

# East Asian Economy's Structural Change and New Industry Cluster

Hitoshi Hirakawa<sup>1</sup>

## Abstract

During the last half century, the structure of the global economy has undergone large changes. From the second half of the 1980s, together with the pummeling of the walls of national borders brought about by a serious effort to promote IT accompanied by globalization, regions, industries and firms, which were able to ride on this tide both internationally and domestically, were borned, while the regions, industries, and firms that were late in riding on to such developments are now forced towards rapid decline or reform. However, generally speaking, after China's growth in riding the tide and the Lehman shock of 2008, East Asia has come to be expected by the world to be the engine of growth.

East Asian developing countries have up to now advanced export-oriented policy in parallel with attracting foreign-affiliated firms. Export processing zones or special economic zones are a thorough policy mostly of East Asian countries amidst the practically insufficient market, capital, and technology. Once this creates an external economy with a certain level of success, a higher level of regional industrial policy is pushed. In this way, the "positive lock-in effect" of industrial agglomeration is able to takes effect, and a spontaneous agglomeration effect is strengthened.

Incidentally, it would be inadequate to simply treat this phenomenon as the shifting of industry from Japan to the latecomers. Globalization and IT-ization have intensified the competition among advanced countries, but at the same time amidst this environmental change, it seems that an opportunity has been given to East Asia to achieve a peculiar type of innovation. It seems in turn to have deepened industrial agglomeration and increased competitiveness.

In this paper, firstly in section 1, we will verify the facts of the spatially structural changes of East Asia. Next, in section 2, we shall look at the heightened interest, and its background, of researchers on industrial agglomeration or clustering. In section 3, we will consider the agglomeration itself and clustering policies, and lastly form our conclusions.

Keywords: export-processing zones, globalization, industrial agglomeration, industrial cluster, innovation in East Asia

JEL Classification: L16, L52, L86

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<sup>1</sup> Professor, Economic Research Center, Graduate School of Economics, Nagoya University, Furo-cho, Chikusa-ku, Nagoya, 464-8601, Japan. Tel/Fax: +81-52-789-4943, E-mail: hhirakaw@soec.nagoya-u.ac.jp

## Introduction

During the last half century, the structure of the global economy has undergone large changes. From the second half of the 1980s, together with the pummeling of the walls of national borders brought about by a serious effort to promote IT accompanied by globalization, regions, industries and firms, which were able to ride on this tide both internationally and domestically, were borned, while the regions, industries, and firms that were late in riding on to such developments are now forced towards rapid decline or reform. However, generally speaking, after China's growth in riding the tide and the Lehman shock of 2008, East Asia has come to be expected by the world to be the engine of growth.

Actually, the East Asia region is the largest region promoting a structural change that is accompanied by intense market competition. The national economies in East Asia, since the second half of the 20<sup>th</sup> century, have rapidly shifted from the traditional economies that relied on primary industries to economies that are driven by secondary industries, particularly manufacturing, and are transforming to become the manufacturing goods export base as "factory of the world."

How was this development achieved? With the growth of East Asia, the major concern of researchers have expanded and deepen from growth itself but to manner of development strategy and policy, and the manner of international division of labor and multinational firm activity as a concrete force for industrialization. Since the 1990s, as reflected in the interest in advanced countries, interest in East Asian industrialization on the region and "spatial structure" have grown.

Incidentally, it is alright to say that globalization indeed has given a framework of growth to East Asia as a region. But at the same time, this has intensified the competition between firms in the world market, and between countries and regions at the policy level. How does the situation look like and what are its effects on the region? A consideration of such issues from a regional perspective is sought for. In this paper, the objective is to verify the structural changes of East Asia as well as the spatial characteristics that cause such changes, and to feel out the issues and prospects related to this matter.

Firstly, in section 1, we will verify the facts of the structural changes of East Asia. Next, in section 2, we shall look at the heightened interest, and its background, of researchers on industrial agglomeration or clustering. In section 3, we will consider the industrial agglomeration itself and clustering policies, and lastly form our conclusions.

## [1] Globalization and East Asia's Industrialization

### (1) East Asian Economy and Structural Change

Firstly, let us start by verifying the position of the East Asian economy in the world economy. In the description of the changes of goods exports composition by regions in world exports from the 2009 version of the "International Trade Statistics" by the World Trade Organization (WTO), in 1973, Northern America had 17.3% (12.3% of which was by the US), Europe occupied 50.9%, and Asia had 14.9%. In 2008, Northern America had 13.0% (8.2% of which was by the US). While Europe's share dropped to 41.0%, Asia rose to about 27.7%, which is about twice the level of Northern America. Incidentally, in this period, Japan dropped to 5.0% from 6.4%, and China rose rapidly from 1.0% to 9.1%. The Six East Asian Traders<sup>2</sup> also had a big increase from 3.4% to 9.0%.

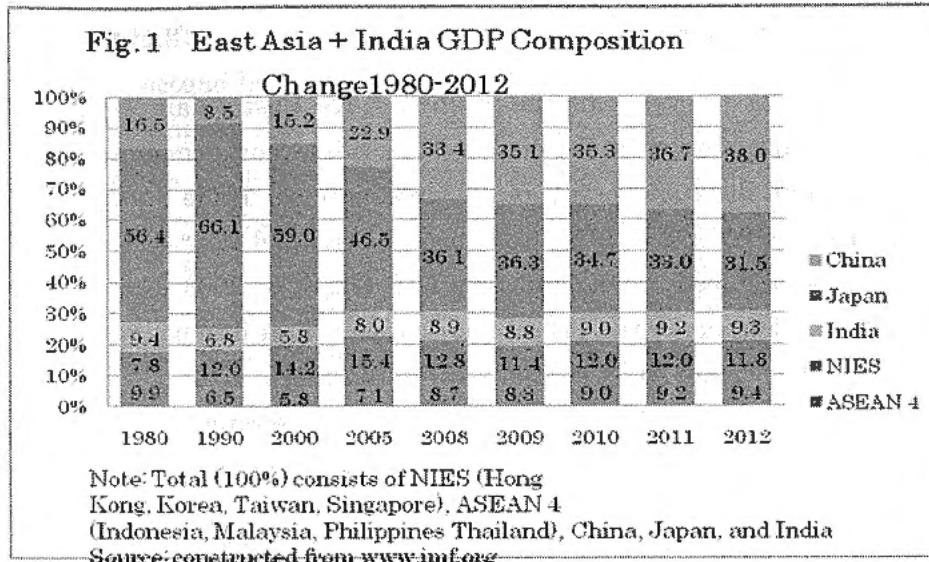
What would be the make up of such good exports? We shall verify this later, but, the NIEs, which since the 1960s have been rapidly increasing its exports of manufacturing goods, have raised their share (excluding Singapore, which had a high share of petroleum products) of manufactured goods exports in goods exports in the 1970s up to 80 to 90%. Even as a region, this share continued to rapidly increase since the 1980s. Looking at the recent 2008 statistics on manufactured goods export share, North America had 68.2%, Europe had 76.8%, while Asia had the highest at 79.2% [WTO 2009]. Asia was greatly expanding its share of world exports by rapidly increasing its manufactured goods exports.

Next, let us look at Figure 1, which shows the change in the GDP composition of East Asian countries and regions, which occupies a dominant share of Asia's economy. In addition to the GDP composition of East Asian countries and region from 1980, this figure shows the share of India, which has grown remarkably and therefore, should be considered in relation to East Asian development. Either way, up to the start of the 1990s, Japan greatly expanded its share in the bubble economy period, with a dominant economic power of about 2/3 of East Asia GDP (including India). However, since the long running malaise of the 1990s, Japan has rapidly reduced its share down to 1/3 recent years. This is in contrast to China, which has expanded its share to close to four times, and is expected to overtake Japan's share in 2010. During this period, the NIEs, ASEAN4 (Indonesia, Malaysia, Philippines and Thailand), as well as India have basically increased or maintained their shares.

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<sup>2</sup> WTO used the expression Six East Asian Traders to group together Hong Kong, Malaysia, Korea, Singapore, Taiwan, and Thailand. [WTO 2008].

Figure 1 East Asia + India GDP Composition Change



Note: Total (100%) consists of NIES (Korea, Taiwan, and Singapore), ASEAN 4 (Indonesia, Malaysia, Philippines Thailand), China, Japan, and India.

Source: constructed from www.imf.org

Let us verify from the figure the scale of the economy and per capita GDP of East Asian countries from the IMF statistics using Japan as benchmark, without raising the flag. There are variations in exchange rate but roughly the levels are thought to be appropriate. First in terms of the scale of the economy, in 1990, China, the NIEs, and ASEAN4 were below Japan's 20%. China's share was about half of Japan in 2005, reaching about the same level in 2009, and is predicted to overtake in 2010. The NIEs, ASEAN, and India have been reducing their gap with Japan, closing it to within 20 to 40%. In terms of GDP per capita, Singapore has surpassed Japan in 2007, and is currently at about the same level. The GDP per capita of the NIEs, Hong Kong, Korea, and Taiwan, is behind by 40 to 80% but is on an upward trend. ASEAN follows next and lastly by China and India, which have GDP per capita far behind that of Japan but have the fastest growth rate and are known recently for the emergence of a large middle class.

