The FORMATION OF INDUSTRIALCLUSTERS IN ASIA AND REGIONAL INTEGRATION
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Midterm Report

Chapter 1

Patterns of the Flowchart Approach to Industrial Cluster Policy: its Feedback Processes of Hanoi and Guangzhou

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1. Introduction

Thang Long Industrial Park is located in Hanoi where Canon is moved in and started to operate in 2001. Its related and other firms have agglomerated in northern Vietnam partly thank to Canon's effect. In the park there were 82 firms and 380 thousand of employees in 2008. The share of exports of the park as the total exports of Vietnam is 3.3 %. Kuchiki (2007c) explained the successful industrial cluster policy according to his flowchart approach. But the approach is not systematic.

The Tinbergen (1952) principle told us that the number of policy measures should be equal to the number of policy objectives for policies to be successfully implemented. But we need to prioritize policy measures since we cannot implement them at the same time under budget constraints. It is usual that the numbers of policy measures and objectives are not so clear in growth strategy. Industrial cluster policy needs several policy measures more than one to attain one policy target.

Porter (1998) constructed a diamond model in which the four factors of demand conditions, factor conditions, firm strategy, and related and supporting industries are conditions for an industrial cluster. But it is difficult for most of regions in the world to satisfy the four conditions at the same time. Our flowchart model will try to prioritize the four factors, not in a diamond form, but in a linear form.

Kuchiki and Tsukada (2008) proposed a way of prioritizing policy measures and Tsuji, Miyahara and Ueki (2008) proposed an econometric method of the positive analyses on how to determine the priority of policy measures. Kuchiki (2007a) proposed the typical models of the flowchart approach to industrial cluster policy in both the manufacturing industry and the software industry. Kuchiki (2005) and Kuchiki and Tsukada (2008) illustrated the successful flowchart approach of the automobile industry cluster policies in Tianjin and Guangzhou in China respectively.

We can apply the flowchart approach to the following three cases. The first case is to apply the approach to newly forming an industrial cluster. The second case is to make clear whose players are lack in implementing industrial cluster policy in its unsuccessful cases. The third case is to make clear what policy measures are needed to

accelerate industrial agglomeration in the feedback processes of the successful cases of industrial cluster policy. Kuchiki (2008c) applied the flowchart approach to Mozambique as the first case. There is no application of the flowchart approach to the second unsuccessful cases. Kuchiki (2007b) applied the flowchart approach to Malaysia as the third case of the feedback process.

The purpose of this paper is to summarize the flowchart approach to industrial cluster policy and apply the flowchart approach to the third case in the feedback processes above. The paper establishes a questionnaire survey method to prescribe industrial cluster policy by prioritizing policy measures. The prescription will try to find players, or actors, to implement the policy measures in the cases of 'No' of the questionnaire survey. The players are expected to be central governments, local governments, and players in the semi-government and the private sector. This method is applied to the industrial cluster policy of northern Vietnam.

We conclude that the prescription for northern Vietnam is to construct highways for automobiles, increase electricity supply, build more capacity of ports, and build institutions such as import procedures. Kuchiki (2008a) called 'Asian Triangle of Growth' a region surrounded by China, ASEAN and India. The industrial cluster policy of Vietnam should be planned by taking into consideration the triangle. We show that the industrial cluster policy should consider not only Vietnam itself but also the regional integration of Asia. In particular, the construction of roads and ports is linked to the regional integration of Asia.

Holt (2004) designed a method called branding genealogy by studying several thousands of advertisement on several major brands such as Coca-Cola and IBM. The model of Holt (2004) was derived by both inductive and deductive methods. We cannot prove our hypothesis of the flowchart approach by inductive or deductive methods as the same as Holt (2004). We try to propose sufficient conditions for success in industrial cluster policy. That is, we can form an industrial cluster by adopting industrial cluster policy if we follow our flowchart that satisfies the condition. Our flowchart model tries to sample a model of successful industrial cluster policy by inductively studying the cases of industrial cluster policy.

It is noted that our flowchart approach does not deny the validity of other flowchart approaches whose prioritization of factors or ingredients are different from ours. We can show, by increasing the number of samples, that our flowchart may be generally applied to industrial cluster policy in other regions.

Section 2 reviews the flowchart approach to industrial cluster policy. Section

3 outlines Canon's effect in northern Vietnam. Section 4 applies the flowchart approach to the feedback processes of northern Vietnam and Guangzhou in China. Two cities of Hanoi and Guangzhou will be integrated in future. Section 5 explains Asian Triangle of Growth. Section 6 concludes the paper.

Two issues are left to be analyzed further. First, we need to take into consideration the decrease in transportation costs by the regional integration of Asia. The key concepts of spatial economics are the economies of scale, monopolistic competition and transportation costs. Transportation costs are expected to decrease by the regional integration of Asia. Second, we must examine how we go to step II of an innovation process from step I of an agglomeration process in the flowchart approach. There are many regions in Asia that have succeeded in step I of an agglomeration process, but they face difficulties to go to step II of an innovation process.

2. Patterns of the flowchart approach

Our aim is to propose sufficient conditions for the success of an industrial cluster policy. That is, we hope to provide a flowchart that can lead to the successful formation of an industrial cluster if the sufficient conditions listed in the flowchart are satisfied.

(1) A general model of the flowchart approach: From the diamond model in the form of a plane to the flowchart model in the form of a line

Figure 1.1: A Model of Flowchart Approach

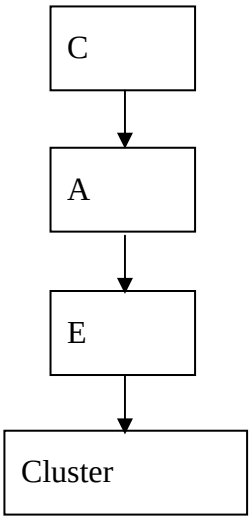


Figure 1.2: An Example of Flowchart Approach

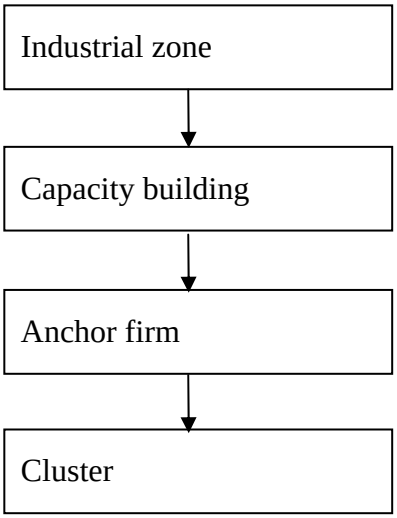
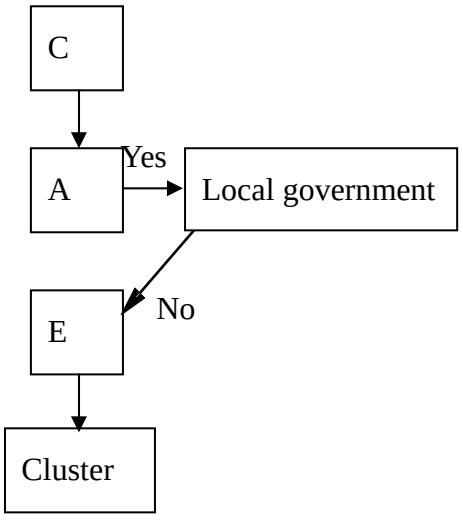


Figure 1.3: Roles of Actors of flowchart Approach



Our flowchart approach is not an empty theory but a practical hypothesis applicable to industrial cluster policy in reality since we can form a cluster if we follow the following four steps: Find ingredients or factors such as establishing industrial zones, building capacity, and inviting an anchor firm. Figure 1.1 shows A, B, C, D, and E.

(i) Select the minimum number of ingredients from the ingredients found

above for a flowchart. Figure 1.2 shows C, A and E.

(ii) Order them along a flowchart. Figure 1.3 prioritizes the ingredients. The number of ways we prioritize them is a mathematical 'permutation' and 3! = 3*2*1. In general, n! = n*(n-1)*(n-2)*…*3*2*1. But we can implement only one policy. So we must prioritize policy measures.

(iii) Specify actors such as central government, local government, non-governmental organization, or private firms and move forward one step on the flowchart if the answer is 'No'.

