

Chapter 33. Industrial complexes in South Korea: An urban planning approach

Jung Won Sonn and Sang Hee Kim

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ABSTRACT

This chapter argues that two variables should be considered in deciding the location of an industrial hub: 1) whether the industries in the hub require heavy infrastructure; and 2) whether workers and their families need a full urban environment. The second is as important as the first because a hub without a living environment that fits the needs of the workers and their families will have trouble attracting and retaining workers. Focusing on these two variables, we propose a two-by-two matrix with four ideal types of industrial hubs. They are: 1) industrial annex of metropolis; 2) industrial town; 3) metropolitan-immersed industrial hub; and 4) new industrial city. For each of these types, a South Korean example is provided.

Keywords: urban planning, South Korea, industrial complex, developmental state, location of industrial hub, national territorial planning

Introduction

In deciding the location of industrial hubs, various factors should be considered. These include natural factors such as geological and hydrological aspects, and socio-economic factors such as the distribution of infrastructure, location of existing economic activities, and distribution of population. Urban planning-related issues are also an important part of location choice for industrial hubs and their construction because urban planning provides living environment for workers and their families.

This chapter discusses the main theoretical principles for location choice from urban planning perspectives and looks at relevant South Korean experiences. From 1962 to 2018, South Korea built almost 1,207 industrial complexes. These complexes host 19.2 per cent of all manufacturing establishments, which generate 48.5 per cent of total employment. Their labour productivity is higher than those outside the complex, producing 70.3 per cent of the manufacturing output of the nation. The export ratio is even higher, and as much as 73.9 per cent of national exports are from these industrial complexes (Institute for Industrial Location

2018). However, since much has already been written on this topic, here we do not depict the full picture of industrial complex development in South Korea,¹ focusing instead on the location of industrial hubs from an urban planning perspective.

Urban planning and industrial hubs

Industrial hub development can be seen as a policy action at the cross-section of three broader realms of public policy: industrial policy, national territorial planning, and urban planning (see Figure 33.1). These three policy areas overlap (AB, AC, and BC) and industrial hub development falls within the area that all three share (ABC in Figure 33.1).

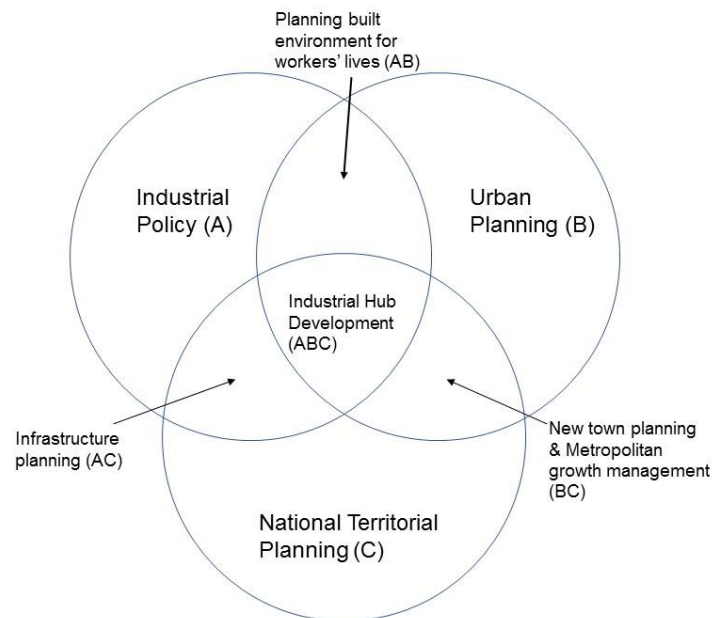


Figure 33.1 Industrial hub development at the cross-section of three areas of public policy

¹ Some of the key contributions are: Ryu (1998), Kim et al. (2012), Cho (2012), Korean Industrial Complex Corporation (2016), and Korean Corporation for Industrial Base Development (1978). Unfortunately for readers who do not speak Korean, most of these publications are in Korean. Two of the few exceptions are Chapter 23 of this volume and Sonn (2019). Section 2 of Sonn (2019) is a review of Korean literature.

