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LEVERAGING A NEW GENERATION OF INDUSTRIAL PARKS AND ZONES FOR INCLUSIVE AND SUSTAINABLE DEVELOPMENT

STRATEGIC FRAMEWORK



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Preface

UNIDO was among the first development agencies to define guidelines for the establishment of industrial parks in the 1990s.¹ In the 2000s, several UNIDO publications addressed the issue of industrial parks such as *UNIDO Industrial Development Report 2002/2003: Competing through Innovation and Learning* and *Industrial Development Report 2009: Breaking In and Moving Up: New Industrial Challenges for the Bottom Billion and the Middle-Income Countries*. A series of regional conferences on industrial parks were held from 2010 to 2015 in Azerbaijan, Slovenia and Belarus and led to related publications. These conferences facilitated networking, knowledge and experience-sharing among policymakers, practitioners and academics to better understand the role of a new generation of industrial parks and special economic zones and to build the capacity of public and private stakeholders to design, establish and manage industrial parks.

This strategic framework was prepared in the context of the UNIDO Project: Fostering inclusive and sustainable industrial development (ISID) in the New Silk Road Economic Belt, later referred to as the Belt and Road Initiative: Leveraging the potential of industrial parks, zones and cities in Azerbaijan, Tajikistan, Turkmenistan and Uzbekistan. It is designed to assist national and international stakeholders in using various forms of industrial parks and zones as spatial policy instruments to promote balanced regional economic development and inclusive and sustainable industrialization.

The framework identifies critical issues and outlines the major steps to be taken for the establishment and management of an industrial park or special economic zone. It provides guidelines, in accordance with international best practices, rather than solutions, supporting the decision-making process for establishing new parks and zones and their operation—and enhancing existing parks and zones' effectiveness in promoting ISID of the regions or areas where they are located.

Parks and zones can be adapted to different economic and political settings—from less developed countries, to transition economies, to resource-based economies and to middle income countries. The challenge for governments is to ensure they are used most effectively and efficiently within a given country context. The strategic framework is a road map in that direction:

- It provides a brief overview of concepts of industrial parks, zones and other territorial units, their roles and expectations as spatial development policy instruments, highlighting their evolution over time and links with growth pole theory and regional development approaches.
- It underlines the importance of parks and zones in facilitating linking SMEs and their clusters to regional and global value chains.
- It clarifies the roles of various stakeholders, such as policymakers, regulators, zone and park authorities and management bodies, as well as investors, enterprises, employees and representatives of civil society in designing and implementing park and zone projects.
- It presents good practices and successful experiences in establishing and managing industrial parks in line with ISID.
- It explains the principal phases of planning, designing and implementing a park or zone project: preparatory analysis; diagnostics; policy design and planning; implementation and financing; operation and adaptation, promotion and marketing; and monitoring and evaluation.
- It provides a checklist to gather and analyse information as part of the process of planning and implementing new parks and refurbishing existing ones.
- It delineates key success factors and minimum requirements, or performance indicators, covering legal, regulatory, social, economic and environmental aspects and related topics, to monitor and evaluate existing or planned parks and zones, with the objective of contributing to national progress on realizing the Sustainable Development Goals (SDGs).

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Abbreviations

ADB	Asian Development Bank	ISID	Inclusive and Sustainable Industrial Development
ADR	Alternative Dispute Resolution	IT	Information Technology
AfDB	African Development Bank	KLIC	Kuala Lumpur Internet City
ASCM	Agreement on Subsidies and Countervailing Measures	KPI	Key Performance Indicator
CAREC	Central Asian Regional Economic Cooperation	LEED	Leadership in Energy and Environmental Design
CK	China Knowledge	MSMEs	Micro, Small and Medium Enterprises
DGNB	German Sustainable Building Council	OEM	Original Equipment Manufacturing
DS	Diagnostic Study	OSS	One-stop Shop
EIA	Environmental Impact Assessment	R&D	Research and Development
ERZ	Early Reform Zone	RECP	Resource-efficient and Cleaner Production
ESIA	Environmental and Social Impact Assessment	SDG	Sustainable Development Goal
EU	European Union	SEZ	Special Economic Zone
FDI	Foreign Direct Investment	SME	Small and Medium Enterprises
FEMOZA	World Free & Special Economic Zones Federation	TEDA	Tianjin Economic Development Area
FTZ	Free Trade Zone	TRIM	Trade-related Investment Measure
GATT	General Agreement on Tariffs and Trade	UNIDO	United Nations Industrial Development Organization
GDP	Gross Domestic Product	VAT	Value-added Tax
GIS	Geographical Information System	WEPZA	World Export Processing Zones Association
ICT	Information and Communications Technology	WFZO	World Free Zones Organization
ILO	International Labour Organization	WTO	World Trade Organization
IPR	Intellectual Property Rights		

All references to dollar and \$ are to the US dollar unless otherwise noted.