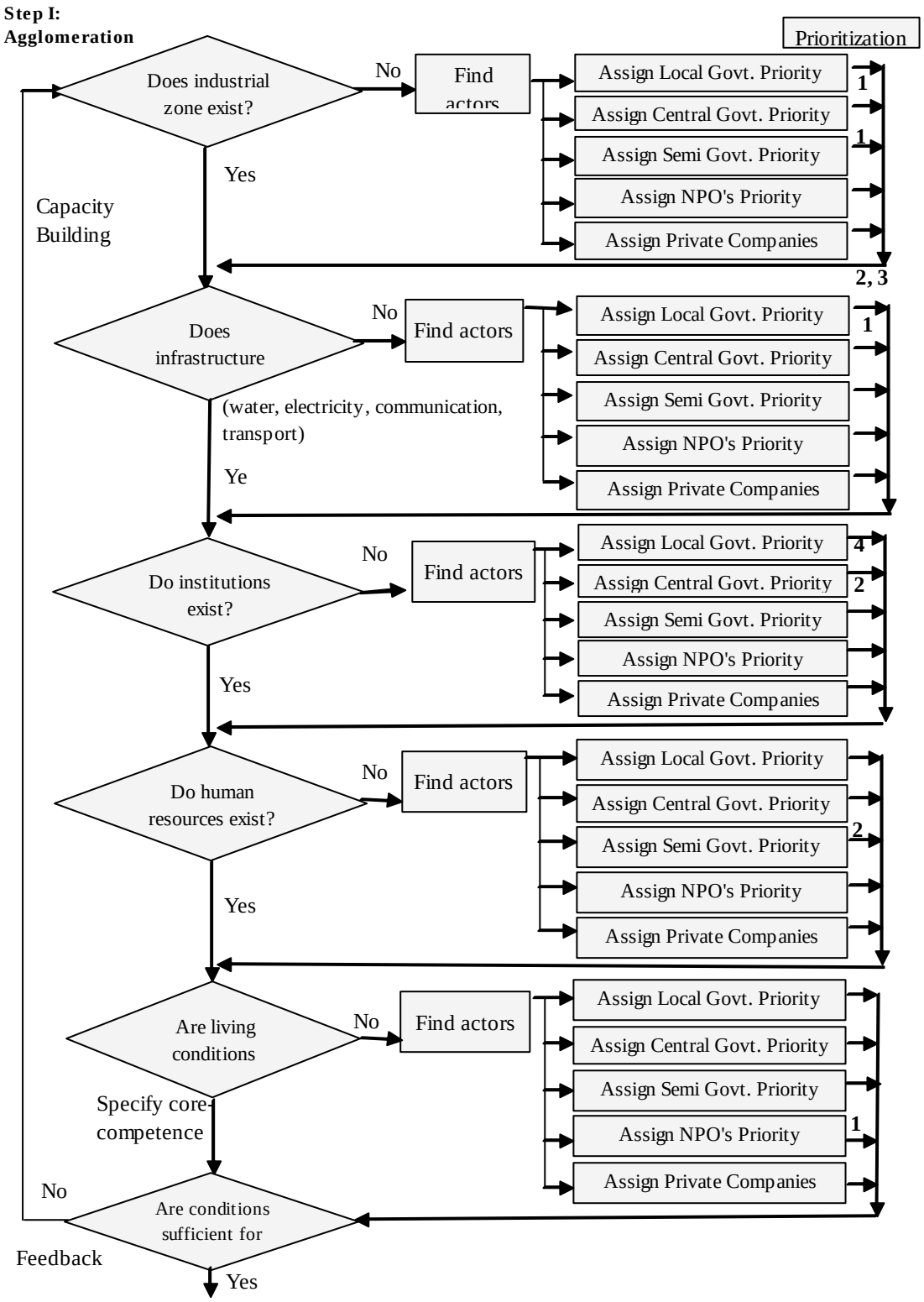
The flowchart approach functions as the following three roles: first, prioritizing policy measures, specifying players and giving prescriptions to industrial cluster policy.

(2) A prototype flowchart model for cluster policy

Our flowchart of the manufacturing industry cluster policy proceeds as follows. First, a local government establishes an industrial zone to attract foreign investors. Second, the government builds capacity for improving the business and living conditions for foreign investors. The elements of capacity building include: (1) constructing physical infrastructure, (2) building institutions, (3) developing human resources, and (4) creating living conditions amenable to foreign investors. Physical infrastructure refers to roads, ports, communications, and so on. Institutional building, which is also crucial for success in inviting foreign investors, includes streamlining investment procedures through one-stop services, deregulation, and the introduction of preferential tax systems. Human resources, which are usually an initial condition for foreign investors, include unskilled labor, skilled labor, managers, researchers, and professionals. The living environment, for example, includes the provision of hospitals and international schools in order to attract foreign firms. An anchor firm will be ready to invest after this capacity building has been carried out. The anchor firm is defined as its high value of the backward linkage in the manufacturing. Rasmussen method is based on the column sums of the Leontief inverse to measure intersectoral linkages. The backward linkage based on the Leontief inverse matrix is defined as the column sums of the inverse matrix.

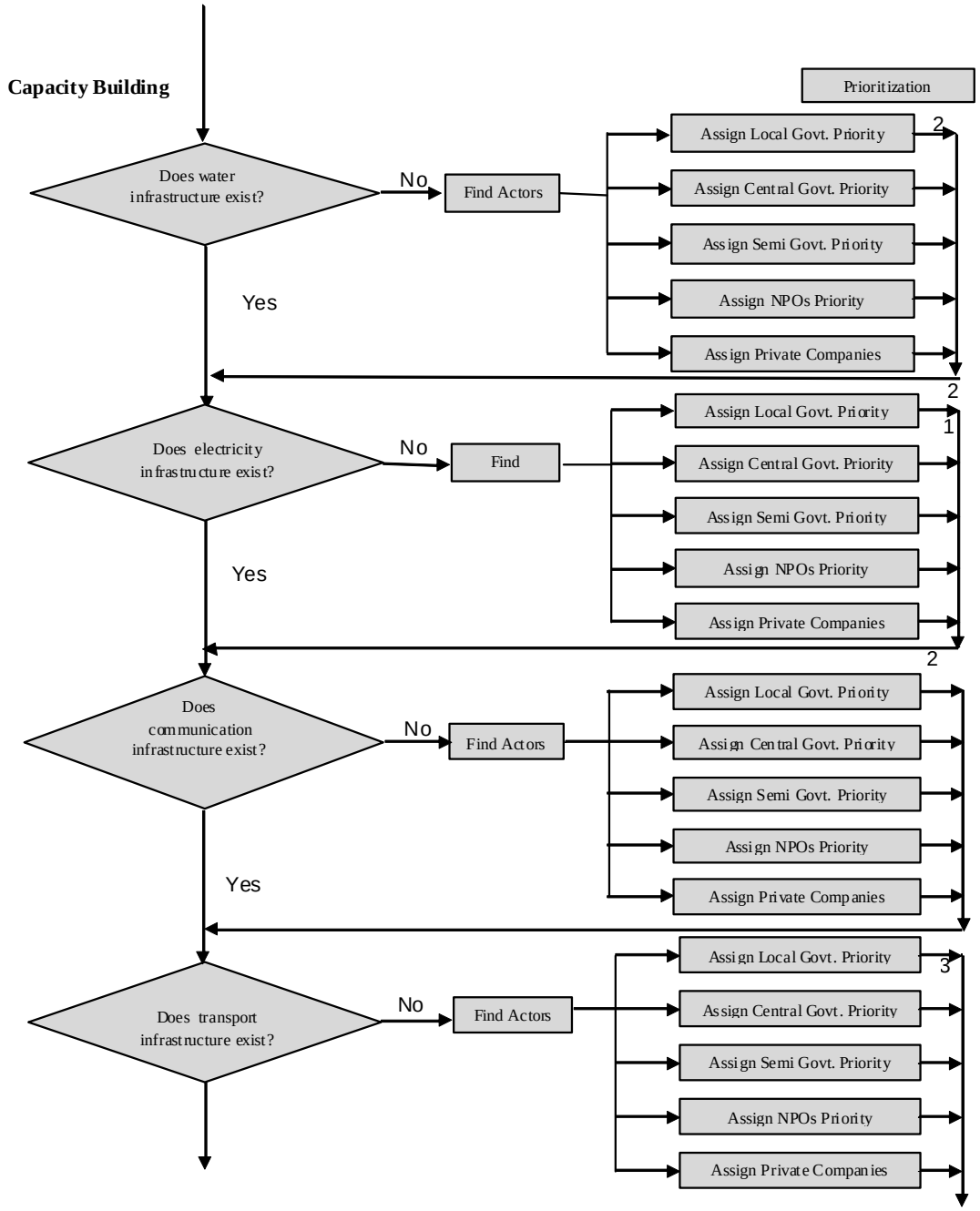
$BLRj=\Sigma^{n}_{i=1}l_{ij,}$

Figure 2: Flowchart Approach: Step I. Agglomeration



(Source) A.Kuchiki and J.Kabir

Figure 3: Flowchart Approach: Step I. Infrastructure (Capacity Building)



(Source) A. Kuchiki and J. Kabir

where l_{ij} is the ij'th element of Leontief inverse matrix that is denoted by L = (I - A)-1. BLRj is backward linkage for sector j which reflects the effects of an increase in final demand. Core competence of a region should be established to invite an anchor firm.