The interface between industrial policy and national territorial planning (AC in Figure 33.1)

Industrial policy should decide whether an industry should be promoted through policies and, if so, whether that industry needs an industrial hub. For the industry that needs an industrial hub, the location of the industrial hub should be decided in national territorial planning. The location decision is often based on what Sonn and Choi (2017) called the Smith–Weber paradigm. Adam Smith's (1776) theory of comparative advantage explains how the integration of two national economies will naturally create a division of labour between two countries that specialize in different industries. A national government can apply the same principle of comparative advantage to its regions, allocating industries to regions based on their existing resource endowment. Alfred Weber (1929), one of the forefathers of the modern theory of industrial location, put transportation costs into the equation in addition to resource endowment when explaining firms' location choices. Smith's comparative advantage theory and Weber's least-cost theory can be seamlessly amalgamated because both seek the optimal location of factories on the assumption that the social and physical endowments of sites are fixed.

However, national territorial planning must do more than choose an optimal site if the target industry is strategically important for the structural transformation of the national economy. Industries have to grow by breaking through existing structure of comparative advantages and the optimal locations based on existing structure of comparative advantages of sites. For that, various conditions have to be modified, including the physical and social endowments of the site. In other words, transformation of the site is required for an industrial hub that will host an industry that, in turn, will transform the national economy.

The transformation of the site mainly means, first, that infrastructure has to be laid across the national territory so that required inputs for the hub such as electricity, water, and intermediary goods can be delivered to the industrial hub. Second, the division of labour among regions and cities in the nation may have to be altered so that other regions and cities can produce what the industrial hub needs. Construction of dams, seaports, airports, power plants, communications infrastructure, roads, railways, and other infrastructure across the national territory is the responsibility of national territorial planning. Once all these modifications of the national territory are complete, the optimal hub location is likely to be different from its original state. In other words, for a strategically important industry, the

location of the hub should be determined not based on its current natural and social endowments but rather on its future endowments after the national territorial plan has been implemented (Sonn and Choi 2017).

The interface between industrial policy and urban planning (AB in Figure 33.1)

Urban planning mainly deals with the built environment in everyday life. The area of overlap between industrial policy and urban planning is the living environment for the workers and their families rather than for all the area's citizens. It is the workers and their families that are the users of the living environment, and the demographics of the workers are determined by the industry that industrial policy targets.

Different industries use different types of workers. Some industries prefer women to men, while others hire irrespective of gender. Jobs in some industries need stamina and concentration that are more likely to be possessed by younger workers. Some other jobs require long-term learning from novice to skilled worker. These demographic characteristics of workers determine their length of stay in the hub and the city, as well as their family status, which in turn determines the type of living environment that they need.

The interface between urban planning and national territorial planning (BC in Figure 33.1)

Because location of new towns, how existing cities will be connected, and how cities are supported by energy, water, and other infrastructure is designated by national territorial planning, there is significant overlap between urban planning and national territorial planning. The overlap is relevant to industrial hub development mainly when it is developed as a new town. We will discuss this issue later in this chapter.

Principles of location choice for industrial hub: an urban planning perspective

Two variables

In determining the location of industrial hubs from the urban planning point of view, we should consider two variables: industrial infrastructure required by the industry; and living environment needed for the workers and their families.

Industrial infrastructure

Not all industrial hubs require a brand-new supply of a full range of infrastructure. The scale and type of industries determine the type and scale of the new infrastructure. For example, one can easily see that a petrochemical plant requires more water, more wastewater disposal, and more electricity than a weaving factory, and so on. It is also a matter of scale. Even a weaving factory might require a large-scale electricity supply, seaport, and land transportation system if the factory is large or if there are many weaving factories on the same site.

Living environment

The other key variable is the need for a living environment. Different demographic characteristics require different types of living environments. Factors such as age, gender, educational attainment, and so on are determined by whether the industry requires skilled workers and thus needs to retain the workers for a long time.

If, for whatever reason, the industries in the hub require long-term retention of workers, then the industrial hub should provide a good living environment, so workers will want to stay for a long time and will see their jobs as a lifetime commitment. For workers to stay long term, the suitability of the living environment for their families is as important as it is for workers themselves. To fulfil such aims, a full-scale urban environment that can offer shops with high-quality goods, schools for workers' children, leisure space for families, and a hospital is necessary. Even retirement facilities might be needed. If a full-scale urban environment is not provided, even if wages are high, workers might see their work as a short-term position before moving on to a long-term career somewhere else.

