8.4 Considerations of Industrial Development Strategy

8.4.1 Two Industrial Development Strategies

The industrial development strategies are generally divided into two types: industrial development strategy by introducing external capital (ISEC) and industrial development strategy by utilizing local resource (ISLR).

The first strategy, ISEC, is the strategy mainly by inviting enterprises to set up factories in industrial estates with basic infrastructure such as land, traffic system, water supply and electric power. The second strategy, ISLR, is the strategy for generating value added products and promoting industry by highly advanced utilization of local resources such as mineral, agricultural, forestry, and marine resources; traditional technology and culture; and human resource.

However, the above categorization is used for convenience to show the industrial development approach. Industry is not developed by only one approach. Industrial development strategy practically lays special emphasis on ISEC in some stage or condition, and on ISLR in another stage or condition.

In a stage of the regional industry being focused on the primary industry, the industry mainly produces agricultural, forestry, and marine goods or makes materials for such production. The industrial development relies inevitably on ISLR under this circumstance.

In the process of industrialization, industrial agglomeration is observed in the urban area, and then income disparities are increased between urban and rural areas. The principal strategy to reduce income disparities is inviting enterprises having excellent factories in the urban area to set up branch factories in the rural area. The income disparities give the rural area a labor wage advantage that can attract industries.

In the stage of further industrial development with industrial agglomeration being observed in the rural area as well, expanding the strategy of inviting enterprises become possible utilizing agglomerated industry, technology, human resources, etc. Simultaneously, for further ISLR, it is possible to prepare conditions such as spinouts from engineers or the development bodies and product innovation by linkage with industry, academy, and government or with other industries.

ISEC and ISLR are apt to be considered as opposing each other, as ISEC is for inviting industries from outside and ISLR, for establishing industries by one's self. However, they have many common points to prepare conditions for industrial development and to promote industry matching with the regional circumstances. Emphasis is put on the preparation of production environment when ISEC is applied. Emphasis is put on

human resource development and preparation of supporting system for start-up new businesses and industries when ISLR is applied. In spite of such differences, they have many common factors, i.e. preparation of production bases, labor force development, human resource development, and preparation of the environment for industrial development such as linkage between industry-academia-government and the living environment, etc.

In other words, it is not easy to develop a new local industry in a region where people have a negative attitude toward the idea of introducing enterprises from outside, and it is not possible to attract enterprises to the region where the new local industry is nipped off.

Recently, more importance is attached on environmental consideration and zero-emission in both cases of ISEC and ISLR. For energy use, further utilization of locally available natural energy is demanded. For advancing zero-emission, more importance is attached on the linkage among industries and regions as well as on recycling in enterprises. It is much better to use ISEC and ISLR in a harmonized way instead of alternative way.

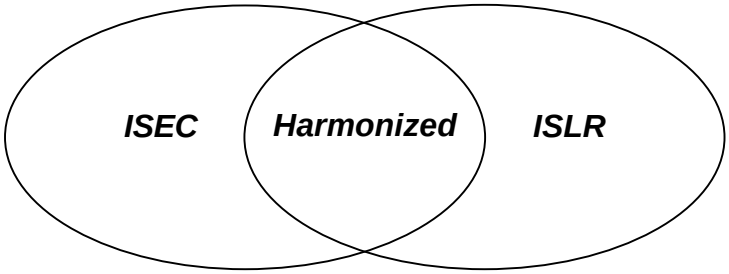


Figure 8.10 Industrial Development Strategy

(1) ISEC (Industrial Development Strategy by Introducing External Capital)

It should be noted that industrial location is to be realized when the industrial requirements meet with the regional location conditions. Industrial requirements vary with the kind of industry. For example, even when B-type industry is demanded in A-region, realization is difficult, unless A-region's location conditions satisfy the industrial requirements for B-type industry.

The strength of industrial requirement is different depending on the type of industry. industry into the following four types according to their strength of industrial requirement:

- Infrastructure-oriented industry;

- Consumer-market-oriented industry;
- Labor-oriented industry; and
- Resource-oriented industry.

Industry is not always involved in only one type, but sometimes in two or more types. Each type of industry is characterized as follows:

1) Infrastructure-oriented Industry

The term “Infrastructure-oriented industry” can be defined as the type of industry that shows a strong tendency to be located in the region with a particular infrastructure such as a large port, a vast industrial area, an abundant supply of industrial water and a high-speed traffic network.

This type of industry mostly belongs to the industry largely depending on imported resources or the mechanical industry treating large and heavy goods. Typical examples are iron and steel industry (blast furnace steel making, electric furnace steel making, etc.), petroleum refining, petrochemical, paper and pulp, aluminum smelting, copper smelting, lead smelting, zinc smelting, shipbuilding, car manufacturing, etc.

2) Consumer-market-oriented Industry

The term “Consumer-market-oriented industry” can be defined as the type of industry that shows a strong tendency to be located in the region close to the product market or having a large consumption. The market largely varies with the type of industry and it is categorized into markets requiring urban function, population, industrial agglomeration, agricultural agglomeration, etc.

Products requiring urban function are related with knowledge, information, logistics, construction, etc. Typical industries requiring urban functions are car manufacturing, computer, publishing and printing, ceramics, construction materials, steel processing, medical machines, etc. Most products requiring population are those related with food, clothing and shelter. Other products under this group are textile goods, furniture, fitting, wooden goods, etc. Those requiring agricultural agglomeration are livestock feed, fertilizer, carton boxes for packaging, various agricultural materials, etc.

3) Labor-oriented Industry

The term “Labor-oriented industry” can be defined as the type of industry that shows a strong tendency to be located in the region where labor is available at low wage rate or a large number of labor is available.

Industries requiring a large number of labor are shipbuilding, car manufacturing, steelmaking, electric machinery, precision machinery, etc. Most factories belonging to

industries such as food, garment, textile goods, electric machinery parts and electronic parts require a large number of labor at low wage rate.

4) Resource-oriented Industry

The term “Resource-oriented industry” can be defined as the type of industry that shows a strong tendency to be located in the region that yields mineral resources, agricultural products, marine products, and forest products.

Typical industries categorized into this type are cement, agro-processing, livestock processing, marine product processing, woodworking, etc.

There are several location tendencies of industry, as mentioned above. It is important to clarify what regional conditions meet with which type of industry, and then the industries to be introduced to the region should be chosen.

Clarification is necessary for the regional conditions listed below.

Table 8.24 Regional Conditions for Industrial Location

Land	Coastal or inland, land area, geological conditions, ground, bearing capacity, land category, land price
Water Supply	Ground water (possibility of intake, depth of water where it is taken from, amount of water taken from a well, total amount of water where it is taken from, water quality) Industrial water supply (amount, water tariff rate, water quality)
Port	Sailing routes, depth at anchorage, number of wharfs by capacity, access to the closest port (if there is no port at site)
Road	Conditions of expressways, national highways, and other main roads Access from the site to such roads
Railway	Access to the closest railway station, possibility of siding
Air port	Existence of air port, access to the closest air port
Urban functions	Function and scale of the city, access to the city
Population	Population at the site and surrounding area
Industrial Agglomeration	Industrial agglomeration at the site and surrounding area
Labor force	Number of new graduates of universities, excess labor by sex and age, labor wage level
Resource	Kinds and availability of agricultural, forestry, marine and mineral resources

Source: JICA Study Team

Candidates are screened by the comparison of the industrial requirements with the regional conditions. The industry having higher reality and satisfying the regional

demands are normally selected from the screened candidates by assessments of location demands, development effects, and environment impact.

The industry selected becomes the target industry. It is also important, at the early stage, to involve some enterprises having a relation with the region in the regional industrialization as target enterprises. Examples are enterprises that have top managements coming from the region or graduated from regional universities, a lot of employees coming from the region, and business connections in the region. Connections with the local community and relatives should be fully utilized.

In general, introduction of enterprises into the rural areas by ISEC begins with labor-intensive industries by utilizing the connections with the local community and relatives. Garment and electronic parts industries are attracted by abundant labor force and low labor wage in the region. Agglomeration of labor-intensive industries enables further development of infrastructure and location of related industries like logistics and services, followed by location of processing/assembling industries such as electric machinery, car parts and precision machinery. In this stage, the regional level of technology is gradually improved and quality of labor force is demanded together with quantity. In the next stage, research and development departments may be established in the factories and the regional industry may expand to the advanced industrial agglomeration that becomes the conditions of ISLR.

The recent trend of information-oriented society and rapid development of information infrastructure are creating a new industry that can be called “Human Resource-oriented Industry”. Software development and information service industries are typical example. The industry is rarely restricted by any factors except human resource and information infrastructure, therefore, it can be located anywhere and called footloose industry. Actually it shows a tendency to be agglomerated in urban areas, since highly educated persons are apt to desire high quality of life and urban services. However, it is viable in rural areas according to intentions of human resource. Various cost increase in urban areas is encouraging mobility in human resource such as IT engineers and others in the USA. Infrastructure development based on this phenomenon is one direction of regional development. It is necessary to consider the strategy of attracting human resource rather than industry.

(2) ISLR (Industrial Development Strategy by Utilizing Local Resource)

ISLR is the strategy to generate value-added products by highly advanced utilization of local resources.

In case of introducing industry, a set of capital and technology that is required for manufacturing a specific product is introduced. On the other hand, entrepreneurs should develop own products by themselves, in case of ISLR. Although they can use various measures such as obtaining cooperation from external experts and employing

persons for product development, they still surely have to develop products by themselves.

Local resources are categorized into (a) tangible resources such as agricultural, forestry and marine products produced in the region; and (b) intangible resources such as climatic conditions, landscape, folk art, history and people.

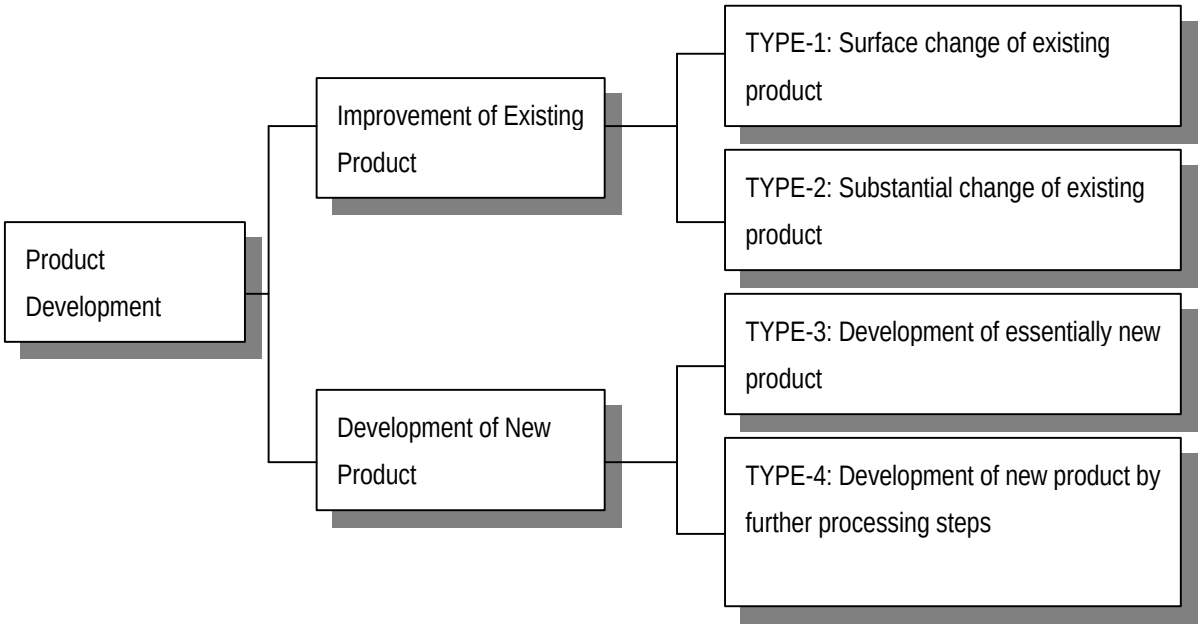
Tangible resources are processed and finally provided as food together with the primary products of agriculture, forestry and fishery. While, intangible resources are utilized mainly for tourism and keeping a company with urban inhabitants.