(3) Step I. Agglomeration:

Our flowchart approach is illustrated in Figure 2. First, we ask whether industrial zones have been established. If they have not, we must decide which actors should establish such zones. Once these actors are identified, we return to the main stream of the flowchart.

Next we apply the flowchart's second step, capacity building, which takes place after the establishment of industrial zones. We examine whether there is an adequate water supply for the industrial zones (see Figure 3). We then proceed along the flowchart to examine power supply, communication, and transportation.

After looking at the physical infrastructure, we examine whether institutions are in place. The central government must institutionalize national tax systems and the local government must institutionalize local tax systems. It is well known that one-stop investment procedures are crucial for success in attracting foreign investors.

In the area of human resource development, an abundance of unskilled labor with a high literacy rate is a necessary condition for luring foreign investors whose purpose is to employ cheap labor. On the other hand, an industrial cluster sometimes faces a shortage of skilled labor after industrialization has progressed; universities and on-the-job training centers for innovation are then needed for further development.

Living conditions are crucial for attracting foreign investors. Researchers from investor companies have incentives to work hard if they can enjoy their lives, so it is important to create satisfactory conditions in areas such as housing, schools, hospitals, and so on. These are the final conditions that must be satisfied to bring in anchor firms.

Here the anchor firm is defined as follows: it belongs to the manufacturing industry and has a high value of backward linkage in its input output relationship.

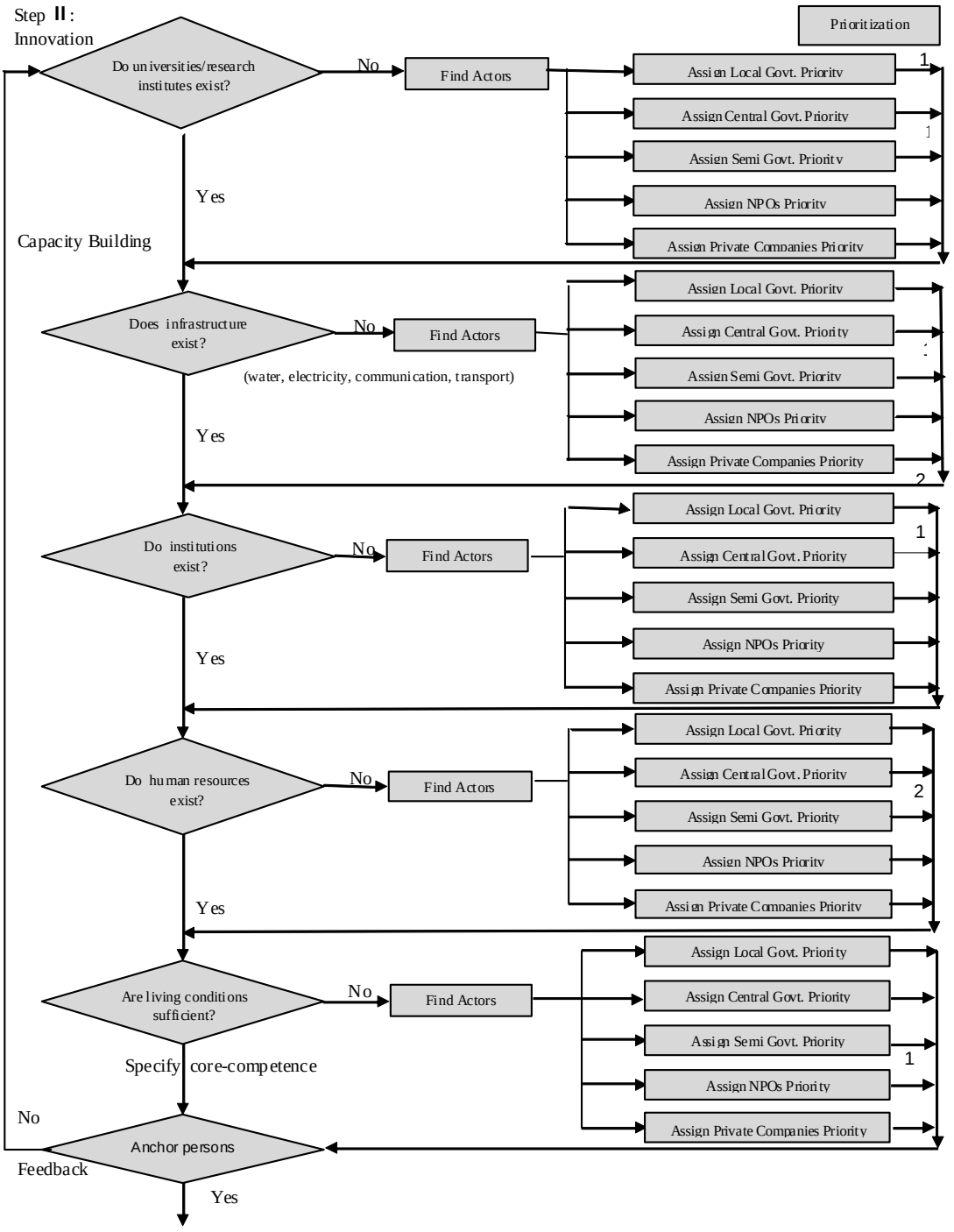
(4) Step II. Innovation:

Intellectual property rights should be enforced for Step II of innovation as is shown in Figure 4. Preconditions for Step II are as follows: (i) Related services: finance and insurance, logistics, marketing companies, repair shops, used car shops; (ii) Professional and other services: lawyers, restaurants, retail shops, tourism.

As is shown in Figure 1, the factors of proceeding Step II of innovation are (a) universities and research institutes, (b) capacity building of infrastructure, institutional reforms, human resources, and living conditions, (c) anchor persons.

Then joint actions for Step II may be as follows: (i) facilitate cluster skill centers; (ii) establish collective projects; (iii) create business associations; (iv) take branding strategy. Linear instruments and interactive approach of policy

Figure 4: Flowchart Approach: Step Ⅱ. Innovation



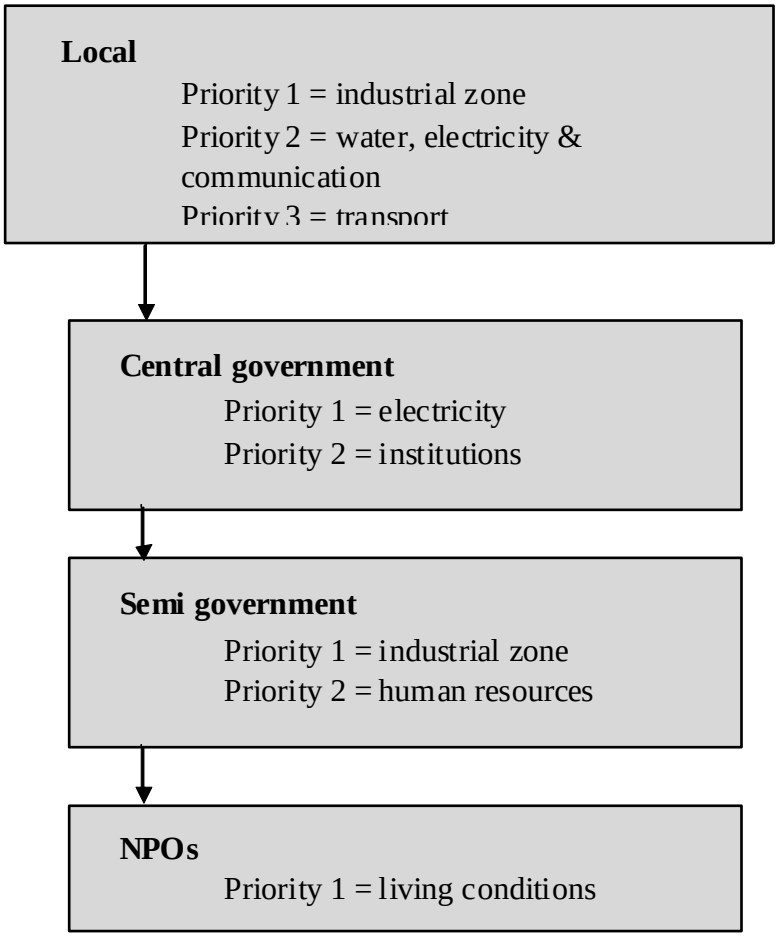
(Source) A. Kuchiki and J. Kabir

instruments for innovation may be as follows: Linear instruments: (i) direct R&D aids; (ii) transfer of research-based knowledge to firms; (iii) financial support: Interactive

approach: (i) improving institutions and programs providing technology transfer services; (ii) policy to stimulate networking and business clusters.

