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**Industrial Parks and Their Impact on Development****Masahito AMBASHI**

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**Abstract:** *This paper reviews theoretical, empirical, and practical studies of industrial parks and examines their impact on development, particularly for developing countries. Theoretical mechanisms indicate positive impacts of industrial parks on economic development through agglomeration economies, including internal/external economies, reduced transaction costs, capital accumulation, and learning and knowledge spillovers. Meanwhile, empirical studies examining special economic zones (SEZs), i.e. industrial hubs with strong incentives for resident firms, show that they do not necessarily bring out high performance. This means that the design of industrial parks and supporting policies are critical for them to cause positive impacts on development for developing countries. This paper points to new issues of industrial park development that policymakers should note. Consideration of the Sustainable Development Goals (e.g. environment, female labour force, and human rights) is necessary to attract foreign direct investment (FDI) that has greater interest in these sustainability issues. This paper also indicates that digitalisation, the service economy, and natural resources should be incorporated into industrial park development strategies to create diversified and upgraded industries. Finally, this paper attempts to provide policy lessons to viable industrial parks based on the above-mentioned discussions, which can serve as a reference point for developing countries.*

**Key words:** industrial parks, agglomeration economies, Sustainable Development Goals (SDGs), digitalisation, development strategy, industrial policy

**JEL Classifications:** L52, O14, O25

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## **1. Introduction: Overview of Industrial Parks**

Since World War II, many countries – particularly developing countries – have enjoyed tremendous economic development. One of the keys to this success is industrial hubs (in the focus of this paper, industrial parks), which have played a critical role in nurturing and strengthening industrial sectors. Through the consolidation of industrial parks, countries have attracted foreign direct investment (FDI), participated in global value chains (GVCs), increased exports, promoted industrial upgrading and diversification, created employment, strengthened technology capacity and innovation, and earned tax revenue. According to modest estimations, industrial hubs had generated about 70 million direct manufacturing jobs and US\$500 billion of direct trade-related value added (Oqubay and Lin, 2020). Additionally, 65% of industrial hubs are concentrated in the Asia-Pacific region (UNCTAD, 2019).

The industrial parks formed in Asia-Pacific countries were integral to the remarkable economic development in the region. In East Asia (China, Japan, the Republic of Korea (henceforth, Korea), and Taiwan) and Southeast Asia (in the early days, Malaysia, Singapore, and Thailand), industrial parks worked effectively as a tool of the export-led industrialisation strategy to stimulate industry and increase employment, and thereby contributed to climbing up development ladders. In these countries, industrial parks were deeply embedded in economic, political, and social structures while achieving sustainable economic development (Oqubay, 2020). Consequently, industrial parks brought to these economies advancement in industrial structures, diversification of industrial sectors, and deepening of domestic and international industrial networks. In sum, East Asian and Southeast Asian countries, aiming at export-led industrialisation, make good use of industrial parks for FDI attraction, GVC participation, and export promotion.

The general definition of industrial parks (sometimes called industrial estates) is an area zoned and planned for the purpose of industrial development. In terms of economic theory, the economic benefits of building industrial parks would be materialised as ‘agglomeration economies’. This includes (i) internal/external economies, (ii) a reduction in transaction costs, (iii) capital accumulation, and (iv) learning and knowledge spillovers. Countries that succeed in industrial development have exploited industrial parks to reap the maximum benefit. It should also be noted that the achievement of industrial clusters leveraged by industrial parks is sometimes the product of ‘chance and randomness’, but it was shaped by a clear ‘policy will’ too according to the history of industrial parks development (Monga, 2020).

For example, in Hamamatsu City, Japan after World War II, the motorcycle industry agglomerated and blossomed, led mainly by the private sector. Meanwhile, Hamamatsu City provided subsidies for private associations to establish and manage industrial parks (e.g. roads connecting industrial parks). Consequently, Hamamatsu City has become one of the largest manufacturing agglomerations of transport machinery, automobile parts, electrical equipment, precision equipment, and food processing in Japan. In the 1960s–1970s, the so-called Asian

Tigers followed suit as second movers in industrialising countries by incorporating industrial parks into their export-led development strategies. The export processing zones in the suburban area of Seoul in Korea, Tai Po Industrial Park in Hong Kong, the processing zones at Kaohsiung Harbour in Taiwan, and Jurong Industrial Park in Singapore contributed significantly to improving these countries' manufacturing and innovation capabilities.

When the reform and 'open door' policy was implemented at the end of 1978, China embedded measures and policies on industrial parks and special economic zones (SEZs) into its industrial policy and established many of them, initially depending on FDI. In the 1980s, SEZs in the coastal areas led astonishing economic growth as the factory of the world, using the abundant labour force, and then upgraded industrial structures from light to heavy manufacturing industries. Since the beginning of the 21st century, the Chinese government has encouraged the high-tech industry (e.g. computers, semiconductors, and mobile phones) as policy priority targets in Zhongguancun Science Park. China has exploited industrial parks, supported by state-owned enterprises, as a way to develop productive and innovative capability while achieving structural reforms.<sup>1</sup> In recent years, Korea (planned national cutting-edge industrial parks) and Taiwan (Hsinchu Science Park) also intended to design industrial hubs, concentrating on high-tech industrial parks, to transit from export-led economic growth and advance technological development and innovation. In short, East Asian countries have provided continuous support to industrial parks and have aimed at integrating them into their industrial policies and strategies.

The Association of Southeast Asian Nations (ASEAN) Member States introduced an export-led industrialisation strategy in the 1980s, reflecting the successful experience of East Asian countries that kick-started the use of international production networks. Many developing countries still confront the significant challenge of integrating their domestic economies into GVCs and climbing up the development ladder. Sufficient room remains for developing countries to integrate their economies into GVCs owing to spatial 'fragmentation' of production in such sectors as electric machinery, automobile parts, and apparel. The boom of industrial hubs, particularly SEZs, in recent years was caused by fierce international industrial competition amongst developing countries that aspire to join GVCs by attracting FDI and bringing in the global business activities of multinational companies (MNCs) of developed countries. The critical role that industrial hubs play has been increasing since they can serve as an instrument to develop domestic export industries.

Malaysia established the first export processing zone in Penang in the 1970s, where the labour-intensive assembly and manufacturing line of electric machinery was established with the support of FDI, and the zone is becoming famous for the agglomeration of the semiconductor industry. In the Mekong region, Thailand intensively fostered industrial parks relevant to the

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<sup>1</sup> Deng Xiaoping, the supreme leader of China in the 1970–1980s, said 'A special economic zone is a medium for introducing technology, management and knowledge. It is also a window for our foreign policy. Through SEZs we can import foreign technology, obtain knowledge and learn management, which is also a kind of knowledge' (Xiaoping, 1984).

automobile industry in Bangkok and its surrounding areas, so many domestic firms agglomerated and grew as supporting suppliers of intermediate goods to mainly Japanese automobile MNCs. In Viet Nam, the government undertook an initiative to aggressively attract manufacturing FDI by establishing about 300 industrial parks. The CLM countries (i.e. Cambodia, the Lao People's Democratic Republic (Lao PDR), and Myanmar) also predominantly encourage labour-intensive industries in industrial hubs by leveraging FDI from China, Japan, and other countries. In Cambodia, Chinese firms are the main investors as the government has aggressively implemented programmes relevant to industrial hubs to diversify its industrial structure to sophisticated sectors. Myanmar has made efforts to develop its manufacturing industry based on Thilawa SEZ, which has been supported by Japan. The Lao PDR has promoted labour-intensive industries such as garment, leather, and other light-manufacturing products, based on industrial hubs in Vientiane, Pakse, and Savannakhet. In the CLM countries, establishing industrial parks with the support of developed countries has greatly helped their economies integrate into GVCs and narrow development gaps within the countries. Moreover, regional economic integration has been promoted as some industrial parks have been established along the border to harness cross-border labour (e.g. the industrial park in Poi Pet in Cambodia, the border city to Thailand).

However, some assessments state that the performance of many industrial hubs (including industrial parks and SEZs) in developing countries has been lower than policymakers' expectations. Several industrial parks and SEZs are not even in use after they have been physically built. UNCTAD (2019), based on a survey analysis, showed that nearly half the SEZs are not operating at full capacity. Hence, despite the boom in building industrial hubs, it is an urgent challenge – particularly for developing countries – to establish SEZs with effectively operating firms. Thus, the development of industrial parks is not necessarily a sufficient condition for successfully attracting FDI and eventually industrial diversification and upgrading.

Furthermore, many developing countries have not made an objective assessment of industrial parks using various criteria (e.g. the creation of value added, employment, tax revenue, and environmental sustainability) or derived best practices and lessons from both successful and failed industrial parks. Therefore, the purpose of this paper is to examine the role of industrial parks in industrial development and to identify ways to enhance their effectiveness based on existing literature. The findings aim to offer practical insights and guidance for policymakers and other stakeholders involved in industrial parks. Towards this end, this paper will deal with interdisciplinary issues concerning industrial parks, such as digitalisation, environmental sustainability, and labour, which have recently attracted much attention. By addressing these challenges positively, we can make industrial parks more attractive for all stakeholders.

