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THE ROLE OF INDUSTRIAL ESTATES IN THAILAND'S INDUSTRIALIZATION New Challenges for the Future

Natacha Aveline-Dubach

The rapid industrialization in Thailand has strongly relied on the capacity to allocate land resources for industries, and provide high-quality facilities and services in industrial sites. Among these sites, as already pointed out in Chapter 1, Industrial Estates (IEs) have played a key role in shaping Thailand's industrialization. Developed after 1972, together with major transportation and communication infrastructure, they have contributed to fostering growth in Thailand by attracting a large share of FDI and multinational companies while preserving the country from heavy pollution and reducing unwanted industrial "sprawl".

This development has been facing two major challenges briefly mentioned in Chapter 4. The first challenge is the growing regional imbalance in the manufacturing industry, which causes an overconcentration of firms in the region of the national capital, a problem shared by many Asian countries, but particularly worrying in Thailand.

The second challenge is the necessity to upgrade the Thai manufacturing industry by focusing on local capacity building and innovation rather than passive technological learning from foreign firms. In the 1980s, IE development was fully undertaken by private developers, under the strict regulations and guidance of the Industrial Estate Authority of Thailand (IEAT). As a result, services and facilities in IEs were gradually improved to meet the demands of multinational firms, to the extent of transforming some estates into virtual "industrial cities". The present chapter describes this evolution and examines whether it is consistent with the urgent need to restore the regional imbalance and improve local input in the manufacturing sector.

In the first section we describe briefly the distinctive features of Thai IEs. Then we examine the development of the existing IE network, in line with the regional development policy. The third section deals with the role of private involvement in IE development, and its effects on the supply of services and facilities. Finally, we examine to what extent the existing IE framework could be used as a basis for ongoing innovation and cluster-based policies.

1. DISTINCTIVE FEATURES OF THAILAND'S INDUSTRIAL ESTATES

According to the definition given by the United Nations, "Industrial Estates" are distinguished by four key features:

- (1) A large-scale area where land is developed in accordance with a comprehensive plan.
- (2) An area served by roads, infrastructures, utilities, and services.
- (3) Sale and lease of factory buildings for manufacturing purposes.
- (4) Controlled development with restrictive covenants for the benefit of both the occupants and the community at large.

The development of IEs has become a widely common practice across Asia. The first IE was established in Singapore in 1951. Japan, Korea, Malaysia, and Thailand started ten years later, followed by the Philippines and Indonesia in the seventies (Ramos and Sazanami 1991). In all the countries, the purpose of introducing IEs was to encourage economic development — in particular rural and regional development — while raising the living standards of the population. Originally, IEs were

developed by a public authority, a state body, or a local authority, but private operators have made inroads into this sector throughout Asia.

Malaysia and India have developed the highest number of IEs, and account for half the estates within the zone between them. Malaysia's importance should be put in perspective: out of its 378 estates, 76 (20 per cent) measure less than 20 hectares. China, on the other hand, shows a high degree of concentration, with more than a third of its IE (41 out of 198) exceeding 1,000 hectares (Table 5.1). The gigantism has peaked in South Korea, with the Kwangyang National Industrial Complex of 9,770 ha, recently developed along the south-central coast, 150 km west from Pusan. The industry is also moderately concentrated in Indonesia, the Philippines, and Vietnam, with very few estates measuring less than 100 ha. Thailand stands between these extremes, with majority of its estates varying between 100 and 500 hectares.

Yet the Thai concept of the "industrial estate" has no equivalent in other Asian countries. Amongst the seventy-three industrial grouping areas in Thailand, only thirty-four are officially listed as IE.¹ Apart from these, there are twenty-three industrial zones, seventeen industrial parks

Table 5.1
Industrial Estates in Asia

	Total number of IEs	Known area of the IEs	IEs of areas less than 20 ha	IEs of areas between 20 and 100 ha	IEs of areas between 100 and 500 ha	IEs of areas more than 1000 ha
China	114	108	0	5	36	26
India	254	254	42	63	141	8
Philippines	99	97	1	56	35	3
Indonesia	22	21	1	2	11	6
Malaysia	378	376	76	178	102	16
South Korea	71	70	13	21	15	9
Thailand*	73	72	2	13	46	9
Vietnam	24	23	0	4	16	3
Taiwan	80	Total area: 45,587 ha, an average area of about 569 ha per estate				

Note: *Only thirty-four IEs are officially listed.

Source: Composed by the author using data from Asian Industrial Estates, Taiwan: Taiwan government, 2003, APEC

(private for the most part), ten “industrial communities”, and a science park (see Chapter 8). The Thai “IEs” may be distinguished from other types of industrial groupings by five key features.

First, they are all developed or co-developed by the Industrial Estate Authority of Thailand (IEAT), a dedicated body set up in 1972 under the supervision of the Ministry of Industry. IEAT is responsible for constructing basic infrastructure (road, rail, and waterway networks, access routes to the IEs) for which it receives an annual royalty when not acting as the sole project operator (as in the case of private developments). It also monitors polluting emissions strictly in each IE — a permanent team is deputed on site — with special attention paid to waste water. Owing to the existence of a unique body in charge of the IEs, Thailand suffers less from a lack of coordination that impedes the management of IEs in neighbouring countries (Malaysia, Indonesia, and the Philippines).

In return for the strict control by IEAT, the firms operating in IEs enjoy quality infrastructure and resources adapted to their requirements: dedicated on-site power stations (thereby avoiding notorious power cuts experienced in other East Asian countries), efficient telecommunications networks, purification and effluent treatment plants, abundant water resources, transport infrastructure for access to and within the zone. The quality of infrastructure, both inside and outside the estates, is a distinctive feature of Thailand's IEs relative to countries of a similar development level in the region. Furthermore, land and infrastructure are supplied at a relatively low cost compared with neighbouring countries. Shipping cost is substantially lower than in Vietnam and India. Land in industrial estates is supplied at a lower cost than in China, the Philippines, Vietnam, and Laos.²

The third feature is a wide array of services such as the IEAT logistical support through the “One Stop Centre” in each estate (providing advisory services to investors and assistance in administrative procedures), training support services (centres for training facilities, testing centres occasionally set up in the estates), as well as banking, postal, commercial services, and various other neighbourhood amenities. This goes in par with the very easily understood system and quick procedures for establishing a company. Thailand requires the lowest number of days to start a business in Asia after Singapore (thirty-three days on average) and ranks fifth in the world for dealing with building permits (World Bank 2009).

Fourth, the IE enables companies to benefit from a number of tax incentives. BOI (Board of Investment) privileges are automatically granted

by the IEAT, which also confers special privileges to the EPZ (Export Processing Zone): exemption from registration fees, custom duties, and VAT, on machinery and equipment. This is quite similar to the free zone concept existing elsewhere, but tax privileges are particularly attractive in the Chonburi and Rayong provinces, for example, where BOI zone 3 offers one of the best incentive packages of the region, with quick access to airports and seaports.