Chapter 1

What are industrial parks and zones?

Industrial parks are geographical areas zoned for industrial and business use, usually on the outskirts of cities. UNIDO defines them as “a tract of land developed and subdivided into plots according to a comprehensive plan with or without built-up factories, sometimes with common facilities for the use of a group of industries.”²

Industrial parks come in variety of forms such as industrial zones, industrial estates, cities and districts; technology or innovation areas; science parks or cities; cyber parks; high-tech (industrial) parks; research and technology parks; science and technology parks; technology incubators; and eco-industrial parks. These different forms can be situated in special economic zones, export processing zones and free trade zones, which can also be a part of a larger geographic and economic area, involving multiple countries along the transport corridors and forming the industrial and economic corridors.

Industrial parks began to appear over a century ago in the United Kingdom and the United States of America. In the 1900s, the first planned industrial

district in Chicago was developed to foster the introduction of steam and electric power and building of railways. In Great Britain, the motivation was to spread industrial centres across the country.³ Early parks varied in both character and size, but all had a common feature: the area was planned, and individual producers had to follow the plan.⁴ In Western Europe, since the Second World War, park development has been guiding industrialization in less developed regions and promoting balanced development in line with growth pole theory, developed in the 1950s by French economist François Perroux.⁵

According to growth pole theory, which became popular in the 1960s, economic growth and development are not uniform across geographic spaces. Instead, they take place in a specific geographic location—a pole—dominated by core industrial activities, such as steel, automotives, agribusiness, petrochemicals, electronics, biotechnology or pharmaceuticals, or tourism. Hence the terms technopoles, biopole, e-pole, agropole, and leisure and tourism pole (box 1.1).

Box 1.1

Agricultural growth poles driving economic development in Africa

Agricultural growth poles—also known as agropoles—present a new trend in Africa’s development strategy. African governments see these growth poles and corridors as a useful tool to attract private investment, promote agricultural transformation from low- to high-productive agriculture and agro-processing and improve the competitiveness of African countries. In Africa, 36 agricultural growth poles and 9 corridors were established over the last 15 years, covering 23 countries and around 3.5 million hectares of land.

A key element of agropole development strategy is aggregation: the grouping of farmers around private actors (aggregators) in agri business parks with strong managerial capacity to deal with land fragmentation and to ensure that aggregated holdings have access to modern production techniques. The aggregators also play key roles in the promotion, processing, monitoring and marketing of products.

Ensuring that the new wave of agropoles and growth corridors is effective requires robust policies, laws and practices to ensure that a possible new trend of investment helps Africa achieve the SDGs. Most important, the host-country rural economy must absorb and integrate the new investment flows in existing systems of production. If it fails to do so, there is a real risk that foreign investment could worsen the situation or create a dual system, so that small farmers may not benefit from the increased economic activities.

The agropole strategy is supported with financial and technical support from regional and multilateral organizations, such as the World Bank, the African Development Bank (AfDB) and the United Nations Industrial Development Organisation (UNIDO).

Source: Picard, Coulibaly and Smaller 2017.

These core industrial activities can trigger related activities, through backward and forward links in value chains, and the demand for industry-related services, such as extension services, retail, banking and logistics. This creates new jobs, investment, uptake of technologies and development of industrial value chains. A secondary growth pole can emerge at a later stage with the development of transport hubs and networks. Growth pole theory was further developed and modified as a theory and strategy of regional development in the 1970s, by using spatial policy instruments such as industrial parks and special economic zones.

During the mid-1960s, many regions—especially in North America and Western Europe—adopted regional industrial park programmes to promote economic and community development through large-scale capital-intensive projects and industrial site development. The purpose was to create new or improve existing manufacturing facilities through planning, development and construction of industrial parks and zones. Such programmes set up a framework for better collaboration among regional and municipal actors and developers of industrial parks.

Driving the early 1970s generation of industrial parks were public sector development and government subsidies for services and facilities. Compared with modern standards, they were very basic, with simple halls and space for storage. After the crisis years of the 1970s, the trend was moving away from providing basic facilities and services for heavy industry and towards providing more sophisticated services for technology and high value-added industrial activities. Precipitating these changes were the advent of industrial graveyards in the United States of America and Europe, the rise of pollution and environmental concerns, and the evolution of economic and social needs. Also spurring the changes were technological progress and significant cuts in transportation costs.