From the simple verification above we can get an idea of the large potential of East Asia's economy and market. The picture of relatively small-scale populated NIEs closing up on Japan in terms of GDP per capita, with ASEAN and China following, and the picture of the country with the smallest GDP per capita having the largest population and high growth rates, are ones where there is the possibility of developing new industries and markets now and in the future. What structure does this East Asian development have? We shall look at this next.

## **(2) East Asian Industrialization and Its Spatial Structure**

Japan's 2005 "METI White Paper" writes about the conceptual chart of "Heightening Trade Triangle", where NIEs together with Japan export intermediate goods and capital goods to ASEAN and China, which uses these to produce final goods that are exported to Europe and the US. According to this, East Asian trade value—here we take this as the export value of final goods of China and ASEAN to Europe and the US, and the export value of Japan and NIEs to China and ASEAN—increased by more than five times from 85 billion dollars in 1990 to 447 billion dollars in 2003, accounting for an increase of the share in these regions total export value from 11.7% to 23.1%. [METI 2005a: 166-7]. Also according to the 2008 version of this white paper, the manufacturing real value added of East Asia (ASEAN + 6 countries) grew from 1.85 trillion dollars in 2000 to 2.55 trillion dollars in 2006, while the value added of EU27 countries for the same period was from 1.87 trillion dollars to 2.50 trillion dollars, and that of NAFTA increased slightly from 1.73 trillion dollars to 1.83 trillion dollars, making East Asia overtake other economic regions in terms of scale and growth rate [METI 2008: 143].

The development of East Asia NIEs, which was met with surprise by the OECD (Organization for Economic Cooperation and Development) in the 1970s, was attained through the trade triangle of Japan-NIEs-US, where NIEs imported capital goods and raw materials from Japan, processed these into labor-intensive final goods, and exported these to the US. Such structure of development spread spatially in East Asia and has been leveled up after the 1980s.

However, the main feature of today's trade in goods is the extremely rising share of intermediate manufactured goods. One main factor that brought about such intermediate goods trade is the international division of labor by multinationals based in Japan and other advanced countries. The WTO's "International Trade Statistics" points out that the share of intermediate manufactured products in the world's non-fuel trade has reached around 40% in 2008, and 'unfinished goods may cross frontiers several times during the assembly process'. 'The impact of this "double counting" can be significant'. For example, the figures of Taiwan were an import share of 65 % and an export share of 71 %. 'Thus, roughly two-thirds of its trade was intermediate goods in 2008' [WTO 2009:2].

This situation could be understood as a fragility of East Asian intra-regional trade. This is because most of the final goods produced in East Asia are leaking out as exports to extra-regional advanced countries, particularly the US. According to the world trade matrix of the Institute for International Trade and Investment in Tokyo, Japan, in 2007 East Asia accounted for 57% of the IT-related goods world exports. About 1/3 of East Asia's manufactured goods exports are IT-related goods, but while 72.9% of IT parts are

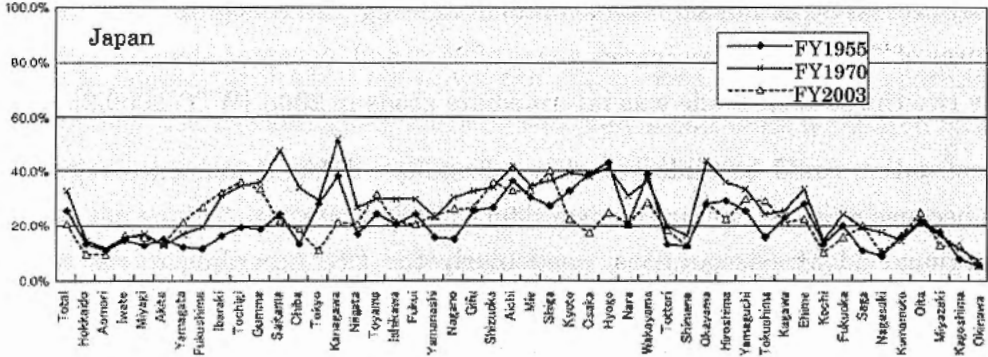


intra-regional exports to East Asia, only 39.1% constitute final goods intra-regional exports. However, comparing to the 2000 shares, IT final goods intra-regional export ratio rose by 7.4% points, and the IT final goods export ratio to the US in 2000 was 24.8%, with East Asia being higher by 14.3% points [Institute for International Trade and Investment 2008]. According to the trade matrix of this institute, the intra-regional export ratio of total export values of East Asia, consisting of Japan, NIEs, ASEAN, and China, increased by 14% points to 47.4% in 1995 from 33.6% in 1985, and further increased by 10% points, reaching 57.5% in 2007. Even though intermediate goods trade, which is accompanied by an international production chain, accounts for a large portion of East Asian intra-regional trade, it could be said that the self-reliance of the East Asian economy is rising. This promotes economic integration of East Asia, and at the same time once again shows the big development possibility of the intra-regional economy and market.

In order to know the spatial structure of East Asia’s industrialization, let us take a look at the changes in the share of manufacturing workers population of Japan and Thailand, and the regional composition of China’s manufacturing. This is shown in Figures 2a and 2b.

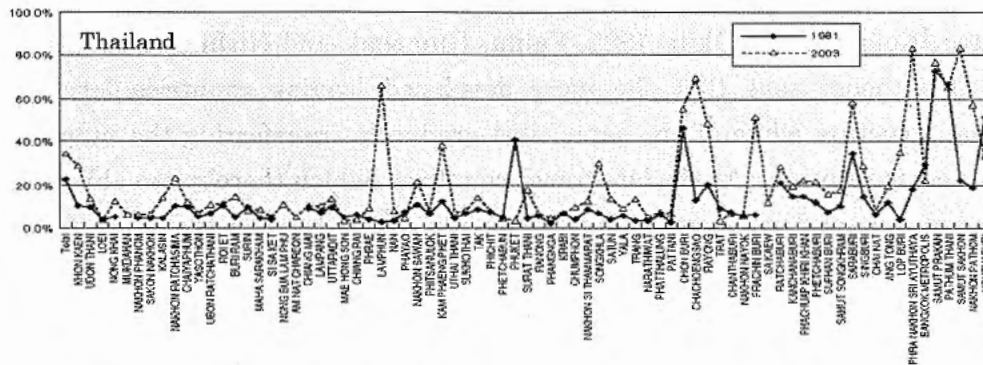
Firstly, in Japan, manufacturing, up to the high-growth era of 1970, showed a high share of manufacturing workers in areas such as the capital region in the periphery of Tokyo and the industrial belt of Kansai, centering on Osaka. However, in 2003, the two capital regions of Tokyo and Osaka have greatly fallen, and in their stead the Chubu region centering on Aichi, and regional cities such as Yamaguchi, Tokushima, and Oita have risen. But, in general, the share of manufacturing is on a downward trend. In contrast, an opposite trend to that of Japan can be seen in Thailand between 1991 and 2003, where not only one region but the whole grew rapidly. The regions that greatly expanded their manufacturing share are the three prefectures contiguous to Bangkok of Chacheongsao, Chonburi, and Rayong, an Eastern seaside development site, where the automobile industry clusters [Sakamaki 2006: 110].

**Figure 2a Manufacturing Workers Share by Regions (Nominal)**



Source: Sakamaki (2006: 109-10)

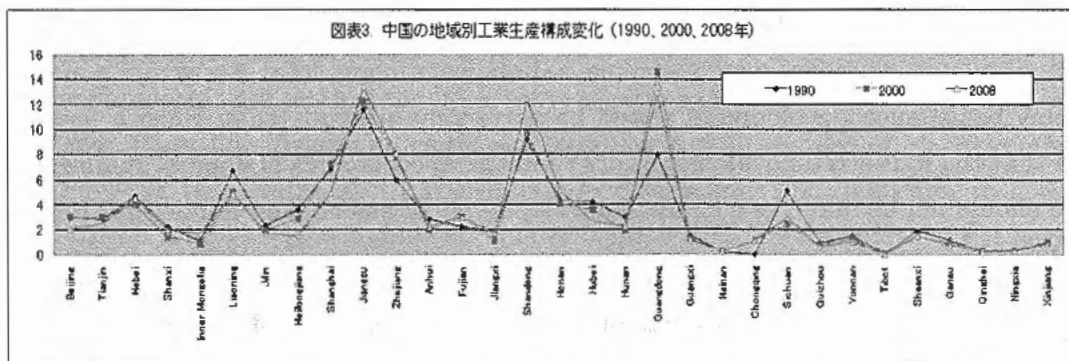
**Figure 2b Manufacturing Workers Share by Regions (Nominal)**



Source: Sakamaki (2006: 109-10)

Looking at Figure 3, since 1990, Jiangsu province of the Chiangjiang delta area, Zhejiang province, Guangdong province of the Pearl River delta area, and the surrounding Shandong province of Bo Hai Bay region produces peaks in the manufacturing production shares. Moreover, in 2008, it could be seen that clustering towards Guangdong province and the vicinity of Shanghai was moving forward, lowering the manufacturing status of Sichuan province of the inner parts. Incidentally, Beijing and Tianjin's manufacturing production share is not that big, but the agglomeration in Chiangjiang, Pearl River delta, and Bo Hai Bay region is remarkable. Needless to say, a bias towards the coastal area of manufacturing could be confirmed. .

**Figure 3. Changes in the Composition of Manufacturing in China by Region**



Source: created based on data from the Chinese National Statistics Bureau (1991; 2001; 2009) "China Annual Statistics".