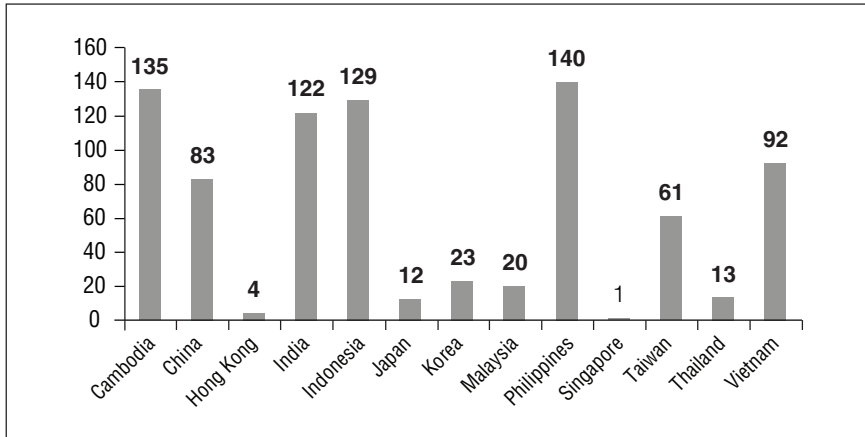
Last but not least, significant guarantees are offered in Thailand's IE. Foreign experts and technologists invited into a company can repatriate profits. Foreign investors can enjoy full property rights over land (100 per cent freehold ownership) in private IEs, whereas leasehold or joint ventures with local partners owning 51 per cent of the operation is common in other Asian countries. This is a substantial merit, as land has always appreciated consistently in Thailand. The land title can be used to secure local financing, and property owners have a guarantee that none of their holdings will be expropriated in the future.

Adding to these distinctive features, other factors contribute in drawing companies to Thailand's IEs instead of those in other countries in the region. Intellectual property rights protection and high transparency rules are seen as strong assets by foreign firms. Limited pollution — especially compared with that of major Chinese cities — reasonable housing rents available for expatriates, the easygoing and hospitable nature of the Thai people are assets that converge to attract expatriate managers seeking a good quality of life. Owing to these factors, Thailand ranks thirteenth out of 181 economies for overall ease of doing business, according to the World Bank's 2009 survey. It occupies fourth position in Asia, behind Singapore, Hong Kong, and Japan, and stands far ahead of comparable economies in the region, except for Malaysia (see Figure 5.1).

2. IE FRAMEWORK SETTING AND REGIONAL DEVELOPMENT POLICY

Industrial estates are very unequally distributed across the national territory (see Figure 5.2). Out of thirty-four IEs, twenty-eight are concentrated in the central region (Bangkok and its bordering provinces) and the eastern region. The remaining ones (six IEs, 18 per cent of the total) are in three peripheral regions — six in the north, one in the north-east, and two in the south.

Figure 5.1
Ranking of Countries in Asia on Overall Ease of Doing Business There (2009)
 (Out of 181 countries worldwide)

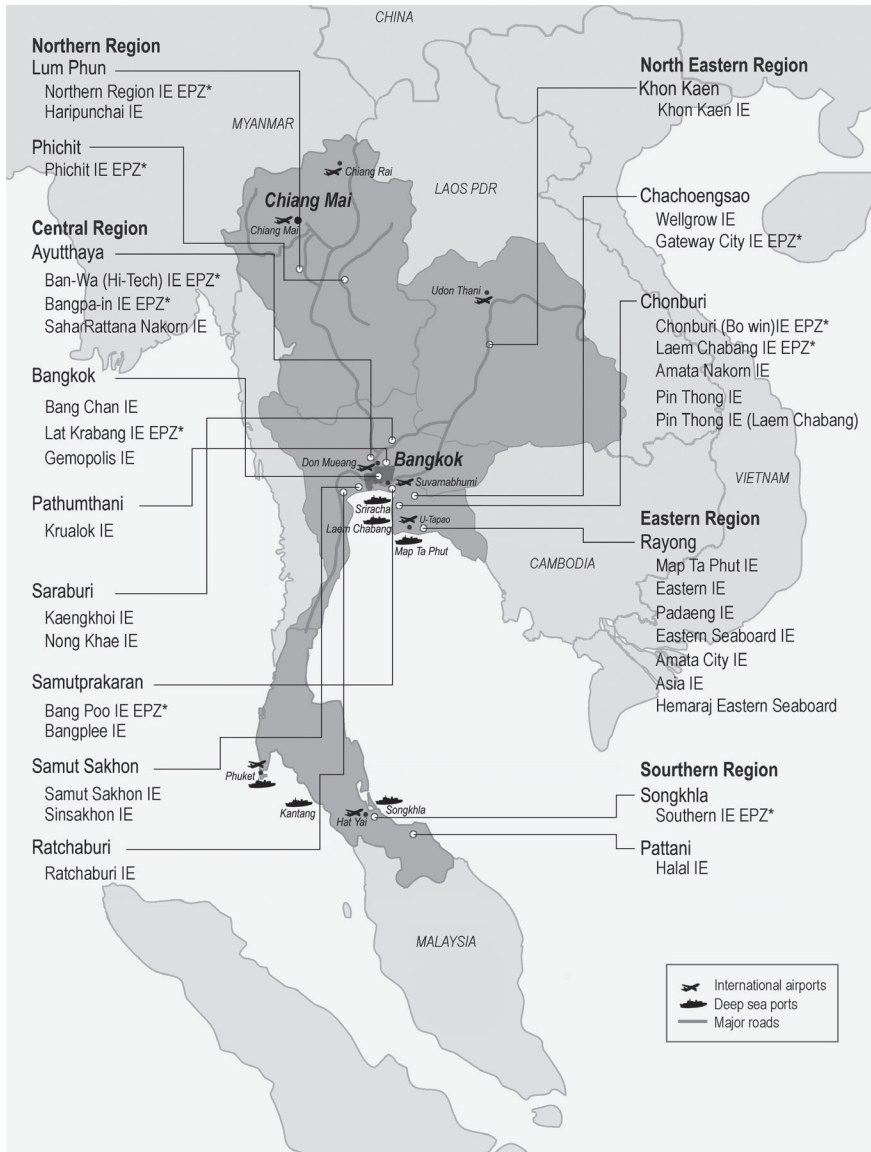


Source: Composed by the author using data from "Doing Business 2009", The International Bank for Construction and Development/The World Bank.

As mentioned above, the foundation of this framework goes back to the 1970s. Thailand had based its growth model on the establishment of foreign companies, in the hope that the outsourcing tie-ups between them and Thai small and medium-scale companies would lead eventually to a diversification of the national industries. Foreign industries had been confined to a few sites to enjoy the full benefits of economies of scale. But the weaknesses of such industrial concentration surfaced quickly. Excessive exploitation of resources (mainly water), various nuisances (olfactory, noise, landscape deterioration), and air and water pollution became worrying. A new agency, IEAT, was formed in 1972, with the mandate to regulate industrial development and integrate respect for environmental protection.

The principle behind the decisions of IEAT was to orient new industrial groupings on suitable sites equipped with infrastructure adapted to the needs of these companies (transport, effluent treatment, waste water treatment, power, telecommunications, and water distribution networks) and offering a wide range of services to facilitate the relocation of foreign companies.

Figure 5.2
Distribution of IEs in Thailand



Source: Made by the author.

The first two IEs, Bang Chan IE (108 ha completed in 1973) and Lat Krabang IE (407 ha, completed in 1978) were developed by the IEAT about thirty kilometres from Bangkok. Two new development projects were later launched slightly further east, about forty kilometres from Bangkok in the border province of Samut Prakarn. Unlike the two earlier IEs, these new estates were not entirely developed by IEAT. Bang Poo IE, completed in 1977, was the first IEAT-private joint venture. This massive estate of 872 ha was built by the Thailand Industrial Development Company, a company created through a German-Thai government agreement with the objective of promoting development of small and medium-scale companies. As for the second, Bang Plee IE (161 ha), it was integrated with the construction of a new town to provide accommodation for families going to work in these new industrial estates and parks within the region — and consequently assigned to the National Housing Authority,³ the public developer for social housing.

These new IEs enjoyed considerable success with foreign companies, especially in the automotive and electronics industry, key industrial sectors of Thai production. Nonetheless, they only served to reinforce the primary importance of Bangkok, whose hypertrophy had reached alarming proportions.