If the industry does not require workers to remain long term, then the hiring of young workers might be a consideration. Young, single workers come to the hub and work for a few years then leave with some money in their bank accounts. These workers do need a living environment, but not necessarily a full-scale urban environment.

Four Types

Combining the two variables discussed in the previous section yields a two-by-two matrix in which four types of industrial hub are matched with four types of location (Table

33.1). These four types are ideal types. Some real-world industrial hubs are similar to these ideal types but others are mixtures of two or more.

Table 33.1 Typology of industrial hubs based on their locations

		Required industrial infrastructure	
		<i>Light</i>	<i>Heavy</i>
Required living environment	<i>Partial</i>	Industrial annex of metropolis	Town of factories
	<i>Full</i>	Metropolitan-immersed industrial hub	New industrial city

Industrial Annex of Metropolis

What we call an industrial annex is a small-scale industrial hub in a suburb of a major city. This is a feasible option when the industry does not require heavy infrastructure and the workers in that industry do not need a full urban environment. The suburban location minimises the combined cost of living environment provision and industrial infrastructure provision.

The main advantage of the industrial annex is good access to the infrastructure of the existing city. Urban infrastructure such as water and electricity supply, sewage, and urban road systems can be extended to reach the site at low cost. If the industry requires large-scale electricity supply, water supply, transportation systems, and so on, development as an industrial hub will seriously damage the living environment for the residents of the city. However, if the industry's need for such input is not substantial, the hub can share those inputs with the city without damaging the living environment of the city too much. If the economic benefit of that industrial hub is estimated to be larger than its damage to the living environment of the existing city, which is often the case at an early stage of a nation's economic development, a suburban location for an industrial hub is justifiable.

However, the living environment that industrial annexes can provide for workers and their families is only partial. Because the location is chosen for its low cost, the living environment in or around the hub is not comparable to a suburban new town that serves as a

high-quality living environment for middle-class families. In an industrial annex of a metropolis, the bare minimum of the living environment is provided at the level of a dormitory, simple shops, and bars. To enjoy a real urban environment, workers can occasionally travel to the main city because it is not too far. This environment would not be enough for workers who have families and/or workers who plan to stay in the hub for the rest of their careers. On the other hand, young workers without a family and without long-term career prospects in the hub can bear these conditions for a few years.

Town of Factories

When the target industry does not need to retain the workforce for a long time, and workers do not mind working for the industry without making a long-term commitment, a full-scale urban environment is not necessary as described in the previous section. The difference between a town of factories and an industrial annex is the scale of its industrial infrastructure. When the industries in the hub require large-scale industrial infrastructure, minimizing the cost by connecting to the existing infrastructure of a major city would damage the living environment of the city at an unjustifiable level. Rather, a specialized infrastructure may have to be constructed on a large scale, in which case even suburban land might be deemed too costly. A site far away from a major metropolitan area where natural conditions are right can be a better choice.

For a town of factories to be sustained, a certain scale is required. Industrial infrastructure has to be built into its optimal scale. This optimal scale is likely to be much bigger than what an average-size factory in a developing country would need. Multiple large factories and/or numerous small factories should share the infrastructure. A larger scale also benefits the living environment aspect of the hub. Although a full urban environment is not an absolute necessity, workers will be more satisfied if the living environment provided offers more than just dormitories. Enlarging workers' total purchasing power by having more workers in the hub would increase and improve the commerce and services available in the market. At least part of the urban living environment would then be fulfilled, without public investment of large scale.

New industrial city

When a large-scale industrial infrastructure similar to that in a town of factories is needed for the industry, but workers will not be satisfied with the type of bare minimum living environment that is provided in a town of factories, a new industrial city should be developed, combining a heavy industrial infrastructure and a full living environment. In a developing country, a new industrial city is needed usually for the industries that hire skilled workers. In an advanced economy where skilled workers are abundant and omnipresent across the country, businesses might use salaries to attract workers who already have skills or whose level of education facilitates fast learning of skills. In a developing country where skilled or educated workers are scarce, a business or industrial hub should train workers until they become skilled. If an industry requires a certain level of skill, an apprentice-level worker is not productive enough to cover his or her minimum wage. Spending time training and retaining apprentices until they become skilled workers is a substantial cost for the factories and the industrial hub. The only solution to this problem is to retain the workers for life so that the investment in the early part of their careers can pay off later on when they become productive enough.