This paper is organised as follows. Section 2 provides an overview of the background of various industrial parks from theoretical, empirical, and practical viewpoints. Section 3 discusses emerging issues on industrial parks, including environmental and labour issues (especially related to women) under the Sustainable Development Goals (SDGs), as well as digitalisation and 'servitisation', which have significant potential for leapfrogging industrialisation. Section 4

proposes policy recommendations, mainly for developing countries, providing helpful suggestions to policymakers and practitioners interested in industrial parks. Section 5 concludes this paper.

## **2. Theoretical, Empirical, and Practical Backgrounds**

This section gives readers background information and knowledge about industrial parks in terms of not only theoretical and empirical studies, but also practical observations.

### **2.1. Theoretical Mechanism**

How can and why should industrial parks diversify and upgrade industrial sectors and create employment opportunities? What theoretical mechanism drives such outcomes? To these questions, the simple answer from economists is that industrial parks can resolve or mitigate ‘market failure’ problems, when there are public goods provision, positive and negative externalities, scale economies, asymmetric information, coordination failure, and so on. Basically, industrial parks gather multiple firms and plants in the same delimited location and provide them with common physical and soft infrastructure. In general, ‘agglomeration economies’ are theoretically expected in establishing industrial parks. They are likely to generate positive benefits of agglomeration: (i) internal/external economies (i.e. economies of scale), (ii) capital accumulation, (iii) a reduction in transaction costs, and (iv) learning and knowledge spillovers. This paper reviews the mechanism through which these benefits are brought about in economies.

#### **2.1.1. Internal/External Economies**

First, the new economic geography tells us that two forces are generated in the geographical distance, which has a core and periphery (Fujita, Krugman, and Venables, 1999; Baldwin et al., 2003). One is an agglomeration force, which means that economic activities, people, and others are attracted to the core where positive agglomeration effects are found (i.e. advantage of agglomeration). Alongside this mechanism, the positive agglomeration effect manifests itself as ‘internal economies’.<sup>2</sup> It emerges as economies of scale internal to individual firms that benefit from moving to the core from the periphery. This scale benefit is achieved through the specialisation of firms and the division of labour within a delimited agglomeration. In such a case, as firms or industries increase their overall production, the average cost decreases and the production amount is expected to reach the critical level for firms to attain comparative advantages (Krugman, 1991).<sup>3</sup> On the other hand, a dispersion force may also generate movement of economic activities, people, and others from the core to the periphery and cause negative agglomeration effects such as wage increases, land price rises, and congestion

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<sup>2</sup> Marshall (1920) was the first economist to point out internal and external economies. He identified factors that enhance agglomerations, such as the availability of intermediate goods/services and labour, idea and information flow through face-to-face communication, and infrastructure, as public goods.

<sup>3</sup> This benefit is also sometimes called ‘localisation economies’.

(i.e. disadvantage of agglomeration). If the positive effect exceeds the negative one, such agglomeration brings net benefits to the economy.

The entry of firms and workers to a specific area induced by agglomeration effects is also likely to generate both ‘forward linkage’ and ‘backward linkage’ effects (Kono, 2020). In the forward linkage effect, an increase in goods and workers creates demand for a variety of intermediate and final goods, and this increase then attracts firms (that use intermediary goods) and consumers (who consume final goods) to the area. In addition, an increase in the number of workers shapes a labour pool and attracts firms that seek more workers for new business activities. On the other hand, the backward linkage is formed in response to increased demand brought about by the entry of firms and workers – i.e. increased demand for intermediate goods attracts supplier firms and high wages attract labour supply. This sort of network effect mechanism is often called ‘external economies’. It refers to economies of scale external to individual firms that work within a given geographical boundary. The advantages for firms agglomerating in industrial parks are realised through available pools of skilled labour, and this agglomeration enables workers to change their working place to another when idiosyncratic productivity shocks happen to the current working place (Overman and Puga, 2010).

### **2.1.2. Capital Accumulation**

Second, industrial parks are expected to accumulate various types of capital (e.g. infrastructure, machines, factories, and electricity equipment). Generally, since industrial parks devote their resources to the delimited areas, more productive capital can be arranged inside them than in other areas. This capital is often brought by FDI or assistance from developed countries, although they may not be state of the art. Physical capital can thus be formed quickly in industrial parks. Shared infrastructure in industrial parks may also contribute to the acceleration of internal and external economies of scale as described above. In addition to tangible (physical) capital, industrial parks accumulate intangible capital such as human capital, management skills, patents, brands, and corporate culture.<sup>4</sup> It is worth mentioning that Japanese MNCs are particularly active in investing in human capital development through on-the-job training (e.g. 5S approach, quality control circles, and *kaizen*),<sup>5</sup> with the expectation that the investment will improve overall productivity.

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<sup>4</sup> Endogenous growth theory suggests that knowledge accumulation (which is intangible capital) through learning in economic activities generates sustainable economic development with increasing returns on investment (Romer, 1986).

<sup>5</sup> The 5S approach is a lean manufacturing methodology, based on Japanese terminology, which refers to five activities: (i) sort, (ii) set in order, (iii) sweep, (iv) standardise, and (v) sustain the discipline. Quality control circles are formed voluntarily by workers on manufacturing floors to improve products and production processes. *Kaizen* aims to eliminate inefficiencies hidden in production processes through constant improvements initiated by individual workers.

### **2.1.3. Reduction in Transaction Costs**

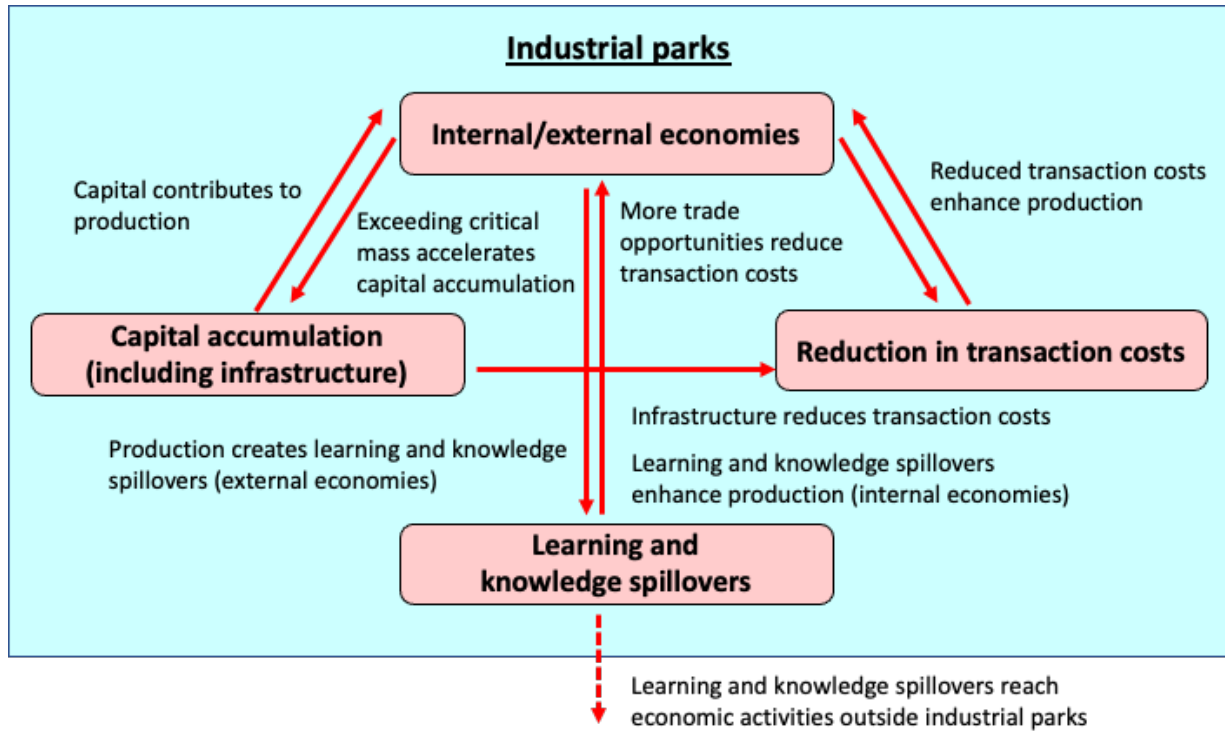
Third, a reduction in transaction costs is also likely in the agglomeration of industrial parks. Firms generally incur costs when they trade either through markets or with external firms. In fact, costly transportation directly increases the transaction costs of firms when they engage in economic activities, but effective physical infrastructure in industrial parks can reduce these costs. Transaction costs also result from metaphysical factors such as bounded rationality and information asymmetry, the latter of which is frequently a cause of uncertainty, complexity, and opportunism (Williamson, 1975; 1985). Industrial parks gather firms and workers together in the same location and connect them with each other through shared infrastructure, daily transactions, and exchange of information. This familiarity and daily contact amongst firms in industrial parks may mitigate information asymmetry. The transaction costs of matching workers to firms are likely to be reduced. Thus, firms in industrial parks can reduce transaction costs and gain a competitive edge.

### **2.1.4. Learning and Knowledge Spillovers**

Fourth, industrial parks benefit from learning and knowledge spillovers, which lead to technological development and innovation in the economy (Glaser, 2010). Amongst other things, the connection with GVCs through FDI in industrial parks is an efficient and effective way to reinforce the absorptive capacities of firms, workers, and industries (Cohen and Levinthal, 1990). In many cases, MNCs (particularly Japanese companies) investing in industrial parks are inclined to nurture local suppliers and provide skills training for local workers. Firms located outside industrial parks can also obtain learning and spillover benefits by trading with firms inside industrial parks and by hiring workers who have experience working in industrial parks.