In the process of local resource utilization, price of value-added product increases drastically from the raw material price to the intermediate product price, and further to the final consumer price.

Take Japan's food situation, for example. In 1998, its agricultural outputs and marine product outputs were JPY 10 trillion and 2 trillion, respectively, or 12 trillion in total. Industrial outputs of food processing that includes processing of imported agricultural products was JPY 24.8 trillion, double the total of agricultural and marine product outputs. The final expenses for food and drink cost JPY 80 trillion, broken down into the following: JPY 16 trillion, 40 trillion and 24 trillion for perishable foods, processed foods and food-restaurant, respectively.

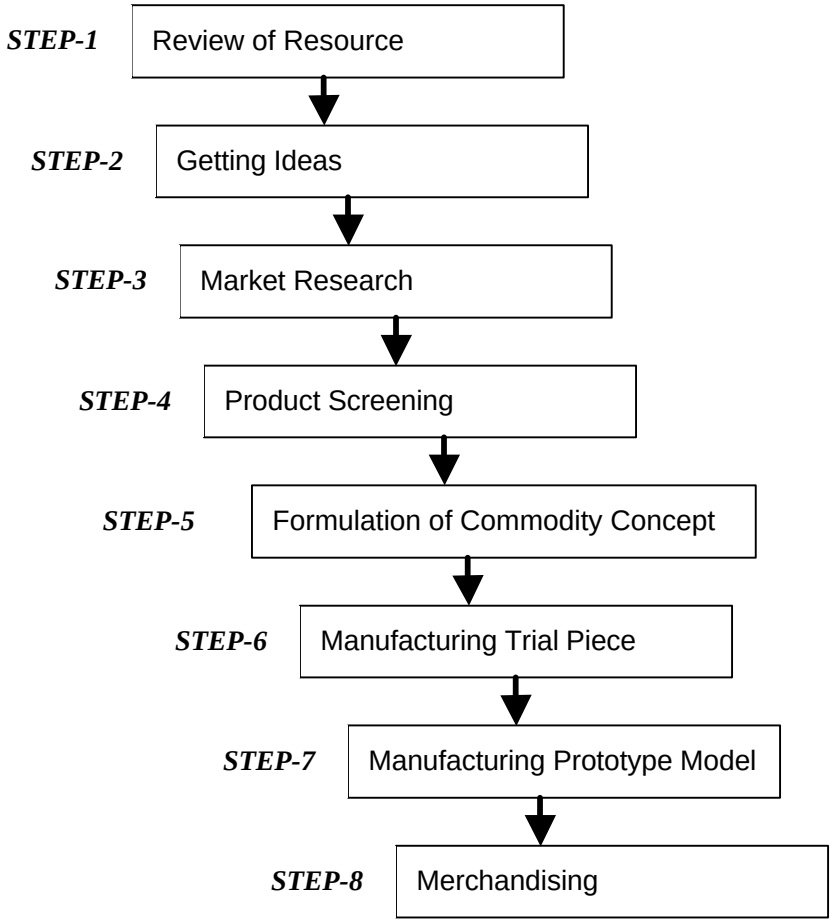
Consumer support is essential for ISLR, whether tangible or intangible resource is utilized. More competent development is required with the progress of market expansion from restricted area to wider area. It is necessary to develop products by following more reliable steps. Human resource and organization become the most important for product development.

Four types of product development is shown in Figure 8.11.



TYPE-1 is the product improvement without any substantial changes from the existing products, while TYPE-2 is adding something to the existing product. TYPE-3 and -4 are those for new product development. Type-3 creates quite new products, and TYPE-4 adds further processing to the primary product or primary processed product currently marketed.

Product development is performed according to the following sequence.



STEP-1 “Review of Resource” consists of research of material resource, human resource and required fund.

In STEP-2 ”Getting Ideas.” By utilizing the results of STEP-1, investigation should be made to answer the questions: “What kind of new products should be created?” and “What and how should the existing products be improved?”.

STEP-3 ”Market Research” is carried out for various products obtained by STEP-2. In this step, research work should be made to answer the questions: “What are the similar or related goods?”; “What characters do they have?”; “Why are the products popular?”; “Why are the products not popular?”, etc. For the concerned goods, statistical data should be collected and market route should be researched in this step.

In STEP-4 ”Product Screening” deals with screening of various products for development or improvement according to the results of market research. Screening

should be done based on comprehensive evaluation in consideration of competition, raw material procurement, required technology, production facilities, market route, etc.

A definite concept of commodities and its basic specifications should be formulated in STEP-5. At first, one should come up with a key word for each product in consideration of the regional history and culture. Based on the key word, commodity information such as content, image, trade name and price should be threshed out.

STEP-6 is to manufacture a trial piece including the commodity content and package design. Entrepreneurs make trial pieces, if they have facilities and technologies for manufacturing. If they do not have such facilities and technologies, they should outsource such work.

In STEP-7, a prototype model should be made from the trial piece so that entrepreneurs can ask consumers to try it and make modifications and improvements.

STEP-8 “Merchandising” is the final step in which acquisition of licenses and trial marketing should be achieved and marketing strategy should be threshed out.

It should be noted that appearing to have abundant resources and possibilities of new products largely differ from obtaining consumers’ support.

(3) Basic Principle of Development Strategy

There is no opposition to adopt the industrialization strategy whether ISEC or ISLR[1] at the beginning of industrialization. The difference between them lays weight on the development and/or improvement of production conditions or on the nurturing of the entrepreneurs and excavation of technological seed and the development of investment climate for industrialization, such as development of industrial infrastructure, HRD, collaborative activity between industry and academia, improvement of living conditions, etc. is common to both ISEC and ISLR.

The industrial agglomeration in the I-san region remains at a low level; factories are scattered and of low density. Moreover, most of the factories are classified as small scale. , For example, in Kalasin, which is a rather industrialized province in the region, a factory employing only 28 workers is already ranked in the top-ten companies and in the rest of provinces, factories with 7 to 8 employed workers are already considered as rather large factories. There are some “large” factories employing between two and three hundred workers; however, they are mostly seasonal workers with few regular employees in agro-products processing factories such as sugar, rice mill, tapioca and canned tomatoes Aside from agro-processing industry, other existing types of industry are garment, wooden products, and jewelry, but the factories are few and industrial

[1] ISEC: Industrial Development Strategy by introducing External Capital, ISLR: Industrial Development Strategy by utilizing Local Resource

linkage remains weak.

Under the current situation of industrial structure and of each factory, it is quite difficult for the existing factories to achieve a self-sustained growth; therefore, the adoption of industrial development strategies are limited as follows: 1) to promote the investment from outside of the region, 2) to create a new industry and/or business, and 3) to integrate the investment promotion and the creation of new industry/business. Evidently the current situation of industrial location shows it is quite difficult to promote industries from other regions unless dramatic improvement of location conditions in the region is achieved. Regarding the second approach, which creates new business by utilizing local resources and/or technological seed and nurturing and/or attracting entrepreneurs, it will also be difficult because it requires establishing the proper system and this takes a longer time.

Although both strategies to develop industries, in fact, have difficulties to overcome, they should encourage the industrialization in the region. There are some bright factors in the region as summarized hereafter.

From the viewpoint of promoting the investment from other regions, the location conditions shall be improved by completion of the second Mekong International Bridge in 2004 and the improvement of Asian Highway. The advantages given by suchdevelopments can be enjoyed not only by this region but by other regions as well. Therefore, the inter-regional competition of the investment promotion shall be severe. Even though the competition is hard, the benefit of such an advantage in the region will be rather large.

Attention should also focus on the functions of existing higher education institutes. There are currently 8 higher education institutes, including the Kasetsart University, in the region and they offer courses to cope with regional requirement, but the contents and level of curricula need to be improved. These institutes shall be the prime engine for the creation of new business and/or promotion of direct investment, subject to the private-academia collaboration through the offer of technological seed possessed by them and strengthening the R&D capability and HRD function as well as enhancement of regional industry.

The strategy adopted by the region, therefore, is to phase the development of infrastructure coping with the change of outer conditions, and to effectively establish the HRD and industry support facilities for new industry and business creation.

8.4.2 Investigation on Target Industry

(1) Investigation on Potential Industry

This part of the report investigates potential industries in the study area. It is important to invite enterprises from the outside as well as to promote the local enterprises in the region. In order to select industries for promoting and inviting enterprises, potential industries are generally picked by three measures. The first measure is selection according to the regional resources and the second measure is selection of desired industries to resolve the problems that the region has. The third measure is selection of potential industry by comparison of industrial requirements and regional conditions for industrial location.

For the study area, potential industries are investigated from the following three viewpoints:

- Industries utilizing the regional resources;
- Industries coping with the regional problems; and
- Industries meeting with the regional conditions for industrial location.

Manufacturing industries and logistics have own requirements for location. According to the requirements, desirable sites are selected. Regional conditions of the study area are evaluated to select desired industries.

Target industries that are the policy target for industrial development are investigated based on the potential industries.

1) Industries Utilizing the Regional Resources

The key industry is agriculture with production of cassava, rice, sugarcane, corn for livestock feed, tomato, and livestock products in the study area. There is the food processing industry utilizing these products there, although its scale is small.

It is possible to promote the food processing industry as the leading industry by high degree use of agricultural and livestock products to increase productivity.

The study area has a possibility of promoting paper processing and shearslit, since it is located on the way to Laos and Vietnam from Khon Kaen where a paper mill is located. It also has a possibility of manufacturing wooden products such as construction materials and gardening materials using wood imported from Laos and Vietnam.

There are factories such rice mills, garages, sawmills, wood processing, garment, plastics molding, however, their production capacities are as large as meeting with regional demand. A lot of rice mills are located, but they do not have machinery. Therefore, industrial agglomeration that encourages new enterprises is not observed in

the area.

In consideration of the current regional situations, the following are potential industries utilizing the regional resources:

- Manufacturing starch from cassava;
- Manufacturing compound livestock feed from corn, cassava, freshwater fish, etc;
- Manufacturing construction materials from bagasse;
- Manufacturing fried potatoes, potato chips, and potato flakes;
- Manufacturing processed food of rice such as Mirin, Japanese sweet sake used as seasoning;
- Processing of beef for human consumption or for pet-food;
- Processing and shearslit of paper produced by the factory in the neighboring region;
- Manufacturing products of imported wood from Laos and Vietnam; and
- Manufacturing of agricultural machinery and its parts.

2) Industries coping with the regional problems

The region should solve its own problems by generating large job opportunities in the short or medium terms, and by forming industrial structure for sustainable development. Investigation is made here on industries that cope with the problems in the short and medium terms.

There is a constraint on generating job opportunities in the study area, because it has an industrial structure relying on agriculture. Due to the constraint, the area has a large excess labor that result in the largest supplier of migrant workers in Thailand. Therefore, it is important to invite labor-intensive industries to generate job opportunities constantly in the short and medium terms. It is also important to select industries with little environmental load from the viewpoint of environment protection.