To retain workers for a long time, various schemes have to be devised. Providing a good living environment for workers is one of those important schemes. Workers in a single industry are likely to be a relatively homogeneous group with similar levels of education and similar consumption styles, so a living environment that serves the workers is relatively simple. However, for an industry that retains workers for a long time, there will be an age difference among workers. Age influences consumption patterns in every country but, in a developing country, a larger generation gap exists because younger generations of workers have grown up in a more affluent environment than their older counterparts. Accordingly, the living environment around the industrial hub should cater to much more diverse needs.

Additionally, when a worker stays in one place for their whole career, they are likely to have families. Thus, a family-friendly living environment that includes hospitals, schools, and leisure facilities is needed. Ultimately, the long list of elements desirable in a living environment would be very close to the list of things that exist in a major city.

Inserting the hub in an existing major city is not a solution here. Firstly, the large-scale industrial infrastructure that is needed for this type of hub would have an extremely high price tag if it were built on expensive urban land. Secondly, the living environment in existing cities might not be good enough. In a developing country, blue-collar workers in

established industrial hubs are likely to earn a higher income than the average urban residents. A major city in a developing country is usually polarized between the zones of the country's elite and the zones of the urban poor. The city may or may not have suitable space for the newly emerging, well-paid, stably employed blue-collar class. Given these circumstances, creating a whole new city alongside the industrial hub, away from existing cities, becomes the sensible answer.

Metropolitan-immersed industrial hub

There are industries in which workers require full immersion in an urban environment, but the industry does not need heavy, specialized infrastructure. In this case, an industrial hub has to be created within a metropolitan area. These are industries that are highly dependent upon agglomeration economies: a specialized labour pool, inter-firm networks, and localized knowledge spillovers. Finance and other business services, high-tech industries, and cultural industries are the three categories of industry that are usually cited in this context.

Because the industry and its workers are tightly connected, it is almost impossible to transplant the entirety of related firms and people to a new place or create similar connections in a new place. If an industrial hub is to be created for this type of industry, the best way is to create an industrial hub within a metropolitan area in order to take the greatest advantage of the existing web of firms and workers.

This is possible from a cost perspective mainly because the industrial infrastructure for these industries is not heavy. Industrial infrastructure does not include large-scale water supply, sewage, or large-scale transportation infrastructure. The most important industrial infrastructure is a cluster of office buildings. Because it is within the metropolitan area, new living environments do not have to be built. The prestige of an industrial hub can be used to improve the value of the site, which can also be used for residential or retail development. Profit from the latter can be directed towards industrial hub development if other conditions are met.

Understanding Korean industrial complexes from the urban planning perspective



<Figure 33.2> Land Use in Four Industrial Complexes

We now review cases from South Korea, based on the typology described in the previous section. We do not seek to offer a chronological or comprehensive review, which can be accessed elsewhere (see Sonn 2019). Figure 33.2 shows the locations and land uses of the four industrial complexes that we describe below.

Guro Export Industrial Complex, an industrial annex of Seoul

The Guro Export Industrial Complex (GExIC) was built in the 1960s to promote exports (for the wider context of its development see Chapter 23 of this volume and Sonn 2019). The first phase of GExIC reflected export-oriented industrialization amongst the policy makers' and experts' indecisiveness between export-oriented industrialization and import-substitution industrialization. The second and third phases were, however, implemented a few years later when exports had become a clear target of national industrial policies (Ryu 1998).

Among four types of industrial hubs that we proposed in the previous section, GExIC is the industrial annex of metropolis type. It was within the administrative boundary of Seoul, but outside the built area of the city. This method of development was both required and possible for the urban conditions and level of economic development of South Korea in the 1960s. GExIC mainly hosted light consumer industries such as shoes, garments, and home decoration products. For these products, large-scale new productive infrastructure was not necessary. Water supply was considered in the choice of location, but the main concerns were proximity to Seoul and the price of land (Korean Corporation for Industrial Base Development 1978; Nahm, 2014).