With time, the scope of services became more sophisticated and holistic. In the late 1980s, a new generation of industrial parks was built with greater attention to the requirements of science, technology and business. In the 1990s, parks emerged with greater

flexibility in the use of buildings and space and a wider range of support services supplied to firms. There was a gradual shift from ad-hoc private sector licensing to planned and coordinated public–private partnerships. Private involvement led to improved services, greater product differentiation and non-price competition.

Since the late 1990s, parks have been designed with the promotion of new innovative industries and technologies in mind, as well as the creation of attractive environments for employees, with housing, medical services, shopping and educational establishments. The private sector has been developing, owning and operating such parks on a commercial basis, with the park authority focusing on its role as a regulator, making way for private sector expertise to take on core functions.

Growing environmental and social concerns in countries and communities, combined with a shortage of resources, has led to the introduction of eco-industrial parks, which have high environmental and social standards and apply cleaner and more resource-efficient production methods.

Parks, zones, corridors and growth poles have been used as spatial development policy instruments to support industrial and regional development. “Industrial park,” “industrial zone,” “industrial estate” and other similar terms are commonly used as synonyms, with a general meaning as an area designed and zoned for manufacturing and associated business, which enjoy economic incentives and administrative privileges as well. If successfully implemented, such policy tools can create positive spillovers to the rest of the economy.⁶ In supporting the formation and growth of industrial agglomerations, facilitating the clusters, building value chains and regional innovation systems and promoting new innovative industries and technologies, such designated geographical areas can be hubs to stimulate investment, innovation, technological learning and inclusive and sustainable industrial and economic development, nationally and regionally.

Industrial parks have the potential to generate or strengthen comparative and competitive advantages

and to remove the binding constraints for development. They can be a testing ground for new reforms, policies and approaches. They can lower the risks by offering a transparent and effective legal framework, fiscal incentives, modern management practices and governance mechanisms. They can bring institutional change by building trust, norms, standards and entrepreneurial culture. They can be fertile ground for new technologies, industries, jobs and markets. And they can provide high quality business environment, enabling firms to cut costs and realize economies of scale by benefiting from the provision of common services shared among enterprises.

Parks have also proven to be a key tool for regional development, by implementing a smart mix of hard infrastructure (such as land, industrial plants, offices, laboratories and public spaces) and soft infrastructure (such as rules, regulations, standards and norms). Their growth acceleration services for companies, jobs and wealth creation support the revitalization, competitiveness and internationalization of local supply chains.

Used correctly, industrial parks, zones and corridors can attract private investment in selected sectors that produce positive spillovers to the broader economy and drive job creation and inclusive and sustainable growth. They can facilitate agglomeration economies and spread created prosperity from the centres of excellence to the periphery.

Agglomeration economies and other growth benefits can be realized from hub development around transport nodes and urban and industrial centres. And deepening transportation networks can trigger a web of secondary agglomerations around those nodes and hub centres, creating industrial and economic corridors. By efficiently linking industrial and logistics hubs, economic linkages and networks can extend over an even larger mega-region, dramatically expanding markets, fostering divisions of labour and shaping patterns of regional economic development. Greater connectivity, network development and market integration—combined with policies to strengthen enterprise clusters and networks along and among the production value chains—will lead

to greater industrial diversification and productivity, setting in motion a virtuous growth cycle. By enhancing the business infrastructure to cut the cost of doing business and attract investment in key transport, logistic, commercial and industrial nodes and by ensuring effective coordination and partnership across the national, provincial and city levels in developing and implementing such development programmes, countries can start this virtuous growth cycle, as explained by growth pole theory.⁷

Used incorrectly, they can widen regional inequalities, undermine the livelihoods of small-scale producers and farmers and significantly deplete land, water, soil and other natural resources. Ensuring that the new wave of zones, parks and corridors is effective and leads to sustainable development outcomes requires robust policies, laws, regulations, standards and enforcement mechanisms.

Special economic zones

The term special economic zones (SEZs) applies to a delimited area of public or private land within a national territory, dedicated to any kind of economic activity, from industry to logistics, commerce, banking and R&D. They grant tenants such special advantages as favourable location, skilled labour force, local suppliers, modern infrastructure and utilities, and in some cases fiscal incentives. They also provide administrative and security services, such as one-stop-shops for processing business licenses and in-house customs offices. And they can offer such support services as consulting, training, technical guidance, information, joint research facilities and business support including quality assurance. This broad definition includes industrial zones, export processing zones, free trade zones, free zones and other similar terms.⁸

SEZs are often located close to regional or international transportation hubs (airports and shipping ports) to facilitate fast transfers of goods at lower cost using modern large roads. Within zones, modern infrastructure and utilities include reliable electrical and water supplies, world-class telecommunications (such as full telephone and fibre optic/internet

connectivity), centralized waste management and modern housing and townships.