In 1981, 70 per cent of national production was concentrated within the capital region (Watanabe 2003). Then IEAT initiated the development of a new IE in the northern region of the country (“Northern Region IE”) to serve as an industrial growth pole and alleviate the problem of rapid urbanization in Chiang Mai. However, this IE could not aspire to draw major foreign companies in state-of-the-art industries.

The discovery of natural gas reserves in the Gulf of Siam was to change all perspectives. By galvanizing infrastructure development to open up the eastern coastal zone (Eastern Seaboard), it was thence feasible to plan the redeployment of industry 100 km south-east of Bangkok. Thus the “Eastern Seaboard Development Plan” was launched in the early 1980s, by which the government hoped to achieve its ambition of developing petroleum and chemical industries along the eastern coast, as Chapter 4 already mentioned. Infrastructure projects took off with the construction of two pipelines and a gas processing plant at Map Ta Phut. The region was then opened up with railway access between Sichrea and Laem Chabang (130 km from Bangkok) and from Sattarit to Map Ta Phut (200 km from Bangkok), as well as a highway linking Chonburi to

Pattaya. In order to handle heavy industrial requirements for water resources, a reservoir and water distribution networks were also constructed. These activities had to be regrouped in two new, large-scale industrial estates developed by IEAT at Laem Chabang (569 ha) and Mat Ta Phut (1,634 ha), both flanked by a deep sea port to reorient Thai industries towards exports. In order to attract foreign companies to establish themselves or migrate there, the region was registered in BOI zone 3, which offered the maximum privileges to investors, or as many privileges as the regions 800 km beyond the capital. The government also shifted to financial liberalization by lifting the limitation on external borrowings for Eastern Seaboard industrial projects.

This policy did not take long to bear fruit. The development of the eastern coastal zone was stimulated by the surge of the yen following the Plaza agreement, which drove Japanese firms to the area. Private Thai developers were soon enticed by the idea of developing industrial zones in the region. Once the state had opened up the region, it became less risky to convert agricultural land into industrial land to derive higher capital gains. Many industrial zones flourished along the new axis of Highway 301. Two large private companies were founded, specifically dedicated to industrial estate development: Hemaraj and Amata Public Corporation.

While the development of the petrochemical industry was anticipated along the Eastern Seaboard, it was the automotive industry which was by far the most heavily drawn to the region. Fleeing traffic congestion in Bangkok and attracted by zone 3 privileges, Japanese manufacturer Mitsubishi Motors built an assembling plant in 1996 at Laem Chabang, in Chonburi province. Ford Mazda, General Motors, and BMW soon followed, setting up factories with their outsourcing partners a little further east in the Rayong province, between 1998 and 2000 (Lecler 2002; see also Chapter 6).

In the meantime, IEAT started to launch industrial estate projects in the countryside, in accordance with a new decentralization policy of industrial activities decided by the MOI (Chapter 4). The strategy involved industrial development based on the use of local natural resources. One such case was in South Thailand where IEAT developed an IE of 191 ha for the rubber industry (raw rubber and derived rubber products). Situated in the Songkhla province, 900 km from Bangkok, this public IE was recruited into a vast project to accentuate the importance of this border region, with the construction of a road network providing access to Malaysia, airports (Surat Tani, Chapeau Yai, Phuket), and the Songkhla port.

Central Thailand, another neglected region, was also targeted by the regional development policy. Two public IEs were built here by IEAT: these were the Phichit IE (124 ha, 336 km north of Bangkok) and the Khon Kaen IE in the textile-dominated north-east, 456 km from the capital. Industrial activities relied on the textile tradition of these regions and involved the manufacture of raw materials for textiles, production, and dyeing of fabrics.

During the 1990s, a dozen new public IEs were on the IEAT programme for the peripheral regions. With areas of between 150 to 400 hectares, these projects spread out nationwide, but most of them were concentrated in the southern provinces (Surat Thani, Nakhon Si Thammarat, Krabi, Yala, Trang, and Narathiwat). The regional development initiative in the south was meant to stimulate economic development in the "Growth triangle", linking Indonesia, Malaysia, and Thailand (IMT Growth Triangle⁴), launched in 1993 under the impetus of Malaysian Prime Minister Mahathir Mohamad. But the 1997 crisis dealt a severe blow to these ambitions. None of the public industrial estate projects planned during this period was implemented.

When Thaksin Shinawatra came to power in 2001, he launched the so-called "dual-track policy" (see Chapters 2 and 4), which promoted economic development in rural areas through various funding programmes for small-sized activities, while continuing to support manufacturing industries with government incentives. The cluster concept was the key instrument through which this policy was to be implemented in order to stimulate innovation. In other words, clusters were to replace IEs as a matrix for economic development.

The first axis of the "dual-track policy" related to rural areas was aimed at encouraging new grass roots activities in small districts to generate more value added from projects based on processing, and light manufacturing and trading activities. Clusters had to be planned and implemented at the regional and local levels. This policy did not rely on proactive regional or local governments having a clear vision of desirable measures and capable of coordinating economic development. Instead, it was supervised by provincial governors appointed by the central government to act like provincial Chief Executive Officers (Intarakumnerd 2009).

The second axis, related to the manufacturing and service sectors, focused public effort on five targeted industries for which Thailand possessed comparative advantage, namely the automotive, fashion,

software, tourism, and food industries. Here again clusters had to be planned and implemented. However, in these strategic industries, as mentioned in Chapter 2, clusters covering the whole country had been defined — that is, sector-based clusters, rather than territory-based. For example, an automotive cluster, a tourism cluster, and a software cluster had been designated at the national level without involving geographic clustering. Furthermore, investment packages for clusters, regardless of their geographical location had been introduced in 2004. Industrial activities tended consequently to re-concentrate in the region of Bangkok and the eastern coastal provinces.⁵

The present IE framework reflects the double dynamics ushered in by the governmental policy after the Asian crisis well: firstly in redirecting industrial activity towards the central and eastern regions, and secondly, in consolidating local activities around main public estates (or those having a strong public-private tie-up) in a small number of peripheral provinces.

The latter policy consisted of pushing for more specialization — through the cluster framework — and making the best possible use of the frontier locations of the estates. In the case of the Northern Region IE, development plans have been drawn up with border countries (South China and other countries of the Indochina peninsula) so as to draw foreign investments into this region. This IE has been provided with a stocking central and transportation hubs to facilitate exchanges with neighbouring regions of the Mekong. The principal activities include the manufacture of precious stones and jewellery, fabrics and electronic components, with particular emphasis on the use of local resources and technological development.

The southern part of the country continues to draw special attention owing to its relative underdevelopment and separatist movements in the Muslim provinces (Yala, Pattani, Narathiwat, and Satun), annexed in 1902 by the Kingdom of Siam.⁶ In 2003, a new IE specializing in halal foods (“Halal Food IE”) was created with a view to exporting halal products to Muslim countries. This 144-ha estate is situated in the Pattani province, 1,055 km from Bangkok. Measures have been taken to guarantee the respect of hygiene standards and the halal tradition. Since the project was approved by the OIC (Organisation of Islamic Conference), interest-free loans are now granted by the Islamic Bank to producers of halal foods. Unlike previous initiatives that drove local development, IEAT is not the primary developer of the project. The task was undertaken by a private

operator, the food producer, Halal Fattoni Industries. But the state strongly supports the development project since the political stakes are high, with violence escalating within the zone since 2004. Moving beyond economic development, the government seeks to promote moderate Islam in the region. The construction of an Islamic university in synergy with the production of halal food could activate a cluster dynamics and consequently curtail the departure of students to universities in the Middle East, where the doctrine is far more radical.