The interrelationship between these benefits of industrial parks, as suggested by the theoretical mechanisms, is illustrated in Figure 1, in which the positive benefits are enhanced in conjunction with each other. For example, learning and knowledge spillovers can enhance production (i.e. internal economies) and vice versa (i.e. external economies).

**Figure 1: Relationship Between Benefits of Industrial Parks**



Source: Author.

### 2.1.5. Discussion

The immediate outcomes generated by industrial parks include increased production and exports, foreign exchange earnings, employment creation, and income generation. Ultimately, agglomeration economies, which were described from the viewpoint of the four theoretical mechanisms, are expected to enhance firms' productivity, technological development, and innovation – especially of small and medium-sized enterprises (SMEs) – and thereby stimulate overall economic development through countrywide spillovers (Ottaviano and Puga, 1998). In reality, studies have argued that the immediate and indirect positive outcomes of industrial hubs have led Asian countries to achieve economic development through rigorous industrial dynamics (ERIA, 2010; 2015; 2022).<sup>6</sup>

Moreover, it is important for policymakers to distinguish static from dynamic effects when it comes to establishing industrial parks. Simply put, while static effects imply short-term outcomes such as export promotion, foreign exchange earnings, and employment creation, dynamic effects are more related to long-term outcomes such as productivity improvements, skills

<sup>6</sup> Other studies have discussed the importance of industrial parks from various viewpoints. Porter (1990) pointed out factors determining countries' competitiveness: (i) firm strategy, structure, and rivalry; (ii) demand conditions; (iii) factor conditions; and (iv) domestic geographical concentration of relevant industries. Amongst other things, geographical concentration is a critical factor for product competitiveness to shape national advantages by leveraging capable human resources, useful information, and innovation and entrepreneurship. Porter argued that governments can play a role in, for example, supporting locally based initiatives, using existing institutions, and strengthening connectivity between industries. Industrial parks as clusters can also contribute to forming social networks not only between firms but also between individuals that go beyond the limits of firms (Granovetter, 1985). In this view, the strength of networks is socially embedded.

development, international learning and knowledge spillovers, linkages of domestic firms with GVCs, innovation, the birth of start-ups, and entrepreneurship (Amsden, 1992; Reinert, 2010). These dynamic effects are often induced by what is beyond a response to market failure, and its typical representation is akin to so-called creative destruction (Schumpeter, 1942). This kind of dynamism based on industrial parks would reveal a country's latent comparative advantage and promote further facilitation and upgrading of that comparative advantage (Lin, 2012). Of course, these dynamics cannot be evaluated solely by short-term financial benefits.

Whether a country can make dynamic effects work or not depends on its capability. In terms of dynamic effects at work based on industrial parks, it is necessary to have the capability to synergise both cooperation and competition at all levels (Oqubay, 2020). At the outset, cooperation is essential to prevent coordination failure inside industrial parks. Since industrial parks gather a variety of stakeholders with different backgrounds and objectives, such as landowners, operating companies, and resident firms (including manufacturing, logistics, and information technology (IT) service firms), frequent coordination failures occur. Thus, structuring a cooperation mechanism in industrial parks across stakeholders can lead to strong competitiveness. Such cooperation is accelerated by, for example, preparing common infrastructure, information and knowledge, and institutional support, as well as bargaining with MNCs, which should be mostly carried out by governments. At the same time, fierce global competition requires a country to arrange coordinated cooperation amongst domestic firms and MNCs to make industrial parks competitive. This kind of dynamic interaction and reaction through cooperation within industrial parks is likely to make participating firms more competitive, resilient, and robust.

## **2.2. Empirical Studies**

UNCTAD (2019) presented indirect evidence of the economic impacts of industrial hubs based on cross-country data. The study analysed the relationship between the number of SEZs and several economic performance indicators, including (i) average annual growth in goods trade from 2007 to 2017; (ii) GVC integration, measured by foreign value added (the share of value added by MNCs) in 2017; and (iii) FDI attraction, measured by inward FDI stock to gross domestic product (GDP). By analysing these performance indicators for countries in Asia, Africa, Latin America and the Caribbean, and transition economies, UNCTAD (2019) did not find any clear positive relationships.

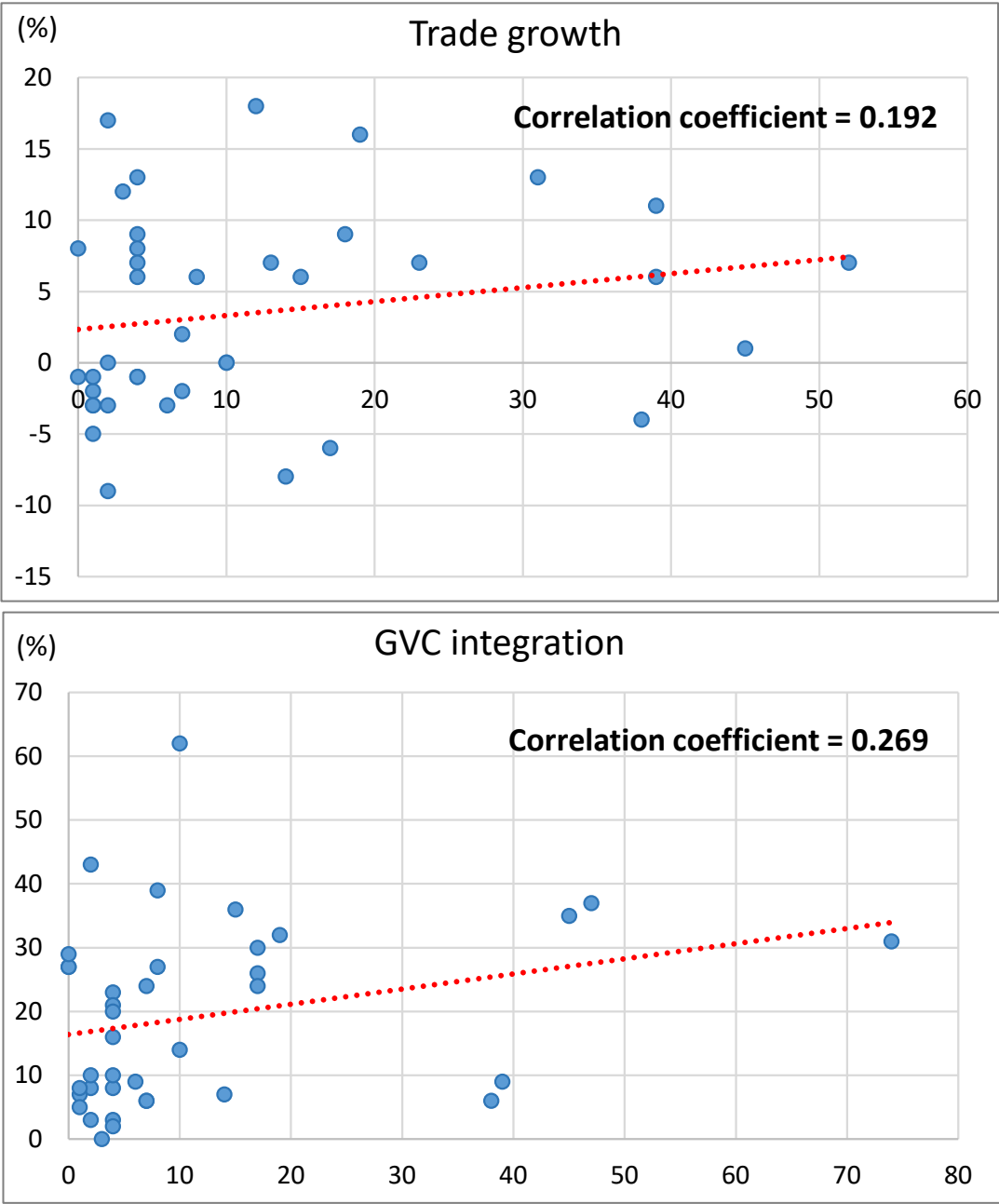
Based on the dataset and UNCTAD (2019), this study integrates the data of 40 countries (i.e. 10 high- and low-ranked countries in each of the four regions) and conducts a correlation analysis between the number of SEZs and the above-mentioned economic performance indicators. Although it lacks the dataset of middle-order countries, this analysis maps a rough pattern of how SEZs are related to countries' economic performance.<sup>7</sup> First, the correlation coefficient of annual