The fiscal incentives may include tax exemptions for exports, imports and property, long and short-term credit at preferential rates, VAT exemptions for energy electricity, gas, fuel, oil and water, special rates for telecommunications services, direct subsidies for rents, better access to finance and lower income taxes. The range of these facilities and incentives may vary by a country's level of economic development. They may be administered by national, regional or local governments, by the private sector or in partnerships.

Modern SEZs also come in many types and sizes from general purpose to specialized; from very small, offering duty-free warehousing of goods in transit, to those offering special governance regime for an entire metropolitan area. Since the mid-1980s, the number of zones has grown rapidly in almost all geographical regions, with especially dramatic growth in developing countries. The ILO identified nearly 30 forms of SEZs ranging from zones in China, which encompass entire provinces to much smaller fenced-in economic zones.⁹ About 75 percent of the world's countries have SEZs, and their number is estimated between 4,500 to nearly 10,000 (with small single-factory zones counted in).¹⁰

In China, SEZs have attracted millions of people looking for jobs and have been integral to China's rapid urbanization. The country's first SEZ opened in 1980 in Shenzhen, then a small town near the border

with Hong Kong, now a trade hub and one of China's largest cities with more than 18 million people, more than 80 percent migrants (box 1.2). Cities in China also have a high concentration of industrial parks relative to other geographic locations.

Beyond standard models

An ancient maxim of Roman jurists, *omnis determinatio est negatio*—"every definition is a negation"—warns about the limits of classifications based on definitions. Peter Warr and Jayant Menon in their study on Cambodia's SEZs¹¹ connect the nature and effectiveness of SEZs—beyond their definition according to governing laws or strategic planning documents—to the host country's stage of development. As they put it: "A serious limitation of the literature on SEZs is that it tends to search for both the characteristics of SEZs and the benefits the host country may expect from them, which are similar for all host countries. It largely overlooks the fact that host countries vary greatly in their level of development, from primarily agrarian African economies, to middle-income industrializing economies in Asia and finally to advanced industrial economies in Europe, North America and some Asian countries."¹²

What differentiates the various categories of industrial parks and zones—as administrative and legal units and spatial economic policy tools—are the type of facilities, services and incentives they provide and the industries they are hosting based on local

Box 1.2

Special economic zones in China

In China, SEZs refer to large, multifunctional and comprehensive zones or areas—such as Shenzhen, Zhuhai, Shantou, Xiamen, Hainan, Shanghai Pudong New Area, Tianjin Binhai New Area and the recent Xiongan New Area—as well as economic and technological development zones (ETDZs), free trade zones (FTZs), export processing zones (EPZs) and high-tech industrial development zones (HIDZs).

Zones and parks have had a profound impact on economic development in China. Seven SEZs, 54 HIDZs and more than 2,000 industrial parks account for 22 percent of GDP, 46 percent of FDI, 60 percent of exports and 30 million

jobs (60 percent of them for women). They also act as crucibles for major reforms—for example, in land, labour and taxes. Shenzhen SEZ, China's FDI gateway, was a testbed for economic reform. Shenzhen was the first city in China to carry out reforms in land tenure, the labour market, public administration, the financial system, state-owned enterprises and taxes, and the first to set up equity and foreign exchange markets. In 1978 GDP per capita in Shenzhen was \$89; by 2015 it had risen to \$26,071. The population was 300,000 in 1978 and stood at 10.8 million in 2015.

Source: UNIDO 2018.

cooperative advantages and the vision for developing new competitive industries. And this depends on the types of industries and activities parks and zones are to host as well as on the country's socioeconomic and institutional development.

In the context of an overall development and industrialization strategy, location-specific development projects and programmes establishing parks and zones can overcome various market and institutional failures. They can leverage comparative advantages to raise regional and national industrial competitiveness and achieve more balanced regional distributions of production and job opportunities. And they can foster the uptake of clean technologies and practices.