We illustrated the minimum number of factors of (a) universities and research institutes, (b) capacity building and (c) anchor persons to simplify the flowchart of Step II and prioritize policy measures. Most of Asian countries are located at the entrance of Step II of innovation and we cannot find a lot of the experiences of Step II in Asia. Step II is still a hypothesis to be further examines.

Figure 5: Priorities of actors

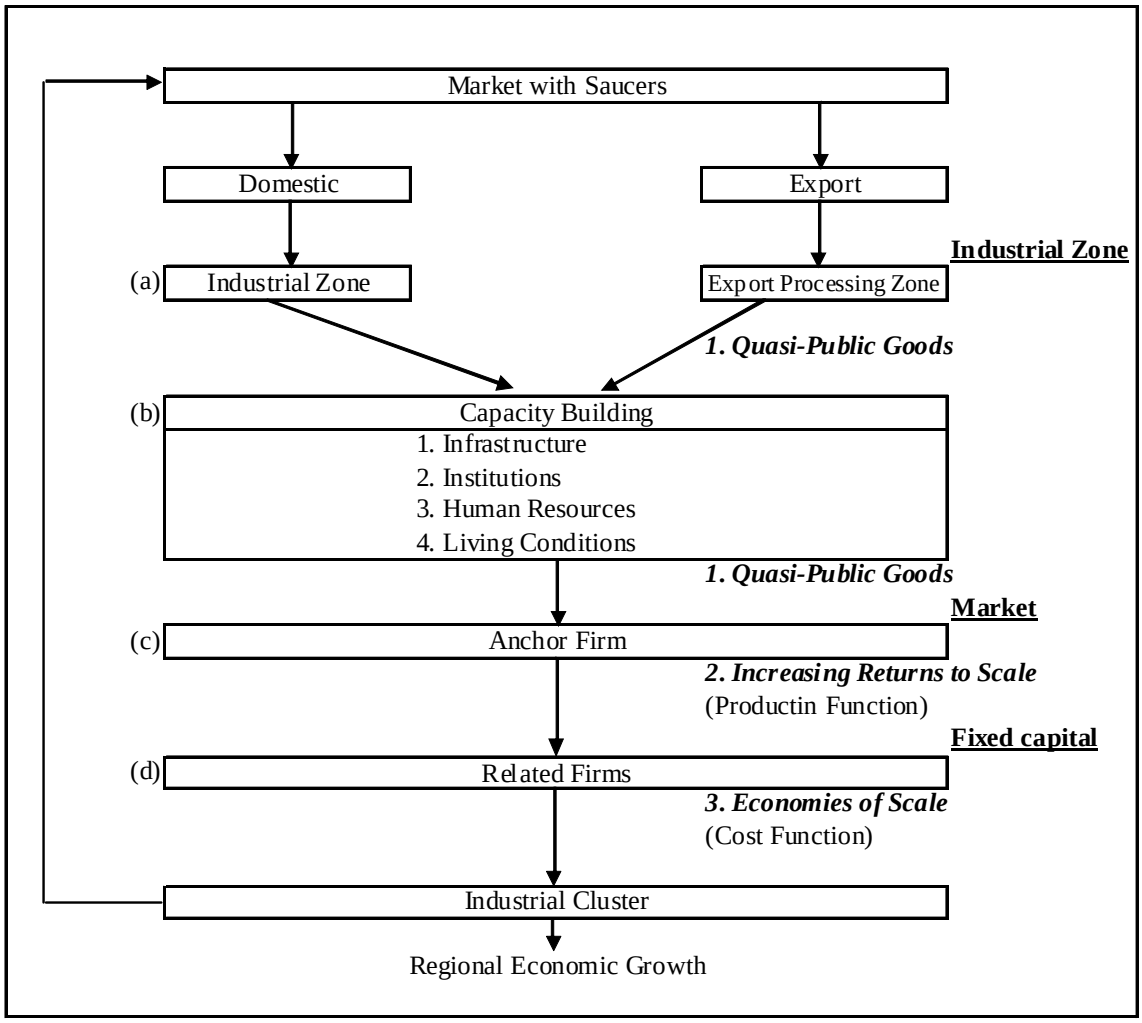


(Source) A. Kuchiki and J. Kabir

Figure 5 shows the priorities of each actor or player. Local governments play the main role in establishing industrial zones, supplying electricity, facilitating transport, and forming institutions. The first priority of local government in Figure 5 is to construct industrial zones to accept foreign investors. The second priority during that

stage is to supply electricity, facilitate transportation and form institutions. The main priorities of the central government are to supply electricity and build institutions.

Figure 6: An Industrial Cluster Formed by an Anchor Firm



(Source) Kuchiki (2008)

The typical industrial cluster policy was theorized by defining an industrial zone as "quasi-public goods," and it was shown that the policy enhances economic growth under a production function of "increasing returns to scale" of an anchor company as is shown in Figure 6. The critical amounts of the production of "scale economies" that are used by related companies to decide whether or not to invest in clusters were also shown (Kuchiki (2008b)).

The flowchart approach to industrial cluster policy can be applied to the following cases:

(1) Applications of the prototype models to other regions to newly form industrial clusters (ex-ante application): examine whether each step of the flowchart is ‘yes’ or ‘no’ and find players when the answer is ‘no’.
(2) Applications of the prototype models to other regions to evaluate the failed cases of industrial cluster policies (ex-post evaluation): examine whether each step of the flowchart is ‘yes’ or ‘no’, find reasons why it failed if the answer is ‘no’, and go to next step.
(3) Applications of the prototype models to the feedback processes of the successful cases of industrial cluster policies to prescribe them for their next upgrading (ex-post prescription): examine whether each step of the flowchart is ‘yes’ or ‘no’, and find players when the answer is ‘no’, and prescribe the region for its industrial cluster policy.

This section delineates “a flowchart approach to industrial cluster policy” by proposing sufficient conditions for forming industrial clusters typical in the manufacturing industry in Asia and providing theoretical support for the sufficiency of these conditions to enhance regional economic growth. The typical pattern of forming industrial clusters in East Asia was theorized by defining “quasi-public goods”, and it was shown that industrial cluster policy enhances economic growth under a production function of “increasing returns to scale”. Critical amounts of the production of “scale economies” that are used by firms to decide whether or not to invest in clusters were also shown.

Concepts of quasi-public goods, increasing returns to scale, and economies of scale are crucial to theoretical development presented here. Sufficient conditions are to establish industrial zones, to build capacity, and to invite anchor firms together with their related firms. First, industrial zones, capacity such as in physical infrastructure, institutions, and human resources as quasi-public goods are provided by both organizations in the quasi-public sector and firms in the private sector. Second, industrial cluster policy to provide industrial zones and capacity as quasi-public goods can enhance regional economic growth in cases where an anchor firm operates under increasing returns to scale. Markets for sales in China are at an early stage of development and large enough for anchor companies to attain increasing returns to scale. Third, the minimum optimal size of car production of economies of scale depends on the size of fixed capital of the related companies of anchor companies.

A flowchart approach to industrial cluster policy emphasizes the importance of the ordering and timing of policy measures. The flow of policy implementation is to establish an industrial zone, to invite an anchor company, and to promote its related

companies to invest in the industrial zone. Further, the recipient country's government reduces its role in order to promote competition. It thereby transfers greater authority to local governments and makes more use of the quasi-public sector (public corporations and state enterprises). As a result, the quasi-public sector is likely to supply quasi-public goods. The improvement and expansion of network formation in Asia by both multinational corporations and the quasi-public sector are thus prerequisites to the upgrading of Asia's industrial structures. Leadership is crucial to the success of industrial cluster policy.