What conclusions could be drawn from the above facts? Japan's regional industrial structure is such that manufacturing agglomeration is clustering towards the northern Kanto and the Chubu area, and the weight of manufacturing in the national economy is going down. In contrast to this are the cases raised about the agglomeration of manufacturing in the coastal parts of Thailand and China. How should this phenomenon be considered?

Since the 1980s, not a few economists, mainly from Japan, have considered such development of East Asia as the Flying Geese Theory, which was advocated by Kaname Akamatsu [Kojima 2003; Okita 1985, Fujita, Kumagai, and Nishikimi 2008:19, Ozawa 2009]. This theory says that the more developed leading countries level up their industrial structure while at the same time gradually transferring the industries that have lost competitiveness to the late-comer countries, which thereby are able to realize a catching-up type of development. Japan is flying at the head of the flock of geese, and industries transfer to NIEs, ASEAN and then to China. The investment activities of Japanese corporations, which were forced to transfer overseas by Japan's endaka (strengthening of the yen) after the Plaza Accord, could be considered as the main entity that accelerated East Asia's Flying Geese type of development [Kojima 2003]. Moreover, with development of each country, the shift of the main industries of national economy could perhaps be understood as the Petty-Clark's law, whereby there is a shift from the primary industries to the tertiary industries. However, such a comprehension, which is premised on a framework of a national economy, should be re-considered in a globalized age when capital, technology, labor and others can so easily cross a national boundary, and each national economy has been integrated in a regional economy. Actually, in entering this century, economic integration in East Asia through FTA is certainly advancing. In investigating policies to remedy local gaps of East Asian countries, Sakamaki points out that East Asian countries, including Japan, "have not come up with local gap remedying policies that always produce sufficient results", in particular, "in the first place, it is difficult to attempt, as a matter of policy, the local distribution of industry" [Sakamaki 2006]. This is to say that even if each country, as a matter of policy, aimed at a development, which strikes a balance among local areas on a national economy basis, such development would be extremely difficult today. Such a fact could mean that the industrial development of the national economies of Japan, Thailand, and China should not be taken as a chain of developments of national economies but rather as a unified economic integration.

It could be thought as a truism, but one indispensable condition for East Asia's development is access to developed country markets and the strategic location and provision of infrastructure needed for such access. East Asia's development started in the NIEs, which includes Singapore and Hong Kong that in the first place were entrepôt trading ports. Even in Korea and Taiwan, free trade areas and the like were set up in places like Masan, Ulsan, and Kaohsiung, which became important industrial bases. In the 1990s, remarkable growth has been shown by the coastal area of China. The development of East Asia was achieved not by the industrial allocation based on each national economy but by an industrial allocation premised on the world market. The agglomeration phenomenon towards a specified region of the non-manufacturing sector of



the software industry, which in recent years have become visible through the shift towards IT and intelligence-based society, has also been achieved in the spatial structure of globalization. While having different industrial characteristics, the manufacturing and software industries developed through a mechanism of access to developed country economies.

## [2] The Development and Background of Industrial Cluster Theory

### *(1) Global Interest on Industrial Cluster Theory*

Incidentally, since the 1990s world interest turned to geographical agglomeration of industry and regional industrial policy. In advanced countries, the concept of “cluster” is spreading quickly among policy-related parties. In management studies, economic geography, and mainstream economics, irrespective of terminology, there has been a growing interest as well in the spatial agglomeration of industry. It has even now been pointed that there is a “cluster fatigue” between some policy makers and researchers, involving discussions on the effectiveness of clusters [OECD RRI 2007:24]. This research was prompted by pioneering research such as “The Second Industrial Divide” by M.J. Piore and C.E. Sabel [Piore & Sabel 1984], M.E. Porter’s “Competitive Advantage of Nations” [Porter 1990; ditto 1998], A Saxenian’s “Regional Advantage” [Saxenian 1994], and P. Krugman’s “Geography and Trade” [Krugman 1991]. But, why have their assertions strongly influenced policy makers, economic geographers, and economists?

With regards to his publication “Competitive Strategy” Porter explains in the “preface” to the Japanese version that the book “puts together in a consistent way a wide-range of concepts about how firms and countries could survive in the era of global competition” [Porter 1998 (translations): i]. The Japanese researcher, Yoko Ishikura, in a co-edited publication related to the industrial clusters, she writes “in the midst of not seeing any signs of Japan’s economic recovery, programs such as the Industrial Cluster Plan (METI) of strengthening competitiveness and reinvigorating the economy, and the Intellectual Cluster Creation Enterprise (Ministry of Education) has put the idea of “industrial cluster” in the limelight. She raises three points in response to the question “why industrial clusters”: 1. the point of the importance of “location (place)” in “globalization”; 2. the effectiveness of the innovation concept as a driving force especially in a mature economy; and 3. the effectiveness of product innovation [Ishikura 2003: i, 18].

In the OECD’s report, “policies that support regional specialization and clusters are at the intersection of several different policy families.” Such policy families include regional policy, science and technology or innovation policy, and industrial/corporate policy. A lot of

programs, which started at the beginning of the 1980s, emphasized the industrial district model of cluster policies, focused on the regions that have lost its competitiveness, and tried to provide the minimum necessary abilities such as providing small- and medium-scale enterprises access to export and information. The report further summarizes that "over time, these policies have generally transitioned from SME-based programmes to those supporting national competitiveness clusters and they increasingly focus on technology and innovation" [OECD RRI 2007:40-41].

In short, the globalization of economy since the 1990s and its accompanying intensification of market competition required new activation policy for competition among states as well as for regions and small- and medium-scale enterprises that are affected by such competition. This sums up the background for the heightened interest on industrial agglomeration theory and industrial cluster theory.

Incidentally, how is the ensuing interest on "region" and "location" related to East Asia's development? But, before we consider this problem, let us first verify the awareness regarding the problem of industrial agglomeration or industrial cluster theory.

## *(2) Awareness of the Problem of Industrial Agglomeration or Industrial Cluster Theory*

One major literature that touches on Industrial agglomeration and industrial cluster research and policy is Piore and Sabel's "The Second Industrial Divide". In this publication, it sees unemployment and slow growth of advanced country as problems, "which have become chronic in almost all the advanced countries". This deterioration in economic performance was caused by the "limits of the model of industrial development that is founded on mass production". And springs from the awareness that questions the choice of "technological development", flexible specialization consisting of a combination of craft skill and flexible equipment is required [Piore & Sabel 1984: 3-5]. They wrote that "the potential route to flexible specialization in the United States passes through the nuclei of small firms that form industrial districts: the traditional centers of the garment, textile, shoes, and metalworking industries, on the one hand, and a new high technology startups, on the other". In the former, the community is in the process of decline due to its demolition by the mass manufacturing industries, while in the latter the community structures of high-technology in Massachusetts – and California – will soon be tested [Piore & Sabel 1984: 286-389]. While stating so, they find the possibility of development in hi-technology industries. Challenged by the manufacturing industries of Japan and East Asia, American manufacturing was in crisis since the 1970s. Such crisis is considered to be a crisis of advanced capitalism of the mass manufacturing system, and it could be said that Piore and Sabel were at the forefront of research towards the

restoration of the flexible specialization system.

Incidentally, the hi-tech industries along Boston's Route 128 and California's Silicon Valley, which caught the interest of the world since the 1970s, were faced with the crisis of decline upon entering the 1980s. In the second half of the 1980s, ultimately only Silicon Valley was able to stage a recovery. A. Saxenian compared these two regions along the lines of Piore and Sabel's research. She made the following comparison. Silicon Valley has a flexible industrial system that is based on a regional network, while along Route 128, a small number of firms, which have a relatively high degree of independence and self-completion, form a group having a dominant force. Such regional feature of industrial location has allowed the development of the hi-tech industry in Silicon Valley [Saxenian 1994]. Moreover, in the development of the hi-tech industry, as pointed out by Piore and Sabel, universities played an important role in the development of the technology of industry and in the provision of industry's human resources. "More important, the universities have served as the organizing center of intellectual communities for the employees in this industry" [Piore & Sabel 1984: 287]. The liberal network of people coming together in new enterprises, which are formed one after another around universities and research institutions, makes hi-tech industries develop. Interest on characteristics of regions, which have a peculiar vitality that give rise to innovations one after the other, have grown.

Interest on industrial region has decisively been influenced by M. Porter's industrial cluster concept. Actually, Porter displaced all of the concepts and expressions of industrial agglomeration that was up to then created by economic geographers and others, and has generalized the concept and term "cluster", signifying a bunch of grapes.<sup>3</sup> Porter cites four factors in his very famous diamond model as the causes that determine a country's comparative advantage. 1. Factor Conditions (the nation's position in factors of production, such as skilled labor or infrastructure, necessary to compete in a given industry), 2. Demand Conditions (the nature of the home-market demand for an industry's product or service), 3. Related and Supporting Industries (the presence or absence in the nation of supplier industries and other related industries that are internationally competitiveness), 4. Firm Strategy, Structure, Rivalry (the conditions in the nation governing how companies are created, organized, and managed, as well as the nature of domestic rivalry) [Porter 1998: 166]. He considers regions as having satisfied these factors, which are successful in coming up one after another with innovations that give rise to international competitiveness of firms.

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<sup>3</sup> As expressions regarding business agglomeration of regions, there are "industrial district", "new industrial spaces", "territorial production complexes", "neo-Marshallian nodes", "regional innovation milieus", "network regions", "learning regions" [Martin & Sunley 2003: 8].

"Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate". And also, "A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster can range from a single city or state to a country or even a network of neighboring countries" [Porter 1998: 197 and 199].

However, such a definition has several elements, is full of ambiguity, making possible a diversity of interpretations. For example, Porter's geographic range of "about 200 miles or less" [Porter 1998: 230 ; Kanai 2003: 49] in short 320 kilometers, applied to Japan is about equal to the distance between Tokyo and Sendai, or Tokyo and Nagoya, which is a much wider area than the case generally considered as cluster in Japan [Horaguchi 2009: 141]. However, the Japanese researcher, Kazuyori Kanai, says that this shows the range within which face-to-face interaction is possible. Even from a market perspective, he interprets this range as the range for forming an industrial cluster, given the dependence on so-called "implicit knowledge", which is market needs that is difficult to put into words [Kanai 2003:54]. Furthermore, a cluster is considered as the main relationship network in a specified field, but Porter, on the other hand, wrote that "cluster development often becomes particularly vibrant at the intersection of clusters. Here, insights, skills, and technologies from different fields merge, sparking new business. The presence of multiple intersecting clusters further lowers barriers to entry, because potential entrants and spinoffs come from several directions. Diversity of leaning stimulates innovation" [Porter 1998: 241].

What does innovation create? Some researchers assert that the external network of a cluster is important. How is an industrial cluster different from an industrial agglomeration? If in the first place the peculiarity of a region is the source of competitiveness, then why did an industrial agglomeration of dramatic proportions come about in East Asia? In actuality, the cause and effect relation between industrial cluster and innovation is vague. Martin and Sunley studied the vagueness of Porter's cluster concept, and despite it all, strongly doubt the strong influence on economists, economic geographers, and policy makers [Martin & Sunley 2003]. But Kanai indicates the following points as the modern significance of Porter's theory. 1. In contrast to industrial agglomeration theory, which emphasizes the comparative advantage of traditional factors of production such as land and natural resources, Porter points to the importance of scientific technological infrastructure, advanced customer needs, and other knowledge that is difficult to put into words. 2. Differing with the traditional agglomeration theory

that focuses on the agglomeration of firms, Porter implies diverse organizations such as universities, research institutions, and local government. 3. Porter emphasizes innovation and not the effect of agglomeration at the least cost. 4. Porter emphasizes the significance of competition [Kanai 2003: 47].

Incidentally, Porter's cluster theory must focus on the fact that it was born in the midst of an American economy the long term growth of which was being threatened, as American manufacturing firms were at an inferior position amidst global competition [Porter 1998: Chapter 13]. He created cluster theory as a framework for obtaining competitiveness, which would surpass the individual firm unit, in order to obtain competitiveness and innovations for a country, in short America, in midst of the global market. This could be thought of as an aptitude of being rapidly accepted by policy makers of other regions of the world, which are searching for growth and reform amidst the intensification of globalization and competition.

The major research, which differs from Porter's management study in terms of theoretical stream, is that of P. Krugman and Masahisa Fujita's spatial economics. They noticed early on the geographical agglomeration of industries in the 1990s, and pointed out that the neoclassical economic model has ignored the space for economic activity and the concentration of industry. They developed a theory of industrial agglomeration, and brought into mainstream economics an economic geography study, which they have up to then accumulated through their own research but ignored by mainstream economics. Krugman has this to say. "the tendency of international economists to turn a blind eyes to the fact that countries both occupy and exist in space – a tendency so deeply entrenched that we rarely even realize we are doing it" [Krugman 1991: 2]. "It was Alfred Marshall who presented the classic economic analysis of the phenomenon. (Actually, it was the observation of industry localization that underlay Marshall's concept of external economies, which makes the modern neglect of the subject even more surprising)" [Krugman 1991: 36]. "While the idea of external economies has always been respectable – indeed recognized as essential by any sensible economist who thought about it – it has been surprisingly neglected in our economic tradition" [Krugman 1995: 51].

What made Krugman open his eyes to industrial agglomeration? Owing to the European integration, he states that "the lines between international economics and regional economics are becoming blurred in some important cases. One need only mention 1992 in Europe: as Europe becomes a unified market, with free movement of capital and labor, it will make less and less sense to think of the relations between its component nations in terms of the standard paradigm of international trade. Instead the issues will be those of regional economics" [Krugman 1991: 8]. Fujita and others also say "in the early 1992, concern about the future of European integration after the



establishment of the European Union in 1993 encouraged some theorists to develop models of the location of economic activities; this has become known as 'spatial economics' [Fujita and Hamaguchi 2008: 13]. The reality of integration in Europe has confronted mainstream economics with a model defect.

Krugman confirms the three main causes of industrial agglomeration from Marshall's "Principles of Economics". Firstly, when several firms of the same industry concentrate in one place, specially-skilled workers gather there, forming a labor market, from which both workers and firms gain profit. Secondly, when an industry concentrates, various non-tradable input goods that are specialized in that industry are supplied at low cost. Thirdly, the concentration of an industry facilitates the transmission of information, promoting the diffusion of technology "what we would now call technological spillovers". Here Krugman touches on the final point that he raises on technological external economies: even though, in the US, Silicon Valley and Boston's Route 128 area are famous for geographical concentration of industry, "equally remarkable concentrations may be found of carpet producers around Dalton, Georgia, of jewelry producers around Providence, Rhode Island; of financial services in New York; and historically, of such industries as shoes in Massachusetts or rubber in Akron. Evidently forces for localization other than those involving high technology are quite strong" [Krugman 1991: 37 and 53]. He buttresses Marshall's theory with current economics, and cites "transport cost and economies of scale in production" as two important factors of such agglomeration. Moreover, he argues that "the interaction of demand, increasing returns, and transportation costs drives a cumulative process of regional divergence" [Krugman 1991: 11].

Fujita also explains the significance of spatial economics. In a world "where all goods, which are assumed by traditional international trade theory and regional economic theory, can be produced under constant returns, such a force for agglomeration cannot endogenously occur. Actually, in such a world, for as long as comparative advantage between regions is not externally brought about by some natural condition, all goods will be produced at minute scales in all places. Owing to this, transport cost of goods is completely avoided, and the most efficient equilibrium is reached." However, "the growth of current cities and production agglomerations, is due more to a force of agglomeration based on endogenous self-breeding advantage (the second nature) rather than to natural conditions (the first nature) such as climate and mineral resources [Fujita 2003:216-7]. Fujita further explains as follows. There are three factors in this agglomeration: 1. diversity of goods and diversity of economic entities such as persons and firms, 2. economies of scale of individual levels of entities, 3. transport cost. The interaction of these three promotes agglomeration, which further gives rise to agglomeration effects. "Owing to this self-breeding advantage of "agglomeration economics", the mere existence

of such agglomeration gives rise to a lock-in effect (freeze effect) in position space, from which it becomes difficult for individual entities to separate, and to which new entities are drawn. This lock-in effect of agglomeration has a powerful "positive effect" in promoting growth at relatively early stages of such agglomeration. However, in the long-run, there is the possibility of creating a large "negative effect", where the change as well as reform of such agglomeration is constrained [Fujita 2003: 224].

The connotation of which is serious. Fujita concludes that "the development of transport and IT will not bring about the destruction of large cities and cutting edge regional agglomerations, but rather there is an almost opposite trend" [Fujita 2003:232]. From this point on, his lean deepens towards Porter's industrial cluster theory. This is because one industrial cluster policy is to emphasize innovation, which becomes a development policy based on a region. He proposes that the direction Japan should take is "creation of knowledge and innovation", and the "linking of industrial cluster policy, which create innovation, with urban/regional policy". "If the desirable industrial cluster can be realized through market competition without government intervention, then only market deregulation becomes sufficient. However, industrial agglomerations in general, industrial clusters, which are entities of innovation, in particular, develop from a competitive advantage that is sourced from the local external economies, which does not sufficiently materialize with markets only. Consequently, we cannot expect a desirable cluster to materialize with markets only" [Fujita 2003:233-43]. In order to bring about innovation activity that is based on a region, a regional cluster policy is called for that will surpass the market mechanism.

The World Bank's "World Development Report 2009", "in an effort to reduce the discontinuity between research and the real world", reviews the accomplishments of the economics, which dealt with the problem of scale economies and industrial agglomeration [World Bank 2009]. Globalization has intensified competition, and at the same time, influenced by the EU integration and formation of NAFTA, the regional integration movement has been accelerating. This is opposite to the assumption of mainstream economics, wherein industrial agglomeration is not made to head towards diffusion, but instead gives rise to the reorganization of the existing industrial structure and the agglomeration of a new industry. Simultaneous to the attainment of national competitiveness, the adjustment towards agglomeration is needed. This is also related to the reorganization and development problem of existing areas of industrial agglomerations, and has heightened the expectations towards industrial cluster policy in both the central and regional governments of developed countries.

### *(3) East Asia's Industrial Policy and Cluster Policy*

Since the rapid advance of IT and globalization in the second half of the 1980s, the hollowing-out of industry in the developed regions has emerged as a big issue. To begin with, this heightens the policy-wise interest towards small- and medium-scale enterprises and regions. Let us first verify the case of Japan.