The proximity to Seoul was important because the state did not have the resources to provide infrastructure. It was not possible to make the private sector pay for infrastructure either because the complex was supposed to offer financial incentives for businesses that could export their products. Land prices could be kept low because more than 90 per cent of the land was state owned, while the rest was acquired.²

The site plan of GExIC was predominantly industrial zone.(See Map 1 of Figure 33.2) Aligning with the plan for roads, electricity, and water supplies in Seoul, GExIC has

² That process was advertised as land owners' voluntary sales for this nationally important project but in fact, they were coerced to sell. President Park himself intervened in the process to cover up the brutal process. It took 45 years for the whole truth to be officially acknowledged by the court and the government and the land owners were properly compensated (Chang 2014).

maximized the efficient use of land. Relying on light industry and unskilled workers, the complex did not provide residential and training facilities either (Sonn 2007).

GExIC was developed and managed by the Export Industrial Complex Corporation of Korea (EICCK), a non-profit organization. At the conception of GExIC, a private organization was created but the state had difficulties in justifying a preferential treatment of a private organisation so EICCK was established and took over GExIC project. (Chang 2014; Lee 2012).

In the first stage (1965–67), 30 blocks for factories, infrastructure such as roads, a sewage system, and water supply facilities were deployed on 52,900m² of the site. GExIC aimed to attract foreign investment and planned to accommodate 30 Korean–Japanese industries, but it also opened to small and medium domestic industries. In 1967 there were 22 Korean–Japanese industries and eighteen domestic ones (Lee 2012).

In the second and third stages of development, the original plan was extended without any significant strategic change. The second stage (1967–68), involving 35 factory sites, public land, roads, sewage, and water supply facilities, was planned on 395,800m² of the site to meet increasing demand from industries. For the third stage (1970–73) a site in the west, away from the second stage, was selected. Along with water supply, land price was key to the selection of 1,131,200m² of the site for 107 factories. The whole GExIC, finished in 1973, produced around 10 per cent of total national exports until the 1980s (Ryu 1998), after which the performance started to decline.

Gumi Industrial Complex, a Town of Factories

Gumi Industrial Complex (GIC) was constructed in the 1960s and 1970s. It was one of several large-scale regional industrial complexes that followed the success of the GExIC against the background of the state's steady promotion of exports. The target industry of GIC was electronics (Ryu 1998).

The infrastructure required for this industry was not particularly heavy either (Korean Industrial Complex Corporation 2016). However, GIC was designed to be much larger than an industrial annex like GExIC and the industrial infrastructure had to be at proportional scale, if not as heavy as that for a heavy and chemical industry hub. The location choice of Gumi, more than an hour's drive away from Daegu, the country's third-largest city at that time, was economically reasonable, although one of the main reasons for this choice was that

Gumi was the president's home town. It was a small town within a rural region, so the land was not too expensive. As a greenfield development, the layout of the city could be determined based on what the factories and their workers needed (Cho 2012).

However, GIC was built to be a town of factories not a new industrial city because of the types of workers. Electronics is an R&D-intensive industry in the upstream, but the downstream side is simple assembly, a typical labour-intensive industry. That means the majority of GIC workers on the production line were low-skilled manual workers. The majority of them were young and single and not likely to expect a high-quality urban environment.

The land use plan of GIC in Map 2 of Figure 33.2 clearly indicates GIC is a town of factories. The communal facility zone is extremely small, and the rest of the area is industrial zone. Dormitories were built in industrial zones to house single workers.

In GIC, financial and administrative support for infrastructure and support facilities was provided by the state. Initially, the infrastructure was to be provided by the local government and the preparation of land was to be completed by the tenant industries (Park and Kim 2015). In 1971, Korea Electronic Industrial Complex was appointed to oversee the construction of Gumi complex. In collaboration with other government organizations, its important tasks included the preparation of land, the provision of infrastructure, and the maintenance of communal facilities (Cho 2012). The state covered all the finances when the Ministry of Trade and Industry decided to extend GIC in 1973 (Park and Kim 2015).

GIC presently occupies 22.628 km², consisting of the industrial site (16.52 km²), the supporting site (1.163 km²), the public facility site (3.684 km²), and a green area (1.261 km²). The complex accommodated 78 industries in 1973, increasing to 336 in 1990, and 1,068 in 2008 (Na 2010). It achieved 1.4 per cent of the total national export in 1973, rising to 6.3 per cent in 2012 (Hwang and Park 2014; Cho 2012) after which GIC started to struggle.