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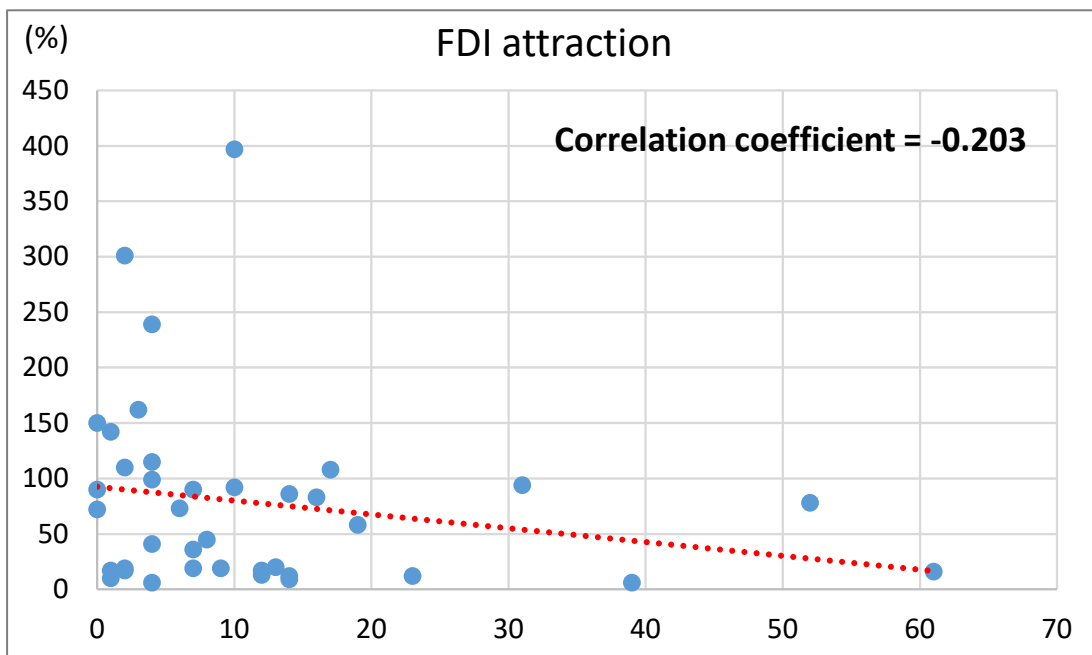
<sup>7</sup> Outliers are eliminated from this analysis.

growth of goods trade is small, at 0.192, which rarely indicates a positive correlation. Second, GVC integration shows a certain degree of positive correlation with the number of SEZs, at 0.269. Third, by contrast, the correlation coefficient of FDI attraction is negative, at  $-0.203$ , so the number of SEZs does not have any association with an increase in inward FDI. The difference between the second and third findings may suggest that the amount of inward FDI is not always critical for linking countries with GVCs. Figure 2 presents the scatter graph and regression lines. In summary, this analysis shows that the establishment of SEZs does not necessarily ensure high economic performance of countries and that the success of industrial hubs depends on other critical factors excluded from this correlation analysis.

**Figure 2: Correlation Analysis Between the Number of SEZs and Economic Performance**



**Figure 2: Continued**



FDI = foreign direct investment, GVC = global value chain, SEZ = special economic zone.  
Source: Author and UNCTAD (2019).

According to a cross-country study that estimated the impacts of SEZs on the economy using 346 samples in 22 emerging countries, SEZs experienced an average growth rate of 14.7% from 2007 to 2012, calculated from light at night emitted from SEZs (Wong and Buba, 2017; Frick and Rodríguez-Pose, 2019). But the variation in growth across SEZs was so large that the median SEZ growth rate was only 2.8%, which is lower than the national growth rates of the countries analysed. The dataset indicates that the growth of regions with SEZs may not continue for long, as 90 SEZs (26%) recorded lower growth rates than the national growth rate. Frick and Rodríguez-Pose (2019) also revealed that while SEZs have a positive impact on the economic performance of the regions surrounding the zones, the growth spillovers are limited and diminish with distance. In general, observations indicate that few regions with industrial parks and SEZs continue to outpace the national growth rates (UNCTAD, 2019). Moreover, aside from discussing the economic impacts, some industrial parks and SEZs are not actually used. The SEZ survey (82 responses) showed that the facilities of 47 SEZs are not used to a certain or significant degree, while those of only 13 SEZs are fully used (UNCTAD, 2019).

Few empirical studies based on econometrics focus on specific industrial parks and SEZs because it is difficult to set appropriate counterfactual situations when an industrial park was not present in the region. In addition, since case studies are often subject to the sample selection bias caused by a focus only on successful samples, research results may not assure that the best practices of these industrial parks are applicable to other industrial parks (i.e. external validity).

Empirical studies of individual industrial parks and SEZs have not derived any general conclusion, as they suggest positive, negative, or neutral economic impacts (Neumark and Simpson, 2015). What follows are some (not exhaustive) interesting research studies focusing

mainly on SEZs. By using Chinese city-level data, Jones, Li, and Owen (2003) showed that the award of SEZ status significantly enhances annual growth rates (by 5.5 percentage points) indirectly through FDI attraction, and the annual growth rates of coastal cities are 3% points higher than those of other cities. Alder, Shao, and Zilibotti (2016) also examined SEZs' impacts in China using panel data of GDP and light intensity based on the solid analytical method of causal inference (i.e. difference-in-differences model). They found that the establishment of state-level SEZs has associations with an increase in GDP of 20% because of positive effects on physical capital accumulation, productivity, and human capital investments. The same result is derived from Cai, Xin, and Zhou (2021), who showed that the zone policy implemented in Shanghai at the end of 2013 had a positive effect on the local GDP (per capita) growth rate. Investigating the Chinese and Indian economy, Leong (2013) exhibited positive impacts of the presence of SEZs on regional growth in these two countries by increasing FDI and exports, but negligible impacts of increasing the number of SEZs.

In contrast, Zheng et al. (2016) concluded that development zones in China (including all types of special zones and industrial parks), on average, do not increase the total output proportional to the share of land covered by development zones in the host city, while there is some heterogeneity in the effects across different territories. In the case of countries other than China, Quaicoe, Aboagye, and Bokpin (2017) analysed the free zones programme of Ghana based on quarterly data for 1998–2015 and showed negative relationships between exports and investments of the zones and economic growth, which suggests the programme does not fulfil the purpose. Sa'dia and Fitriady (2023) made clear that Sei Mangkei SEZ has not positively affected the economic growth of Simalungun Regency, North Sumatera, Indonesia by using an appropriate counterfactual (i.e. synthetic control method). As they suggested, the reason for such results is that new business activities there are still below the target. In sum, whether the economic impacts of establishing industrial parks or SEZs is positive or negative seems to depend on various conditions such as countries/regions, time periods, and other institutions.

### **2.3. Practical Aspects of Industrial Parks**

Industrial dynamics can be promoted through various forms of industrial hubs, including industrial parks, SEZs, free trade zones (FTZs), export processing zones (EPZs), and science parks. All industrial hubs, except science parks, aim at promoting manufacturing production and export capability. Although regional industrial hub policies have many similarities, the provision of incentives is not uniform. For example, EPZs were popular for policymakers in East Asia during the 1970s and 1980s and provided special incentives for exports to achieve export-led industrialisation. Most EPZs provide simple assembly and processing of manufacturing products, as well as different labour regimes.

China succeeded in industrialisation through the aggressive and effective use of SEZs in the 1980s during the reform and 'opening-up' policy. SEZs are typically characterised by (i) a clearly demarcated geographical area, (ii) a regulatory regime distinct from the rest of the economy, and

(iii) infrastructure support (UNCTAD, 2019). They frequently offer incentives such as tax concessions; financial support; business-friendly regulations (e.g. investment promotion and protection, and trade facilitation); access to land; swift processing of permits and licences; and simplified administrative procedures (e.g. customs clearance and bonded storage). Policymakers pay special attention to SEZs because they can facilitate economic reforms, low-cost industrialisation, and competitiveness in GVCs. In general, the industrial parks discussed in this paper need to satisfy conditions (i) and (iii) above, whereas condition (ii) is not a requirement. Nevertheless, since industrial hubs in developing countries aim to attract FDI, they tend to apply (ii) (i.e. distinctive regulatory regimes) by providing strong financial incentives. Table 1 summarises the variations of industrial hubs to identify characteristics between industrial parks and other hubs.

**Table 1: Variations of Industrial Hubs**

<b>Item</b>	<b>IP</b>	<b>SEZ</b>	<b>FTZ</b>	<b>EPZ</b>	<b>Science Park</b>
Activities	Manufacturing	Manufacturing	Manufacturing, trade	Manufacturing, processing	Manufacturing, innovation, incubation
Location	Anywhere, close to cities	Close to roads, airports, ports	Close to roads, airports, ports	Close to roads, airports, ports	Anywhere, close to cities (especially source of knowledge)
Demarcation	Nominal or physical	Physical	Physical	Physical	Nominal or physical
Market	Local or regional	Local and foreign	Foreign (global)	Foreign (global)	Local or regional
Support	Infrastructure (energy, roads, water, ICT), agglomeration	Infrastructure (energy, roads, water, ICT), agglomeration, logistics, training	Infrastructure (storage, warehouses, transshipment facilities), logistics	Infrastructure (storage, warehouses, transshipment facilities), logistics	Infrastructure (energy, ICT), agglomeration, amenities
Regulation	Limited	One-stop service, reduced red tape	Limited	Limited	Limited
Incentives	Limited	Strong	Medium	Medium or strong	Limited

EPZ = export processing zone, FTZ = free trade zone, ICT = information and communication technology, IP = industrial park, SEZ = special economic zone.

Source: Author in reference to Farole (2020) and Alcorta and Tesfachew (2020).

The roles that industrial parks should play differ practically between developed and developing countries. While the aim of industrial parks in developed countries is to make cutting-edge innovations based on science and technology, the goal in developing countries is to diversify and upgrade industries by attracting FDI from developed countries. The type of industrial park that should be established depends on individual countries' situations, so the use of industrial parks should be aligned with their development strategy.