Industries of both labor intensive and small water consumption are listed, referring to industrial characters shown in Japanese industrial classification. For the purpose of study, labor- intensive is defined by the number of employees per floor area being more than 1.5 times of the average in Japan, at 14.6 employees per thousand square meters. Small water consumption is also defined by the water requirements per floor area being less than half of the average in Japan, or 69.5 cubic meters of daily requirement per thousand square meters. The results are as follows:

- Food: manufacturing food such as bread and cakes;
- Textile and garment: manufacturing such as net, outerwear, shirts, underwear, clothes, personal articles, bedclothes and embroidery;

- Wood, wood products, and furniture: manufacturing wooden containers, wooden statues, religious items, furniture and fittings;
- Paper and paper goods: manufacturing paper goods and paper containers;
- Publishing and printing: printing and bookbinding;
- Petroleum and coal products: manufacturing briquets and oval briquets;
- Rubber products: manufacturing rubber belts, rubber tubes, and industrial use rubber products;
- Leather and fur goods: manufacturing industrial use leather goods, leather shoes, bags, and handbags;
- Ceramics, stone and clay goods: manufacturing construction clay material and ceramic products;
- Metal products: manufacturing of tableware, cutlery, metal fittings and metal spring;
- Machine, electric, and precision machinery: manufacturing metal processing machinery, wood processing machinery, metal molds and parts, electric machinery such as power generators and electric motors, electric measuring instruments, parts for electronic and communication equipment, surveying instruments, gauges, optical instruments and medical instruments; and
- Other manufacturing industry: manufacturing stationeries such as pens, pencils, ballpoint pens, accessories, and buttons.

The above industries are listed for the short and medium terms. It is necessary to give a role of elements in the industrial structure aimed for the long term to these industries.

3) Industries meeting with the regional conditions for industrial location

The regional conditions for industrial location are shown in the section 8.3, and they are summarized below.

Traffic Conditions

The road system is relatively developed in the study area. Although the northeastern part is currently blocked off by the River Mekong, the future traffic between Laos will be available by the new bridge construction project. There is no high-speed traffic system in the area.

There are two airports in the study area such as Nakhon Phanom and Sakon Nakhon and, in addition, there are three airports including an international airport in neighboring Kohn Kaen, Ubon Rachatani (international airport), and Savannaket (Lao PDR). In the future, the airport will be the important location factor to develop the industry as well as road network.

Infrastructure (water, land, electricity)

It is easy to acquire land for industrial use, although so far no industrial estate is developed in the area. For water supply, industrial water supply system is not prepared and underground water contains salt. It is easy to receive electric power.

Labor

The study area has abundant labor, being a supplier of migrant workers. Most of them are unskilled and the training for them is insufficient. On the other hand, it is possible that the skilled workers in the metropolitan area whose hometowns are in the study area will be returning to the I-san region.

Approach to Market

As the study area is 700 km away from Bangkok with no expressway, an approach to the major market is not so good. Although there is a population of approximately 3 million in the study area, the regional market is insufficient to attract the direct investment of industry.

Urban Functions

Each capital of four provinces has a population between 70,000 and 200,000, and a standard level of urban functions such as medical care, educational, cultural, sports and welfare facilities.

Industrial Agglomeration

No industrial agglomeration is observed in the study area. The neighboring area, Khon Kaen, has industrial agglomeration, however, it is 400 km away from the study area.

The above conditions are compared with the industrial requirements to investigate potential industries. For the investigation, industries are classified into three types, by product: “Basic Resource Type”, “Daily Products Type”, and “ Processing and Assembling Type”. Taking each type’s requirements into consideration, potentials of industrial location are studied.

Basic Resource Type Industry

This type of industry includes the iron and steel, petroleum refining, petrochemical, and nonferrous metal industries. As these industries require an approach to mineral resource as an important factor, they are normally located near production sites of mineral resource or ports. However, the fine chemical industry requires accessibility to market, water supply, and agglomeration of research institutions. It is less possible to locate the basic resource type industry in the area, because the regional conditions of

the area do not satisfy its industrial requirements. The area has neither mineral resource that can be used as industrial raw material nor a large port for receiving raw material.

Daily Products Type Industry

Industries belonging to this type are those manufacturing daily goods such as food, beverage, textile, garment, wood, furniture and leather. Some factories process locally available raw materials such as agricultural, forestry and fishery products, while the other factories process the raw materials brought from other regions for satisfying the regional demand.

This type of industry also includes manufacturers of rubber products and plastic products. However, these products are widely used from daily goods to industrial use and their industrial requirements are mainly market and abundant labor.

Potential industries categorized in this type are processed goods of agricultural, fishery, forestry and livestock products, and wood, and wood products that utilize local resources. Textile goods, garment and plastic products also have a potential, because of abundant labor.

Processing and Assembling Type Industry

This type of industry is engaged in assembling and manufacturing parts for industrial machinery, precision machinery, car, etc. and categorized into the manufacturing industry of metal products, general machinery, electric machinery, precision machinery and transporting machinery like cars. The key industrial requirements are accessibility to market, agglomeration of the related industry and abundant labor.

The area is about 700 km away from Bangkok and 400 km from Khon Kaen, neighboring areas with industrial agglomeration that is not so good for market accessibility and traffic conditions. There is a potential of manufacturing parts of electric and electronic machinery and agricultural machinery. The new bridge construction project will develop the potential of locating these industries, because the study area will be a relay point for transportation between Thailand and Laos/Vietnam.

(2) Investigation on Target Industry

The above investigation on potential industry revealed that industrialization would be very difficult in the study area that has small industrial agglomeration and not good regional conditions in terms of traffic system and accessibility to market. In order to promote industrialization in the area, it is necessary to work out political measures to improve the regional conditions and lead industrial location politically.

Some of these measures are to nurture enterprises of food processing especially

agro-processing and its related industries, to provide incentives and support for production in case of new enterprises entering to the area, to lead industrial location of recycling and environmental industries of promise in Thailand, and to set up organizations for human resource development and high-tech promotion.

Mere potential industries based on the regional industrial potential are not enough even for solving employment problems that are a short tem issue. Therefore, it is necessary to politically lead the industries that show promise for sustainable development.

The following are four goals of target industry for industrialization in the study area:

- To promote agglomeration of “Industries utilizing the regional resources” that can be introduced in the short term;
- To attempt agglomeration of “Logistics with light processing,” because the study area is located in “a relay point” of various places in Thailand and Laos/ Vietnam;
- To lead politically the location of promising industries, “Reuse and recycle industries,” and set up a leading model business; and
- To agglomerate politically “Assembling industries” that have a strong linkage among enterprises for the sustainable development in the study area.

Industries meeting with the above four goals are listed as follows:

1) Industries Utilizing Regional Resources

Among industries of this category, the target industry is the food processing industry utilizing resources of agriculture and fishery that are key industries in the area. Industries manufacturing souvenirs related to tourism resource and those requiring abundant labor are also included in the target industries.

Industries related to Agriculture and Fishery

a) Processing of cassava

Manufacturing technology of starch from cassava is being developed by Kasetsart University and others, and it is at the initial stage of industrialization. The crops researching center in Rayon is performing a series of research work from cultivation to processing of cassava. Thus, the target industries are as follows:

- Starch manufacturing industry;
- Ethyl alcohol production as an addition to liquid fuel;
- Starch processing industry as eco-material products (to agricultural sheets, food containers, plates, packaging materials, etc.); and
- Other food processing industry such as fried potatoes, potato chips, flaked potatoes, etc.

b) Manufacturing livestock feed from corn and other agricultural and fishery products

Compound fertilizer is manufactured from corn for livestock feed, bagasse that is sediment of sugar cane, cassava, and freshwater fish. And so the selected target industry is compound fertilizer manufacturing industry.

c) Other processing Industry

Demand for rice, the key agricultural product in the area, is stagnant. Manufacturing of Mirin, Japanese sweet sake for seasoning, from rice for export is a promising value added industry. A Japanese enterprise actually has a plan of new factory for manufacturing a kind of Japanese liquor from Thai rice in another area.

Manufacturing pet food from beef, the key livestock product in the area, for export is also a promising industry.

Following are the selected target industries:

- Sake and Mirin brewing industry utilizing rice;
- Beef processing including pet-food;
- Fish meet sausage production;
- Construction material utilizing bagasse; and
- Wooden products using local materials.

As the regional resources-oriented industry, ethyl alcohol production from cassava and/or sugar cane is given focus. Produced ethyl alcohol is used as added mixture to fuel for a 10% share of total fuel content. The Government of Thailand considers establishing 4 factories to produce such ethyl alcohol. The feasible production volume is calculated as 500 kilo liters per day in minimum by MOI; therefore, the annual production volume will be 165 thousand kilo liters and the required materials will be 240 thousand tons of cassava or 280 thousand tons of sugar cane per year. The supply of materials from the North Eastern Region will be sufficient since the production amount of cassava and sugar cane per annum is 8.9 million tons and 17.4 million tons, respectively. On the other hand, the total consumption of fuel in the region amounts around 674 thousand kilo liters per year; therefore, the required total amount of ethyl alcohol is estimated as 67.4 thousand kilo liters when total fuel production convert from the ordinary to the new energy. This figure is only 40% of the minimum production requirement, so some policy measures to introduce the new mixed fuel should be adopted (i.e. tax incentives to keep price competitiveness and to enhance the substitution from ordinary fuel to the ethyl alcohol mixed fuel, etc.). The project shall contribute to increase the farmers' income, to create job opportunities, and to utilize the existing rich bio-mass in the region as well.

<u>Industry related to Tourism Resource</u>

Manufacturing souvenirs for tourists visiting dinosaur remains in Kalasin, Lam Pao Reservoir and the festival in That Phanom in the study area, is promising. It is recommended that souvenirs be manufactured as the original brand in the area from raw materials not only locally available but also purchased from surrounding areas and Laos.

- Manufacturing industry of leather goods, cane and bamboo goods, wood products, paper products, rubber products, etc.

Industry requiring a Large Number of Labor

It is possible to develop the labor-intensive industries requiring a large number of workers, because the area is the largest supplier of labor in Thailand. These industries are as follows:

- The textile and garment industry;
- Manufacturing industry of wood, wood products, furniture, etc;
- Manufacturing industry of plastic goods; and
- Electric and electronics and its related products industry (print circuit board, switch, relay, etc.).

The garment industry targeting the domestic market faced difficulties through the severe competition with low-priced products imported from China, Vietnam, and India. The export-oriented garment industry, which is consisted of foreign investors mainly, is shifting their production from ladies' to men's products (higher-grade products). Some investors locating their factory in BKK point out that to locate in BKK and its vicinity is to get several advantages such as export procedures and logistics. Therefore, the incentives to relocate from BKK are quite small except that labor would be much cheaper as against the rising cost of labor in BKK.

It is pointed out that the equipment being used by textile and garment industries in Thailand are quite old and their competitive edge is being eroded by countries with the latest equipment and advantage of low labor cost. To survive such severe competition, the garment industry in Thailand will have to shift its products to the higher-grade products and higher value added products. Under these situations, the targets to promote into the region should be the investors who tend to shift their products.

2) Logistics with Light Processing

The area is about 700 km away from Bangkok and 400 km from Khon Kaen. However, its eastside is facing with Laos across the River Mekong, Vietnam being located east to Laos.

The new bridge over the River Mekong is under construction. This bridge is expected to encourage the traffic between the area and Laos/Vietnam. It is expected that the route

between Khon Kaen/ Bangkok and Laos/ North and Middle Vietnam be the key route, and the area be the important place as relay points.

From such points of view, the following industries of logistics with light processing are selected as target industries.