In a parallel move to the Halal Food Estate, the government plans to consolidate activities around rubber in the public industrial estate of the Songkhla province, also situated in South Thailand (the "Southern IE"). The goal is to reinforce the importance of this industry, largely oriented towards exports (90 per cent of raw rubber and rubber products are being exported), through collaborations with Malaysia and Indonesia. This IE benefits from the proximity of a new deep sea port recently opened in Kantang (Tang Province, see map), which was jointly financed by Thailand, Indonesia, and Malaysia within the framework of the "IMT Growth Triangle".

Despite these attempts to promote regional development, regional city centres have not gained a significant role. Economic activities continue to concentrate in the central and eastern regions, thus exacerbating the regional imbalance. The Bangkok Metropolitan Area has reached a population of 8.1 million inhabitants, dwarfing that of Chiang Mai, the second largest agglomeration (less than 1 million inhabitants). The other regional cities are far smaller even, with populations below 160,000 inhabitants. In contrast, in Malaysia and the Philippines, regional cities stand over 500,000 inhabitants. The figure is much higher in Indonesia, Korea, and Japan, where several regional cities have more than one million inhabitants.

The severe imbalance in the distribution of the population goes hand in hand with a weak local institutional framework. Although the new constitution enforced in 1997 stipulates that the central government must allow autonomy for local governments, decentralization is far from being effective. Many functions at the level of local government are performed by the central government whose departments extend their operations into the provinces. Most resources and revenues generated are drawn into the centre, leaving local governments with inadequate means to meet the growing needs of local communities, especially in urban areas. This lack

of resources restricts the capacity of local governments to deliver basic services to the local communities, and impedes their capacity to develop their own projects.

Clearly, Thailand's government has been ineffective in implementing a regional policy based on the IE framework. Amongst various factors, poor local governance and the lack of infrastructure in peripheral regions are to blame. It is widely acknowledged that achieving regional development requires a strong commitment by local government and stakeholders. More recently, the idea that regional economic development might give way to new innovation paths has given rise to the concept of "Regional Innovation Systems" (RIS). Unlike other Asian countries such as Japan and Korea, where the focus has been recently put on regional development through geographical agglomeration of firms or innovative poles (IEs, clusters, etc.), Thailand has chosen to promote an industry-specific policy without consideration for geographical factors. This partly explains why the so-called "cluster policy" has been mostly disconnected from the IE framework. We shall discuss the implications of this choice later (in section 4).

3. PUBLIC-PRIVATE COOPERATION IN IE DEVELOPMENT

The IE framework formed the matrix of Thailand's industrialization, but the very core of this matrix was made up by effective public-private cooperation in IE development. The basic idea was that IEAT will provide large infrastructure projects (especially transport and communication facilities), services (through One Stop Centres), and environmental quality control, while private developers will bear the risk of land development within the estates. In fact, as mentioned earlier, the initial IEs were totally relying on IEAT's development initiative. But private developers soon stepped in. The major impetus was given in the early 1980s by the launching of the "Eastern Seaboard Development Plan". After the advent of the Thaksin administration, the withdrawal of state funding accelerated. Private developers were fully entrusted with the initiative of large-scale IE development and even construction/management of large facilities such as deep seaports (in Sriracha and Chonburi for the eastern region, and more recently, in Kantang for the Southern region).

Of the thirty-four IEs officially listed, only nine are run by public operators (eight by IEAT and one by the National Housing Authority).

The vast majority of IEs hence belong to the private sector. Private developers have very different profiles, but they may be classified into three broad categories: entrepreneurs developing production in the IE; entrepreneurs that become developers to seize an opportunity; land development companies specialized in industrial parks (Table 5.2).

The first category is barely represented, with fewer than ten operators. Two German-Thai initiatives may be cited in this category in the central region: the Bang Poo IE (first private IE launched in 1977) born of a governmental initiative in support of small and medium-scale companies, and the Nong Khan IE, a German-Thai joint-venture in the ceramics industry. Also in this category is the Ban-Wa (Hi Tech) IE, the only estate comprising high-tech companies, developed by a group of petrochemical industrialists associated with a Singaporean specialist in high-tech park development (Jurong Town Corporation). Other estates are highly specialized: Padeang Properties, an estate focused on zinc, constructed close to the zinc mines of Padeang; Gemopolis, specializing in gems and jewellery; Sinsakhon Printing City IE, for printing activity. In the last two cases, the IE tries to bring together different small and medium-scale companies whose activities are related to the industry in question.

The second category also comprises about ten IEs developed by industrialists, but without the objective of specialization. Hence a wide variety of activities may be found on one site. The operators of these estates most often have seized an opportunity to diversify into development. This is the case of Well Grow industries (member of the Taiwanese steel group Hsiung) or subsidiaries of Thai public works such as Bang Pa-In Land Development or MDX Public Corporation. Also in this category is the company Mahachai Land, set up by a Thai plastic manufacturer.

Lastly, it is in the third category that the most important operators may be found. In particular, two major Thai companies specialized in Industrial Estate development towards the end of the 1980s. The first, Hemaraj, was founded in 1988 by the financial firm Thailand Securities, a subsidiary of the Thai Stock Exchange. Within a decade, the operator became the main private industrial developer in the country. Apart from the four large estates completed in the Chonburi and Rayong provinces totalling 4000 ha, the developer also completed two new IEs in the same region, on land obtained through absorption from a subsidiary of the cement manufacturer Siam Cement Public Company Limited (SIL Industrial Land Development) in 2005. In total, the Hemaraj group was flush with

Table 5.2
Developer Types of Thai IEs

Name of IE	Developer	Year established	Year of completion	Area developed by end 2006 (ha)	Developer type
Bang Chan IE	IEAT	1972	1973	124	State enterprise under the control of Ministry for Industry.
Lat Krabang IE	IEAT		1978	407	idem
Laem Chabang IE	IEAT		1982	569	idem
Map Ta Phut IE	IEAT		1989	1,634	idem
Northern region IE	IEAT		1983	201	idem
Bangplee IE	National Housing Authority		1984	161	Public development company for new cities and social housing construction
Phichit IE	IEAT		1994	124	State enterprise under the control of Ministry for Industry
Southern IE	IEAT		1995	191	idem
Khon Kaen IE	IEAT		1999	0,6	idem
Bang Poo IE	Thailand Industrial Development	1977	1994	872	German-Thai governmental agreement. The development of this IE was accompanied by a government policy to promote the development of small and medium-scale companies and industries.
Saha Rattana Nakorn IE	Saha Rattana Na-korn		1993	328	Industrial company affiliated to the Taiwanese steel group Hsiung.
Well Grow IE	Well Grow Industries	1987	1989	516	Land developer, 78% holding subsidiary of the finance firm Thailand Securities Depository Corp, itself 100% owned by the Thai Stock Exchange.
Hemaraj Chonburi IE	Hemaraj LDP	1988	1989	655	