Parks and zones can also provide an institutional framework, modern business development services, physical infrastructure and information and telecommunications technology that may not be available elsewhere in the country. They can be testing grounds for new reforms, policies and approaches to improve the business environment and become the stepping stone of wider country liberal policy reforms, as in many East Asian countries. Governments can experiment with establishing parks gradually to see whether they produce public goods and other benefits, such as foreign exchange earnings, government revenue, export diversification, increased investment and greater trade efficiency among domestic firms, that otherwise would not have happened and whether they can be gradually replicated in other locations. China has followed this approach to gradual lateralization, in contrast to the rapid liberalization approach that countries in Eastern Europe and some countries in Central Asia have followed.

Carefully planned, designed and integrated into national and regional development strategies, they can achieve economies of scale in large industrial complexes (cutting the cost of capital investment) and further reduce costs in the provision of common high-quality specialized services and facilities. Their products can diversify a country's exports and increase its foreign exchange earnings.

Parks and zones can also lower risks by offering transparent and effective legal frameworks, fiscal incentives, modern management practices and governance mechanisms. They can bring institutional change by building trust, norms, standards and an entrepreneurial culture. They can be fertile grounds for new technologies, industries, jobs and markets. Concentrating certain industries and industry-support services, and marketing them well, attracts new investors and talented people. Their concentration can also enhance the trade efficiency of domestic firms. They can use leveraging of local SMEs linkage to global value chains for acquiring new technology, information and market access and for industrial upgrading and modernization.

Parks and zones can be catalysts for smart specialization and diversification, linking industry, academia and government—and fostering technological learning and innovation. That can induce structural changes in production and the economy—and create new activities and jobs. Industrial clusters of SMEs can be developed through collective learning and innovative behaviour and provision of appropriate cluster-support structures, and various programmes for capacity building and promotion of SME development. Training and skilling can improve labour productivity and integrate disadvantaged populations in urban and rural areas into productive industrial activities. Buyers, producers and suppliers can operate in the same location, reducing the transaction costs of economic learning while establishing new standards and norms of entrepreneurial behaviour. Companies in industrial parks often benefit from cooperation and competition of other companies, multiplying the effects on innovation and learning. And parks with university research centres stimulate universities to work more with industrial companies—and in time to locate some of their departments close to the park.

Successful parks and zones also use the services of local companies, creating backward and forward linkages in the local economy, and diffusing acquired knowledge and technology to the wider business community in the country. They can thus become growth and

innovation hubs, fostering uptake of new Industry 4.0 technologies, creating high-growth regions and driving national industrial and economic development.

A new generation of industrial parks is building more resilient economies and achieving social, economic and environmental objectives. They can set minimum requirements or sustainable performance standards, against which existing, or planned new parks can be assessed, to foster inclusive and sustainable industrialization.

Countries at different level of economic development use parks and zones to foster their respective economic development objectives, including increased government revenues:¹³

- Low-income developing countries, with low productivity and employment in agriculture, use parks and zones to attract investment and create jobs in traditional low- and medium-skilled light industries, such as leather and apparel in Sub-Saharan Africa (box 1.3), South Asia and less

developed Southeast Asia. They have provided women the opportunities to gain financial independence and to expand their personal autonomy and life choices.

- Middle-income developing countries use them to facilitate the formation of industrial clusters and to attract investment in high-tech industries.¹⁴
- Transition economies use them to address cumbersome administrative business start-up and import/export procedures; inconsistent rule of law; weaknesses in infrastructure and business development services. As experimental tools to consolidate a market economy, they provide the institutional framework, modern services and a physical infrastructure that may not be available in the rest of the country. Some examples of possible solutions to specific problems that frequently arise are presented below (table 1.1).
- Post-crisis countries use them to offer relatively secure and stable environments for the private

Box 1.3

Industrial parks in Ethiopia boost industrialization by focusing on light industry and leveraging partnerships

The Ethiopia strategic orientation for industrialization is to capitalize on the country's competitive advantages and to focus on labour-intensive light manufacturing such as leather, apparel, textiles, agro-processing and electricity, supported by the promotion of industrial parks, which circumvent business climate impediments through simplified procedures, tax advantages and easy access to financial services.

UNIDO launched a Programme for Country Partnership in Ethiopia in June 2014. The Programme brings together development partners, UN agencies, financial institutions and the business sector, under the leadership of the national government. It helps achieve the goals set out in the country's industrial development strategy and Growth and Transformation Plan II (2015–2020) to achieve middle-income status by 2025 and increase the contribution of manufacturing and industry to GDP.

The Programme focuses on three light manufacturing sectors: agro-food processing, textiles and apparel and leather and leather products. The sectors were chosen for their prospects for job creation, strong linkages to the agricultural sector, high export potential and capacity to

attract private sector investment. They will act as a springboard for the transformation of Ethiopia's economy: from one based on agriculture to one driven primarily by light industries.