According to the Small and Medium Enterprise Agency, Japan, with the progress in Japan of "the unification of foreign and domestic markets" [White Paper 1990 version], in the second half of the 1980s, the search intensified for the survival of small and medium enterprises. In the traditional industrial agglomeration areas of small and medium enterprises, an active formation of inter-industry exchange groups could be seen. In their survey of December 1988, there was at least 1,527 inter-industry exchange groups that were formed, with the number of participating firms climbing up to 52,149 [SMEA 1989]. The SMEA's "White Paper" of SMEs picks up as an example the increasing value added in such places as Sabae City, Fukui Prefecture, which is famous for eyeglass products, and Tsubame City, Niigata Prefecture, which is famous for metallic Western tableware. The former developed a metal eyeglass frame using an extra flexible alloy as material, and the latter accomplished research on various products such as stainless steel curved mirrors, thermos bottles, and golf clubs. At that time, in the representative urban areas for small and medium enterprises agglomerations, such as Ota-ku, Tokyo and Higashi Osaka City, Osaka, firms were raising their levels of specialization while at the same time forming development-oriented networks, and practicing small-lot "test product joint development", "joint product development", and "joint technology development". The cases of America's Silicon Valley and Italy's small and medium agglomerations were also discussed [SMEA 1994, 1995, 1996, 1997; Watanabe 1994]. Japan's Ministry of Economy, Trade, and Industry (METI) from the end of the 1990s pushed industrial agglomeration research and the industrial cluster plan. The 1997 issue of the "White Paper on International Economy and Trade" touched on the industrial agglomeration of Asia, and implemented the industrial cluster plan<sup>4</sup>, aiming at the chain reaction of innovation from 2001. Amidst the shaken trust on Japan's competitiveness after the collapse of the bubble economy, this is a move to secure the country's competitiveness. Of course, these policies were influenced by the theory of Porter and Krugman [Matsubara 1999:83; Yamamoto 2005:4; Tawada and Tsukada 2008]

What kind of agglomeration/cluster policy did other East Asian developing regions

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<sup>4</sup> The first term "Industrial Cluster Plan" was implemented during 2001-05, and the second term was implemented during 2006-10. In industrial clusters, 17 projects, such as IT, bio, environment, and craftsmanship were being pushed under the lead of regional economy and industry agency all over the country [METI 2005, 2006]

have? The industrial research of Korea was flourishing in the 1990s, but industrial parks such as Ulsan industrial park, Guro industrial park, and Masan export free area, were constructed and were very successful in the export and development of labor-intensive products, in line with the export-led industrialization policy. In the 1980s, the policy for the setting up of hi-tech parks, and the policy for the industry-academe collaboration started, and, upon entering this century, the progressive cluster policy was being fully pursued. In the surrounding areas of Seoul, the policy is being implemented for the breeding agglomerations/clusters for the knowledge information industry, and, in other areas, for IT, bio medical care, green energy, and the like. In 1999, the policy for industrial promotion started in four regions outside the capital region. In 2002, nine more new areas were added. Promotion of regional industrial projects is targeted to be carried out in a total of 13 regions (4 + 9 regions) from 2008 to 2012 [Um 2009; Seo 2009].

Similar to Korea, Taiwan, which pursued the export-led industrial policy as symbolized by the setting up of the Kaoshiung export processing zone in 1965, developed the labor-intensive electronics industry in the 1960s and the 1970s. This was followed in 1980 by the construction of the Science Park in Hsinchu, which was pursued as a national project for the nurturing of the semiconductor industry. In 1983, the Very Large Scale Integration (VLSI) plan was started, and in 1987, the Taiwan Semiconductor Manufacturing Company (TSMC), and in the 1990s, the full time business model was created for foundries in semiconductor manufacturing. This encouraged the birth of world-class foundry enterprises, and related small and medium enterprises such as several design enterprises, guiding the formation of the hi-tech industrial cluster [Wang Shuzhen 2006; Sato 2007]. Still, the hi-tech industrial cluster centering on semiconductors was concentrated in the Taipei and Hsinchu in the northern part of Taiwan. The correction of regional imbalances was called for. The setting up the Southern Science Park was decided on by the Executive Yuan in 1993, promulgated in 1995, and in general has been developing steadily, with the setting up of the Central Science Park in 2002. In 2010, the national land and air space development strategy plan was decided on, hammering out the initiative to develop these agglomerations as cluster corridors through knowledge and the nurturing of human resources [“Taiwan Economic Forum” Vol. 8, Term 3]

The small country of Singapore is known for setting up the Jurong Industrial Park in 1968 as an export processing zone, but it aggressively expanded to attracting foreign firms. As a result, the electronics industry was able to grow as one axis of manufactured goods exports. Threatened in 1985 by the first minus growth of 1.8% after the nation's foundation, the government, hammered out a total business center conception, decided on the “strategic economic plan: towards advanced countries” in 1991, and adopted the

hi-tech industrial cluster policy aimed at strengthening international competitiveness. According to S.Y. Chia, this is an invocation of Porter's cluster framework [Chia 2000: 366]. The neighboring country of Malaysia has also decided on the second industrialization basic plan in 1996, wherein the "cluster foundation industry development" is hammered out. This conceptualizes the international market alliance clusters, where local enterprises are nurtured through the subcontracting relationships with multinational firms, government-led clusters, and resources foundation clusters [Hirakawa 2006:15].

In 1978, since its shifting from the self-reliance policy to the liberal reform policy, China initiated the policy of export-led development by the introduction of foreign-owned firms through economic zones. In 1979, special economic zones were placed in Shenzhen/Zhuhai, Shantou (Guangzhou), Amoy (Fujian). Thereafter, in 1984, Dalian, Tainjin, Yantai and others became economic technology development areas, and in 1988 Chianjiang delta, the Pearl River delta, and others became coastal economic development areas. In 1990, Shanghai Pudong New Area was set up. As the hinterlands of Hong Kong, the Pearl River delta was home mainly for Hong Kong firms, but in time Japanese, American, and Taiwanese firms started coming in. By the 1990s, an agglomeration of Taiwan's IT industry in Dongguan was underway. Although non-manufacturing, Beijing Zhongguancun in 1988 was certified as China's first state-class hi-tech industry development area, and through the collaboration of Beijing University and Tsinghua University, an agglomeration area of the global IT software industry is emerging.

### **[3] Issues and Policies for East Asia's Industrial Agglomeration and Industrial Cluster**

#### ***(1) Types of East Asian Industrial Agglomerations***

What are the types of East Asian industrial agglomeration? Japan's Small and Medium Enterprises Agency, focusing on small and medium enterprises, classifies the current industrial agglomerations of Japan into four: 1. Company Town Clusters, which are "clusters formed by the sitting of numerous subcontractor groups around the mass-production plant of a particular large enterprise"; 2. Production Region Clusters, being "formed by enterprises belonging to a specific industry (such as consumer goods) concentrating in a particular region, and they have grown through their members' mutual use of raw materials and technologies that have accumulated in the region"; 3. Mixed Urban Clusters, which have "formed in urban areas around prewar production bases or munitions plants, or wartime factories set up to disperse production, around which have concentrated related enterprises"; 4. Mixed Invitation Clusters, which are "formed as a result of local government efforts to attract enterprises and the



implementation of industrial relocation plans” [JSBRI 2006: 135]. However, with respect to international industrial districts, perhaps the most well known classification is that of Markusen: (a) the Marshallian (or Italianate variant) district; (b) the Hub-and-spoke district; (c) the satellite industrial platform; and (d) state-centered district. Markusen considers each industrial district or agglomeration as follows. Type (a), Marshallian district is an agglomeration of regional small and medium enterprises that A. Marshall assumed when pointing to the external economies as a merit of regionally specialized industries [Marshall 1890: Book IV, Chap. XI]. Real transactions are conducted between locally small firms. Here, labor is free to move, and has a regional cultural identity. Type (b), hub-and-spoke district is an agglomeration where there is one or a number of big firms at the center surrounded by small firms and affiliated firms. There is a transactional and cooperative relationship between the big firm and small and medium firms. However, a cooperative relationship between competing firms does not exist. Type (c), satellite industrial platform is an industrial agglomeration that is dominated by a branch facility of a big firm, the headquarters of which is located elsewhere. Type (d), state-centered district is a regional agglomeration that is formed with a public or non-profit organization (e.g., military base, university, government administration office) at its core<sup>5</sup> [Markusen 1996: 297-307; OECD RRI 2007: 28-9].

How could we adapt East Asia’s industrial agglomeration to the above classification? Generally speaking, there are some similarities, but the above classification would not cover the reality of East Asian countries. From a personal perspective, it would be possible to make the following classification: (1) Export processing zone or special economic zone industrial district or agglomeration; (2) Hi-tech industrial district or agglomeration, which could be divided into manufacturing-centered or software-centered; (3) Production regional agglomerations; (4) State-managed firm agglomeration. Let us look at these below.

(1) Export Processing Zone or Special Economic Zone. This is an industrial agglomeration that is typical and characteristic of developing countries. Based on ILO’s estimate, there are 3,500 in the world, with a labor force amounting to 66 million, and operating in 116 countries in 2002 [ILO 2008]. Before 1966, there were only two locations in developing countries, in 1986 there were 176 locations operating mainly in Asia, with a labor force of 1.3 million [Hirakawa 1992: 65-7]. In 1975, the number of countries with such agglomerations did not exceed 25. One could appreciate the extent of today’s boom.