Changwon, a New Industrial City

Examples of new industrial cities can be found among the industrial complexes built in the 1970s (Sonn 2007, 2019). A whole new city of Pohang was built around the Pohang Steel Corporation, Ulsan, around the Ulsan Petrochemical Industrial complex, and Changwon, around the Changwon Mechanical Industrial complex (Sonn 2007).

These hubs were built to facilitate the heavy and chemical industry drive that characterized the developmental-state phase of South Korea's economic development (Amsden 1989; Lee 2003; Park and Choi 2014; Sonn 2007; Sonn and Lee 2012). Heavy and chemical industries require heavy infrastructure. Large-scale water supply, sewage systems, a seaport, and stable and abundant electricity supply, among others, were needed. Some of these are taken for granted in a developed country but were hard to attain in South Korea in the 1970s. Even the most developed area of South Korea did not have enough industrial infrastructure. Instead of trying to use existing infrastructure, which is not good enough anyway, South Korean state chose to build from scratch at locations endowed by good natural conditions.

Some may wonder if a remote location would make it more difficult to find workers. This was not the case in South Korea at that time because, irrespective of the location, there were not enough workers with the necessary skills for heavy and chemical industries. Skilled labour supply is a problem irrespective of the location of the industrial complex. In many ways, it was easier to create a new town and create skilled workers in it.

Changwon is a useful example of the new industrial cities of the 1970s, because its development represented the mature form of a South Korean industrial new town. Based on the partial success of Ulsan in the 1960s, the central government simultaneously built the city and the mechanical industrial complex. Knowing that the local government did not have enough urban planning expertise, the central government assumed control of housing, transportation, and most other elements of urban planning. The provincial government was only responsible for landscaping and apartment buildings (Choi 2014). A whole new city was built under the central government's direct control.

The area of the industrial complex encompasses 53.12 km², consisting of industrial, residential, commercial, green and other sites (See Map 3 in Figure 33.2). The residential site and a supporting site were planned to accommodate 200,000 residents working in the complex. The incorporation of parks, green spaces, conservation areas, and natural greenery was also part of the design plan. The residential area was said to be modelled on Canberra, Australia, which at that time was considered the epitome of cutting-edge planning and design. The residential site consists of 50 apartments and a supporting site, with a research facility and a training centre to educate skilled workers onsite (Choi 2014; Ryu, 1998).

Guro Digital Industrial Complex, a Metropolitan-immersed Industrial Hub

Guro Digital Industrial Complex (GDC) that was built through regeneration of the 30-year-old GExIC is a good example of a metropolitan-immersed industrial hub. It hosts software and cultural industries that hire workers who prefer an urban living and upon which businesses rely for a spatially proximate connection with other businesses in Seoul. Such conditions make a metropolitan location like Guro an ideal location. Guro was, at the time of GExIC's development, a suburban location outside the built area of Seoul. By the 1990s, after fast expansion of Seoul, Guro found itself within Seoul's urbanised area where an immersed metropolitan environment could be offered.

GDC reflects the transformation of South Korea from a manufacturing-centred economy to a knowledge-based one. GDC is also an outcome of reflection upon the repeated failures in the industrial complex policies of the 1980s and 1990s. In the 1980s, with state-led economic development on the wane and the private sector increasingly taking charge of the economy, government agencies that were responsible for industrial complexes in the 1970s and 1980s experienced difficulties in justifying their existence. That was why they started to use the discourse of balanced national development which corresponded to the political climate of those decades (Sonn, 2010).

Industrial complexes of the 1970s were concentrated on the south-eastern coast of the country which, along with Seoul, became one of the two developed regions, leaving the rest of the country behind (Sonn 2007, 2010). Naturally, people in less developed regions expressed their discontent and became mobilized politically (Park 2005; 2008). A regional balance discourse emerged from the late 1970s and became stronger, eventually making regionalism the main issue in the elections of the 1980s.

The state responded to this with various regional balance policies, including the use of industrial complexes. In the 1980s and 1990s, industrial complexes were mainly built in less developed parts of the country. The main beneficiaries were the provinces in the southwestern part of the country. Also, a new category, called 'rural industrial complex', was created to boost rural economies with purpose of reducing the gap between rural areas and cities. These industrial complexes were, unfortunately, less than successful (Sonn 2019) causing decline in industrial complex development.