Three integrated agro-industrial parks are under development in the Amhara, Tigray and the Southern Nations, Nationalities and People's Region, with a fourth set to start soon in the Oromia region. In addition, the government is establishing an environmentally-friendly leather tanning district with a state-of-the-art common wastewater treatment plant to reduce the environmental impact of leather processing. Net FDI increased from \$4.2 billion in 2016 to \$4.9 billion in 2017, driven by the new industrial parks.

The authorities are advancing reforms to improve the business climate and enhance competitiveness, and substantial resources have been deployed to develop road, rail, dry ports, air transport, energy, telecommunications, water and irrigation infrastructure to reduce the cost of doing business, and improve productivity.

Source: IMF 2018.

Table 1.1

Frequent operational issues and possible solutions where markets are still not fully developed

Issue	Good practice examples
Timely and effective legal framework enforcement	Adopting a high standard alternative dispute resolution (ADR) system.
Targeting traditional and consolidated markets	Revamping old industrial regions to attract new investors interested in developing and producing more sophisticated and higher value-added products for the same target market, eventually promoting a lead firm.
Supporting and monetizing traditional business and manufacturing cultures	Equipping a new or existing textile zone with a cutting-edge service centre, able to support investors in choosing raw materials and yarns, designing fashionable products, training workers and searching for buyers and subcontractors. Creating a dairy product zone in a territory traditionally populated by dairy cattle breeders to concentrate and support them in selecting and improving breeds, the collection and treatment of milk, the production, packaging and marketing of high-quality cheese.
Natural beauty, historical heritage or archaeological sites	Localizing a new—or expanding an existing—zone neighbouring territories rich in natural beauty or archaeological sites could generate new firms, manufacturing products and gadgets for tourists, creating and maintaining touristic trails, promoting and managing farm housing.
Important universities or research centres	Creating, expanding or specializing a zone strongly connected to universities or research centres to generate technologies to produce innovative products usually rare in developing or transition countries. Supporting a lead anchor firm to provide the engine for attracting other technological investors.
Craft and family business tradition	Creating a zone to promote and facilitate the development of small and medium-size enterprises in service industries, such as low-cost utilities, business planning, marketing, legal services and others.

sector to operate, to enhance competitiveness and to revitalize the economy. Countries with fragile situations—those with high risk of institutional breakdown or violent conflict—use SEZs to address drivers of fragility and build resilience.¹⁵

- Resource-based economies use them to diversify the economy by stimulating investments in related products and creating value chains.
- High-growth and emerging economies use them to support technological deepening and upgrading in existing value chains and to foster the uptake of clean technologies.
- Subnational local economies use them to stimulate investment and leverage local comparative advantages (assets, history, culture, human and material resource base) through cluster development.
- Developed countries and some developing countries use them to foster linkages with the rest of economy and with international production and research networks to create new innovations, as in Germany, Malaysia and Singapore.
- The most advanced countries have eco-industrial parks, technology parks and innovation areas or districts (as in Germany, Singapore, Switzerland and the United States of America). As countries achieve a higher stage of economic development, stronger environmental regulations make eco-industrial parks and zones not only to comply with environmental regulations but also to be financially profitable for industries.
- Urban areas in advanced economies and some developing countries use technology parks to compete in the knowledge-driven economy. Countries can further use SEZs to target a specific location, origin of investor, industrial sector, or business or value chain segment:¹⁶
 - Location: urban centres; semi-urban, in towns within mixed urban and rural areas; or rural, in towns in predominantly rural areas.
 - Origin of investor: local, comprising mainly domestic investors, or international, also including businesses run by foreign investors.

- Industrial activity: one industry such as pharmaceuticals, automotive or metal works; related and unrelated industries; or other economic activities (table 1.2).
- Business or value chain segment: supporting a specific value chain segment or business segment, such as start-up businesses or micro, small and medium enterprises (MSMEs) and their clusters serving key players in global value chains.