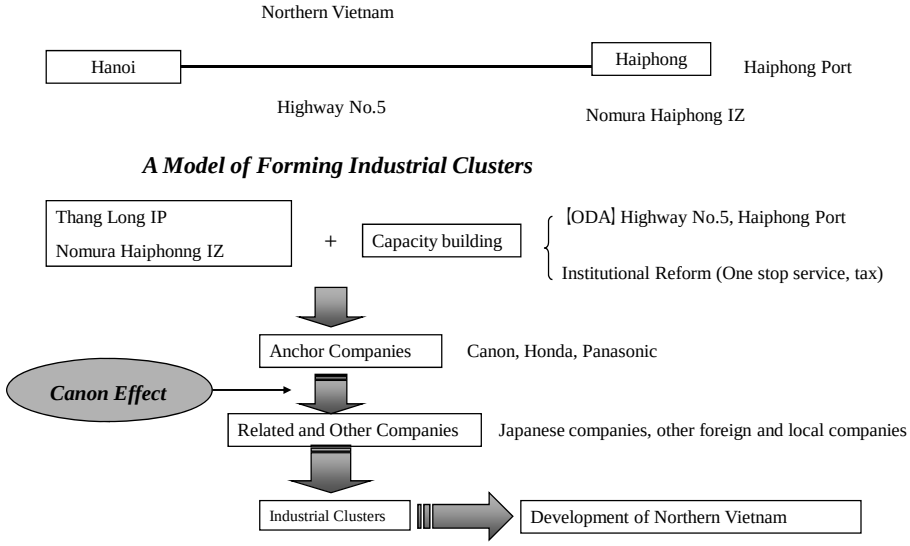
3. The electronics industry cluster policy in northern Vietnam

(1) Thang Long Industrial Park (TLIP)

We explain industrial clusters in Hanoi and Haiphong that are located west and east of national highway Route 5. Hanoi is centrally positioned from Hochiminh in Vietnam, Bangkok in Bangkok, Kunming and Guangzhou in China. It is located 1,100 km from Hochiminh, 950 km from Bangkok, 600 km from Kunming, and 850 km from Guangzhou. Therefore we can expect northern Vietnam to be merged with southern China from the supply chain management viewpoint in the future.

Highway Route 5 is 100 km long and links Hanoi in the west and Haiphong in the east. Hanoi is the capital of Vietnam and Haiphong is a port city. Thang Long Industrial Park (TLIP) located in Hanoi was established by Sumitomo Corporation. Its total area is 220 hectare. Nomura Haiphong Industrial Zone (NHIZ) located in Haiphong was established by Nomura Security Company.

Figure 7. Industrial Clusters in Northern Vietnam



(Source) Kuchiki (2007c).

Both TLIP and NHIZ offer good quality infrastructure as a common incentive. TLIP illustrates national highway Route 5 from Hanoi to the Haiphong port as is shown in Figure 7. NHIZ analyzed the positive effect in a relatively short time due to completion of national highway Route 5 as follows: It took 1 hour and 15 minutes by car from Hanoi to NHIP in 2002 though it had taken 3 to 4 hours before the completion of national highway Route 5.

One factor that influences foreign investors' decision on investment is capacity building within recipient countries. Capacity depends on the following four conditions: 1. Human resources, 2. Infrastructure, 3. Living conditions, and 4. Institutions.

Regarding infrastructure, the Japanese official development assistance loans contributed to facilitating infrastructure in northern Vietnam. National highway Route 5 and the Haiphong port constructed and rehabilitated by the loans are effective in forming industrial agglomeration.

Regarding living conditions, apartments, supermarkets, restaurants, hotels, direct air flights from host countries to recipient countries, schools, hospitals, and amusement facilities are a key to inviting foreign investment. The Hanoi area cleared the key condition.

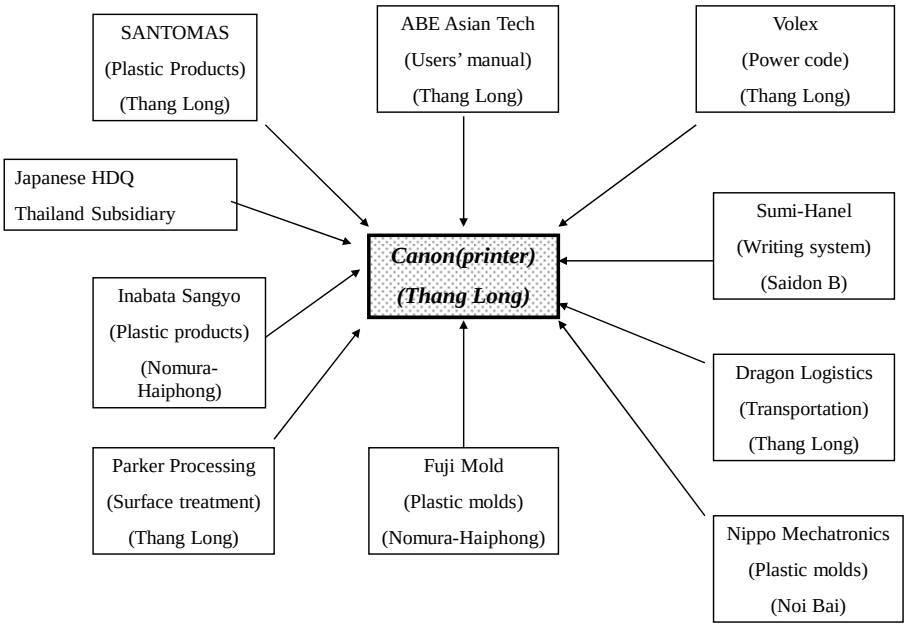
Regarding institutions, one-stop service plays a large role in streamlining

investment procedures. This means that, at an office of TLIP, tenant companies can get all approval related to investment licenses, factory operation on export procedures, and so on required from ministries. Streamlined customs clearance helps reduce tenant companies' costs. Industrial zones in Asia offer preferential tax treatment. Corporate tax in Vietnam is exempted for four years after a company makes profit. After the four years the tax rate is 5% for a further four years and then 10%.

The Japan Bank for International Cooperation (2001) survey showed that institutional reform is a key to developing the private sector in Vietnam. Japan's minister of finance in April 1999, Miyazawa, pledged to provide 20 billion yen to support programs for developing the private sector as requested by Vietnam's former Prime Minister Phan Van Khai. The loan was agreed and implemented in September 1999.

According to the survey, private companies positively rated trade liberalization, change from an approval system to a registration system to establish companies, and abolishment of the industries restricted or prohibited by some ministries. The number of restricted or prohibited industries was reduced from 400 to 250. The registration system in establishing companies has streamlined administrative procedures and reduced the average required time to less than one month from three months before 2000. All of the private companies were permitted to export and import without licenses to guarantee free trade. As a result the institutional reforms have been highly rated. We can conclude from the survey that institutional reforms for streamlining the procedures are effective in developing the private sector and promoting foreign direct investment.

Figure 8: Satellite Investment



(Source) Tran Van Tho, A. Kuchiki, F. Idei, and S. Sakata (2003), 'On a Project of Traffic Infrastructure in northern Vietnam,' *Impact Evaluation of Japan Bank for International Cooperation*.

Table 1: Benefit of well developed infrastructure

Type	**Poduction**	**Market-Local**	**Market-Export**	**Import**	**Hai Phong Port**	**Highway No.5**	**Example**
1	Hanoi		Hai Phong	Hai Phong	XX	XX	Canon
2	Hanoi	Local	Hai Phong	Hai Phong	XX	XX	TOTO
3	Hanoi	Local		Hai Phong	XX	X	Vietnam Float Glass
4	Hanoi		Via internet	CAD technology			Yabashi
5	Hanoi		Noi Bai	Hai Phong	X	X	Sumitomo Bakelite
6	Hai Phong		Hai Phong	Hai Phong	XX		As'ty
7	Hai Phong	Local		Hai Phong	XX	X	San Miguel Yamamura
8	Hai Phong	Local	Hai Phong	Hai Phong	XXX (inc.local distribution by ship)	XX	Han-Viet Heavy Industry & Constructio n
9	Hai Phong		Noi Bai	Noi Bai		XX	ESTELL
10	Vinh Phuc	Local		Hai Phong	X	X	Honda

(Note) X shows frequency of use

(Source) Japan Bank for International Cooperation

(2) Canon's effect

Sumitomo Corporation began selling TLIP land lots in 1997. Canon that was established in April 2001 started operation in May 2002. Companies that provided parts to Canon decided to move into TLIP particularly in 2002. Canon and its related firms established factories in TLIP after national highway Route 5 was constructed and Haiphong port rehabilitated in period 2 starting from 2002.