Eastern IE	Hemaraj LDP	1989	398	Idem
Eastern Seaboard IE	Hemaraj LDP	1994	1,123	Idem
Hemaraj Eastern Seaboard IE	Hemaraj LDP	1999	1,867	Idem
Amata Nakorn IE	Amata Public Corp.	1989	1,059	Land developer, 31% capital held by the Kromadit family, institutional investors and companies established in the IE. Another IE in Vietnam.
Amata city IE	Amata Public Corp.	1996	714	Idem
Bangpa-in IE	Bangpa-in Land Devlpt	1994	314	Subsidiary of the Thai building and public works group Karn-chang
Kaeng Khoi IE	Saraburi industrial park co	1990	94	
Gateway City IE	MDX Public Corp.	1990	1,040	Thai building and public works company
Samut Sakhon IE	Mahachai Land Developmt	1990	233	Plastic manufacturer
Ratchaburi IE	Mahachai Land Developmt	1998	228	Idem
Nong Khae IE	Thai-German Industry Public Co.	1990	327	German-Thai joint-venture in the ceramics industry
Gemopolis IE	IGS Public co	1993	28	Jewellery industry. Shown as a jewellery cluster
Padaeng IE	Padaeng Properties Public Corp.	1981	86	100%-owned subsidiary of the group
Pin Thong IE	Pinthong Industrial Park Corp.	1994	81	Padaeng Industry, mining zinc in Padaeng Jutha Wan Metal Ltd, firm that stocks and distributes stainless steel, 67% held by the Pira family.
Asia IE	Asia Industrial Estate Corp.	2001	398	

continued on next page

Table 5.2 — cont'd

Name of IE	Developer	Year established	Year of completion	Area developed by end 2006 (ha)	Developer type
Sinsakhon Printing City IE	CAS Printing City Corp.		2006	134	Shown as a cluster comprising printing and packaging industries.
Ban-Wa (Hi tech) IE	Thai Industrial Estate Corp.	1986	1992	367	Group of petrochemical industrialists in a tie-up with a Singaporean hi-tech park development specialist, Jurong Town Corporation.
Halal Food IE	Fattoni Industries				Received the ASEAN Association of Housing and Planning award for this development in 1996.
Kruaok IE	Khunchai Corp.				Regional development project with participation of investors from Malaysia, Indonesia, Brunei, and Bangkok.
Hariphunchai IE	Dhevi Spa and Longstay Resort Corp.				
RIL IE	Rayong Industrial Land Corp.	1996			
304 IE zone2	304 industrial park Co	1993	2001		Company affiliated to SIL, recent joint venture tie-up with Hemaraj. Developing company founded by a group of Thai entrepreneurs to build complete "industrial cities". This company built an industrial park at Prachinburi before taking on the multiphase development of a new project near the Laem Chabang port.

Source: Composed by the author based on data from IEAT.

property stocks of close to 5,000 hectares.⁷ The second largest private developer is the company Amata, founded in 1989 by the Sino-Thai businessman Vikrom Kromadit, who is among the wealthiest people in the country. With a capital far more modest than Hemaraj (1 million and 13 million baht, respectively), Amata has developed two large IEs of more than 2,000 hectares. Its activity is not confined to Thailand though. It is the first Thai property developer to enter Vietnam (on a site of 700 hectares), owing to the strong relations established by Vikrom Kromadit with Vietnamese authorities. In the last few years, Amata has asserted its position as a market leader in the country for the commercialization of property with a market share of 37 per cent. It places particular emphasis on client services. This is how Kromadit succeeded in drawing one of the most prestigious schools into one of his IEs, the Suankularb Wittayalai International School.

It may be observed that a number of industrial park developers easily exploit the label "Industrial Estates" to serve their commercial strategies. This is the case for the firm Rojana, a Japanese-Thai joint-venture with a 49 per cent stake held by *sôgô shôsha* Sumikin Bussan of the Sumitomo conglomerate, which runs two industrial parks in Ayuttaya and Rayong. The industrial parks offer the same BOI privileges as the IE, and a reasonably wide array of services, including housing (up to 250 units available in the Rojana Park at Rayong) but they lack a "One Stop Centre" and free zone (EPZ). Furthermore, foreign companies cannot acquire full rights over property. This explains why developers here offer turnkey factory rentals and leasehold property. Despite these shortcomings, Rojana is particularly well positioned to attract large Japanese automotive and electronic companies, because of its Japanese-Thai status. This explains the scale of its projects whose areas are comparable with those of the Industrial Estates (672 ha for Rayong Park where the sixth phase is underway). Flush with success, Rojana is now a pioneer among Thai developers, having attempted to penetrate China with a vast industrial park project of 880 ha in the Zhonglou Economic Zone, 160 km from Shanghai.

The advent of specialist operators in IE development may be explained by the enormous opportunities resulting from the opening of the eastern coastal region, but also by the increasing demands of IEAT with respect to the environmental and urban quality of projects.

Obtaining the "Industrial Estate" label entails lengthy administrative procedures. The developer must first present a project to IEAT, which

takes sixty days to examine its feasibility, followed by a site study. Subsequently the project is submitted to the Ministry for Industry and the Environmental Agency. The first registers the IE for industrial zoning (official declaration for the creation of an IE) while the second undertakes a study on the environmental impact in collaboration with IEAT. Once the necessary authorization has been granted for establishing an IE on the identified site, the developer must obtain approvals for the layout, equipment, and infrastructure required in the IE. Finally, permission must be obtained to allot land holdings and allocate plots to potential occupants. It should be highlighted here that despite the imposition of strict environmental quality control standards, IEAT can grant permission within short timeframes of barely three months (ninety-seven days for all procedural steps). Development projects are completed in phases, thereby alleviating financial risks (taxes and financial costs for holding properties), since the land acquired is for public purposes by the estate as and when the property is acquired. However, the IE is always enclosed in order to prevent intrusions and protect manufacturing trade secrets. Several developers such as Hemaraj and Amata are implementing their seventh or eighth phase in the eastern coastal region.

In reality, negotiations between the private operator and IEAT commence long before procedures are officially launched. The developer begins by acquiring land in a region suitable for IE development, that is, conforming to the following conditions: registering the site in a BOI zone offering massive privileges (zone 2 or 3), proximity to a port (if possible a deep sea port to attract major firms in automotive or electronics industries) and/or an international airport, highway access within a reasonable distance-timeframe to Bangkok (enabling senior management executives to shuttle daily within timeframes of three-and-a-half and four hours per day). A workforce is not a prerequisite since the rural population, largely from the north-east, migrates readily to the IE. Worker housing needs are addressed by promoters or small-scale local private entrepreneurs, less often by public developers. A number of public IEs have, nonetheless, built new towns, such as Bang Plee (developed by the National Housing Authority) or Laem Chabang (about 100,000 people of whom more than 50 per cent live in social housing). It may not come as a surprise that these urban projects are not a result of local initiatives, but emerged from concerted action among the principal state bodies concerned: IEAT and the ministries for Industry, Environment, and Labour.

Parallel to property acquisition, the developer consults IEAT to examine the nature of industries that may be located on the estate, given the site features. The strategy consists of attracting a large "anchor firm" to help commercialize other lots. Such companies attract not only outsourcing partners, but also confer a positive image to the project, the basis for a marketing strategy. IEAT, supported by the BOI, has a significant role to play in estate promotion, which is then entirely billed to the developer.

As we have seen earlier, IEAT provides major transport infrastructure (ports, roads, highways, and railroads) and networks (telecommunications, water, gas, electricity). In return, the developers pay an annual fee to IEAT, which accounts for 50 per cent of its turnover (57 per cent in 2004⁸). The developer also pays for the maintenance of the IEAT "cell" and a Customs office. Costs are very high since they include the construction and maintenance of the premises, employee housing (up to fifteen employees in some estates, including even the housemaid!).

The IEAT cell provides logistical support services to companies located in the estate ("One Stop Centre") and exercises rigorous control over infrastructure quality and services offered within its boundary. Controls are particularly strict over water and air pollution. Agents in the cell also grant the permission to construct factories on the estate, and manage land records in which all property registrations are entered. Permissions take a little over a month to obtain. Properties are available for sale only in private IEs. Those developed by IEAT are leased to companies for an annual rent that accounts for 25 per cent of the IEAT turnover (27 per cent in 2004⁹). Foreign companies, however, prefer to enjoy absolute ownership rights over the land since property rights are totally secure in Thailand, unlike in China or Vietnam.