- Logistics with light processing industry that is related to agricultural and fishery products (food processing, warehouses, sorting, transportation, etc.)
- Logistics with light processing industry for wood and wood products (sawing, manufacturing of building materials, stockyards)
- Industries of processing and shearslit of paper
- Industries of the secondary processing and shearslit of steel
- Logistics such as warehouses of raw materials, semi-products, products, commodities, etc., sorting, labeling and transportation

3) Reuse and Recycle Industries

It is internationally required that a resources recycle system be established to cope with the environmental problems caused by a series of current industrial systems consisting of raw material, production, consumption and disposal.

As the Thai industrial structure will inevitably move in this direction, it is necessary to take political measures for it. It is hoped that development should be carried out based on the concept of resource recycling, and that the country's model business of reuse /recycling should be started in this newly developed area. Although the reuse/recycle business requires the investigation on transportation costs for disposal and products, price of recycled products, dumping area, etc., it is expected to improve employment situation in the area and to decentralize the Thai industry.

It is anticipated that there is a demand for reused goods in the neighboring areas of Laos, Vietnam and China.

The following industries are deemed as promising reuse and recycling industries.

<u>Reuse Industry</u>

- Repair, processing, transportation, selling and maintenance of cars, construction equipment, agricultural machines and implements, scrap tires, electric generators, electric appliances, office equipment, etc.
- Collecting rare metals

<u>Recycle Industry</u>

- Recycling scrap tires

- Recycling wooden waste
- Recycling plastic waste
- Recycling waste of glass, etc.

4) Assembling Industry

In the region that has no industrial agglomeration, technicians, production facilities and information are insufficient for supplying parts to factories, even if they come from outside, and those located in other regions.

As the study area has almost no industrial agglomeration, it should begin with promoting industries utilizing regional resources and then promoting the logistics with light processing industry to improve industrial agglomeration, taking advantage of new bridge construction over the River Mekong.

A large number of engineers, researchers, related enterprises, and information will be gathered to the area according to industrial agglomeration. It will lead a formation of industrial structure with enterprises' linkage.

The long-term target in the area is to establish an industrial structure that mutually links large-, medium- and small-scale enterprises. It is necessary to make an agglomeration of the assembling industry that is labor-intensive and require a strong linkage effect in the course of establishing the industrial structure.

An agglomeration of the industries having a wide range and a strong linkage effect is not expected under the current conditions in the area, as such industries require a relationship with market. The most important thing is to politically lead promotion and invitation of the core enterprise in the course of establishing industrial agglomeration in the area.

The promising industries related to assembling are as follows:

- Industries of manufacturing agricultural, industrial and construction machines, office equipment, etc. and their parts; and
- Industries of manufacturing parts of communication and electronic instruments.

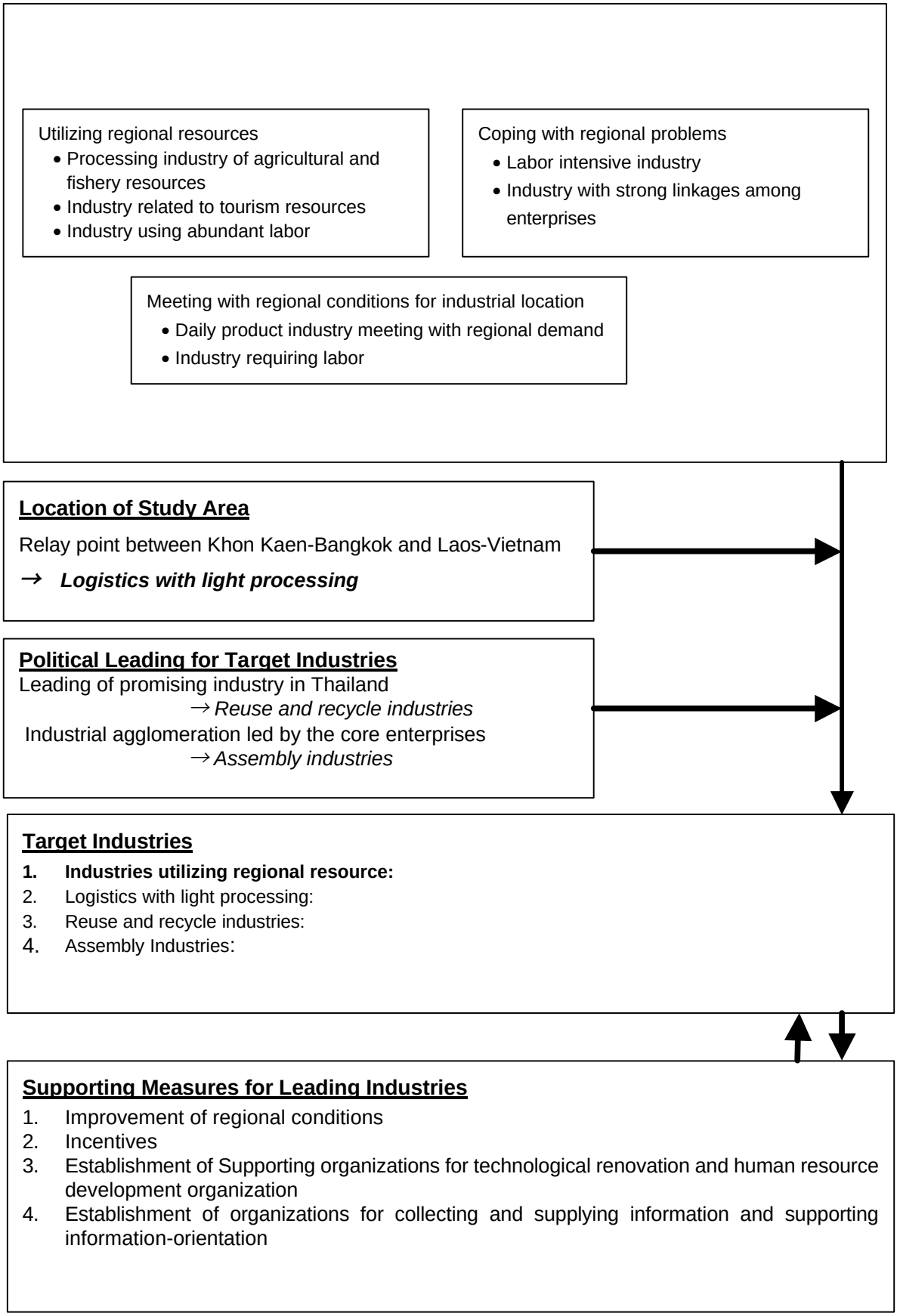


Figure 8.13 Investigation on Target Industries

8.4.3 Direct Investment Promotion Measures

Judging from the current situation of the industrialization in the region, it requires for the direct investment promotion into I-san region to improve the investment climate from the long-term point of view and to persistently make effort to achieve the target.

In general, there are two basic measures to promote the industries; one is infrastructure development as a hardware aspect and the other is provision of incentives as a software aspect. Basically the promotion measures in the region will follow the above directions, and the provision of high-speed data communications lines and related support functions for regional industry should be focused. Strengthening of functions such as HRD, excavation of technological seed, and private-academia collaboration based on the development of latest IT-related infrastructure is essential not only for the industrial promotion measures but for the vitalization of local industries as a whole. In other words, the development of such IT-related infrastructure shall give the opportunity to overcome the handicap of the remote area to promote industries.

(1) Infrastructure Development

1) Industrial Park Development

Recently the propriety of the preceding infrastructure development for industrialization is discussed; however, in the purchase of factory lot, investors will not be able to decide the land acquisition when the proposed land remainas forestry mountain and/or un-reclaimed fields without the decisive evidence of development. Whether the land is reclaimed or not, the most important factor for investors is to certainly purchase the land with required conditions and at a proper time. After the economic crisis in particular, manufacturers hesitate to purchase land for new factories without any concrete plan. But when a new factory establishment plan was decided, the investor is rather rushing to select the factory lot from recently available land. This indicates that even in the industrial park development the market oriented management strategy is required.

From the developer side, the largest concern at the planning stage is whether the investors really purchase the developed land (each lot of industrial park) in accordance with the plan or not. Regarding the private developers, the profitability is the final objective; however, the target of the development of industrial park as a regional development project is rather different from the profitability. Obviously the profitability is important to implement the project but not the proper objective from the point of view of regional development.

Certainly the development of infrastructure for industry is not only that of industrial park; however, it is an effective method as a packaged infrastructure development. From the regional development point of view, the industrial park development will contribute not

only to the regional economic growth but also to the management of environmental protection and to the implementation of urbanization through the purification of land usage. When it is planned to develop the industrial park, the most important issue is to select the efficient development strategy (e.g. selection of the method of stepwise development in coping with the actual demand) in order to reduce the initial investment. In the region where the demand for industrial site will be revealed at least in the long run, for example, the comprehensive land use plan, which will be able to control the land use by zoning, to protect the urban sprawl, and to prepare for the future demand, should be conducted.

In the I-san region, the development of industrial park as packaged infrastructure will be required to promote the industrialization. There is little problem of land acquisition and reclamation to develop the industrial park but, on the other hand, the water supply to the industry is considered to be a problem so the careful survey for water supply in both quality and quantity shall be conducted. In addition to this, as the selection of development site, it is required to study the condition of flood.

2) Development of Data Communications System

The objective of the development of data communications system should be to develop the system to totally support local industries from the viewpoint of so-called "regional informatization[2]" while the system is an incidental function of the industrial park and the contents of the development are to expand the Internet access points, to construct the high speed data communications lines, and to provide services with reasonable price. Practically the development is to establish the high-speed data communications network by optical fibers, which will make possible interactive data exchange and collaboration. Recently, information technology becomes the key tool of management; in other words, modern management requires its effective use. Therefore, easy access to the high-speed telecommunications network is essential. While the materialization of the ITC[3] infrastructure should be assessed carefully, at least the information system to support the regional industry development is that to fully utilize the various resources possessed by the region and to stimulate the restructuring of regional society and economy. The players of the system, therefore, are not only the industries but also universities, administrations, and local communities, which join the system from each standpoint. The procedure of the establishment of the system, for example, will be that each sector sets up the local area network (LAN), then the LANs are networked as the wide area network (WAN). The procedure is summarized as follows:

- In the private sector, provincial chamber of commerce and industry, industrial estates, etc. will set up the LAN. In the LAN, subscribers, which are companies under the provincial chamber of commerce and industries and/or tenanted in the

[2] "Informatization" is a coined word to indicate the process of the establishment of information-oriented society.
[3] ITC: Information Technology and Communications

industrial estates, enjoy the services such as commonly usable information. In addition to such a service, leasing and rental of IT-related equipment with reasonable price or free of charge is provided.

- In the academia, the campus-LAN in the existing higher education organizations will be established at initial stage[4]. The LAN in the higher education organs will be networked and then connected with the network in the private sector.
- The establishment of the LAN will be expanded to the administrations and other public sector, communities, and other NGOs. The networking among the communities aims to search "regional resources" and to efficiently utilize such resources and results to enhance the activities of self-development of communities.

The current situation of informatization in the I-san region, however, remains at low level. So-called information systems are mainly established at the higher education organs but they are insufficient, except that in the Kasetsart University connected to the UNINET. In other words, most of the existing information systems are limitedly utilized as the documentation and the retrievals of the Internet. Except the higher education organs, even such systems are introduced into the public sector and a few in the private sector. At the community level, on the other hand, there are few information systems. The key issue to establish the IT society in the region shall be to enhance the networking among whole sectors. In the study region, therefore, the strategy to build the network should focus on the networking at the community level, which is the weakest link of the network.