In ASEAN's early economic development history (1980s–1990s), industrial parks provided an important impetus to pursue sophisticated high-level manufacturing industries, particularly for Malaysia and Thailand (e.g. automobile parts, electric machinery, and semiconductors), rather than labour-intensive sectors (e.g. apparel and garments) by introducing Japanese MNCs. In industrial parks, not only was employment created, but skills and human resources were improved through on-the-job training and knowledge sharing from engineers (i.e. so-called industrial cooperation from Japan). Although the technologies brought by MNCs were not always state of the art, they were more advanced than those used by local firms. Expecting positive outcomes from foreign technologies and the management skills obtained from operating industrial parks, many governments of ASEAN Member States have incorporated them into their development strategies. Furthermore, the effective use of industrial parks and the expansion of their outcomes to the rest of the country was expected to generate 'dynamic benefits'. Specifically, as shown in the experience of China, industrial parks could be a starting point for structural reforms of the whole economy by introducing their accumulated best practices in other regions.

Since the 1990s, the development of information and communication technology has prompted the 'third unbundling' (Baldwin, 2016) – the evolution of GVCs – which has enhanced development strategies based on industrial hubs in developing countries. Industrial parks located in the Mekong region still have the attractiveness of low-cost labour as a source of manufacturing competitiveness. The new international division of labour in supply chains (e.g. China Plus One and Thailand Plus One) seeks the abundant labour in the CLM countries. Thus, these countries should lay out their own development strategies leveraging industrial parks (ERIA, 2015). In case of the Lao PDR, for example, it is desirable to kick-start labour-intensive industries and export promotion in industrial parks, following advanced developing countries (i.e. the flying-geese development model). As discussed in Section 3.2, digitalisation and 'servitisation' of industrial sectors<sup>8</sup> are also promising. In the Lao PDR, the service sectors of business outsourcing and tourism could be another target for industrialisation (ERIA, 2022). These comparative advantages in the Lao PDR are likely to increase the competitiveness of industrial parks and build reputations in GVCs.

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<sup>8</sup> Servitisation implies the change in business models, particularly of manufacturing firms, where they aim to provide services associated with products, thereby creating new value for customers.

Employment creation, particularly an increase in the female labour force, is the most promising economic impact of establishing industrial parks. As industrial parks have strong linkages with other regions, the employment creation impact, including indirect impacts, is likely to be large. Industrial parks give workers formal employment opportunities, especially in developing countries that have immature industrial structures. An estimation shows that 67 million workers were employed in EPZs around the world in 2006 (70%–80% in China) and that employment in EPZs has been increased in regions other than China since the 2000s (ILO, 2017). Another estimation is that FTZs in Cambodia created 65,000 direct and 155,000 indirect jobs (UNCTAD, 2019). However, employment in industrial parks is not always stable. This means that workers in industrial parks are subject to employment adjustment in step with a variation in production, and in an extreme case, employment may be lost when MNCs exit local sites. Moreover, governments should be careful about what types of workers would be affected by industrial parks since the development of industrial parks provides formal employment opportunities to workers in informal sectors. But industrial parks targeting advanced technologies and services may provide benefits of income distribution only to high-income workers who have high skills and educational levels. In this case, industrial parks may affect informal sectors and negatively affect low-skilled labour through price increases in neighbouring regions.

The clue to obtaining various economic benefits from industrial parks is to keep local firms, including supporting firms, competent within and connecting with GVCs and to improve the skills of the local labour force. If supporting industries and skilled labour are absent around industrial parks, MNCs will need to depend on outside supply chains, which would result in high costs of production in the resident country. Therefore, the failure to nurture competent local supporting industries and labour that can meet the needs and standards of MNCs may be a serious constraint for the development of industrial parks.

Finally, other negative aspects (mostly negative externalities) of industrial parks should be noted. Although mainly the case with SEZs, typical examples include increases in land prices and wages; crowding out of private investment, production, and exports outside industrial parks; congestion of infrastructure; environmental destruction; pollution; resource wasting; degradation of working conditions; financial fragility (due to infrastructure development, subsidies, and tax concessions); corruption and lobbying; and disruption within local communities. In addition, countries that are dependent on special trade preferences may limit themselves to the production and export of specific trade items and possibly fail to diversify and upgrade their industrial sectors. Hence, policymakers should keep in mind that the establishment of industrial parks does not necessarily provide assured pure advantages to the whole economy. Rather, deliberate policy designs are required to maximise advantages and minimise disadvantages and risks. Table 2 briefly summarises both. Considering these, section 3 will concentrate on new issues, including environmental and labour problems.

**Table 2: Advantages and Disadvantages of Industrial Parks**

<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"><li>▪ Attraction of FDI</li><li>▪ Promotion of manufacturing production and exports</li><li>▪ Employment creation</li><li>▪ Growth and income generation</li><li>▪ Technological development and innovation</li><li>▪ Positive spillovers to regions outside industrial parks</li><li>▪ Expanding structural reforms to the whole economy</li></ul>	<ul style="list-style-type: none"><li>▪ Rise in land prices and wages</li><li>▪ Crowding out of private investment, production, and exports outside industrial parks</li><li>▪ Congestion phenomena of infrastructures</li><li>▪ Environmental destruction, pollution, and resource wasting</li><li>▪ Degradation of working conditions</li><li>▪ Financial fragility</li><li>▪ Corruption and lobbying</li><li>▪ Disruption of local communities</li></ul>

FDI = foreign direct investment.

Source: Author.

### **3. Second-Generation Issues of Industrial Parks**

This section sheds light on new issues related to industrial park development from the viewpoint of the SDGs, and the promotion of new industrial sectors using digitalisation, servitisation, and natural resources.

#### **3.1. Consideration of the Sustainable Development Goals**

The SDGs adopted by the United Nations in 2015 present a blueprint for a sustainable future. While stressing ‘no poverty’ (SDG 1), the SDGs highlight ‘decent work and economic growth’ (SDG 8); ‘industry, innovation, and infrastructure’ (SDG 9); ‘responsible consumption and production’ (SDG 12); and ‘life and land’ (SDG 15).<sup>9</sup> Industrial parks are not an exception under the SDGs and are required to be consistent with poverty reduction, the happiness of workers and communities, sustainable industrialisation, and environmental protection. Since the adoption of the SDGs, laxer regulations regarding these socio-economic issues cannot be a source of competitive advantage to attract investors to industrial parks. The key to improving the performance of industrial parks in relation to the SDGs is the provision of incentives for environmental and labour protection. In sum, industrial parks need to integrate their operational models with all issues concerning sustainable development.

In this connection, new issues have emerged concerning industrial parks other than economic growth through industrialisation. Amongst other things, the development of eco-industrial parks to protect the environment, and the promotion of decent work considering human rights in supply chains and female labour force participation, are worth noting. Although laxer

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<sup>9</sup> See United Nations (n.d.).

regulations are applied to SEZs than other regions (e.g. the prohibition of labour unions), they may not now constitute a strong competitive advantage.

### **3.1.1. Environmental Protection and Eco-Industrial Parks**

In the past, little attention was paid to environmental protection and sustainable development when industrial parks were established. There was a terrible misinterpretation that simply deregulating environmental standards with the aim of securing favourable investment regimes gave industrial parks a source of competitiveness within GVCs. However, some studies have shown that industrial parks have had negative influences on their local environments, such as atmosphere, water, and soil, during the process of urbanisation (Akinci and Crittle, 2008; Chen et al., 2011; Levein, 2012). Therefore, stakeholders in industrial parks cannot discount environmental sustainability in both the international and strategic contexts. UNCTAD (2015) reported that more than half the EPZs have already adopted international environmental standards such as ISO14001. In recent years, many people have become more conscious about the broad issues of environmental sustainability (typically, the climate change problem), with increased awareness of the SDGs, and do not regard environmental problems as merely a cost of industrial development. Thus, underestimating the significance of environmental aspects may lower the long-term performance of industrial parks (e.g. in terms of profitability) because of the increasing scrutiny of stakeholders.

From the policy viewpoint, it is important to attain a balance between the benefits obtained from considering the environment and the additional burdens placed on industrial parks. The key to obtaining positive benefits in addressing environmental problems is to achieve green industrial dynamics, in which industries are dynamically reformed by taking advantage of environmental technologies. In this connection, eco-industrial parks operating in developing countries have attracted significant attention from policymakers (Mathews, 2020). According to a survey by Kechichian and Jeong (2016), 140 eco-industrial parks were developed or operated in 40 countries in 2015, including developing countries.

Amongst other things, eco-industrial parks were established in Ethiopia based on its Climate-Resilient Green Economy Strategy, which is remarkable in terms of green economic development. In Ethiopia's development strategy, Hawassa Eco-Industrial Park is a flagship model to which environmentally conscious MNCs are invited (Valensisi, 2020).<sup>10</sup> This eco-industrial park has introduced state-of-the-art garment and apparel plant technology, efficient effluent treatment facilities (recycling 90% of waste), recycling of materials within the park, renewable hydropower generation,<sup>11</sup> and LED lights. This is how Hawassa Eco-Industrial Park achieves sustainable participation in garment GVCs using common renewable energy supplies and infrastructure and an intra-park recycling system, which distinguishes it from other industrial

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<sup>10</sup> Modjo Leather City Industrial Zone was developed by a Taiwanese firm in another region of Ethiopia.

<sup>11</sup> Renewable hydropower generation is indispensable for investments in energy-intensive sectors in industrial parks.

parks. Put simply, this type of industrial parks realises industrial symbiosis, in which firms gathered in parks generate synergy effects on both production and environmental protection. Meanwhile, MNCs that are sensitive to environmental, social, and governance (ESG) investments are interested in residing in eco-industrial parks to promote their environmental protection efforts. This shows that respecting the environmental sustainability of industrial parks can be attractive to international investors.

