Tools	3.88	3.88	20,378,837.69	18,346,536.05	1,200,095.97
		Other Products	2.17	2.42	919,395.40	-267,717.86	302,074.61
3	Central Java	Textile, Leather, and Footware	1.65	1.95	3,407,906.70	-2,015,029.51	1,326,799.68
		Paper and Printing	0.29	0.27	245,274.15	76,930.91	-40,695.60
		Fertilizer, Chemical, and Rubber	0.49	0.63	903,321.86	-45,464.26	719,454.20
		Basic Metal, Iron, and Steel	0.09	0.10	65,842.51	-42,799.97	17,394.11
		Transportation, Machinery & Tools	0.14	0.14	423,628.23	381,381.45	73,305.54
		Other Products	0.25	0.32	63,107.44	-18,376.20	43,214.10
4	Yogyakarta	Textile, Leather, and Footware	1.17	0.93	282,330.65	-166,936.67	-130,485.79
		Paper and Printing	0.70	0.52	69,071.98	21,664.62	-55,987.05
		Fertilizer, Chemical, and Rubber	0.28	0.36	61,472.57	-3,093.92	38,918.97
		Basic Metal, Iron, and Steel	0.00	0.00	2,958,706.96	-1,923,264.62	-2,428,214.19
		Transportation, Machinery & Tools	0.36	0.19	646,717.49	582,222.89	739,403.36
		Other Products	3.31	2.56	96,817.53	-28,192.20	-57,041.90
5	East Java	Textile, Leather, and Footware	0.44	0.34	1,616,838.45	-956,005.39	-617,610.26
		Paper and Printing	2.94	3.35	4,398,309.97	1,379,542.07	2,455,394.32

APPENDIX B: (CONTINUED)

No	Provinces	Industry Sectors	LQ 00	LQ 10	NS (IDR)	IM (IDR)	CS (IDR)
		Fertilizer, Chemical, and Rubber	0.88	0.94	2,914,257.70	-146,674.83	815,134.40
		Basic Metal, Iron, and Steel	2.24	1.25	0.00	0.00	0
		Transportation, Machinery & Tools	0.12	0.15	128,765.23	115,923.98	-217,784.23
		Other Products	3.11	2.10	1,366,952.80	-398,041.66	-936,361.85
6	Banten	Textile, Leather, and Footware	3.88	3.34	3,184,960.07	-1,883,205.47	-707,812.68
		Paper and Printing	4.09	1.22	1,377,699.19	432,119.15	-2,810,502.36
		Fertilizer, Chemical, and Rubber	4.49	6.81	3,333,898.20	-167,795.37	4,914,577.19
		Basic Metal, Iron, and Steel	9.03	7.90	2,693,673.20	-1,750,983.26	-500,058.67
		Transportation, Machinery & Tools	1.78	0.56	2,174,798.40	1,957,914.28	-5,157,768.55
		Other Products	1.32	0.67	130892.0139	-38114.31899	-145596.4582