In China, a number of special economic zones in various forms were built centering on

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<sup>5</sup> Kuchiki is recently developing his own flow chart approach of industrial cluster formation by rearranging Markusen’s horizontal classification of industrial districts to stage framework of clustering [Kuchiki 2010].

the coastal area. In Vietnam, in 2006, industrial parks (IP) and export processing zones (EPZ), mostly, are being established in 145 locations all over the country. Incidentally, in 1991 there was only one location [Dao, Do, and Do 2007]. According to the Philippine Economic Zone Authority (PEZA), Economic Zones (EZ) operating in the country total to 211 locations, centered in Manila (65 locations for manufacturing EZ, 129 locations for IT Parks/Centers, 9 locations for Tourism EZ, 6 locations for Agro-industrial EZ, and 2 places for Medical Tourism Parks/Centers) [PEZA Home Page, as of March, 2010]. In a word, due to the under development of industry, late comer countries are providing industrial infrastructure in specified regions in order to attract firms from abroad.

These export processing zones or economic zones differ greatly in terms of scale, business areas, and quality. Most of the export processing zones manufacture or process labor-intensive goods such as textile, apparel, and leather products, but currently the coverage is expanding to hi-tech science parks, logistic centers, tourist resorts, and others [ILO 2008:2].

There is also the emergence of agglomerations of export processing zones or industrial parks covering a large area. Thailand's eastern coastal industrial area, which is based on the Laem Chabang industrial park, is particularly gaining attention as the agglomeration of the automotive industry. Becoming the center of attention due to the Pearl River delta, which developed based on economic zones in Shenzhen and Zhuhai, the Chang River delta belt, which has become the catalyst for regional development in Shanghai Pudong, and the Tianjin Binhai New Area, the Bohai Rim region is giving birth to three large industrial agglomerations with their individual peculiarities. Guangzhou's Pearl River delta is gaining attention as an agglomeration for the automotive industry. It is also an agglomeration for the production of personal computers, communication devices, and parts. The enormous agglomeration of Wenzhou's local small and medium enterprises in the Chang River delta is gaining attention.

Incidentally, such agglomeration areas manufacture or process products, which are generally labor-intensive and of low-level technology, and have limited innovation and intra-regional networks. Even in an agglomeration anchored on a multinational firm, innovation is limited. In a small portion of agglomeration areas very active innovation activities could be seen, typically could be classified separately as hi-tech types. Hence, their internal linkages are wide ranging from what Maruksen calls as satellite platform types to hub-and-spoke types.

(2a) Hi-Tech Industrial Agglomerations Based on Manufacturing. These are the manufacturing-centered industrial agglomerations based on semiconductors that could be seen in the NIEs such as Korea and Taiwan. Innovation policies by the government are

indispensable here. The semiconductor agglomerations, which are based in Taiwan's semiconductor-centered Hsinchu Science and Industrial Park and Korea's Seoul and Kyonggi Province, are company town or hub-and-spoke agglomerations since they have at their core locally based global firms such as the Taiwan Semiconductor Manufacturing Company [TSMC] and Samsung Electronics. Internal linkages are also dense. However, in obtaining innovation external linkages are also important. In Taiwan, the importance of human exchanges with Silicon Valley has been pointed out [Saxenian and Hsu 2005]. Samsung Electronics recruits overseas engineers, and both companies cannot lightly treat external linkages [Yamasaki, ed. 2008]. A report, which surveys the semiconductor agglomeration areas in Japan, China, Korea, and Taiwan, reaches the conclusion that "in a lot of industrial centers including the semiconductor industry, the more dynamic developing regions appropriate their development drive from global linkages" [Kishimoto 2008:190].<sup>6</sup>

(2b) Information Software Based Hi-Tech Industrial Agglomeration. As one more type of hi-tech industrial agglomeration, this is a service industry agglomeration, which was born at the arrival of the knowledge based society brought about by IT-ization and information-ization. The most famous example of which is India's Bangalore, but there is also the agglomeration of software/service industry and internet industry such as Zongguancun of Beijing, Seoul of Korea, and Singapore. Currently in the ten science parks under the administration of Zongguancun Science Park, there are more than 21,000 locators, a scale which surpasses the 5,000 firms in Silicon Valley, and the 6,121 firms (2004) in Bangalore [Kuchiki 2007:86]. In the Jiangnan region (Jiangnan-gu and Seocho-gu) of Seoul, along the Teheran road called "Teheran Valley", an agglomeration area is being formed, where big IT firms and venture firms gathered. Guro-gu, which used to be the agglomeration area of labor-intensive industries, has inaugurated the Seoul Digital housing complex [Park Sam-Ock 2008].

(3) Production Regional Agglomeration. This "full time type" industrial agglomeration was spontaneously born in China through the tremendous momentum concentrated in the coastal area after the opening up reform. The support of the regional government for

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<sup>6</sup> At Nagoya University, surveys, regarding the IT industry, were made in 2006 in Taiwan in collaboration with researchers at Chung-Hua Institution for Economic Research, and in 2007 in collaboration with researchers at Kyungpook National University and University-Industry Research Institute, Korea. According to this, the final educational attainments of the CEO of the 200 Taiwanese firms that gave valid responses are as follows: 43 firms (22%) "finished college or graduate school overseas", of which 29 firms (15%) finished graduate school. Managers had high educational attainments and overseas experience [Hirakawa, Tawada, Yamori, Su, Sai, Xu, Chen, et.al. 2009].

such industrial agglomeration is important. According to Wang Jici specialized regions, where such businesses and related businesses agglomerate, is climbing to more than 500 locations in 15 provinces [Wang Jici (王緝慈) 2010]. There are, among others, the button, apparel, shoes, light electric parts, automotive parts, and pulp of Wenzhou [Marukawa 2008], and the eyeglasses production area of Guangzhou's Shenzhen, Dongguan, and Wenzhou [Nakamura 2007]. These are Marshallian type industrial agglomerations. However, in this type of agglomeration, innovation is extremely limited, and low wage is the main source of competitiveness.

(4) State-managed Firm Agglomeration. The example that Maruksen cites last is that of government institutions, military bases, universities, and the like. Business entities are not assumed. However, if we consider state-owned firm agglomerations, these are what we generally see in China. But, the importance of these has been lost in the process of state-owned enterprises reform and privatization.

Overall, the industrial agglomerations of East Asia's developing region have the characteristic that is peculiar to developing economies. There is the policy support of the central government or the regional government. Export processing zones or special economic zones, such types of industrial agglomerations act as industrial infrastructure provisions in a particular region aiming to attract foreign enterprises. The cases wherein such agglomerations develop into more hi-tech industry agglomerations will gain attention.

## ***(2) Industrial Cluster Policy and Central –Regional Government Relationship***

Globalization and IT-ization have intensified global competition, heightened interest in region and space, and have become an opportunity for pouring interest on industry's geographic concentration. This has led to the wide diffusion of industrial cluster concept and practical policy to policy-related parties whose task is regional industry regeneration and development. Actually, Piore and Sabel pointed out that "the reactivation of the regional local autonomy institutions" in the industrial reformation of America is important [Piore and Sabel 1984: 380], but when talking about industrial cluster policy, even though innovation is emphasized, the aspect of an "industrial policy of regional promotion", which adheres to the region, has been added. Japan's industrial cluster plan has been changed from one where "that which has been decided by the central government is simply applied to the regional site" to a framework where "the various agencies of the Ministry of Economy, Trade and Industry and others located in each regional block visit firms and universities, grasps the industrial situation of various regions, and build a industry-academe-government network" [METI 2006: 1]. Similarly in Korea, the regional industry promotion plan was formulated by the central government,



but it has become a framework “where the central government performs the function of effectively adjusting nationwide the plan, which was formulated in a way to reflect the needs of regional local autonomy groups, moving away from the top-down method of the past” [Seo 2009]. As was already mentioned, as a regional industry activation plan for overcoming the depression of the regional economy, this is also being implemented in the non-capital areas (excluding Seoul Special City, Greater Incheon City, Kyonggido). As mentioned before, a similar policy is being formulated in Taiwan.

In the case of China, a special mechanism operates in such a policy. China’s special economic zone policy is a coexistence of a policy by the state and an enterprise-attracting policy by the regional government. Most of the research on China’s development explains this as the result of the liberalization policy, and research, which goes into such mechanism, appears to be few. However, the “Fiscal Federal System” type of tax reform (“tax-sharing system” reform) done by the Chinese government in 1994 played a big role. This has become a mechanism to force the regional development policy on the regional government, since it reduces the authority of the regional government on the fiscal income side while the expenditure burden remains the same. In order to secure fiscal income, the regional government competes and rushes into building special economic zones and in attracting foreign enterprises. If successful, it is given a political reward. This is the “decentralization of the economy and centralization of politics”. This industrial policy is creating vitality in the Chinese economy. Actually, the industrial promotion policy of regional governments played a large role in the automotive industry agglomeration of Guangzhou and Tianjin [Mang and Hirakawa 2009]. Beijing City government also played a large role in the formation of Zongguancun’s hi-tech clusters [Kuchiki 2007: 77, and 96]. However, such policy of China has produced curious investment phenomena done by multinational foreign companies. For example, though Toyota has two joint ventures in Guangzhou and Tianjin, there is no acting in concert between the two, and two ventures are completely independent.