Taking environmental issues into consideration when industrial parks are built may increase the costs of both operators and resident firms in the short term. However, MNCs respond to the concerns of all stakeholders by fulfilling corporate social responsibility and establishing eco-friendly business models, images, and brands. As social impact investments totalled US\$500 billion in 2019, estimated by Mudaliar and Dithrich (2019), MNCs are under pressure to make ethical investments. Investing in industrial parks that adversely affect the environment may create a serious reputational risk for companies. In contrast, if MNCs invest in eco-industrial parks, they are likely to be highly evaluated by environmentally aware stakeholders. Hence, eco-industrial parks attaching high weight to environmental sustainability is a substantial sales point to attract environmentally conscious FDI by enhancing the ESG performance of resident MNCs.

Respecting the environmental sustainability of industrial parks can also facilitate elaborate development strategies and create value added. If infrastructure, investment, and technologies related to industrial parks are transformed into more environmentally friendly ones, countries can make forward and backward linkages within economies much stronger. Realising a circular economy inside industrial parks would result in additional employment, learning at all levels, and opportunities to acquire technologies, which creates a unique competitive advantage (Govindan and Soleimani, 2017). Thus, developing countries that aspire to participate in GVCs must address sustainability issues. To receive assistance and finance from international organisations, they need to show that they are aggressively addressing environmental problems. In addition, delayed greening of industrial parks could lead to high operating costs in the future due to the lock-in effect of inferior infrastructure and technologies. Becoming early movers in green transformation could provide developing countries with a first mover advantage within GVCs.

### **3.1.2. Decent Work, Human Rights, and the Female Labour Force**

SDG 8 stipulates that workers have the right to engage in decent work.<sup>12</sup> In addition to providing employment opportunities, decent work focuses on wage and labour conditions from the perspective of workers' welfare. The attractiveness of industrial parks in the past included a

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<sup>12</sup> The UN Economic and Social Council defines decent work as '(work that) respects the fundamental rights of the human person as well as the rights of workers in terms of conditions of work safety and remuneration. It also provides an income allowing workers to support themselves and their families... These fundamental rights also include respect for the physical and mental integrity of the worker in the exercise of his/her employment' (United Nations Committee on Economic, Social and Cultural Rights, 2005).

denial of elements such as decent work. However, the concept of decent work has been extended to all places of work, including developing countries (Oya and Schaefer, 2020).

Ensuring decent work in industrial parks is essential for several reasons. First, sufficient wages are indispensable for workers to improve their living standards and maintain healthy and cultured lives. While jobs in industrial parks do not necessarily ensure higher wage levels than those in other formal sectors, they can at least be higher than those in the informal sectors. Second, working conditions (e.g. work time, safety management, and fringe benefits) directly affect workers' welfare, such as physical and mental health. As observed from the disasters that occurred in garment factories in Bangladesh in 2013, the working conditions in some industrial parks are reported to have poor safety conditions. Third, although on-the-job training and technical and vocational education and training are critical for human resources development, some workers (especially women) in industrial parks are not assured access to them. These issues are also relevant for workers' human rights. Industrial parks need to demonstrate sufficient consideration of human rights when using cheap labour at the initial stage of industrial development, as emphasised by the United Nations (UN) Guiding Principles on Business and Human Rights.<sup>13</sup> The use of child labour in supply chains connected to industrial parks also requires attention. If industrial parks were reported to use child labour, they would suffer tremendous losses and reputational damage.

As argued in relation to environmental issues, lack of decent work and violations of human rights could be a cause of disinvestment from industrial parks as they are in opposition to ESG investment. Indeed, according to macroeconomic evidence, preserving the major labour standards stipulated by the International Labour Organization does not adversely affect countries' export performance or FDI (Kucera, 2002; Kucera and Sarna, 2004). Microeconomic survey data also show that improved working conditions do not culminate in lower labour productivity and profitability of firms in Indonesia and Viet Nam participating in the Better Work programme (Brown, Dehejia, and Robertson, 2018). Another interesting finding is that foreign-owned and exporting firms that are targeted by anti-sweatshop campaigns in Indonesia are inclined to increase real wages and not decrease employment after campaigns by non-governmental organisations (Harrison and Scorse, 2010). Hence, policymakers and operators of industrial parks should arrange decent work and preserve human rights not only by monitoring the internal management but also by consolidating domestic laws and regulations to protect workers in general.

Surveys have shown that women comprise more than half the workers in SEZs, and 90% in some developing countries (Tejani, 2011; Serlet, 2023). It is also estimated that women make up 42% of total employment in GVCs and that the share seems to be much higher in developing countries (ILO, 2015). Furthermore, women in developing countries tend to engage in labour-

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<sup>13</sup> The UN Guiding Principles on Business and Human Rights, endorsed in 2011, present a set of guidelines for states and companies to prevent and address human rights abuses committed in business operations (Business & Human Rights Resource Centre, n.d.).

intensive manufacturing industries, which pay lower wages for female workers than male workers (Tregenna and İzdeş, 2020). However, the predominance of female labour in industrial hubs cannot be completely criticised. On the one hand, low-wage labour provided by women has contributed significantly to the development of manufacturing industries, strengthened international competitiveness, and facilitated rapid economic growth, while supporting women's entry into society and rise in their status. On the other hand, female workers in industrial hubs are subject to more unstable and severe employment and work conditions (Rossi, 2020).

In contrast to industrial parks in developed countries, developing countries have rarely specified clear goals or codes of conduct concerning female labour. To expand labour pools, industrial parks need to reinforce women's labour participation through the effective practice of gender equality, anti-discrimination and sexual harassment rules, and childcare and schooling support. According to empirical evidence, training programmes for line supervisors are underdeveloped (Macchiavello, Rabbani, and Woodruff, 2015), but productivity improved significantly in developing countries when discrimination against women was reduced to help train female workers as supervisors of factory lines (Babbitt, 2016). Encouraging women's labour participation in industrial parks would create significant economic benefits for firms that employ female workers.

In summary, parties responsible for the management and operation of industrial parks are obliged to provide workers – both men and women – with sufficient wages to maintain a minimum standard of living, as well as safe factory work and job training to improve human resources. Applying lax labour regulations in industrial parks will not attract MNCs that have stakes in ESG investments. Underestimating labour issues to earn short-term profits is not likely to attain long-term competitiveness, economic development, or structural reforms. To advance industrial parks' production and workers' welfare jointly, the involvement of all stakeholders is required.

### **3.2. New Industries Using Digitalisation, Servitisation, and Natural Resources**

The Fourth Industrial Revolution, enabled by rapid digitalisation, is exerting significant influence on existing industrial structures. This industrialisation is typically characterised by artificial intelligence, robotics, the internet of things, big data, and so on. These digital technologies will transform existing manufacturing industries. In other words, they are expected to change conventional factories into smart manufacturing, unify factory production with markets through instant data sharing, and eliminate inefficient production and redundant labour forces (Sampath, 2020). Concrete examples of industrial diversification and upgrading include servitisation of manufacturing (Yusuf, 2020), connected factories via cloud computing, and the digitalisation of supply chains and GVCs. In the process of digitalised industrialisation, the emphasis will move from low-skilled to high-skilled labour, which masters digital skills. In addition, intangible capital will become vastly more important than physical capital.

Meanwhile, for developing countries that are still in the process of initial industrialisation, such as the CLM countries, there is a serious threat to abundant labour, which may be replaced by the mechanisation of production facilities. Existing comparative advantages to attract FDI may be lost in the future in developing countries. The automation of factories makes offshoring in developing countries less attractive, and FDI may revert to developed countries (i.e. reshoring). Nevertheless, new digital technologies are also likely to give developing countries, including countries falling into the middle-income trap,<sup>14</sup> an opportunity to upgrade industrial sectors or leapfrog development stages. Although existing industrial sectors have focused on leveraging economies of scale through mass production, future manufacturing will advance modular and order-made production owing to the digitalisation and servitisation of manufacturing. The use of 3D printing, for example, can cope immediately with demand for customisation, which invalidates the advantage of mass production and past investments in industrial parks that aim to decrease average costs. Therefore, though it might appear contradictory, these digital technologies can complement existing labour – particularly in countries that lack sufficient labour pools.

In this context, promoting high-tech sectors that produce high value added using digitalisation and servitisation could be a new direction that industrial parks should undertake. It is now impossible for industrial parks segregated from digital technologies to contribute to manufacturing development. Thus, servitisation could be incorporated into manufacturing processes (e.g. marketing, design, and consumer-led innovation), establishing digital data centres inside industrial parks and introducing digital single windows of trade based on internet cloud technology to facilitate production and export via industrial parks. New innovators or entrepreneurs using digital technologies, who have close connections with industrial parks, are also expected to emerge. However, many developing countries have less solid foundations for immediate digital industrialisation than developed countries such as the United States, Japan, and Germany. As such, developing countries need to expand their labour pools with digital skills, strengthen the high degree of digital connectivity, and nurture relevant local service firms supporting other firms' business activities.