As more IEs moved away from the capital and the private sector took over development projects, a broadening of services offered to tenant companies was required. In the first public IEs, services were essentially confined to the industrial domain. The developer did not look into housing needs except in the case of the Bang Plee public estate, undertaken by the National Housing Authority. Moreover, only worker housing requirements were taken into consideration, since executives had the option of travelling to and from Bangkok on a daily basis. With the multiplication of IEs in the eastern coastal region, in the zones reached only by a two-hour car journey from Bangkok, it became necessary to consider executive housing needs, if only to ensure a temporary housing facility during the week (for families

preferring to stay in the capital). Luxurious condominiums have been constructed on the new estates alongside more modest house types for middle-management. The workers continue to live outside the IEs, but developers also build housing for these workers close to their workplace.

The introduction of housing on the estates entailed the development of an entire range of connected services: the IE hereafter must have a golf course, neighbourhood amenities such as shopping centres, restaurants, banking services, security, health, and less frequently, educational institutions. This widening of services fits in with the marketing strategy of developers, some of whom virtually transform their estates into live urban projects. This is how the developer Amata Corporation uses the concept of the "Perfect City" to promote its two estates in Chonburi and Rayong. It emphasizes "care for human needs", a large array of facilities available in the neighbourhood, including 24-hour hospitals, ambient surroundings (greenery, bird parks), technology (state-of-the-art communication infrastructure), education (childcare services, Suankularb Wittayala International School), as well as arts and culture (sponsored by the Amata Foundation). Likewise, the Gemopolis developer launched the concept of the "Factory Town", a small urban enclave in a large Bangkok suburb a few kilometres from the new international airport. Manufacturers and traders in the precious stone and jewellery industry may stay here for varying lengths of time and thereby avoid the congestion in metropolitan Bangkok.

Even if these urban projects are enclosed and under close surveillance, they are far removed from the "gated community" model. On the contrary, they are largely open to local communities, and offer the latter access to sports, commercial, and educational facilities. Private developers in fact seek to be like regional developers in providing work opportunities and modern equipment. They also emphasize "sustainability" by providing open spaces with natural landscapes, and adhering to environmental quality standards (ISO 14001 standard for the two estates of the Amata Corporation and the industrial parks of Rojana). They also actively sponsor education and cultural activity in the region in the form of school materials and study grants. The founder of Amata, Vikrom Kromadit, has withdrawn from business activities to dedicate himself to the foundation, to which he donates generously (US\$110 million in 2007).

These strategies for regional development earn the support of the authorities, and especially, IEAT, but they also have the irrefutable

advantage of facilitating land acquisition ahead of the projects. Even though some zones are far from the urban centres and not always suited to agricultural activity — as is the case of the eastern coastal region, where the high salt content leaves the soil sterile — the purchase of land at low prices is not a simple affair. This is because once farmers are aware of development projects, they raise land prices or refuse to sell them, speculating for better gains. Private operators cannot resort to expropriation; unlike public developers, they must depend on a local agent to facilitate land acquisitions. Hence, they turn to the local functionary, the *puyah*, who alone can convince farmers to sell their land at reasonable prices by demonstrating the beneficial impact of IEs on the local community.

Owing to these skilful strategies, private developers are able to keep land at a reasonable price for incoming firms. This in turn allows for the upgrading of infrastructure and the enhancement of support services within the IE so as to meet client demand. Some developers are trying to promote an “urban life” in their estates, but expatriates are not likely to renounce Bangkok's true vibrant urban atmosphere and highly diversified services. This does not leave much room to locate future IE projects. Industrial land developers have thus invested heavily in the eastern coastal region where abundant land reserves can be made. Chonburi and Rayong provinces offer particularly well balanced conditions. They are far enough from Bangkok to avoid traffic congestion and to provide the highest BOI privileges (zone 3), but at the same time close enough to allow expatriates to live with their families in Bangkok. Furthermore, they give close access to the deep sea ports from which manufactured products can be exported.

In fact, the comparative advantages offered by these two provinces are so favourable that even Chinese firms have relocated there. This move is explained by various factors. First, the cost of labour has become lower than in Chinese major cities and coastal regions since 2006. Second, the privileges granted by BOI in zone 3 beat the highest tax exemptions in China. Third, access is offered by Thailand to a large consumer market in the region through numerous FTA agreements. Chinese investors set foot on Thailand's soil after the signing of a bilateral Thailand-China trade agreement, in October 2003. Chinese FDI peaked in 2004, when Thailand became the fifth largest recipient of Chinese FDI on the continent.¹⁰

Quite obviously, Thai estates are gearing up for expansion. Becoming more sophisticated and inclined to match the requirements of the firms closely as they evolve, they remain the most appropriate instrument for

attracting multinational firms to Thailand. However, no matter how well they fulfil clients' needs, private IE are no longer meant to advance the technological content of national production. Fully relying on market forces to accommodate a wide range of local and foreign firms, they do not differ basically from ordinary, profit-oriented land development projects. In this respect, Thailand's recent orientation contrasts with that of other Asian countries. We will now examine more closely evidence from empirical research on industrial grouping and economic growth.

4. THAILAND'S IE FACING THE NEW INNOVATION PARADIGM

Until the 1980s, academic research on economic development mainly concentrated on the national level. As national economies progressively integrated into a globalized economy, the gap between regions widened — especially in emerging countries — and became a source of political concern. Regional economic development therefore gained growing interest in both academic and politic circles. Literature and research in this field can be classified into two main bodies.

The first body deals with city and regional development planning. Questions are raised on how to achieve a more balanced regional growth, increase the participation of the local stakeholders (especially the residents), and what role local governments should play in the development process under very centralized administrative systems of planning and administration. In Asia, particular attention was paid to overconcentration of population and activities in mega-urban regions (see Ramos and Sazanami 1991). In terms of policymaking, these empirical studies usually come out with recommendations for appropriate institutional arrangements and planning procedures to improve the management of mega cities and alleviate the regional imbalance.

The second body, of particular relevance to this chapter, deals with the concept of regional innovation systems (RIS). Originated in the 1990s from modern innovation theory, the RIS concept has recently evolved into a widely used analytical framework and is currently underlying innovation policymaking (Storper, Porter, Doloreux, Cook, among others).

There is no commonly accepted definition of a RIS, but it is usually understood as a set of interacting private and public interests, formal institutions, and other organizations that function according to organizational and institutional arrangements and relationships conducive

to the generation, use, and dissemination of knowledge (Doloreux 2003). It would be beyond the scope of this chapter to review the extensive academic literature produced on this issue, but we shall summarize here the major findings.

The RIS concept strongly emphasizes the fact that innovation is a *locally embedded process* (Storper 1997; Malmberg and Maskell 1997). Far from being location-free, RIS are embedded in local networks and communities of firms and support infrastructure operating in research and training institutions, financial intermediaries, government agencies, as well as community and business associations.

The distance between the actors of a RIS may be critical. Thus, geographic proximity is of much importance. Not only does it facilitate knowledge spillovers, but it also generates economies of scale and scope, as well as network externalities. Particularly crucial for innovation is the knowledge transfer between universities and high tech firms, which requires spatial proximity, at least in the early stages. It takes the form of information transmission in local personal networks of university and industry professionals, or formal business relations. Local university knowledge spillovers may also be generated by industrial application of university physical facilities, but it very much depends on the nature of the concerned industry (Lim 2006).