(2) Improvement of the Investment Circumstance in the Institutional Aspect

The incentives for industrial promotion in the region is limited to tax incentives that are provided to the industry in Zone 3 by the Central Government under the new BOI scheme. Such incentives, on the other hand, are applicable to any region designated as Zone 3. There is no special treatment prepared by the NBR region itself. Therefore, the measures to promote the industry into the region are only provided by the BOI.

[4] Obviously the establishment of LAN will be excluded at the organizations that have already set up Campus-LAN such as Kasetsart University.

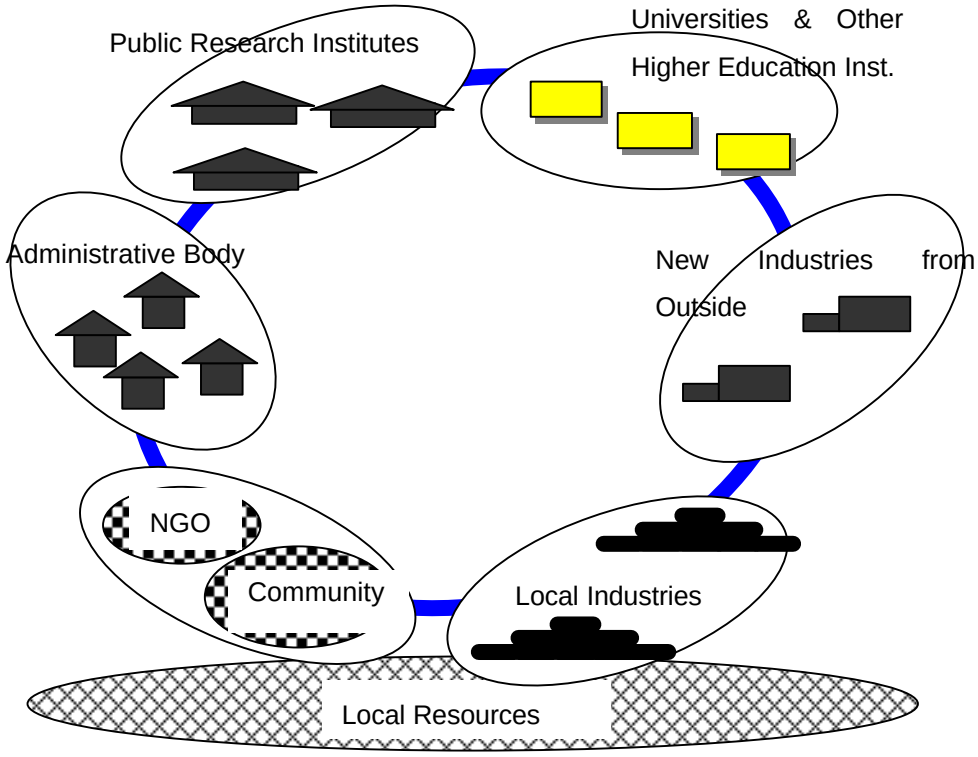


Figure 8.14 Concept of Information Network for Local Industrialization

Generally, the investors evaluate the candidate sites based on the physical location conditions such as water supply, electricity, telecommunications, transportation conditions, etc. firstly then compare the institutional aspect, such as incentives in the selected sites. While the difference of the incentives is not the decisive condition to select the site, the investors attach importance to the living conditions such as security and/or comfort and the good prospect in the blue print of the regional development.

In case of Japan, there are some laws and special measures to enhance the development of certain regions such as Industrial Relocation Law, Development Law for Hokkaido and Tohoku Region, Development Law for Okinawa, and so on at the National Level. In addition to them, almost all local governments from village to the province have an ordinance for the provision of incentives and the institutions for the industrial promotion. The major incentives provided by the local governments are tax reduction and/or exemption and various subsidies such as the subsidy of 300 million yen maximum to a promising industry and that of 50 thousand yen per subject to certain numbers of employment, and so on. The above special treatment by some local governments attracted the investors' attention at first but when the others adopted similar measures few investors paid attention to it. Notwithstanding the efforts made by the local governments, the investment to such regions remained at a low level compared to the number of prospective investors. These experiences in Japan indicate

only that the provision of incentives focusing on the designation of the region is insufficient to promote industries; therefore, the re-designation of the zoning in Thailand will be of little contribution to enhancing the industrial promotion to the region.

Under this scheme are inland depots, SEZ, flexible systems for business activities, deregulation, etc.

(3) Local Industry Platform (LIP)

The supporting functions for local industries, in general, are local HRD function, technical/technological assistance function, function for enhancing the entrepreneurs, incubation function, consultancy function for management skills, and so on. The Industrial Promotion Center of Thailand, for example, is categorized as the supporting institution possessing above functions. Global enhancement of the supporting function of the industry tend to be important, especially in Japan, the USA, Germany, and other developed countries; the new business creation measures, e.g. incubation function, encouraging and/or nurturing the entrepreneur-ship, etc. are reinforced. In connection with such movement, encouraging industrial usage of the fruits of the R&D activities resulted and accumulated in the universities and institutes and the collaboration between academia and industry to support the technological development in the regional industry are activated. It is also notable that most industry-supporting policies have been shifting to the support of establishing efficient organizations that can easily handle difficult situations on the spot, and that of putting the “right person in the right place” to really work such organs.

Basically, new business creation and development of industries have common supporting functions, while there are differences of conditions of countries, regions, and industrial structures. The I-san region, therefore, should posses supporting functions such as private-academia collaboration, HRD, incubation, information dissemination, finance, consultancy, research, marketing, and so on. In order to efficiently provide such services, the most important issue is to establish a regional information network system to integrate all sectors in the region with other regions and furthermore with the world. Through such a system, the various resources in the region will be usable and the relevant information will be fed back in each sector and stimulate change in the region. The establishment and enhancement of the linkage of functions through the information network system is a key factor to activate the regional industry, to promote the investment, and to create new businesses. This indicates that the core management body of the supporting functions will be established inevitably. The Study Team proposes the installation of the information network system to support local industries aimed at developing the local industry, promoting direct investment, and creating new businesses on the one hand, and the establishment of the core management body aimed at implementing the related activities, namely the Local Industry Platform (LIP), on the other hand. Shortly the LIP is the system to efficiently

implement the industrial development and new business creation, and is the new type of infrastructure toward the next generation.

The business concept of the LIP is shown in the following figure. The concept is different from the existing Industrial Promotion Center of Thailand, and is characterized by the following:

- The LIP will be managed by either the Local Government or private sector in coordination with the central government;
- One of the major activities of the LIP is that related to the information network aimed at promoting the usage of IT in the region; and
- The LIP will appoint the personnel from the private sector and enhance the linkage between industry and academia and/or among industry, academia, and public sector.

The concept of the LIP is summarized as follows:

1) Formation of LIP

The LIP is consisted of two major parts; one is the Local Consortium and the other is the implementation body called the Platform. The former is composed of the whole sectors organizing the region such as private companies, universities, R&D institutes, NGOs, regional inhabitants, and regional government, and is aimed at the discussion and decision of the basic policy for the activities of LIP, finding the source of funds, and so on. The latter is the implementation body to be entrusted by the Local Consortium.

2) Organization

When a new organization is established as the Platform, the organization should secure the public's benefit. Recently the university is requested to contribute to supporting the regional development directly from technological aspect to managing as well as to supplying the capable personnel to the industry. In other words, some of the supporting functions implemented by the Platform are in common with that expected in the university. Therefore, it is one of the options that the new organization is set up in the university. In case of Japan, many universities established the supporting facilities to support the regional/local development, e.g. local industry supporting center, regional collaborative research center, etc.; therefore, utilizing such an existing center as the platform is reasonable in terms of resource allocation (finance, technological support, human resources, etc.). If such a center was established in the university in the I-san region, the center is practically used as the platform. If not, the new organization shall be established as the foundation.

3) Management

Actually the management of the Platform should be initiated by the personnel belonging to the business sector or, at least, having the experience to do business. It is required that the Platform should follow the rapid progress of the global economy and that of the ITC so the managers of the Platform are required to have the knowledge and experience to cope with the dynamism of the economy.

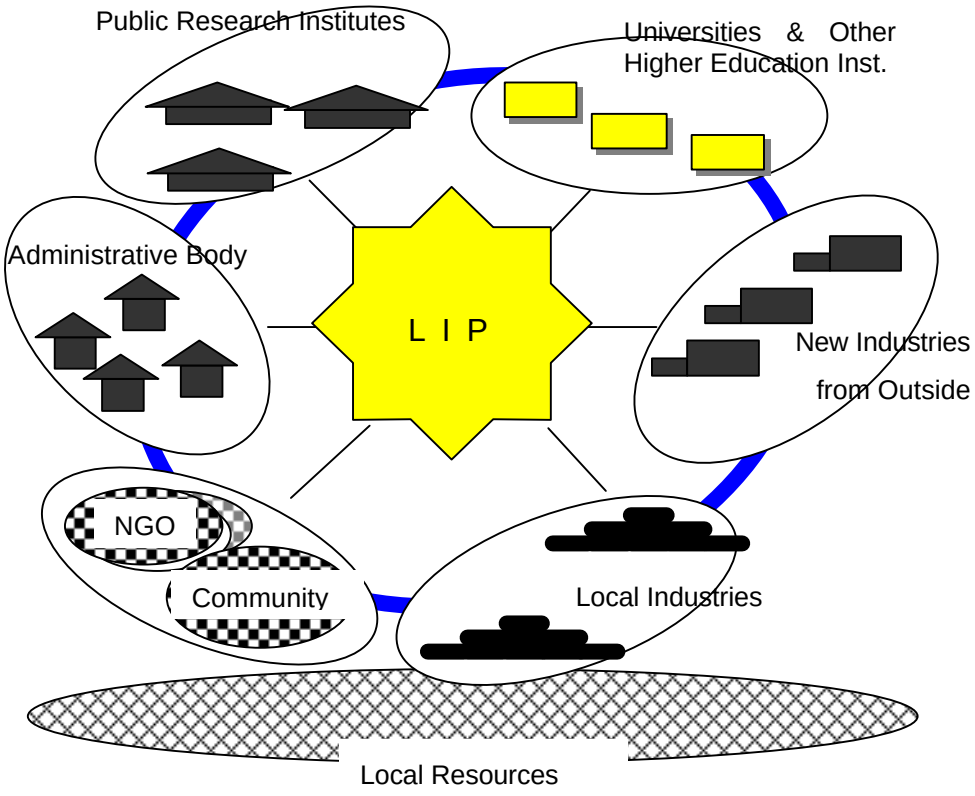


Figure 8.15 Concept of LIP

On the other hand, the objective of the Platform is to develop the region as a whole; therefore, the organization should secure public interest through the transparency of the implementation of the activities. In addition, the activities by the Platform have a public character (non profitable), so the financial assistance by the public sector is required. It is the reason for the public sector to be involved. The Platform is the generic measure to enhance the linkage of all sectors as a web, so flexible and speedy activities are always required to eliminate red tape.

4) Functions

The functions to be required are categorized into two according to the situation of regional conditions such as the existing facilities and the provision of services; one is the function to be possessed by the Platform and the other is the function to be

outsourced. Most of the functions to be required are in shortage in the region, so the newly established organization shall possess these functions by itself. When the existing facilities, such as Kasetsart University, have to perform some functions, the Platform should cooperate with them. In this manner, the Platform should play the role of one-stop service center. In case of the new business creation (or incubation), for example, a stage-wise support from the start-up is required so the Platform should prepare the system to consistently support them by the incubation manager. In addition to it, the functions such as market development, information dissemination and exchange, HRD, promotion of the regional IT usage, etc. shall be dominated by the Platform to smoothly implement in line with the objectives. Following are the functions of the Platform to be selected by the Regional Consortium from the point of view of efficiency and rationality of actual implementation:

HRD Support Function

The personnel to be nurtured are for the following business categories: IT, Business Administration, Production Management, Quality Control, Entrepreneur, Middle management, Leader for the self-development of the community.