Either way, while such policy encourages development in China’s coastal area, it also leads to the widening of the gap among regions. Owing to this, the Chinese government has instituted inner region development policies: “Big Development of the West” strategy (the twelve areas including Chongqing city, Sichuan province, Guizhou province, Unan province, and Tibet) in 2000; “East-West Promotion” (Liaoning province, Jilin province, Heilongjiang province) in 2003; “Center Rising” (Shanxi province, Henan province, Anhui province, Anhui province, Hubei province, and others) in 2005. The Chinese government is aggressively undertaking infrastructure investments and the like with the objective of a balanced national development. However, eradicating intra-regional disparities is a serious issue, and, in recent years, it is said that the objective has started to include the



clarification of the region's role assignment based on each region's situation [Kato and Okubo 2009:144]. The shrinking of regional disparities is not an easy task amidst the advance of globalization. However, without a perspective of endogenous regional invigoration, or of combining policy and endogenous development, the prospect is gloomy for eliminating regional disparities.

### ***(3) East Asia's Innovation and Industrial Agglomeration***

East Asia as a region sustained growth over a long period, with a momentum that surpasses Japan. China's growth knows no end. How is such East Asian development related to industrial agglomerations? It would be inadequate to simply treat this phenomenon as the shifting of industry from Japan to the latecomer countries. Globalization and IT-ization have intensified the competition among advanced countries, but at the same time amidst this environmental change, it seems that an opportunity has been given to East Asia to achieve a peculiar type of innovation.

Originally, "innovation" is understood as a concept of technological innovation of J. Schumpeter, but according to him, this is a phenomenon that appears sporadically, and defines "new combination". The substance of which are: (1) new wealth, in short, new product, (2) new production method, (3) development of new outlet, (4) development of materials or new supply source for semi-product, and (5) materialization of a new organization [Schumpeter 1977:(Translation)183]. Bearing Schumpeter in mind, Porter defines innovation as "Innovation can be manifested in a new product design, a new production process, a new marketing approach, or a new way of conducting training" [Porter 1990: 163].

In a capitalistic economy, the innovation entity as assumed by Schumpeter is the firm. However, in developing countries, government's policy is also important. Actually, several East Asian countries have up to now advanced export-oriented policy in parallel with attracting foreign-affiliated firms. The nationalistic policy of the nurturing of local firms have also been aligned or linked with export-oriented policy. Export processing zones or special economic zones are a thorough policy mostly of East Asia NIEs amidst the practically insufficient market, capital, and technology. In this export processing zones or special economic zones, cheap labor and infrastructure provision are concentrated, creating an agglomeration of industry. There is more and more awareness of the importance of the provision of infrastructure for sea, air, and land strategic bases. Once this creates an external economy with a certain level of success, a higher level of regional industry policy is pushed in the NIEs and others. In this way, the "positive lock-in effect"

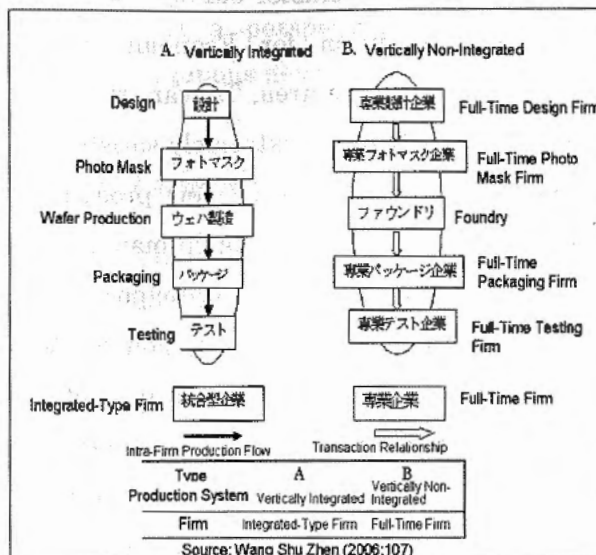
of industrial agglomeration is able to take effect, and a spontaneous agglomeration effect is strengthened. In the IT cluster survey undertaken jointly by Nagoya University and the Chung-Hua Institution for Economic Research, in relation to the business environment in the Hsinchu area, Taiwan, the high level items of satisfaction, to which firms responded "satisfied" or "extremely satisfied", are broken down partially as follows: development of new technology or new product, etc. (55%, N=66), obtaining product information (51%, N =65), securing human resource (47%, N =60). Moreover, in the survey in the next year of Daegu, Kyungpook, as well as Suwon area, the high level items of satisfaction by those who responded "satisfied" or "extremely satisfied" are broken down partially as follows: conservation of transport cost and time to purchaser or retail firm (56%, N =405), good quality of purchasing firm in the area (54%), acquisition of product information (51%), favorable taxes and regulations of the area (46%) [Hirakawa, Tawada, Yamori, et.al 2009]. The breakdowns of satisfaction in the two surveys are different, but it could be confirmed that agglomeration raises the level of satisfaction

The firm itself has achieved innovation. M. Hobday focuses on the process that allowed the accumulated development of production technology fortuitously brought about by the linking of the NIEs development experience up to the 1980s with the local firm's international subcontracting. He schematized the evolutionary development phases of Taiwan and Korea from Singapore's example as follows: from OEM (original equipment manufacture), to ODM (own designed manufacture), to OBM (own brand manufacture). He entitles the book as "Innovation in East Asia" [Hobday 1994]. Here, ODM stops at an OEM contract, but the design is done by the OEM firm itself. The accumulation of design technological ability makes this form possible. Finally, entering the realm of marketing, there is the entry to the market based on the firm's own brand product. This corresponds to moving from the production-center of the "smile curve" to the rightward end of marketing.

A paradoxical model, which is different from the above OEM-ODM-OBM model, has also been created centering on Taiwan. This could be understood as the "materialization of a new organization", which was raised by Schumpeter as a final method of new combination, and not clearly expressed by Porter. This has been significantly performed well in the development of Taiwan's semiconductor industry, and China's local electric device and automotive industries.

In Taiwan's semiconductor industry, the TSMC, founded in 1987 through the process of pushing the VLSI plan of the Industrial Technology Research Institute (ITRI), created the pure play foundry model. Figure 4 shows a conceptualization of this model. The rival company UMC, which was established by the ITRI Electronics Research and Service Organization, adopted this model, thereby

Fig.4 Two Types of Semiconductor Production System



establishing its importance. The semiconductor firms of the major developed countries generally take the Integrated Device Manufacturer (IDM) form, which has the five manufacturing steps of design, photo mask manufacturing, wafer manufacturing, packaging, and testing. This is also the mainstream form in Japan and Korea. In contrast, Taiwan contrived the division of labor model of pure play foundry, successfully nurtured it as a powerful business model of the semiconductor industry. This model has been given the name of "vertical non-integration" by Taiwan-born Wang Shu Zhen, and is called as the "Pure Play Foundry Model" by Yukihiro Sato of the Institute of Developing Economies, Japan [Wang 2006; Sato 2007]. The semiconductor industry has rapidly expanded the construction financing of manufacturing equipment together with technological advancements. Due to the simultaneous suppression of enormous financial risks and the allowing of the entry of small and medium enterprises, related firms, centering on design firms, were created one after the other in Taiwan, under the business model that promotes full play foundry firms. According to Taiwan's ITRI "2009 Semiconductor Almanac", there are currently 13 photo mask manufacturing firms, against which there are 251 IC design firms, 19 packaging firms, and 26 testing firms [IEK 2009]. This gives rise to a new business model where various institutions of industry, government, and the academe take advantage of the business opportunity. It could be confirmed that this has deepened industrial agglomeration and increased competitiveness.

Three fourths of Korea's semiconductor-related firm or 72 firms out of 92 are semiconductor device manufacturers established since the 1990s. Having pushed vertical integration up to 1980, Samsung Electronics since the 1990s shifted to a policy of

simultaneous external procurement. The objective was to remove pampering and to diversify the risk. But at the same time, this encouraged the birth and agglomeration of related enterprises around Kyonggido, Korea [Hirata 2008:98-103].

Japan's China researcher, Tomoo Marukawa, observed that the electric device market share of Japanese-affiliated firms in China was falling since 1996 when the six major Japanese-affiliated electrical appliance makers, such as Matsuhita (currently Panasonic), Toshiba, Sony, Hitachi, and others started local manufacturing. He considers the reason for this to be the result of "the opening up among firms of the closed transactions within the framework of the (existing) vertical integration of the firm", and terms this type of transaction as "vertical disintegration" [Marukawa 2007]. "Key parts, which have high technological difficulty and require large financing, have made easy the entry of foreign makers, while this has made it possible for Chinese makers to obtain a dominant share in any household appliance market. It is said that this is a business model that arose from the behavior of Chinese firms that give weight to price rather than product differentiation as well as a policy that separates key parts and final products based on a basic awareness of a Chinese planned production method of the communist period. More than anything else, this method, on one side, makes possible the production of cheap final products, and has the "homogenization trap" wherein product differentiation is difficult leading right away to an intense price competition" [Marukawa 2007:67,72]. Despite that, for as long as low price continues to be an important term of competition, repetition is very much possible.

Incidentally, according to Marukawa, such "vertical disintegration" of China is different from the case of Taiwan's semiconductor industry, which Wang Shu Zhen calls as "vertical non-integration". This is because China's vertical disintegration is not "a shift towards 'modular type' of craftsmanship architecture", without changing the design thought of the product made by developing country firms. In short, it is simply modularization for appearance's sake. However, the vertical disintegration model of external procurement of key parts, which was thought up from a circumvention of the absence of technological ability and initial investment, nevertheless displayed superiority in the competition with vertically integrated type of firms [Marukawa 2007; 43-44].