Table 1 shows that eight of the ten firms use highway Route 5 and that eight of the ten firms use Haiphong Port. Firms moved into TLIP and NHIZ in 2001 and 2002 after Canon established its factory and the number of projects by foreign direct investment increased in Hanoi and Haiphong after 2001. Two companies in 2000, six in 2001, and 11 in 2002 singed up to invest in TLIP. As is shown in Figure 8, Parker Processing VN Co., whose products are paint and surface treatment for metal parts, moved into TLIP in August 2000 to provide parts to Canon. Volex Cable Assembly started producing power supply cords and interconnectors in 2001. The Singaporean company started providing products to Canon, though its intention was not only to sell to Canon. Companies that provided parts to Canon decided to move into TLIP particularly in 2002. They are Sumitomo Coil Center that produces parts for printers, a Japanese company producing dye-casting products, and a Malaysian company, Santomas VN Co. that produces precision plastic injection molding. So Canon is an anchor company to lead other companies to provide parts and components.

Table 2: Change in direct investment (registered amount) and number of investments by region

(higher: US$ millions; lower: number of investments)

	2000	2001	2002	2003	2004	2004/2000
North	62.3	272.9	375.4	604.5	1195.9	**19.2**
	(61)	(89)	(176)	(204)	(197)	3.2
Central	58.7	128	145.1	218.4	405.2	6.9
	(18)	(35)	(39)	(59)	(39)	2.2
South	707.1	2102.2	992.1	1061.1	2609.6	3.7
	(284)	(378)	(536)	(484)	(486)	1.7

Data Source: Reproduced from General Statistical Office, *Statistical Yearbook 2000-2004*

Policy Coherence for Development: Case Studies from East Asia, *Journal of* **JBIC** *Institute*, No.29, p.29 (2006)

(3) Its outcomes

The number of the suppliers to Canon is around 100 including about 20 local companies in 2007. Eighty two foreign firms have invested from 1997 to 2007 and about 37 thousand of people are employed in TLIP. The share of the export by the firms in TLIP as the total amount of Vietnam's export is 3.3 %.

Inflows of FDI into Vietnam inflows totaled US$2.47 billion. The reasons why the amount approved by the Vietnamese government increased the growth rate were that European companies invested in an electricity supply project and that Canon and its related Japanese companies established factories in export processing zones in Hanoi (*Nihon Keizai Shimbun*, April 9, 2002).

We will show the macroeconomic effects of national highway Route 5 on the economy of northern Vietnam based on the data of growth rates of foreign direct investment from 2000, before completion of national highway Route 5, to 2004 after its completion. The data of Hanoi and Haiphong in northern Vietnam, Danang in central Vietnam, and Hochiminh in southern Vietnam are shown in Table 2, telling us that the growth rates in northern Vietnam are higher than the central and southern averages and that national highway Route 5 had the positive effects on Hanoi and Haiphong in 2002 as follows. The growth rate in North is high at 19.2% while the growth rates in Center and South are low at 6.9 % and 3.7 %, respectively. The growth of Hanoi began to diffuse over northern Vietnam.

4. Prescriptions for the industrial cluster policy of Hanoi and Guangzhou

We propose that, considering the facts of northern Vietnam, its industrial policy can take the following three ways. First, the flowchart goes to Step II of innovation. Second, the flowchart feeds back to the capacity building of the flowchart. Third, the local related firms are suggested to take partnerships with foreign firms.

(1) Hanoi

Here we examine the second way of the feedback and raise the following twelve questions:

1. Do industrial zones exist sufficiently?

Regarding the physical infrastructure of capacity building,

2. Does transport infrastructure exist sufficiently?
3. Does electricity infrastructure exist sufficiently?
4. Does communication infrastructure exist sufficiently?
5. Does port infrastructure exist sufficiently?

6. Do institutions exist sufficiently?

Regarding human resource,

7. Does unskilled labor exist sufficiently?
8. Does skilled labor exist sufficiently?

Regarding living conditions,

9. Do hospitals exist sufficiently?
10. Do schools exist sufficiently?
11. Do entertainments exist sufficiently?
12. Do thefts happen?

We carried out a survey of the industrial cluster policy of northern Vietnam to determine whether we can solve its problems using our flowchart approach. We interviewed ten professionals on the questionnaire, and found the following six results, as summarized in Table 3. (The ten respondents included six staff at companies in Hanoi, three staff of Japanese semi-government organizations in Hanoi, and one Japanese professor studying the Vietnamese economy).

Table 3: Questionnaires on industrial cluster policy: Hanoi

	1	2	3	4	5	6	7	8	9	10	Results	Problems
1. Do industrial zones exist sufficiently?	O	O	O	O	O	O	O	O	O	O	10	
Capacity building: Physical infrastructure												
2. Does transport infrastructure exist sufficiently?	X	X	X	X	X	X	X	X	X	X	0	X
3. Does electricity infrastructure exist sufficiently?	X	X	X	X	X	X	X	O	O	O	3	X
4. Does communication infrastructure exist sufficiently?	O	O	O	O	O	O	O	X	O	X	8	
5. Does port infrastructure exist sufficiently?	X	X	O	O	X	X	X	X	X	X	2	X
6. Do institutions exist sufficiently?	X	X	X	X	X	X	X	X	X	X	0	X
Human resources												
7. Does unskilled labor exist sufficiently?	X	X	X	X	X	X	X	X	X	X	0	X
8. Does skilled labor exist sufficiently?	X	X	O	O	O	O	O	O	O	O	8	
Living conditions												
9. Do hospitals exist sufficiently?	O	O	X	X	O	O	X	O	O	X	6	
10. Do schools exist sufficiently?	O	O	O	O	O	O	O	O	O	O	10	
11. Do entertainments exist sufficiently?	O	O	X	X	X	X	X	O	O	O	5	X
12. Do thefts happen?	X	X	X	X	X	O	O	O	O	O	5	X

(Source) A. Kuchiki and T. Gokan (interviews in Hanoi on Aug. 28-30, 2008)

Regarding industrial zones, no respondent answered “Yes.” Our survey made clear that the roads, electricity and ports of infrastructure are insufficient in industrial clustering. Regarding highway roads specific for automobiles, all of the ten respondents answered “No.” In particular, the following roads are listed: (1) Hanoi – Haiphong, (2) Hanoi – southern China and (3) Hanoi – Noibai Airport. Regarding electricity supply, seven of the ten answered “No.” Three of the ten, who belong to firms located in Thanglong Industrial Park answered “No.” They have no problem of

electricity supply since they are given priority for the electricity to be supplied.

But electricity supply in Hanoi is usually planned to stop (August 2008). Regarding communication, two of the ten respondents answered 'No'. Email system of Vietnam is not sometimes connected smoothly. Regarding ports, eight of the ten respondents answered 'No'. The other two who answered 'No' cannot know the problems of the port since they ask logistics companies to carry their materials and products, and do not directly use ports. This means that all of the respondents pointed out the problem of ports. Haiphong Port, which is a main port in northern Vietnam, is a river port and shallow in depth from five meters to seven meters. Cailan Port is located in Halong Bay and substitutes the role of Haiphong Port. It is worried about that the development of Cailan Port will harm Halong Bay that is a world heritage. So it is necessary to expand the facility of Haiphong Port. Cargos are loaded on a small ship at the port, sent to Hong Kong Port, and loaded on a large ship again.

Regarding institutions, all of the respondents answered 'No'. The problem of institutions is the most serious of the twelve questions. In particular, the four problem of customs clearance are serious as follow. First, every document on customs clearance should be translated into Vietnamese language. Second, every paper of the documents should be original. Third, companies should put their stamps on their documents. Fourth, every document needs the signatures of companies. In short, it costs much that original documents move from one place to another in northern Vietnam to put stamps and signatures on the documents.

The three problems of transporting cargos from Hanoi to the border of southern China are as follows. First, working hours at customs clearance of the border is short in operation. Suppose that their working hours at Vietnam and China at the border are from 8 A. M. to 5 P.M. Their operating hours are different from the working hours and 9 A. M. to 4 P. M. The time difference between Vietnam and China is one hour. Then their operation hours are for six hours. Trucks must spend one night at the border when they miss to arrive at the border during the real operating hours. The time of one night is the cost.

Second, it cost much for container cargos to be transshipped, that is, unloaded from one truck in Hanoi and loaded to another truck in China at the border. The second problems of the transshipment of container cargos are as follows: stealing, damaging, getting wet, and delaying. A truck consists of its driving part and container part. We can reduce transportation costs when we can use the container part continuously beyond the border between Vietnam and China.