Technology Development Support Function

The components of the functions are: (1) Support of technology development by the private company, (2) Excavation of development seed in the region, (3) Leasing and/or rental of testing and analyzing equipment, (4) Entrusted testing and Analyzing, and (5) Assistance of collaboration among Industry, Academia, and Public Sector.

Technology Transfer Function

The function is to strengthen the transfer of technology on the R&D fruits from the R&D institutes to the private sector.

Venture Business Support Function

The components of the function are: (1) Matching service between the market need and technology seed and (2) Management of incubator.

Financial Assistance Function

In cooperation with the Venture Capitalists, Banks, and Financial Companies, the provision and mediation of the financial aspect of the entrepreneurs and of the start-up business is performed by this function.

Consultancy Service for Management Function

In cooperation with the Accountants, Lawyer, Banks, and CCI, the services of the

management aspect of the companies are provided.

Marketing Support Function

The components of the function are market development services and promotion of e-commerce.

Information Dissemination and Exchange Function

The information on industries, technologies, products, and markets will be provided in order to strengthen the exchange among the different types of industries and between regions.

Regional IT Usage Promotion Function

This task is intended to support the acceleration and expansion of the broadband telecommunications system in the region, to develop the agent system and database, and to promote the IT usage in the communities and other relevant organizations.

Required Human Resources

- Incubation Manager
- Network Manager
- Marketing Manager

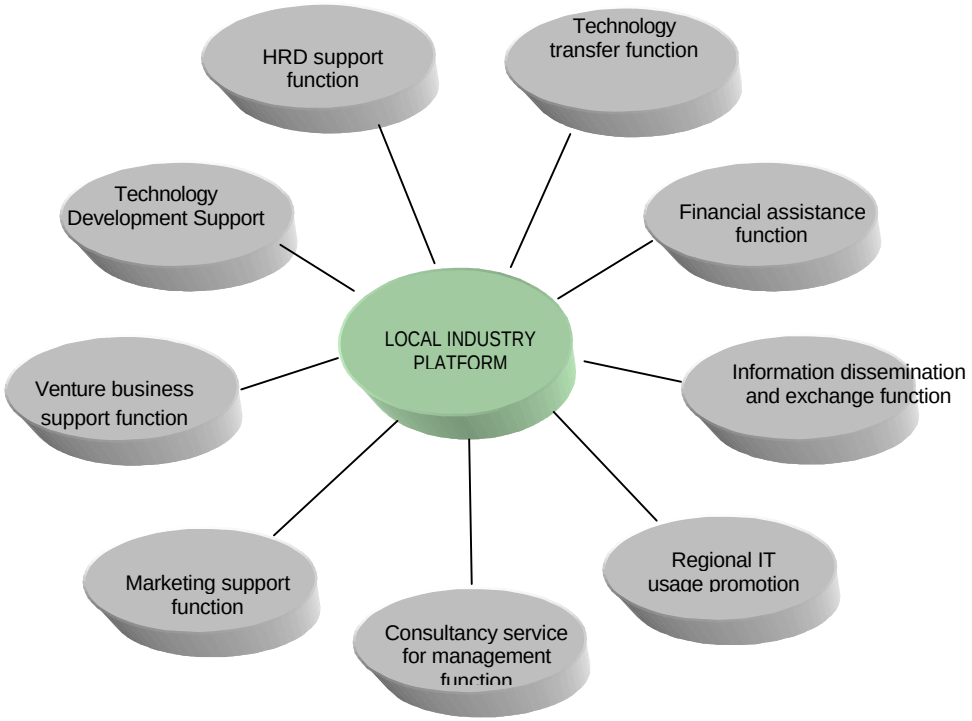


Figure 8.16 Concept of LIP's Functions

(4) Other Industrial Promotion Measures

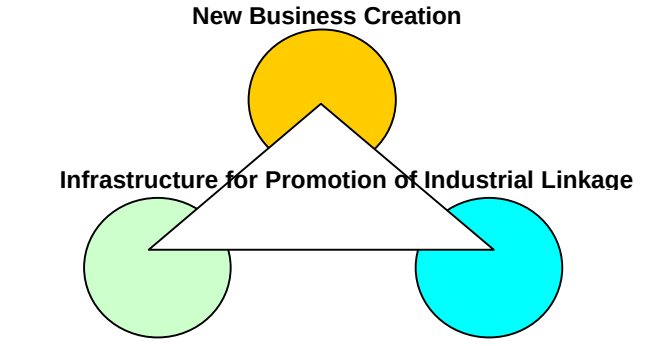
The direct investment promotion starts from publicizing the region to the potential investors for the purpose of attracting them. The actual activities to approach such investors are generally to trace their kith and kin in the local community and to hold a seminar and study tour to the sites. At the study tour and/or the promotion seminar, it is required that the relevant information and data, which are presumed to be requested by the potential investors, and the available services provision including the incentives based on the case study of the potential investor should be prepared. The organization in charge of the industrial promotion in the region shall be experienced in promotional activities so no explanation is needed. However, in case of Thailand, the IEAT is the major builders of industrial estates, so the promotional activities have been mainly implemented by the IEAT. It indicates that the promotional activities in the region with less development of industrial estates are rather inactive. In fact, the Joint Public and Private Consultative Committee that aims at the information exchange and discussion to solve the regional economic issues including the promotion of direct investment is existing, but it is hard to say whether the committee sufficiently dispenses its function of discussing industrial promotion in detail, or whether it is the proper committee to report from the local to the central government. (?)The direct investment promotion activity has the aspect of regional competition on one hand; therefore, the bigger organization or inter-regional organization faces more difficulties. In other words, the individual activity by the region is fruitful in some aspect, so the autonomous activity for the promotion will be encouraged.

The Study Team proposes two tactics with regard to the activities of the direct investment promotion.

a) It is said the NBR is a huge pool of seasonal workers. The labor mobility, therefore, has been one way from NBR to Bangkok and its surrounding area of which the situation is a disadvantage to promote industry. The tactic to convert such a disadvantage to an advantage is to promote the movement of the establishment of the factories into the hometown of seasonal workers in cooperation with the local government and CCI. The target industries to promote are the footloose industry and the labor-intensive industry in particular. Firstly, the local government studies the situation of workers (e.g. what company or industry employs seasonalworkers?). It is not unusual that a certain company sticks to the practice of employing many workers from the same town. Workers from the NBR are mainly unskilled but some of them have had some experience of working in a factory. Some managers mentioned that the engineers and managers are hesitant to move to the NBR but the majority of workers from the NBR could possibly welcome the prospect of returning to their hometown. To situation, the provision of retraining the employed NBR workers to relocate the factory to the NBR is

proposed.

b) The second tactic to introduce the factory into the NBR is to prepare the "U-turn and J-turn[5] Information". The local government collects data on which workers, employed in BKK and its surrounding areas and abroad, tend to return to their hometown and/or its vicinity. The data collected reflects types of occupation and experience, expected occupation, expected region to return, and so on. Regarding manpower, the supply of Bachelor degree holders by the universities in the region amounts to only around 1000 now, but their numbers are expected to increase to around 4,000 from the year 2004. In addition to them, the proposed HRD program by the Study Team will be able to supply the 1,000 degree holders. In the near future, the NBR will supply enough well educated human resources in quantity and in quality. The expansion plan of the higher education sector in the region is characterized as coping with the requirement of the industry.



a) HRD support
b) Technology development support
c) Technology transfer
d) Venture business support
e) Financial assistance
f) Consultancy service for management
g) Marketing support
h) Information dissemination and exchange
i) Collaborative activity among Industry, Academia, and Public Sector
j) Regional IT usage promotion
k) Industrial Park Development

[5] U-turn means that the workers who went out to work in the big city return to their hometown. J-turn means that the workers who went out to work in the big city return to a city near his hometown.

8.4.4 Industrial Development Framework and Industrial Location Policy

(1) Industrial Development Framework

Based on the macro framework, the development scale of the region in 2020 is estimated. In the coming 20 years, the region will develop the industrial land (or industrial estate) of around 450 hectares.

(2) Industrial Location Policy

The industrial location policy within the region is summarized as follows.

1) Nakhon Phanom

Judging from the accumulation of existing industry, the situation of regional resources, the airport as the transportation conditions, and the future plan of the third international bridge, the Nakhon Phanom has the potential of industrial development. The strategy to enhance the industrial location is to designate a special zone for industrial location and to improve basic infrastructure. The target industry is summarized as follows:

- Construction and Civil Work Materials, Gardening Materials utilizing the Laotian log and gypsum, Furniture
- Electrical and Electronics Parts (PCB, Switch, Connector, etc.)
- Agricultural Machinery and its maintenance, Motor, Pump
- Others (Garment & Apparel, Food Processing, Natural Rubber Processing)

2) Sakon Nakhon

The major industry in Sakon Nakhon is agriculture and livestock. In addition, Sakon Nakhon is characterized by the accumulation of higher education organizations such as Kasetsart University, Rajamangla Institute of Technology, and Rajabhat Institute. The transportation condition is also rich within the I-san region. The strategy to industrial development in the province is to strengthen the HRD and R&D function in relation to the agri-genetics to enhance the food processing industry and agriculture. In the future, the “Sakon Nakhon Bio Park” will be established aiming at accumulation of biotechnology related industries. The target industry is summarized as follows:

- Food Processing Industries;
- Livestock Products (Meat products, Dairy Products, Pet Food Products);
- Organic Fertilizer and Compound Feeds;
- Garment and Apparel;
- Bio-industry related to the Agriculture (Food Supplements Substitutions for Agricultural Chemicals, Reagents);

- Agricultural and Environmental Engineering;
- Information Services Industry related to Agriculture and Environment;
- International Collaborative R&D Center; and
- LIP (Local Industry Platform).

3) Mukdahan

The geological condition in Mukdahan is similar to that in Nakhon Phanom so the target industry in Mukdahan competes with that of Nakhon Phanom. The accumulation of factories, however, is rather poor compared to the ones in Nakhon Phanom, and there are only two modern factories (Sugar Factory and Pet Food Factory). Although the current location condition remains at a low level, the future potential of Mukdahan shall be raised by the construction of the 2nd International Mekong Bridge in 2004. Selection of the target industry is conducted by its future potential and the resulting benefits from introduction of the transportation-related industry. The target industry is summarized as follows.

- Truck Terminal and Logistic related services Industry (Forwarder, Vehicle Maintenance, Guest House);
- Warehousing, Stockyard;
- Construction and Civil Work Materials, Assembly of Furniture Components;
- Precise Precutting of Wooden Products;
- Mixture and Packaging of Balanced Compound Feeds and Fertilizer;
- Labeling and Packaging of Daily Sundry Goods;
- Filling Gas, Bottling, Packaging; and
- Decomposition of Machinery and Recycling.