D. Ernst cites the following five reasons as the cause for the loss of competitiveness in the Asian market by Japan's electric device makers: 1. persistence on the diversity of organizations; 2. location diversification for risk minimization; 3. ignoring the characteristics of local markets and a market tendency that focuses on Japan; 4. a weak ability to utilize the creativity of non-Japanese skilled workers, engineers, and managers; 5. passivity in R&D and outsourcing. Indeed, Japan's electric device makers are passive about the management strategy of selection and focus as a general electric device firm,

and in general Japanese firms have avoided the aggressive appointment of non-Japanese. Even with regards to technology, as Ernst points out, core technology has been kept in Japan, and the transfer to Asia has been avoided [Ernst 2006: 172-5].

H. Chesbrough and J.F. Christensen consider a shift in the mainstream competition strategy from a closed innovation system in the 1990s where technology stays within the firm to aggressively utilizing external technology to develop and drive entrepreneurship. They call this the open innovation paradigm. The major global firms up to the 1980s do R&D strategies within the firm, and were "vertical integrated" types that also comprehensively produce products in the firm. They cite Sony as a typical case. Sony manufactures such products as television display, DRAM, game console, video deck, digital camera, stereo, and television, and even procures from itself the dedicated memory device for comprehensively transferring data from such devices. However, amidst the intensification of competition through the globalization of the 1990s, global enterprises focus the injection of resources in strategic areas so as to secure competitiveness, and with regards to other technologies and products, aggressively procure from external source or undertake spin offs [Chesbrough, Vanhaverbeke, and West 2006:28, 35-61]. Local firms of East Asia, for whatever the background, grasps such trend and even accelerate it. Japanese-affiliated appliance firms in China were only able to occupy a small share of the final goods and luxury goods markets. The same goes for the personal computers market.

This trend also appeared in one part of the low-price end market of the automotive industry. The source of the global competitiveness of the Japan's automotive industry has been understood to be the feature of an "integral type" of industry, where satisfactory quality could not be secured just by a manufacturing process that assembles parts. This would be true of luxury cars. The world's brand car market is a monopoly of global automotive firms. However, in China, the "structure is such that vertically integrated type of national large makers, and vertically disintegrated local small makers exist side by side." Engines are also equipment that could be procured externally. According to Marukawa's research, there are only eight firms which is a completely vertically integrated type of car manufacturers, and eight firms of automotive and engine manufacturers in "closed vertically disintegrated" firms that practically manufacture only on a two-firm basis. On the other hand, "open-type" firms, wherein an automotive maker procures engines from more than four firms, or an engine maker sells engines to more than four firms, number 50 for automotive makers and up to 35 for engine makers. It was Mitsubishi Motors first and then Toyota Motors which became engulfed in this trend of selling engines [Marukawa 2007: 212].

The "homogenization trap" is in a manufacturing style, which creates a similar function



even though the modularization or manufacturing concept is different, just like in the case of the home appliances. The three-fourths of the price of Chinese automotive makers are explained by the type of engine and transmission [Ibid: 228].

But, would it be alright to consider this production system as simply a backward production system. Marukawa states as follows. "The different structure of China's industries from that of Japan has been often explained as the result of the current underdevelopment of China's market economy.... ever, at the very least, the vertically integrated Chinese firms have shown to have a higher level of suitability in China., China's industrial system, which normally has been simply dismissed as "manifestations of backwardness" from the perspective of vertical disintegration, may reveal a rational aspect" [Marukawa 2007: 236]. The intensification of competition due to globalization has given birth to vertical non-integration or vertical disintegration type of industrial organization as a new business model, and has given the opportunity for development to East Asian countries. To such an opportunity, East Asia has responded with flexibility. This, for want of a better expression, is innovation of the production process, and is organizational innovation. It is not simply a matter of low wages providing the source of competitiveness to Chinese firms and East Asian firms. In addition to which, could it be that a new industrial organization approach may have been created? Such dynamism pushes forth from the inside of industrial agglomeration, and is increasing East Asia's competitiveness. Such an understanding may also be possible, in East Asia's development.

#### **Conclusion:**

#### **East Asia's Industrial Agglomeration and the Burden of International Reform**

East Asia has developed centering on the coastal portion through an export-oriented policy. As a result, today Japan/NIEs-ASEAN/China-Europe/US a higher level of triangle trade was born. At the same time, this has certainly expanded the intra-regional trade of East Asia, and not only production but also economic integration and marketization are advancing. However, from the point of view of the host countries, they linked up with developed country markets based on low wages, and in time are able to achieve organizational innovation and the like, securing competitiveness. This promotes the agglomeration of industry, which further strengthens competitiveness. Foreign-affiliated firms are caught up in this dynamic mechanism.

Actually, East Asia now is showing a strong ability to grow, taking over Japan and America, which have reduced economic power due to the stagnation of Japan since the 1990s and the global financial crisis of 2008. The world's enterprises have increased their

dependence on the newly emerging economies starting with China. Markets have not been limited to advanced economies and are starting to be born inside the East Asia region, further increasing its possibility of self-reliant development. Enterprises of the world are aiming to enter such markets. Such agglomeration of firms in areas, where industrial infrastructure has been provided as symbolized by export processing zones or special economic zones, create external economies so that even the various problems created by excessive agglomeration now operates so as to increase the chance of development of a portion of inner China and other latecomer countries. In the current interest on the BRICs boom is reflected a firm behavior, which does not miss the business chance in a region with a high possibility of development, replacing the matured low-growth developed country markets. The uncertainty that accompanies globalization and the maturization of the developed country economies has further heightened the interest on new large-scale potential economies. The author refers to such economies as Potentially Bigger Market Economies (PoBMEs), with BRICs as a typical example [Hirakawa 2010a; Hirakawa and Thang Thang Aung 2010b].

However, Akifumi Kuchiki, an ex-researcher at the IDE and now a professor at Nihon University, Tokyo, is advocating a flow chart approach of industrial cluster formation, which allows the development of low developing countries through export processing zones and special economic zones type of industrial agglomeration [Kuchiki 2010, 2007, 2008]. The industrial policy of a lot of developing countries of East Asia aiming for industrialization is not possible under an innovation and reform of existing industrial agglomeration areas like in the developed countries. First of all, agglomeration of industries is extremely fragile. The only way is to use policy to promote industries with export competitiveness. Kikuchi is trying to schematize this as a theory of cluster formation. His industrial cluster theory has a first stage, which aims for agglomeration, and a second stage, which aims for innovation. In the first stage, industrial estates are set up, anchor firms enticed, and agglomeration by related industries is promoted. Using this as foundation in the second stage, the objective is industrial cluster formation, which would achieve innovation in partnership with universities and research institutes [Kuchiki 2010]. This strengthens the feeling in the author of a comprehensive institutionalization of the experience of export-led policy of East Asia. Actually, today's movement of firms is not just for labor but is a search for markets. This makes it possible to successfully form industrial cluster in a number of regions of latecomer countries.

But, how is industrial agglomeration related to innovation? As pointed out by a lot of research, industrial agglomeration does not automatically give rise to innovation. However, it appears that in East Asia peculiar innovations have encouraged industrial agglomeration. Japan's 2006 issue of the "White Paper on Small and Medium Enterprises

in Japan” points out that Japan’s small and medium enterprises have already lost cost-wise advantage vis-à-vis other Asian products, while product shipment value and number of employees have gone down by about 80% and 70%, respectively, in 2003, after peaking in 1991. “The business climate has greatly changed due to the advance of internationalization, and the speed of change is being accelerated by such things as the development of information technology”. The paper generalizes that “the ‘merit enjoyed through the existence of internal agglomeration’ is fading” [SME Agency 2006]. East Asia is coping with the international environment simply through diverse innovations in addition to low wages. This would give rise to competitiveness, further strengthen the agglomeration effect “positive lock in effect”.

Above all, the attainment of competitiveness through the developed country type of innovations amidst a remarkable shift towards knowledge-based economies could become an important policy issue the more development is successfully accomplished. For both central and regional governments in every country, an industrial cluster policy, which hoists the goal of innovation, becomes a policy of pursuing the two aspects of “the nation’s competitiveness” and “the region’s industrial policy”. Of course, even though the policy prescription that would make this surely successful could not be found even in advanced countries, what perhaps is certain is that cluster policy is not a panacea, but it was the one that was pursued, and would be the one to be pursued.

Finally, let us touch on a new issue. As Fujita has pointed out from the standpoint of spatial economics, when low-cost production is achieved as regional integration advances, there is strong possibility that this will give rise not to diversification but to agglomeration in industries where economies of scale operate. Mainstream economics emphasizes that the conclusion of an FTA through economic integration increases welfare. But, actually, economic integration is advancing through agglomeration in a limited number of regions domestically and internationally, making the widening of regional disparities highly possible. In ASEAN, the concentration of the automotive industry in the Thailand is very much evident [Hirakawa and Kawai 2009; Maquito and Carbonel 2010]. Even in China, the possibility is high of agglomeration in Guangzhou, Tianjin, and a few numbers of other cities. The possibility could not be denied that there will be an increased necessity to face up to such issue in the near future as competition intensifies. The advance of regional integration will push the structural shift in East Asia, and at the same time, in many senses, will shed light on regional industrial policy

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