Finally, it is effective for developing countries with abundant natural resources to incorporate resource exploitation sectors into industrial park development. Industrial parks can create high value addition to raw materials obtained from the agriculture, forestry, and mining sectors. That is, the upstream raw material sectors can be integrated with downstream ones through industrial parks that produce value-added export products. In the example of agriculture, industrial parks support its industrialisation by helping to export packaged vegetable and fruit products. The effective use of digital technologies is the key for high value-added agricultural production connecting with consumer markets in a timely manners (i.e. smart agriculture).<sup>15</sup>

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<sup>14</sup> The middle-income trap generally refers to developing countries stagnating for a long time far from the income level of developed countries after achieving the middle-income level.

<sup>15</sup> A good example is flower and vegetable cultivation in the Netherlands, where digital technologies are used

Moreover, industrial parks can supply neighbouring agricultural communities with the necessary facilities and services, such as grain storage, cold stores, rental of agricultural equipment, packaging facilities, food quality control, distribution, and marketing platforms. Another possible effort that industrial parks can undertake is to promote agritourism, which integrates the agricultural and tourism sectors. The linkage of these sectors with GVCs can be a growth engine for developing countries, which is comparable with the manufacturing sector leveraging GVCs.

#### **4. Policy Lessons for Developing Industrial Parks**

It is difficult to identify success factors for industrial parks. External validity is a serious problem in carrying out policies, since measures that worked well in one country may not work in another. But this section attempts to derive contemporary policy lessons to develop industrial parks, particularly in developing countries, based on the previous review of theory, empirical evidence, practical aspects, and the prevalence of the SDGs and digitalisation. What follows will reveal that industrial parks are not a ‘magic bullet’ for industrial development, but they can create positive effects if supported by appropriate policies and institutions.

##### **4.1. Development Strategy with Effective Use of Industrial Parks**

It is critical to design well-functioning development strategies that leverage industrial parks, supported by strong political willingness. Development strategies using industrial parks should help countries steadily climb up development ladders, not only by depending on existing comparative advantages but also by identifying and cultivating new potential comparative advantages. This objective suggests the importance of what sectors and products industrial parks target and nurture. On this point, some industrial sectors are strongly associated with production capability, technological development, innovation, and catch-up. Authors have stated that manufacturing is still the core sector for achieving such benefits (Aiginger and Rodrik, 2020). Development of the manufacturing sector is also expected to induce industrial upgrading, skills and knowledge spillovers, and other sectors’ development (e.g. agriculture and services).

In terms of what sectors industrial parks should focus on, Lin (2012) advocated a framework for identifying and enhancing growth sectors based on new structural economics, which serves as a reference when we deliberate industrial park development. His theory indicates that policymakers need to (i) find countries that are growing dynamically with similar factor endowments of their own and have 10% higher income levels than their own or the same income levels 20 years before, (ii) select export sectors that have been growing for 20 years from the countries mentioned in (i), and (iii) attract FDI and support businesses in the sectors mentioned in (ii) if such sectors do not exist in their own countries. He argued that developing countries can catch up, depending on low-wage labour and technological transfer, if they can steadily create sectors with comparative advantages.

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to supply fresh products to neighbouring European countries in a timely manner.

At the initial development stages, if developing countries like the CLM countries focus on labour-intensive and low-skilled industrial sectors such as apparel and garment manufacturing, it will not result in failure. Rather, establishing industrial parks that are not aligned with current development stages would have difficulty in gaining international competitiveness in GVCs due to the high costs incurred because of the shortage of skilled labour. In fact, the efforts to form high-tech science parks are not always wasteful in developing countries, but some conditions are required, such as whether universities and research institutes can create innovations in association with industrial parks, proficient domestic skilled workers can be hired, and talented foreign engineers and researchers can be attracted to the host countries.

However, even if industrial parks introduce mainly labour-intensive industries in their initial stages, policymakers should consider how dynamic impacts and linkages (including both forward and backward ones) work effectively, which would lend support to other industrial sectors. Industrial parks can strengthen linkages with domestic firms in other sectors and regions and thereby contribute to the development of local firms and their business environments. In term of human resources development, industrial parks are expected to create jobs that realise learning, skills improvement, and social upgrading. One way to achieve this is to invite MNCs as a hub enterprise with strong synergy effects in terms of technology transfer, worker training, and financial assistance. The key is for national development strategies to examine what sectors they focus on and from what sectors they acquire value added within GVCs where many developing countries compete (i.e. finding their global niche). As previously discussed, it is also necessary to identify what sectors are most conducive to creating innovation by stimulating the digitalisation and servitisation of manufacturing sectors as well as the environment, finance, tourism, and natural resources sectors.

Exports still play a significant role in development strategies. For example, the CLM countries could further exploit international production networks and GVCs through the division of labour from neighbouring Thailand and Viet Nam. For this purpose, industrial parks need to introduce FDI that is likely to make substantial contributions to domestic economies. In other words, MNCs as a core of export activities should be induced to provide learning opportunities (e.g. technical guidance on product quality) so that local firms can deploy their export activities in GVCs and upgrade the skills of their labour force. Development strategies for industrial parks need to encourage local firms to ‘learn by exporting’ through FDI and to have linkages with both domestic and foreign markets. Furthermore, developing not only industrial parks but also neighbouring regions is important, particularly for local firms to enter GVCs, which expands the productive capabilities of countries. As such, industrial strategies should be comprehensive from the perspective of lifting countries overall.

The national development strategies should be consistent with measures taken in industrial parks. However, industrial parks struggle to identify potential target sectors on their own due to coordination failures stemming from the lack of collective decision-making amongst the private actors operating within them. Therefore, development strategies need strong administrative

commitments, as evidenced by the cases of China, Malaysia, and Singapore. Moreover, it is notable that no development strategies can be applied to all countries and regions. Strategies to achieve targeted industrialisation should be flexibly fine-tuned and evolve in line with countries' current development ladders, as industrial parks are a key lever to climbing them.

#### **4.2. Geographical Location and Quality Infrastructure Development**

As pointed out in subsection 2.2, good access to major infrastructure, cities, and abundant labour is an important factor, especially for attracting MNCs to industrial parks. Amongst other things, it is essential to provide quality and low-cost hard infrastructure not only inside industrial parks (e.g. electricity) but also good connections with transport access outside them (e.g. roads, railways, ports, and airports) to export hubs that are linked to GVCs. Experience shows that poor geographical location of industrial parks is a factor for failure. High infrastructure costs, remoteness from cities and export hubs, and shortages of skilled labour place such industrial parks at a disadvantage. Conversely, industrial parks with quality infrastructure (particularly electricity and transportation), proximity to major domestic and export markets, abundant labour pools, and socio-cultural amenities of cities (e.g. healthcare and education) are attractive for MNCs invited there as FDI. If countries hope to establish industrial parks in rural regions, they should begin by building the capacity of the local labour force because their quality is sometimes an obstacle to operating industrial parks.

Since overall infrastructure development in developing countries is delayed, it is sensible to prioritise the development inside industrial parks and their surroundings. This is why countries should select geographical locations, appropriate types of infrastructure, and targeted industrial sectors that correspond to their development stage. At an initial development stage, access to FDI, GVCs, and labour pools should be prioritised in establishing industrial parks. Otherwise, industrial parks that lack these important elements will more than likely fail. Industrial parks in strategic geographical locations, with quality infrastructure, can have easier linkages with GVCs, providing growth opportunities via exports. This will bring about affordable intermediate goods, profits from foreign markets, and knowledge and technology spillovers to regions outside industrial parks, which will lift the overall domestic economy.

In the context of industrial parks, quality infrastructure includes both hard and soft infrastructure. Customs clearance is an example of soft infrastructure that can improve investment environments, which will be accelerated by further use of the national and ASEAN single windows. Amongst other things, the soft infrastructure of cities can transform them into global industrial hubs that attract competent skilled labour in conjunction with agglomeration effects.

#### **4.3. Effective Investment Using Limited Resources**

In relation to subsection 4.2, it is necessary to input the available limited resources into industrial parks efficiently and effectively. The merit of building industrial parks in developing

countries is to concentrate infrastructure, which is prone to be scarce nationally, in limited regions to rapidly upgrade industries that operate there. In this sense, it is not desirable to establish multiple industrial parks close together because they may not be able to secure sufficient demand or labour if they are competing against each other. It is reported that, in the case of Viet Nam, the excessive establishment of industrial parks by regional governments generates overall inefficiencies, creating underutilised capacity (Tu-Anh and Anu-Tuan, 2020). Unless facilities and infrastructure are utilised in industrial parks, it is a waste of resources.

Although the role of governments is indispensable for developing and operating industrial parks, governments should tap the strength of the private sector and use public–private partnerships if appropriate. Having said that, since the private sector alone may find it difficult to take a leadership role in establishing industrial parks, governments must be actively involved to play a role in coordination amongst stakeholders. For example, land expropriation from farmers and cession to investors sometimes needs to be executed by governments. In sum, governments and the private sector can decrease their risk of failure by collaborating in industrial parks.

#### **4.4. Re-examination of Excessive Incentives**

It may be wise for governments to avoid providing excessive financial incentives to firms. Oqubay (2020) argued that competition for attracting FDI generates a race to the bottom, which exhausts countries' financial systems. Excessive financial incentives can complicate countries' financial situations, and FDI could escape from industrial parks if such incentives are terminated. Financial incentives cannot compensate for the disadvantage of geographical location, while many countries compete by offering aggressive financial incentives. Although some form of financial incentive may be necessary for industrial parks, there is no supporting evidence that they alone have succeeded in attracting MNCs (UNCTAD, 2019). In addition, survey research shows that no conspicuous relationship is observed between financial incentives and SEZ performance (Wong and Buba, 2017). This lack of correlation may imply that the business environments of SEZs are converging internationally due to the fierce competition in terms of financial incentives for FDI.