4) Kalasin

Kalasin leads all agricultural production in the I-san region, so industries related to agriculture should be promoted. At the same time, it is expected that a branch factory from Khon Kaen will be relocated and/or established in the area. Tourism is also a promising industry because of the Lam Pao Lake; therefore, tourism-related manufacture such as handicraft items as souvenir will be expected. In addition, based on the aquaculture (e.g. catfish), fish paste products will be expanded. An industrial estate should be developed to prepare such industries. The target industry is summarized as follows:

- Agricultural Food Processing;
- Freshwater Fish Products (Fish Paste Products);
- Starch, Ethanol, Citric Acid, Eco-materials, Compound Feeds, Organic Fertilizer;
- Sugarcane Processing (Sugar, Compound Feeds, Fertilizer, Construction Materials using Bagasse);

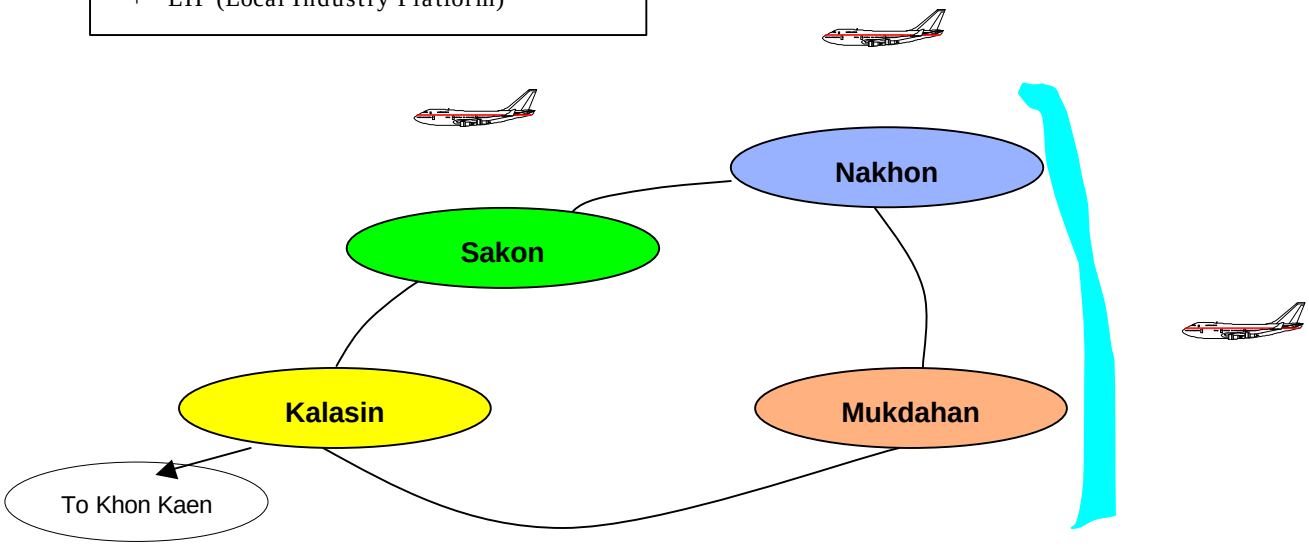
- Garment and Apparel (Silk, Cotton);
- General Machinery (Agricultural Equipment and Spare Parts);
- Ceramic Products;
- Leather Bags and Shoes;
- Construction and Civil Work Materials; and
- Handicraft Items as Souvenir.

＜Sakon Nakhon＞

+ Food Processing Industries
+ Livestock Products (Meat products, Dairy Products, Pet Food Products)
+ Organic Fertilizer and Compound Feeds
+ Garment and Apparel
+ Bio-industry related to the Agriculture (Food Supplements, Substitutions for Agricultural Chemicals, Reagents)
+ Agricultural and Environmental Engineering
+ Information Services Industry related to Agriculture and Environment
+ International Collaborative R&D Center
+ LIP (Local Industry Platform)

＜Nakhon Phanom＞

+ Construction and Civil Work Materials, Gardening Materials utilizing the Laotian log and gypsum, Furniture
+ Electrical and Electronics Parts (PCB, Switch, Connector, etc.)
+ Agricultural Machinery and its maintenance, Motor, Pump
+ Others (Garment & Apparel, Food Processing, Natural Rubber Processing)



＜Kalasin＞

+ Agricultural Food Processing
+ Freshwater Fish Products (Fish Paste Products)
+ Starch, Ethanol, Citric Acid, Eco-materials, Compound Feeds, Organic Fertilizer
+ Sugar cane Processing (Sugar, Compound Feeds, Fertilizer, Construction Materials using Bagasse)
+ Garment and Apparel (Silk, Cotton)
+ General Machinery (Agricultural Equipment and Spare Parts)
+ Ceramic Products
+ Leather Bag and Shoe
+ Construction and Civil Work Materials
+ Handycraft Items as Souvenir

＜Mukdahan＞

+ Truck Terminal and Logistic related services Industry (Forwarder, Vehicle Maintenance, Guest House)
+ Warehousing, Stockyard
+ Construction and Civil Work Materials, Assembly of Furniture Components
+ Precise Precutting of Wooden Products
+ Mixture and Packaging of Balanced Compound Feeds and Fertilizer
+ Labeling and Packaging of the Daily Sundry Goods
+ Filling Gas, Bottling, Packaging
+ Decomposition of Machinery and Recycling

8.5 Regional Development Projects and Programs

Aiming at the establishment of final firms and export-oriented industries for niche markets, a business creation method should be introduced in the study area. Business creation is the answer to queries on how to find business seeds, how to study capability of the seeds, how to establish pilot plant and samples, and how to conduct test marketing with product creation (see Figure 8.19).

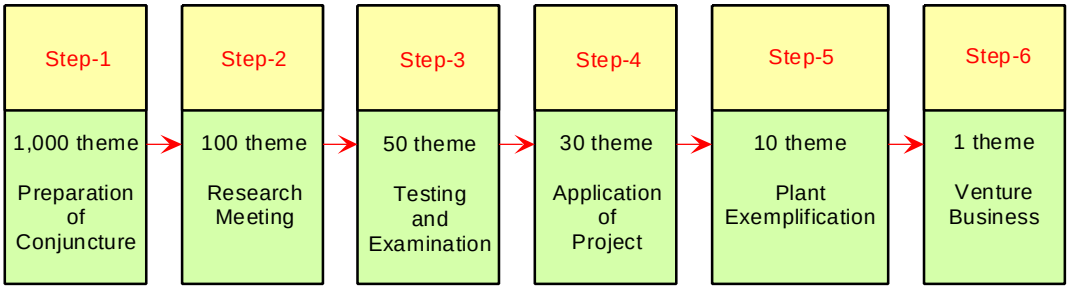


Figure 8.19 Model Process for Business Creation

Step 1: During the section exchange meeting with industries and universities, a number of themes are proposed for the preliminary potential product as a business seed, depending on the interest of attendees. Therefore, invited participants to the meeting should represent a cross section of different business fields in order to get new and diverse ideas.

Step 2: At the conference or business forum, about a thousand themes will be announced. From this number about 100 themesshall be selected for further study. Another section meeting will be set up, forming section groups and starting the study work more deeply.

Step 3: Each section group shall examine and test the new themes. At this stage, around 50 themes shall be selected.

Step 4: If the section groups find the new ideas have some potential, a request to the government shall be made for R&D institutional funding for around 30 themes out of the 50 selected in Step 3.

Step 5: Government selects around 10 themes among 30 appreciations, and provides the funds for them. The groups will be setting up the pilot plant of this fund and continue further detailed R&D.

Step 6: The group who could get good result can establish a new company and start

the venture business. The government will provide technical and financial support for the project.

Projects and programs for industrial development are concerned with business creation activities, mainly with Information network, human resource development, Industrial policy, manufacturing infrastructure, raw material development, development of new product, up-grading of product, manufacturing technology and market development with business start up support and technical support to local enterprises.

It is very necessary that these industrial developments are carried out in coordination with the central/local government and that their functions are in accordance with industrial policy of central/local government. Otherwise these developments will not work well as a whole, because the relationship among their functions is important for local manufacturing industrial development.

Upon this industrial strategy related with function, the projects and programs are marked as described in the Table 8.25.

Table 8.25 Projects and Programs for Local Industrial Activities

	Function / Project and Program	1 Information Network	2 Human Resource Development	3 Industrial Policy	4 Manufacturing Infrastructure	5 Raw Material Development	6 Development of New Product	7 Up-grading of Product	8 Manufacturing Technology	8 Market Development
1	Local Industrial Platform	●	●	●	●	●	●	●	●	●
2	International Join Research Center by Universities	●	●			●	●	●	●	●
3	Industrial technology Development Center	●	●			●	●	●	●	●
4	Sofia Plaza	●	●					●	●	
5	Mediaship	●	●							●
6	Nakhon Phanom Industrial Area	●			●					
7	Sakon Nakhon Bio-Park	●	●		●	●	●	●	●	
8	Mukdahan Special Economic Zone	●			●					
9	Kalasin Industrial Area	●			●					
10	Compatriot Office for I-san People in Bangkok	●	●					●	●	●
11	Small and Medium Industries Support Program	●		●				●		●

The development projects and programs are proposed for supporting local industrial activities for business creation and establishment of niche industries in the study area. However, the projects and programs are effectively and efficiently located in the study area. The location of inducement of the projects and programs are described in Figure 8.20.

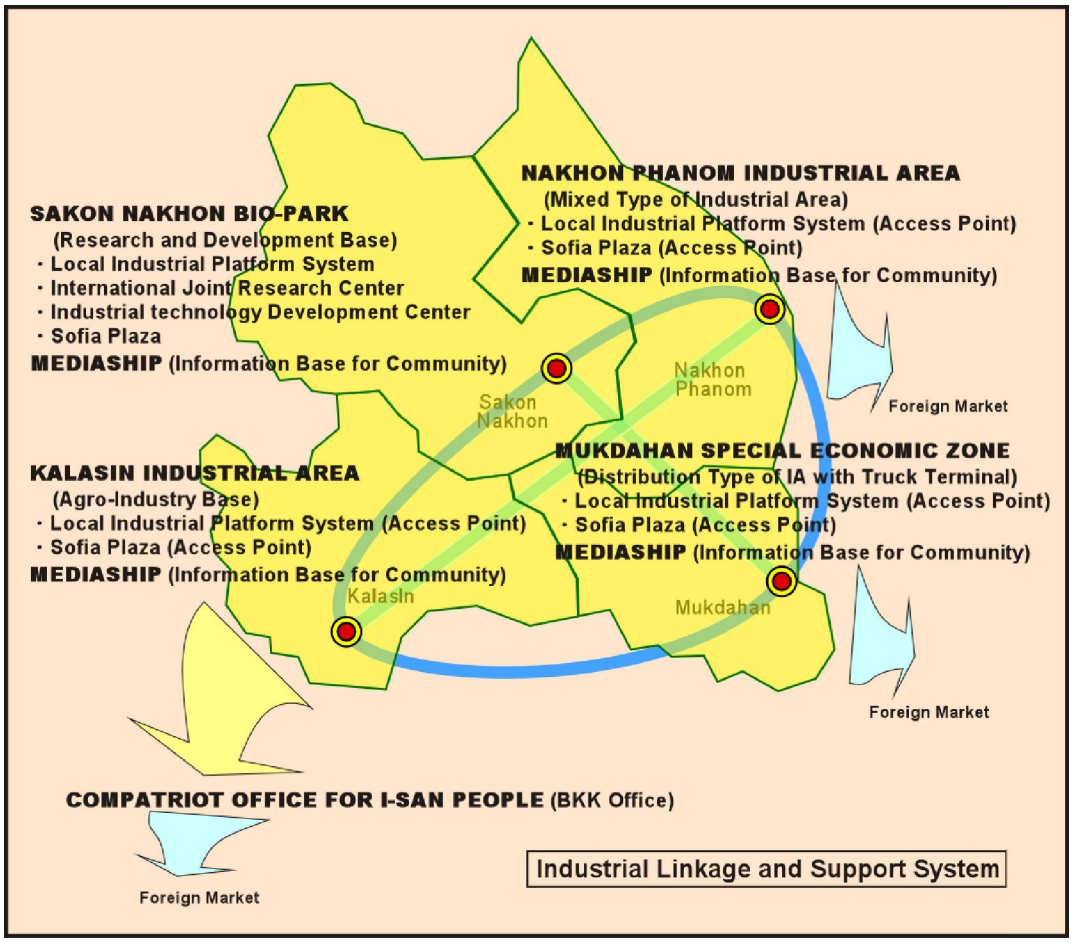


Figure 8.20 Location of the Projects and Programs and Its Linkage

The general description of projects and programs are shown in Table 8.25, although some parts need further fine-tuning and economic feasibility study. Major projects and programs are outlined as follows:

(1) Local Industrial Platform System

Local Industrial Platform (LIP) is a comprehensive supporting system for generating businesses and improving the business activities for regional industry. LIP provides information tools and a networking system across the boundaries of industry, connecting comprehensive services including incubation for venture business, technical support including R&D, business start up support.