Table 1.2

Examples of specific zones

Type of zone activities	Development objective	Activities	Markets	Examples
Technology or science parks	Promote high tech and science-based industries	High technology activities	Domestic and export	Singapore Science Park, Singapore
Petrochemical zones	Promote energy industries	Petrochemicals and other heavy industry	Domestic and export	Laem Chabang Industrial Estate, Thailand
Financial services	Development of off-shore financial services	Offshore financial and non-financial services	Export	Labuan Offshore Financial Centre, Malaysia
Software and internet	Development of software and IT services	Software and other IT services	Export	Dubai Internet City, United Arab Emirates
Airport-based	Air cargo trade and trans-shipment	Warehousing, trans-shipment	Re-export and domestic	Kuala Lumpur Airport Free Zone, Malaysia
Tourism	Integrated tourism development	Resorts and other tourism	Export and domestic	Baru Island, Colombia
Logistics park or cargo village	Support logistics	Warehousing, trans-shipment	Re-export	D1 Logistics Park, Czech Republic
Hi-tech park	Biopharmaceuticals	Cluster of similar industries	Export and domestic	Zhangjiang Hi-Tech Park

Source: Akinci and Crittle 2008; UNIDO.

Chapter 2

Traditional parks and zones

In recent decades, a classification of zones has sprung up according to specific objectives:

- Driving economic reform processes in countries—early reform zones.
- Promoting exports, with a special trade regime, where tariffs, quotas or duties differ from the rest of the country—export processing zones.
- Promoting free trade regimes, as in the EU—free zones.

Driving economic reform: early reform zones

Early reform zones (ERZs) can be policy tools for restructuring rent-distorted economies and for driving substantial economic and business environment reforms.¹⁷ They provide such critical post-reform conditions as world-class infrastructure, business friendly services, property rights and the rule of law—to rapidly expand a dynamic market economy. In such countries, zones can be experimental areas for liberalizing business and trade and for attracting foreign investment. The most relevant example is China (see, for example, Shenzhen, Zhuhai, Shantou and Xiamen in the late 1970s and Shanghai in the 1990s), but some

Sub-Saharan countries are trying to follow such a pattern.

As it became evident that SEZs were helping to foster structural transformation in China, other countries began working with China to share its experience.¹⁸ Establishing and operating the Chinese bilateral zones result from bilateral cooperation objectives with many countries, mainly in Africa, needing assistance or tutelage in building and managing zones (box 2.1).¹⁹ The Chinese bilateral zones—especially in Africa—are facing the traditional problems of large industrial and infrastructure projects in developing and transition countries (like sustainable access to water and power; synergies with local universities, technology institutes and local communities; and lack of institutional weaknesses and supplier programmes). Establishing these zones involves partnering with Chinese developers (state owned and private), the Chinese government and African governments.²⁰

Nonetheless, the partnership formula could be effective, since Chinese partners are driving the SEZ creation and operation process, contributing their experience in infrastructure construction and

Box 2.1

Chinese-led public-private partnership

China Fortune Land Development Co., Ltd. (CFLD), a leading real estate developer founded in 1998, established an international department in 2015 to boost the construction of new industrial parks overseas. Guided by its commitment to green development, quality of life, continuous innovation and bringing industries together, CFLD recently developed industrial parks in Egypt, Indonesia, India, the Philippines and Viet Nam and has committed to co-invest and develop an SEZ in Brunei.

CFLD's core strategy aims to integrate global resources and provide the regions where its new industry cities are located a comprehensive solution to industry upgrading and economic development through industry research and planning and industry investment within the industry service operation.

Through its partnerships, CFLD engages in planning, designing, land consolidation, investment, infrastructure construction, public facility development, industry investment solicitation and city operations services. It continues to support innovation and uptake of new technologies following the model of establishing incubator-accelerator-specialized park-new industry cities and promotes global innovation networking through various platforms. Together with TechCode, it recently created incubation platforms with a global innovation network covering six countries and regions, and it has set up more than 10 incubators in Berlin, Tel Aviv and Silicon Valley.

Source: <http://en.cfldcn.com> [accessed May 7, 2018].

managing the zone. Chinese bilateral zones (in combining top-down and market-driven approaches) could thus represent a benchmark for the establishment of zones in other parts of the world including Central Asia, but other industrial countries could also establish bilateral zones in the framework of their bilateral economic and social aid schemes for developing countries.

Export processing zones

Export processing zones aim to increase exports and attract export-oriented investment and manufacturing, accelerating the entry of foreign capital and technology. They enhance productivity, economies of scale and access to foreign markets by providing a special trade regime and more effective administration than in the rest of national economy (box 2.2). Fiscal incentives to export firms include duty-free access to imported equipment and material, as well as simplified procedures for trade. Firms outside the zone have to obtain duty- and tax-free imported inputs through a rebate system while firms in the zone can avoid all the formalities connected with obtaining these rebates. Investors can start their projects quickly and could run them with minimum bureaucratic fuss. But firms in the zone are required to export most of their production, keeping it out of the domestic market.