Third, the road condition is very bad as follows. First, there is a lot of death traffic accidents on the highways in Vietnam since the highways are not in particular use for automobiles. Bicycles and motorcycles can use the highways at the same time. Second, the speed of trucks on the highways is slow compared with that in Thailand and Lao due to the road condition of Vietnam. Suppose that the speed in Vietnam is 30 kilometer per hour while that in Thailand is 50 kilometer per hour (We interviewed a firm at Thanglong Industrial Park on August 30, 2008).

Regarding customs clearance in Vietnam, its implementation of rules is not transparent. It was pointed out that the rules change so often and are sometimes implemented.

Regarding unskilled labor, all of the ten respondents answered 'No' partly because illegal strikes happened at many firms in 2008. Firms are forced to be obliged to establish their labor unions starting from 2008. The boards of firms can designate the presidents of their labor unions in 2008. But the labor unions can decide their presidents by themselves in 2009. So the boards feel uneasy at the future of the labor unions.

The labor market of unskilled labor has become tight in Hanoi's areas. For example, when firm A employed 50 workers in both 2007 and 2008, the number of the applicants of firm A in Thanglong Industrial Park reduced to 170 in 2008 from 700 in 2007. The firm employed its workers around the Hanoi area in the past but was forced to employ them from mountain areas far from Hanoi. The firm needs to construct an apartment for the workers to live. The share of its workers from the Hanoi is 70 % in the past but reduced to 30 %. The share of the workers from the mountain areas became 10 % in 2008.

Regarding skilled labor, two of the ten respondents answered 'No'. It is a common phenomenon in most of Asian countries that workers change their jobs so often. The phenomenon is called job hopping. One respondent pointed out that it is difficult to find many Vietnamese people who can speak Japanese and that Japanese firms should employ the Vietnamese who can speak English. More the Vietnamese people will study Chinese and Korean languages due to the shortage of the Vietnamese who can speak Chinese and Korean languages.

Regarding living conditions, most of the respondents answered 'Yes'. But four of the respondents answered 'No' regarding hospitals. They usually use hospitals not in Hanoi but in Bangkok or Singapore in the cases of serious illness. In addition, few firms periodically send food from Japan due to the seriousness of bird influenza.

Regarding entertainment, some respondents answered 'No'. They cannot enjoy on Saturdays and Sundays due to the shortage of entertainment facilities such as shopping centers and movies. It is difficult to satisfy these conditions since people cannot fully saturate at any conditions.

Five of the ten respondents pointed out that the thefts of raw materials such as copper coils happen since some of their workers are lack in moral. It takes time for them to change their moral.

In summary, the issues of the investment environment of Vietnam are highways, electricity, ports, customs clearance, and unskilled labor in 2008.

(2) Guangzhou

We propose that, considering the facts of Guangzhou, its industrial policy can take the following three ways. First, the flowchart goes to Step II of innovation. Second, the flowchart feeds back to the capacity building of the flowchart. Third, the local related firms are suggested to take partnerships with foreign firms. Here we examine the second way of the feedback and raise the same eleven questions as the case of Hanoi.

We carried out a survey of the industrial cluster policy of Guangzhou to determine whether we can solve its problems using our flowchart approach. We interviewed ten professionals on the questionnaire, and found the following six results, as summarized in Table 4. (The ten respondents included six staff at companies in Guangzhou, two staff of Japanese semi-government organizations in Guangzhou, and one Japanese professor and one researcher studying the Vietnamese economy).

The issues of the investment environment of Guangzhou Authority are land, electricity and institutions. We explain the investment environment of Guangzhou according to the result of our questionnaire in Table 4 in the following.

Table 4: Questionnaires on industrial cluster policy: Guangzhou

	1	2	3	4	5	6	7	8	9	10	Results	Problems
1. Do industrial zones exist sufficiently?	O	X	O	X	X	X	X	O	X	X	3	X
Capacity building:												
2. Does transport infrastructure exist sufficiently?	O	O	O	O	O	O	O	O	O	O	10	
3. Does electricity infrastructure exist sufficiently?	X	X	O	X	X	X	X	X	X	O	2	X
4. Does communication infrastructure exist sufficiently?	O	O	O	O	O	O	O	O	O	O	10	
5. Do institutions exist sufficiently?	X	X	X	X	X	X	X	X	X	X	0	X
Human resources												
6. Unskilled labor	O	O	O	X	X	X	X	O	X	X	4	X
7. Skilled labor	X	O	O	O	O	O	O	O	O	X	8	
Living conditions												
8. Do hospitals exist sufficiently?	O	O	X	X	O	O	X	O	O	X	6	X
9. Do schools exist sufficiently?	O	O	O	O	O	O	O	O	O	O	10	
10. Do entertainments exist sufficiently?	O	O	O	O	O	O	O	O	O	O	10	

(Source) A. Kuchiki and T. Gokan (interviews in Guangzhou on Aug. 24-27, 2008.)

Regarding land, eight of the ten respondents answered 'No'. There is shortage of land in Guangzhou. Guangzhou Municipality has changed its policy from the invitation of the labor intensive industries to the invitation of the high value added industries without the environmental issues. It is difficult for the firms not fitted to the policy to be approved by the government. One of the respondents, who applied to the government, told us that it will not be probable for his firm to be approved. It is sure that there is the shortage of land in Guangzhou even if there is still room in land at Zhongshan, Foshan or Shunde. Dalian Municipality experienced the same situation in around 2000 and introduced the policy of shifting the labor intensive industries from Dalian to the inland areas. The current situation of Guangzhou is the same as that of Dalian at that time.

Regarding electricity, nine of the ten respondents answered 'No'. Two of the ten respondents answered 'Yes' since their firms are located in the district where Guangzhou Municipality gives priority to supply electricity. Regarding other infrastructure such as roads, communication and ports, there were no problems.

Regarding customs clearance, tax systems and foreign currency transactions, all of the ten respondents answered 'No'. Guangzhou Municipality has its own two institutions regarding customs clearance. One is that the import tariffs of parts and components are exempted when their products are exported. It is called Rairyokako. Another is that the value added tax of parts and components are exempted when their final products are exported even if the parts and components are purchased not from foreign countries but from firms in Guangdong Province. It is called Tensho. The local government temporarily arrows that the reduction rate of taxes is 7 % in the import tariffs and 15 % in the value added tax. The total rate is 22 % at the maximum rate.

The increase rate of minimum wages in Guangzhou is from 10 % to 14 %. The increase rate of wages is 10 % per year, becomes 30 % in three years, and is more than 22 % when the reduction rate is the maximum due to Rairyoukako and Tensho. One of the respondents pointed out that the labor intensive industries such as the textile industry and the shoe industry will be difficult to stay in Guangzhou. In addition, the reduction rate of Tensho applied to one thousand kinds of commodities is 10 %. The firms in Guangzhou are forced to move to places where wages are lower than those of Guangzhou in three years or earlier.

Regarding foreign currency transactions, one of the ten respondents pointed out that it takes much time that the money sent to his firm in China is proved to be the money to import parts and components for the firm by the authority of foreign currency transactions. His firm cannot import them until the completion of its approval.

As mentioned above, regarding unskilled labor, six of the ten respondents answered 'No' since the increase rate of minimum wages is high in recent years. One of the respondents, who stayed in both China and Malaysia pointed out that the wage including welfare costs of unskilled labor in Guangzhou is around 20,000 thousand yen while that in Malaysia is 15,000 yen. It is partly because the welfare costs of China are higher than that of other Asian countries. Guangzhou is getting more uncompetitive in the costs of wages of unskilled labor than those of Malaysia.

Many economists discuss whether China has passed its turning point. The turning point is explained as follows. Labor can be unlimitedly supplied at the wage of the minimum subsistence level before the turning point while labor cannot be supplied at the level as labor demand increases. That is, the wage level becomes higher than the minimum subsistence level after the turning point.

We can claim that Guangzhou Authority has passed the turning point. It will be difficult that the labor intensive industries cannot hold in Guangzhou. The labor intensive industries have no other choices to change into the high value added industries or shift to areas where their wages are low. The candidate areas may be Nangning or Beihai in Gungxi Zhuangzu Zizhiqu, or Hunan Province. Northern Vietnam may be one of the candidates.

Regarding electricity, there is shortage in electricity all over the China including Guangzhou. Nine of the ten respondents answered 'No'. One of the ten answered 'Yes' since Guangzhou Authority give priority to his firm in supplying electricity.

Source : Author.

Regarding living conditions, there are few problems since they have been improved in recent years. But four of the ten respondents answered 'No' regarding hospitals. This problem is common in other Asian countries. Serious patients may go to Hong Kong or Japan.