LIP is organized jointly with government, the private sector and the academic community to provide support, always keeping in mind the needs of industries. However, a government-established, private-sector-operated LIP for speedy supporting services should be studied.

(2) International Joint Research Center by Universities

This is a research center where experts of universities conduct research studies jointly with the researchers of client side, i.e. public and private industries, public administration, or regional inhabitants. It enables universities to transfer own technology and knowledge as a Technical Licensing Organization (TLO) and to study regional needs and regional resources. On the other hand, in addition to the final research results, researchers of the client side can obtain related technology and knowledge and use special equipment during the research work. It is desired that the research subjects be chosen from a regional perspective including social science as well as industry.

Desirable management body is universities in the region. It will involve not just one university but several universities including foreign ones. International research of the regional subjects may improve the regional resource to global standard. It can contribute to human resource development from the regional to international level. Required functions are as follows:

- Basic R&D activity for local product especially agriculture;
- Creation of niche products and business;
- Collaboration scheme with large company for new product and business;
- Supporting system for SMI agro-based industry;
- Provision of pilot plants;
- Provision of testing facility;
- Provision of incubation facility;
- Provision of multi-purpose exhibition hall and information center;
- Provision of information for regional resources and agro-industry;
- Provision of incentive scheme for setting up a new company;
- HRD for agro-business;
- Promotional activities for invitation of R&D institutes and university;
- Operation of agricultural experiment farm; and
- Development of plant factory.

(3) Industrial Technology Development Center Project

It is important, not only for industry but also for the regional development, to promote the local industry utilizing the regional resource. This project is to establish a base to provide industrial technology and information support for the purpose of improving and developing product capability of the regional resource of agriculture, forestry, fishery, mining, etc. The center, as a local-oriented technology research center, undertakes laboratory tests and contracts research work and consultancy work, opening up the laboratory to the region and lending special test equipment.

The center also supports general industrial activities for quality control with industrial testing, establishment of I-san brands, I-san trademark, control of origin of products, etc. The proposed facilities of this center are as follows:

- R&D facilities for manufacturing industrial activities;
- Technical support for plant process and usage of tools;
- Control of brands, origin of products, trademark, etc.;
- Collaboration scheme with large company;
- Provision of incentive scheme for collaboration;
- Industrial production support for niche industry;
- Provision of information with IT for manufacturing industry;
- Provision of incubation facilities;
- Provision of testing facilities;
- Certificate scheme for technician; and
- Provision of library.

(4) Sofia Plaza

The project is to set up a facility and system of technology transfer by permanent or semi-permanent residence of old and middle-aged technicians and engineers coming from Japan or other foreign countries for the purpose of transferring and teaching industrial technology. Recent observations point to the fact that a lot of these technicians and engineers wish to live abroad permanently or for a long time. Sofia Plaza provides a good opportunity for them to live abroad; they can come as cooperation volunteer workers and still be productive in their old age.

It would be useful for the regional enterprises to have reliability and high productivity by thoroughly following a fundamental technology and quality control method. It is desirable to have flexible plans for keeping a healthy lifestyle and to make preparations for receiving cooperation volunteers, since their motives for living abroad are different from those going abroad for a job. Program and facilities are as follows:

- Provision of information network;
- Provision of accommodation;
- Provision of workshop;
- Provision of library; and
- Setting up of a multi-purpose information exchange room.

(5) Mediaship (Information Base for Community)

Mediaship is proposed as a base for promoting awareness of the importance of infrastructure and opening up the opportunity of elementary human resource development. It should be the base where people get experiences and arouse their

curiosity through absorption of knowledge and experiences and listening to lectures about things that could be applied in daily life. It should also supply information on the regional industry, opportunity of exhibiting local products, tourist information, and opportunity to cultivate friendships. Expansion of Mediaship is desirable. Mediaship is useful for people in the region, as it may take some more time for a large majority to have personal computers and use the Internet sufficiently. The mediaship program includes the following:

- Setting up of the regional community hall;
- Introduction of multi-purpose information exchange room;
- Multi-purpose exhibition hall; and
- Provision of information for local activities and industrial information.

(6) Nakhon Phanom Industrial Area

The industrial area is planned as mixed industries with footloose industry and local resources oriented industries. This industrial area is to be located on the gateway to central and north Vietnam through Laos in the future. Industrial location would be expected for labor intensive industries using airport facility. These labor intensive industries include textile and garments, plastic products, printed circuit boards (PCB), switches, connectors, and for local resources base industries such as manufacturing of construction materials, natural rubber products, foods, and wood/gypsum/lime products imported from Laos.

A development plan should be made applying a zero-emission concept and cluster development method similar to other industrial areas. Introduction into the area of rental system of lots, factories, warehouses, etc. should be considered. Necessary facilities and functions are as follows:

- Setting up of LIP system;
- Provision of industrial area by town planning with land use by province;
- Provision of land scheme (equal value exchange with real estate and Kukakuseiri);
- Provision of administration office with promotion facilities;
- Provision of IT base with multi-purpose hall;
- Provision of science technology information;
- Promotion activity for relocation and new investment;
- Provision of incentive for relocation and new investment in I-san; and
- Investment promotion by large company for small business.

(7) Sakon Nakhon Bio-Park

This project is intended to develop a science park base for R&D institutes and factories related to biotechnology for agriculture by utilizing the academic and research facilities in Sakon Nakhon Province such as Kasetsart University. Increase in agglomerated

profits is expected by concentrating such activities into the Bio-Park.

Progress in biotechnology contributes not only to medical care, medicines, and the food processing industry, but also to the electrical and electronic industries. Agriculture, the leading industry in the region, is an important field of biotechnology. As is generally known, Singapore announced that biotechnology would be the high-tech industry to follow IT. The Bio-Park is planned to have farms for research work on biotechnology. Prior to setting up the Bio-Park, the proposed projects such as International Joint Research Center by Universities, and Industrial Technology Development Center connected by LIP should be realized in Sakon Nakhon. Participation of foreign capital and organizations may be possible depending on the development concept. Main activities are as follows:

- Setting up of LIP system;
- Induce R&D institutes of private and public sectors;
- Setting up an International Joint Research Center by University;
- Setting up an Industrial Technology Development Center;
- Setting up experimental farms; and
- Setting up of agricultural plant industry.

(8) Mukdahan Goods Distribution and Processing Center

The objective of this project is to develop an industrial area with a truck terminal and light industry base. It is planned for environment-friendly industries with zero-emission concept. The cluster development method, which is a stepwise development according to the demand situation, is applied to the industrial area to reduce cost. It is expected to induce standard factories, warehouses, information center, and related common service facilities. The following industries are assumed to be located in the industrial estate:

- Setting up of LIP;
- Delivery industries of grouping, sorting, and labeling for daily goods;
- Mixed industries of complex livestock fodder and fertilizer;
- Refilling and recharging industries for liquid material, gas and powder;
- Paper industries for treatment, finishing and cutting;
- Recycling industries for broken down automobile and machinery;
- Wood industry for cutting and assembling of semi-products and finished products; and
- Food processing industry for local market.

It is expected that with the introduction of the above-mentioned industries, the government should prepare the system and program as follows:

- Setting up of LIP system;

- Provision of industrial area and industrial land under the town development scheme;
- Equal value exchange and Kukakuseiri schemes for industrial land development;
- Incentive scheme for international trade business;
- Special incentive scheme for purchase of raw material from abroad; and
- Migration scheme for foreign workers.

(9) Kalasin Industrial Area

The provincial government has a development plan of industrial park with assumed industrial locations of food, machine and metal industries, and it has already requested approval from MOID and IEAT. However, the economy suffered and demand from industries began to decrease after the financial crisis. It is therefore highly recommended that development of the industrial area be well balanced from an economic standpoint.

An industrial area is planned to be developed in Kalasin, taking into account the expected stronger linkage with Khon Kaen for supporting industries and food industrial base. It may be that the industrial park will mainly consider the regional character of Kalasin. There is another possibility of locating manufacturers for agro-machinery base, and complex livestock fodder and fertilizer.

The phasing development method is applied for cost reduction and information infrastructure is developed for obtaining higher competitiveness. Major activities are as follows:

- Setting up of LIP system;
- Provision of industrial area by town planning with land use by province;
- Provision of land scheme (equal value exchange with real estate and Kukakuseiri);
- Provision of administration office with promotion facilities;
- Provision of IT base with multi-purpose hall;
- Provision of science technology information;
- Promotion activity for relocation and new investment;
- Provision of incentive for relocation and new investment in I-san; and
- Investment promotion by large companies for small business.

(10) Compatriot Office for I-san People in Bangkok Project

It is assumed that the local industrial supporting activities by governments operate on a top-down system. However this system does not work well. Taking this into consideration, the local people themselves should determine their actual economic situation. Otherwise, they would not get a grasp of the total economic system which I-san is part of. I-san should take its place in the economic system as a large city and

learn a lot of market circumstances in Thailand.

Therefore strengthening of I-san people's linkage and promotional activities should be done in Bangkok. It is recommended that a Compatriot Office for I-san people be set up in Bangkok. I-san people who possess strong leadership qualities should operate and coordinate this office; however, the provincial government should provide the infrastructure for I-san and funds for its operation as well. The contents of this project are as follows:

- Provision of compatriot office in BKK;
- Advertisement of I-san brand goods and products;
- Setting up of sales research center as an antenna for I-san products;
- Sales promotion activities with exhibition room;
- Provision of room for meetings and information exchange among I-san people including businesspersons;
- Provision of trade, commerce and market training;
- Financial assistance scheme for office operation by province; and
- Provision of information center with IT hub.

(11) Small and Medium Industries Support Program

Industries in I-san are facing a lot of difficulties on management of industries. They cover raw material, production technology, financial and marketing aspects. On the other hand, a lot of projects and programs are on going by ministries and agencies. I-san is the poorest region in Thailand but it produces commodities for the local market and export market. I-san products are contributing to the Thailand economy, but the profits from their production are small.

SMI support program should be focusing on business creation in I-san. Related to the business creation, it should be setting up financial scheme, technical support scheme, business administration method, human resources development, etc. This activity from local side is very important. On the other hand, LSI should support SSI and MSI. The LSI should support regional development, too. So, special considerations for I-san industries are required for a wide range of aspects including:

- Financial scheme of investment and working capital for C&FI and SMI in I-san;
- Special incentive scheme for the establishment of a new factory in I-san from department/division independent from the LSI in BKK;
- Special incentive scheme for newly established businesses to generate new small businesses and investments in I-san by I-san people;
- Special scheme for HRD support for a starting new business in I-san;
- Creation of SMI technical and management support system by LSI;
- HRD for new business leaders of I-san people;

- Supporting system for U-ey people to I-san for establishment of new industries; and
- Land purchase and/or rent scheme for new investment in I-san.