Two decades of setback did not completely stop industrial complex development, though. The new millennium saw its revival. Whether this was simply inertia originating

from basic survival instinct on the part of organizations whose jobs are industrial complex development, or the discovery of a new model, is a question that cannot be answered yet. However, it is apparent that the main character of this resurgence is the urban context of industrial complexes. With increasing attention to an agglomeration economy, the need for an urban context for knowledge-intensive industries was accepted by researchers, policymakers, and the public alike. This re-urbanization took two forms: the regeneration of old urban industrial complexes and development of 'urban high-tech industrial complexes'.

GDIC was built in that context. Three decades after the launch of GExIC, it was clearly declining mainly because of fluctuating oil prices and increase in labour cost. A good indicator of such decline was the number of workers, which fell by 56.3 per cent over a ten-year period according to data in 1997 (Nahm, 2014). GDIC was built on that site as a new high-tech and cultural industry park. The regeneration of the old complex was supported by the Urban High-tech Industrial Complexes Act of 2001, which allowed for the small development of knowledge-intensive industrial complexes in urban areas. Industrial cluster policies, introduced in 2007, regulate specialized industrial complexes which combine production and technology, research and development, and production and service within the same industries. Of all the businesses in 2009, 69.5 per cent were knowledge-intensive industries. (Nahm, 2014)

The regeneration of an old complex in an urban context produced financial benefits. The Guro location in Seoul has a good connection to other parts of the city and to an international airport. However, the land price was still not too high because, at the time of regeneration, the site was an outdated industrial complex. Networking and clustering are critical strategies for restructuring industries and recovering competitiveness at a time of rapid change. Linking creative industries with diverse businesses and service sectors in Seoul appears to have been effective.

Regarding workspace, a high-rise office building-type factory was designed within the site to facilitate business, service, research, marketing, development, education, and training. New industries do not need substantial space for production, but tend rather to develop services with innovative ideas and high-skilled workers. Small high-tech industries can easily replace the old light industries.

Another benefit of the regeneration is the improved living environment. Amenities and leisure facilities are important to high-skilled workers (Kim et al. 2012). A supporting

site (150,000m²) and a public amenity site (332,000m²) were designated within site (1,982,000m²) (Map 4 in Figure 33.2). The Guro Industrial Complex was also redeveloped to include communal green space filling the space between the industrial complex and the city. A street park, public leisure facilities, pleasant walking routes and an electric bike hire scheme are among the amenities provided.

Conclusion

The development of an industrial hub is within the realm of industrial policy. While this is true, it is also the case that industrial hub development belongs to urban planning and national territorial planning. In this chapter, we discussed how the interaction between industrial policy and urban planning determines the location of an industrial hub.

In the planning of a living environment, urban planners tend to advocate for an ideal living environment. However, planning of an industrial hub, particularly a hub in a developing economy, requires serious consideration of opportunity cost. Money that is spent to offer a good living environment for workers and their families comes from a limited financial reservoir, be it a private source or a public one. Offering a better living environment in the hub will have to be paid for with sacrifices elsewhere in the country. That is why the principles of a location decision covered in this chapter assume the provision of a necessary minimum-level-of-living environment.

This minimum level, however, should not be compromised because offering anything less will result in problems in attracting and retaining workers. For this reason, in this chapter, we treat the living environment for workers and their families as a type of essential infrastructure which is equally important as industrial.

Based on this view, we have proposed four ideal types of industrial hubs. South Korean industrial complexes were used to illustrate those ideal types. We chose successful cases of industrial hubs in South Korea to demonstrate the principles of location choices. Out of over 1200 South Korean industrial hubs, there have been many failures. Those built in the 1980s and 1990s proved significantly less successful than those constructed in the 1960s and 1970s. That is why three of the four examples in our description were the ones built in the 1960s and the 1970s. In recent years, new attempts have been made which belong to the metropolitan-immersed industrial hub category in our typology. This type of industrial hub is designed to take advantage of the agglomeration economy in a metropolis and is particularly

suiting to cultural and high-tech industries. In view of the transformation of the South Korean economy from a manufacturing economy to a knowledge-based one, and given the lasting presence of industrial policy within the economy, it is quite likely that this type of industrial hub will continue to be built.

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