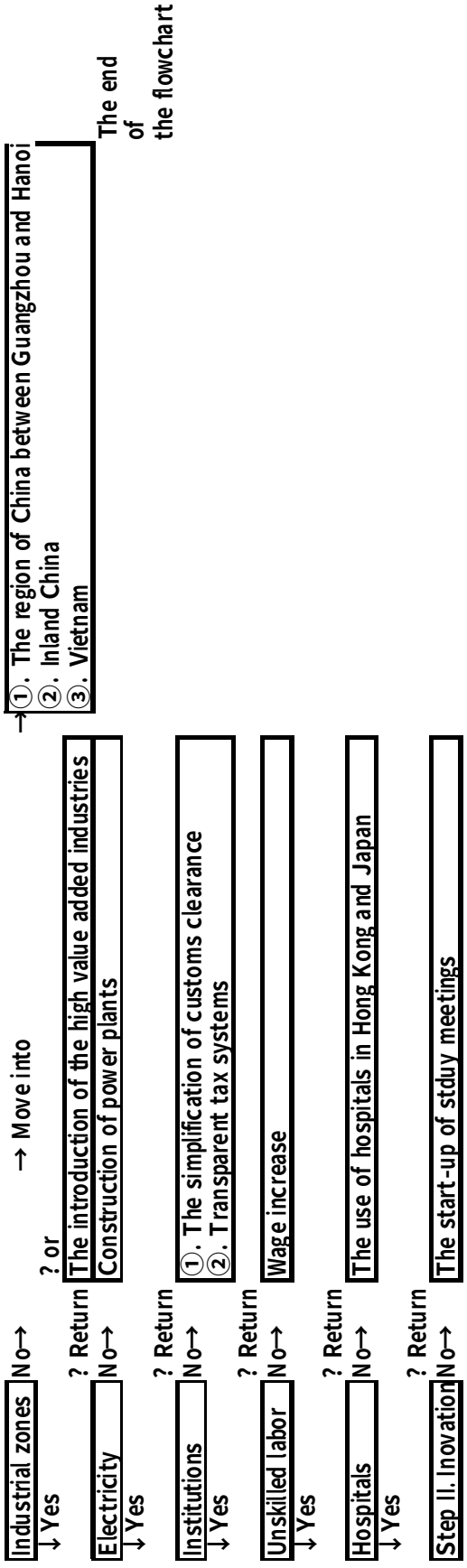
(3) Prescriptions based on the flowchart approach to industrial cluster policy of northern Vietnam

We write out prescriptions for industrial cluster policy in northern Vietnam according to Figure 9. Northern Vietnam is needed to facilitate infrastructure for the next stage of growth since it has reached one thousand dollar of per capita of around 900$ in 2008. Capacity should be built for the stage.

First, new route 5 highway specific for automobiles between Hanoi and Haiphong is needed regarding roads. Second, it is desirable to construct a highway between Hanoi and southern China. The highway should be the same level as China's highway of three lanes of one way. It may be very sure that northern Vietnam will go to next stage if the procedures of customs clearance are simplified together with the construction of the highway. Third, a highway between Noibai Airport and the center of Hanoi is needed. Vietnam needs a highway to link Noibai Airport and Hoalac Hitech Park the government shifts its capital from Hanoi to Hoalac Hitech Park. A highway between Hoalac Hitech Park and the center of Hanoi under construction is expected to be surely effective in promoting the growth of Vietnam since it has three lanes of one way specific for automobiles and is different from its highways that have already existed. The highways of three lanes of one way will contribute to economic growth and reduction in the number of traffic death accidents.

Electricity supply is usually planed to stop in Hanoi even though northern Vietnam is importing electricity from China. Increase in electricity is needed to be developed by private sector development of build-operate-transfer or official development assistance.

Figure 10: Guangzhou's Flowchart



Source : Author.

Regarding ports, Cairan Port should be expanded and Haiphong Port should be further facilitated. The procedures of customs clearance should be more transparent by simplifying them. For example, the format of customs clearance should be simplified by omitting signatures and stamps. Regarding transshipment, its rule should be changed into the rule of changes in driving parts of trucks by leaving the other parts and not transshipping the contents in trucks.

Regarding unskilled labor, it is desirable to employ it all over the country including local villages. Apartments for the unskilled labor are needed to be constructed. Their employment will contribute to reducing the income gap of people between Hanoi and mountain areas. Regarding thefts, it takes time to change people's moral by educating ethics.

On one hand, Guangzhou is losing its competitiveness in the labor intensive industries and has reached the stage of directing the innovative process of step II in our flowchart approach. On the other hand, the per capita in northern Vietnam is below 1000 $ and Vietnam can proceed to the stage of turning point by upgrading its infrastructure such as loads, ports, electricity and so on. Hanoi and Guangzhou compensate each other by constructing the highway between Hanoi and Youyi Xian in southern China and simplifying the procedures of customs clearance. The reduction of a tariff rate from China to Vietnam will be effective in linking the two cities since the tariff rate is 5 % higher than that from Vietnam to China.

(4) Prescriptions based on the flowchart approach to the industrial cluster policy of Guangzhou.

We will write out prescriptions for Guangzhou using Figure 10. Regarding the shortage of land, firms will be forced to shift places at lower wages or change their products into the high value added industries at the same places.

Regarding electricity, there is no other choice to increase its supply. The methods will be atomic power, heating power and water power. Regarding institutions, the procedures of customs clearance should be more transparent. Regarding wage increase of unskilled labor, firms are forced to produce their products at increased wages since they must keep the rule of minimum wages. Regarding hospitals, serious patients must go to hospitals in Hong Kong or Japan.

Guangzhou should proceed to the innovative process of step II of the flowchart approach. For that purpose, the formal meeting of study and research between firms in Guangzhou will activate innovations while informal activities alone are at present done.

5. Vietnam in the center of Asian Triangle of Growth

(1) Guangzhou's automobile industry agglomeration

Guangdong Province located has been symbolized as China's growth since its open door policy. Its growth model at first was to bring raw materials, parts and machines, manufacture them and export them. But Guangzhou, capital of Guangdong Province, has established a new model. As China's domestic market expanded in the 21st century, the model is to procure parts and components locally, assemble manufacturing products and sell them domestically. Guangzhou Municipality supported automobile production for domestic sales. Companies of automobile components have agglomerated in Guangzhou where it has become one of central cities in southern China. Honda, Nissan and Toyota of Japanese firms have their production. There is only one city in the world where three Japanese automobile firms are located. The number of Japanese firms located in Guangzhou is more than 400 in 2006.

(2) China plus one

The development of Vietnam started from the Doi Moi Reform in 1986. Its economic booms were from 1994 to 1996. Its economic growth started in 2001 thanks to Canon's effects and accelerated in 2004. One of the reasons why Vietnam has started to grow rapidly was so called China's risk. The troubles of SARS (Severe Acute Respiratory Syndrome) and anti-Japan movement made Japanese firms realize risks in China. Another reason is that labor wages in Guangzhou started to increase in around 2004. Its minimum wage was from 510 Yuan per month in 2003 to 860 Yuan per month. Firms that want to invest in Asia examine their investment in inner lands of China and Vietnam instead of China.

(3) Industrial agglomeration in northern Vietnam

There are a lot of Japanese firms along National Highway Root 5 between Hanoi and Haiphong as we explained in section 3. Many of them are components suppliers to Canon. The total number of the suppliers was over 100 in 2007. Panasonic and Brothers of Japanese firms agglomerate in the electronics industry cluster in northern Vietnam. More several industrial zones are planned to be constructed. Taiwanese and Korean firms in the information and communication industry have begun to agglomerate in northern Vietnam. Singapore's Sembcorp announced to develop two large industrial zones near Hanoi in 2008.

6. Conclusions

We established and applied 'our questionnaire method of the flowchart approach' to industrial cluster policy in northern Vietnam and concluded that the prescription for northern Vietnam is to construct highways for automobiles, increase electricity supply, build more capacity of ports, and build institutions such as import procedures. We should pay attention to not only Vietnam itself but also the regional integration of Asia in considering industrial cluster policy. Kuchiki (2008a) called 'Asian Triangle of Growth' a region surrounded by China, ASEAN and India. The industrial cluster policy of Vietnam should be planned by considering the triangle. In particular, the construction of roads and ports is linked to the regional integration of Asia.

Two things have left to be further done. First, we need to build prototype models of flowchart approach to industrial cluster policy in other industries than the manufacturing, information technology and biotechnology industries. Second, we need to extend Step I. Agglomeration and Step II. Innovation to Step III.

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