In addition to a decrease in tax revenue in many instances, excessive financial incentives would force the exit of local firms that are not eligible to receive them. Given these adverse effects, what industrial parks should do at the outset to attract FDI is to provide fully fledged infrastructure and reliable operational systems. More importantly, industrial parks can use a 'wise incentive' that obliges clear outcome conditionality on resident firms that receive financial incentives, e.g. a minimum requirement for value addition, employment creation, and research and development (R&D) investment (Mazzucato and Rodrik, 2023). This kind of conditionality will elicit appropriate efforts from firms to achieve the aims of industrial parks. Furthermore, inhibiting industrial parks from using excessive incentives would decrease the risk of countries

falling into a dual economy, in which both prospering and stagnating regions coexist domestically.

In developing countries lacking agglomerations, it is inevitable to provide some incentives to industrial parks and SEZs for rapid industrialisation. Development strategies used by developing countries are similar in terms of FDI attraction, the types of manufacturing products, and export promotion based on GVCs. If other countries emerge with stronger incentives, it is necessary to design more sophisticated strategies, e.g. beyond providing simple financial incentives. As discussed in section 3, developing countries need to present unique development strategies considering the SDGs and digitalisation aligned with their geographical, historical, and social circumstances.

#### **4.5. Broad Range of Industrial and Related Policies**

Both developed and developing countries have deployed industrial policy in the process of their economic development. While countries that succeeded in catch-up and industrialisation depended on comparative advantages in their initial development stages, they leveraged industrial policy to enhance production and technology capability, exports, and innovation, and thereby created new comparative advantages. From this experience, a broad range of industrial policies is needed to fulfil the potential of industrial parks. Besides controlling for attracting FDI, industrial policies should derive the maximum advantages from the agglomeration economies of local supporting firms, knowledge and technology spillovers, and linkages with GVCs. When implementing this kind of industrial policy, it is essential to aim for long-term, dynamic benefits of producing high value-added products, rather than short-term, static benefits of minimising labour costs in industrial parks.

In this respect, first, industrial policy is expected to drive market power by not only fixing market failure but also creating and shaping markets. The approach stimulating the private sector would provide governments with helpful knowledge on market restrictions and opportunities (Rodrik, 2004). Second, governments should not restrict themselves to either horizontal policy that applies measures across all sectors (e.g. flat tax breaks for investment) or vertical policy that targets specific sectors (e.g. subsidies for selected sectors). Both horizontal and vertical policies can be used to make industrial parks work effectively for industrialisation.

Third, promoting industrial parks requires industrial policies that strengthen collaboration between the public and private sectors. Such collaboration helps avoid coordination failures through the sharing of information and common objectives. For example, fostering industrial associations can guide both governments and firms toward coordinated action in relevant sectors. These efforts would also mitigate hold-up problems, where firms underinvest inefficiently to protect themselves from potential opportunistic behaviour by governments due to asymmetric information between the two parties.

To reiterate, industrial park policies should be consistent with a variety of relevant policies, including trade, investment, SMEs, technology, labour, education, and the digital economy, to

create synergies amongst them. Trade and investment policies still play a dominant role in nurturing firms, especially local firms, located in industrial parks, as they can enhance the linkages of domestic firms with foreign markets and GVCs. By implementing these policies effectively, such as tariff and non-tariff barriers, governments can not only lower imported intermediate goods prices but also reinforce preferable investment environments for MNCs. Hence, developing countries need to advance free trade and investment agreements to create favourable business environments for both domestic and foreign firms. SME and technology policies are also required to provide technological guidance to local SMEs and address the challenge of nurturing local SMEs with high skills as a supporting industry. Furthermore, labour and education policies promoting investment in the human capital of local workers are necessary in industrial parks because low-skilled labour forces would hinder advanced technology transfer from MNCs. If this were to occur, industrial sectors could fall into a negative cycle where they are resigned to depending on cheap labour. Therefore, industrial parks can establish specific zones targeting skills development to provide a smooth transition for workers taking up positions in industrial parks (e.g. vocational institutions providing job training programmes).

The environmental and labour rules imposed by governments affect the business activities of firms operating in industrial parks. In addition to trade rules, such as those mandated by the World Trade Organization, free trade agreements, and investment agreements, governments need to conform to international labour (e.g. ILO Conventions) and environmental rules (e.g. the Paris Agreement). As discussed in subsection 3.1, industrial parks can leverage these rules as an opportunity, not a restriction, to transform themselves in line with the SDGs, which would increase their international competitiveness in the long run. Moreover, as discussed in subsection 3.2, advancing the digitalisation of industrial parks demands national and international digital rules (e.g. on privacy, information security, and data storage) that are well designed for the development of industrial parks that use digital tools extensively.

#### **4.6. Decreasing Policy Uncertainty**

Global firms have become more concerned about geopolitical risks such as trade and technology conflicts when choosing their production bases. Since firms are sensitive to these risks, an increase in policy uncertainty has a negative impact on FDI – anticipating uncertain and pessimistic investment benefits (Bloom, 2014). Therefore, developing countries should lower various risks of MNCs investing in their countries by ensuring fair and transparent regulations, rules, and procedures regarding industrial parks. By doing so, developing countries can more easily receive financial and management cooperation and FDI from other countries (i.e. industrial parks development partnership).<sup>16</sup>

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<sup>16</sup> The Japan International Cooperation Agency (JICA) has included industrial parks development in its supporting menu list for developing countries since the early 2000s.

Insufficient governance and lack of transparency within industrial parks could be a negative factor for their development due to increased policy uncertainty for stakeholders. It is important for governments to learn good regulatory practice and governance based on cases in other countries. This is because good governance will lead to appropriate incentives for stakeholders, including policymakers, concerning industrial parks. Coordinated incentives are necessary between central and regional governments and amongst relevant ministries to enhance the predictability of policies and good governance. Furthermore, intermediary organisations in industrial parks can play a role in decreasing policy uncertainty by facilitating information flows amongst ministries, operators, and resident firms and supporting effective measures to be implemented there.

#### **4.7. Experimental Laboratory of Industrial Development**

Industrial parks can not only be a tool to increase production and employment, but also an experimental laboratory to form dynamic industrial structures. In labs, there is an emphasis on the discovery process in the unknown world rather than the implementation of detailed plans (Aiginger and Rodrik, 2020). On this point, industrial park policy is different from regional promotion policy. Before introducing new institutions and mechanisms to the rest of the country, governments can conduct pilot experiments in industrial parks, contributing to structural reforms of domestic industries. China's coast is the most conspicuous example of exploiting industrial hubs as an experimental laboratory. Using SEZs, the Chinese government intended to implement new systems of finance, labour, pricing, etc. before rolling them out to the rest of the country. SEZs in China were also a political measure to counteract anti-export campaigns, which raised concerns about free trade and an open economy. Experiments in structural economic reforms using industrial parks could be executed in the field of the green economy, industrial digitalisation and servitisation, smart cities, and entrepreneurship.

As reviewed in subsection 2.2, no strong evidence suggests that all SEZs have succeeded on a long-term basis, and some are assessed to have failed. While it is impossible to completely avoid failure for all experimental laboratories, it is important to identify the causes when the tries fail in domestically and abroad. Thus, governments should provide an enabling environment for such experiments so that the overall benefits can exceed the overall costs. The importance of learning by doing and trial and error applies to government policies too, as observed in successful cases in East Asia (Stiglitz and Greenwald, 2014). Put simply, industrial parks bring learning experience, which implies that those who are involved with them can learn how to achieve industrialisation. As policies are not guaranteed to be successful if replicated elsewhere, we may not identify a gold standard for the success of industrial parks. Whether industrial parks succeed or not will depend on multiple factors, so policy innovation is crucial, underpinned by governments' learning by doing.

## 5. Conclusion

Developing countries are competing fiercely for better positions in GVCs. To this end, countries like the CLM countries leverage industrial parks to strengthen their domestic industrial sectors. Many countries expect industrialisation to accelerate by providing financial incentives to specific sectors or regions, e.g. in the form of SEZs. Such incentives are necessary to some extent to attract FDI. However, excessive incentives may cause a race to the bottom internationally. When it comes to establishing industrial parks, the key is to explore distinctiveness and uniqueness within GVCs besides financial incentives, which means that developing countries should compete in a race to the top. In this connection, it is imperative to promote sustainable industrial development from the lens of the SDGs, considering the environment, decent work, and women's labour participation in industrial parks, as well as to incorporate the vibrancy of digitalisation and servitisation.

Developing countries are catching up with developed countries. Given that many countries have succeeded by using industrial parks, developing countries are similarly provided with an opportunity to achieve industrialisation and economic development. Despite current constraints, these countries need to make a strategic move beyond the initial and middle-income country stages. The next challenge would be escaping the middle-income trap. Developing countries should investigate how and what industries to nurture after graduating from labour-intensive industry. The next step would be to learn how to create high value-added products and services using advanced technology while continuing to depend on FDI. To this end, industrial parks should be regarded as a valuable opportunity to achieve a dynamic path to industrial development, involving all stakeholders, and thereby create a bright future for inclusive growth that does not leave anyone behind.

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