The region is considered the best geographical level for an innovation-based economy because, according to Porter (1998), the enduring competitive advantage in a global economy often arises from a concentration of highly specialized skills and knowledge, institutions, related businesses, and customers in a given region. The success stories of famous "innovative regions" such as the "Third Italy", the Silicon Valley, or the Route 128 in Boston, have given evidence to the relevancy of the regional scale in the innovation process. They have also displayed the strong disparity of local networks of firms and industries prevailing in each region. Some have the characteristics of "Marshallians" districts with predominantly small-scale enterprises, others are "hub and spoke" districts with regional structure and domination by several major corporations, or one satellite "branch plants" districts, or complex state-oriented districts such as military or research centres (Edgington and Fernandez 2001).

Whatever the form taken by the local networks, institutional support from local governments and local quasi-government organizations (such as chambers of commerce, public-private cooperation networks) is

considered necessary to secure continuous product innovation in an unstable globalized economy. Small firms in particular are unable to bear the cost of developing new technologies, finding new markets, training skilled engineers and workers, and raising capital. Thus support through “soft” infrastructure (regional organizations, access to low-cost credit, information, and training) tends to be more important than the supply of “hard” infrastructure (Edgington and Fernandez 2001).

Some authors have pointed out the shortcomings in the RIS concept. Doloreux and Parto (2007) argue that there is no clear definition of a “region” in empirical studies referring to RIS. The term “region” encompasses a wide variety of scales, ranging from small-scale industrial districts within cities, to national territories. Also unclear are the boundaries of the region. The authors argue that innovation is not exclusively an endogenously generated process within a given region. Innovative firms are linked to the outside world by various sorts of connections, and their ability to tap into different innovation systems is a source of competitive advantage. Available knowledge that can be drawn from outside the region must, therefore, be integrated into the analytical framework.

Though not a panacea, the RIS concept has gained growing popularity over the past decade, policymakers having enthusiastically adopted it. The European Union has started to implement RIS programmes in its less developed regions. Similar innovation systems are also being experimented in Asia. In Japan, Ministry of Economy, Trade and Industry has launched in 2001 an industrial cluster programme designed to upgrade existing industrial agglomerations, and promote, although not exclusively, symbiotic clusters of SMEs where expertise and skill could accumulate, while Ministry of Education, Culture, Sports, Science and Technology established in 2002 its Knowledge Cluster initiative, using regional industrial, but also, researching potentialities to develop new industries or technologies (Hattori and Lecler 2009).

But South Korea is the only country that has explicitly attempted to experiment with RIS concept so far. As Southeast Asian countries have been constantly learning from the experience of the most mature economies in the region, it is interesting to review Korea’s experience with regional policy over the past decades.

Due to its particular recent history (the partition of the country in 1953 and the subsequent massive immigration from North Korea), South Korea has been facing strong spatial polarization in its capital city. The Seoul

National Capital Area — which includes the major port city of Incheon and satellite towns in Gyeonggi Province — has 24.5 million inhabitants, and ranks second in the world after the Tokyo Greater Region. With a national population of 48.85 million inhabitants, its share of the national population reaches the critical figure of 50 per cent. Therefore, regional policy has been a major concern since the early stage of Korea's industrialization.

The basic regulation for regional planning was set in 1963. As in Thailand, the purpose was to decentralize industries from the capital city to alleviate regional imbalance and prevent pollution. Large-scale public investments were provided to expand infrastructure along the Seoul-Pusan expressway axis, and in both the capital and south-east regions. The first IE was developed in the south-east coast in 1962 (Ulsan IE). Furthermore, IE development, undertaken by a devoted public corporation and planned by the government with strict guidelines, was concentrated in major cities, mainly in the capital and south-east regions, in conjunction with roads, railways, power plants, and ports.

To discourage firms establishing in the capital region, heavier taxation and stricter control of pollution applied in Seoul. Construction and expansion of higher education facilities (universities, colleges) were also restricted in the capital city; furthermore, the state proceeded with the relocation of government offices and headquarters of public organizations (Ahn and Ohn 1997). The central government could also act on regional location through the strict control of low-rate industrial loans — both foreign and domestic — granted to Korean large-scale firms. This control did not apply to SMEs and firms with foreign participation (Renaud 1974).

As in Thailand, the regional policy did not achieve much success in its early stage. During the 1970s and 1980s, Seoul continued to dominate the economy, although the momentum for growth spread to adjacent areas (in particular, the five new towns created in 1989) and to the southeast provinces. A common factor with Thailand was the necessity to raise the competitiveness of the capital region against other world cities in a growingly globalized economy. It did not leave much room for reducing regional disparities, and regional development was thus seen as a "byproduct" of national economic plans.

The situation changed after the Asian crisis in 1997. Severely hit by the disaster, South Korea came to question its economic model. Regional development policy was brought back on the agenda, but the approach differed from that of the previous period. Local governments, which had

been given more autonomy in 1995, were encouraged to adopt an entrepreneurial approach to promoting value-added and high technology industries. This change culminated in 2003, when Korea adopted the concept of RIS.

The new model went far beyond the purpose of achieving regional balance and mitigating the ill effects of Seoul's over concentration. It relied on the acknowledgment that Korea lacked competitive original technologies and lagged behind other industrialized nations in terms of productivity. As major instruments of the RIS policy, so-called "innovation clusters" were introduced. They were to replace the previous generation of technopolis/innopolis whose purpose had been to bring together industry, research institutes, and universities in a devoted area — to generate proximity effects — but which had failed to come up with innovative products (Japan had a similar experience with the failure of the "Technopolis Plan" launched in the 1980s). The new framework builds on seven large industrial complexes (IEs), accounting for 64 per cent of the output of national industrial complexes and forms a balanced framework throughout the country. They are all specialized in one or two industries: Changwon (machines, mechatronics); Gumi (electronics); Ulsan (automobile); Banwol-Siwha (parts, material); Gwangju (optical electronics industry); Wonju (medical instruments); and Gunsan (motor parts). SMEs are primarily targeted as key players for innovation. This is a major outcome of the 1997 crisis, which revealed the ill effects of an economic model based on gigantic conglomerates.

To enforce this policy, the South Korean government has established a company, KICOX (Korea Industrial Complex Corporation), which is entrusted with the task of upgrading the industrial complexes into "innovation clusters", by creating new industrial space for SMEs, providing apartment-type factories, and offering a variety of services. But the more crucial component of this system is the industrial-academic network consultation body called "mini cluster". It is an integrated group joined by stakeholders in firms, universities, and research institutes, to extend their efforts for promoting innovative technology. Its tasks are typically information exchange and network activities to grasp on-the-spot difficulties, problem settlements and assistance, after-management methods, business planning, and appraisal methods. Each industrial complex contains four to six mini clusters. KICOX has acquired a patent for its mini cluster management, indicating its ambition to standardize the

Korean-type cluster. It is too early to assess the results of this policy, but KICOX has reported a significant increase in the number of innovation-type companies since 2004.¹¹

In considering Korea's experience, what lessons can we draw for Thailand? Thailand could also rely on its IE framework to develop new types of industrial grouping, that rely on proximity effects and industrial-academic networks prone to innovation. However, Thailand's capacity to set up such structures is limited by the following factors:

- the weak urban framework across the country. Innovation takes place in (or close to) urban areas where universities concentrate. In South Korea, many regional cities have more than one million inhabitants, whereas Thailand contains only two large urban areas, Bangkok and Chiang Mai. Additionally, the lack of power and resources of local governments impedes the making of a favourable business and innovation climate at the local level. The poor investment in infrastructure and public facilities in the peripheral regions contributes to aggravate the weakness of the urban framework.
- the lack, until recently, of industry-specific policies. In South Korea, policies seeking economic development have continuously targeted specific industries, especially in the manufacturing sector, where the prospects for technology transfer were the highest. Specialized IEs were created to generate proximity effects and to facilitate spillovers. Although these objectives have been far from fully achieved, the current RIS policy can take advantage of the strong potential of sector-specific grouping. In contrast, Thailand has put its priority on the quality of its physical infrastructure and services within the IEs, at least until 2001. The wide industry mix within most of the IEs consequently does not allow for the building of such industry-specific advantages.
- the lack of concern for geographical grouping. The cluster-based innovation policy recently launched in Thailand does not rely on "geographic clusters". There are, however, a few exceptions. The "Gemopolis IE" (gem and jewellery industry) falls in this category and is the only IE to have obtained the label "cluster". The jewellery industry has a long history in Thailand, owing to a tradition of gem mining. Skills have been acquired in the heat treatment of gem stones and synthetic gems (Yusuf and Nabeshima 2006). The Gemopolis has

a good potential to upgrade the jewellery sector, given its complete supply chain, its proximity to Bangkok (and to the new international airport), as well as its global linkages (through the Bangkok Gem and Jewelry Fair). But it still needs to strengthen its linkage with academic institutions.

Looking more closely at the two key sectors of Thailand's industry — the electronic and automotive sectors — the situation seems quite contrasted. The cluster programme of the hard disk industry has been designed on a national scale without any concern for its geographical dimension. Hence the production of hard disks is scattered in various IEs, though concentrated in the central region, as documented in Chapter 8. In the case of the automotive industry, an "automotive cluster" has been created within a 50-km perimeter of Bangkok to support a network of small and medium-scale companies operating around shared infrastructure and services. Production in this sector shows a certain level of specialization in large private IEs, namely in the Rayong and Chonburi regions, owing to the proximity of major port infrastructure. However, it is questionable that an innovation policy could successfully rely on these IEs, given the weak institutional support at the local level, and more importantly, the poor intrafirm and industry-academic linkage in these estates.

CONCLUSION

This chapter has provided an overview of the evolution of industrial estates in Thailand. As in most other countries of the region, IEs were introduced soon after the early stage of industrialization as a major instrument for enhancing economic development across the country. This regional policy was aimed at reducing the ill effects of overconcentration of the population and activities in the Bangkok Metropolitan area, while creating new development poles in peripheral areas. However, these goals came into conflict with the need to promote Bangkok in the global competition of mega cities. The central government accordingly put its priority on industrialization near Bangkok, neglecting infrastructure, and political and economic development in peripheral areas.

The Asian crisis dealt a further blow to Thailand's regional policy. The dozens of IE projects planned in the 1990s in the peripheral regions had to be abandoned due to lack of financial resources. It then turned out that even in the more central IEs, where major foreign manufacturers had

located, Thai suppliers did not benefit from the expected technology transfer. As a result, the new policy enforced by the Thaksin administration in 2001 to foster innovation, no longer relied on the IE framework. As was also explained in Chapter 4, the government chose instead to base its innovation policy on "clusters". However, unlike Japan or South Korea, where the term "cluster" explicitly refers to the Regional Innovation Systems (RIS) concept, Thailand has defined a distinctive kind of cluster — that is, a sector-based cluster covering the whole country, rather than a territory-based cluster. Although also referring to Porter's cluster concept, the Thai-type of cluster ignores the essential effects of geographic proximity, in particular, interactive and collective learning, as well as positive externalities for participating actors that have been highlighted in empirical studies on innovation systems.

Yet, the IEs are not about to vanish, far from it. The Thai economy still needs foreign companies to establish themselves in the country and industrial estates entirely fulfil this role. The development of private IEs thus continues to be encouraged by the generous tax exemptions and privileges granted by the BOI, and have expanded in the vicinity of the Bangkok metropolitan area by the enlargement of zone 3. Since regional balance is no longer a state priority, manufacturing activities tend to reconcentrate in the region of Bangkok and the eastern coastal provinces. Private IEs developed in these areas have become highly sophisticated, with services and facilities closely matching the needs of multinational firms and their subcontractors. However, it is clear that they are no longer meant to stimulating innovation through technological transfer, as evidenced by the recent establishment of Chinese factories.

Could Thailand nevertheless try to rely on the existing IE framework to develop future regional poles of innovation, following Korea's example? We have shown in this chapter that it would be difficult for it to do so for three major reasons. First, Thailand's urban framework is one of the weakest in Asia. With a population of a mere 160,000 inhabitants (compared with 500,000 in Malaysia-the Philippines, and 1,000,000 in Indonesia, South Korea, and Japan), a typical Thailand's regional city does not have the critical size to develop innovation poles. Adding to this, the strongly centralized institutional framework does not leave much room to strengthen local governance. Second, unlike many Asian countries, Thailand until 2001 did not implement sector-specific policies since its strategy was to attract the widest range of foreign industries by its low-cost labour and high-quality infrastructure. Thai firms did not, therefore, accumulate the

necessary knowledge and skills to shape a competitive domestic industry upon which innovation could take root. Third, innovative poles in South Korea rely on sector-specific industrial groupings, whereas the industry mix in Thailand's IEs is generally too wide to allow a critical concentration of firms in a given industrial sector.

An exception is the Gemopolis IE, which has the ambitious project of becoming a world centre for jewellery. This estate seeks specialization and industrial synergy, building on an old domestic tradition of gem mining and treatment. Strongly supported by the new innovation policy that is fashionable with the five industrial sectors to be promoted, the Gemopolis IE has been granted the "cluster" label. Conditions are favourable for turning this estate into a true innovative pole, but it would require a more proactive policy in education and training, as well as further development of industry-academic linkages.

Notes

1. Based on data released on the IEAT website, updated in September 2005.
2. According to the Asian Industrial Estates database, the most expensive locations in 2009 hit US\$60–US\$70 per sq. metre in Thailand, compared with US\$50–US\$100 in similar locations in Shanghai, US\$60–US\$110 in Vietnam, and US\$40–US\$110 in the Philippines. Malaysia has similar prices as Thailand, and India stands far below, with peaking locations at US\$20/sq.m, <<http://www.asianindustrialestates.com/aie/asp/default.asp>>.
3. The Bangplee IE is usually included among estates developed by the IEAT, owing to its public character.
4. IMT-GT included the two Indonesian provinces of Sumatra in the north, and Daerah Istimewa (DI) Aceh; the four northern Malaysian states of Kedah, Penang, Perak, and Perlis; and five provinces of Southern Thailand, Narathiwat, Pattani, Satun, Songkhla, and Yala.
5. The fashion industry was dependent, however, on the two public IEs of Phichit and Khon Kan, in central Thailand, where the government wished to concentrate all textile operations.
6. The intensity of these separatist movements may be explained by the fact that these provinces, which were earlier part of the Malaysian Muslim Kingdom of Pattani, were annexed in 1902 by the Kingdom of Siam (present-day Thailand).
7. Statistics of 2005, from the site <www.thailand4.com/real-estate/hemaraj-in-joint-venture-zith-siam-cement-industrial-park.html>.
8. IEAT Annual report, 2005.
9. Property sales in 2004 made up only 0.8 per cent of IEAT figures.

10. After Hong Kong, the United States, Canada, and Australia. Investments were directed mainly at construction, mining, and electronics. In 2004 there were 235 Chinese industrial projects, totaling US\$263 million (Source: Thailand-China links, Kasikorn Research Center).
11. *Korea IT Times*, 31 December 2008. In the seven cluster model estates put forward by KICOX, combined production increased from 198 trillion won in 2004 to 232 trillion won in 2006; the number of companies in the estates rose from 10,036 in 2004 to 11,084 in 2006; the number of employed expanded from 428,000 in 2004 to 448,000 in 2006; and the number of innovation-type companies expanded from 655 in 2004 to 1,644 in 2006. <http://www.kdcstaffs.com/it/main_view.php?mode=view&nNum=4761&parts=Policy&This_Issue=20080>.

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