EPZs were first used by developing countries as part of an export-oriented industrialization strategy and as the second-best policy tool, after a free-trade regime. The purpose was to increase exports by attracting foreign investment. This was accomplished by combining in one place the advantages of a free trade zone, an industrial estate and all the relevant administrative offices of the government—as in Taiwan Province of China in the beginning of the 1960s (box 2.3).

Early EPZs in East Asia targeted low-skilled light industries, such as textiles and apparel, plastic products and electrical appliances, tapping abundant cheap labour. As country infrastructure, administrative procedures and the overall business environment improved, these types of zones became redundant and unnecessary.

First-mover advantage was one reason for the EPZs' initial attraction for investors. EPZ were established in Taiwan Province of China and Republic of Korea, when the first wave of globalization of production was creating new international division of labour in labour-intensive, light industries, led by offshoring practices of multinational enterprises to reduce production costs. Few other countries had EPZs, so they faced little direct competition. By the late 1950s labour-intensive industries were relatively well developed in the two countries, attracting Japanese foreign direct investment

Box 2.2

Export processing zones (EPZ)

The key to East Asia's economic success was the move from mere assembly of imported intermediary inputs, in export processing zones, to a more domestically integrated and higher value-added processes known as full-package supply or OEM (original equipment manufacturing) production and products for export.

By the early 1990s, EPZs had become a leading source of exports and manufacturing employment in several Caribbean countries, with the Dominican Republic a leading example. These EPZs also helped the country take advantage of preferential access to the United States of America. In the mid-1990s, 430 companies employed 164,000 workers in 30 free-trade zones, and three-quarters of the firms were in textiles and apparel. The

competition for FDI among neighbouring EPZs resulted in the race to the bottom: lower wages, currency depreciations that heightened already substantial wage differences in the region, and lower standards of living while doing nothing to improve productivity.

EPZs helped Mauritius transition from exporting bananas and sugar to exporting textiles and apparel. Between 1982 and 1990, the number of firms in EPZs, dominated by textiles and apparel, rose from 120 to 570, while employment in these companies quadrupled from 20,000 to 80,000. About 70 percent of apparel exports (over \$770 million in 1990) went to the European Community where Mauritius has privileged access.

Source: Gereffi and Memedovic 2003; Memedovic 2010; Heid, Mario and Riaño 2013.

Box 2.3

Kaohsiung EPZ, Taiwan Province

EPZs put Taiwan Province of China squarely on the path of export-led industrialization. The first EPZ was established in the southern port city of Kaohsiung in 1965, as part of an export-oriented industrialization strategy.

The zones offered better infrastructure, simplified administrative procedures, freedom from red tape, and efficient transportation links with the rest of the country. But until 1986 the zones' manufacturers were required to export everything they produced. Enterprises that invested in the EPZ had already established their export markets and during the early years helped promote Taiwan Province of China as a supplier of light consumer goods.

Among early investors in the zone were companies that helped establish the foundations of Taiwan Province of China's electronics, optics and TFT LCD display industries, including Canon, Hitachi and Philips Electronic Building Elements Industries (now known as NXP Semiconductors Taiwan Ltd.).

Of the 161 factories in Kaohsiung's EPZ in 1972, 37 were in electronics, 37 in textiles and apparel and 21 in handicrafts. Today, the EPZs' most important tenants are semiconductor testers-and-packagers and LCD companies, flat-panel displays for mobile phones and components for photovoltaic arrays. Intangible digital goods like apps, animation and cloud computing are also coming out of the zones' software parks.

EPZ tenants have become important customers for companies outside the zones. In 1967, around 2.1 percent of the inputs shipped into Kaohsiung's EPZ were of local origin, this rose to 17 percent by 1973, to 33 percent in

the 1980s and to around 48 percent recently. Between late 1967 and 1976, total employment in the zones grew 13-fold and, in 2009 accounted for 58,002 and currently to 81,045 (12.4 percent are foreign nationals), the highest in this century. The workforce is better educated, and 7.5 percent of zone employees hold graduate degrees.

The original site, a 68.3-hectare plot next to the city's harbour, filled up so quickly with factories that within five years, new zones had been designated in what are now Taichung City's Tanzi District and in former sugarcane fields in Kaohsiung's Nanzi District.

Cumulatively, exports from EPZ tenant enterprises have earned Taiwan Province of China around \$76 billion. Seven EPZs, a logistics park and two software parks now cover 530 hectares, with 602 tenant companies. Manufacturing tenants pay a service charge of 0.08 percent to 0.22 percent of turnover (to reward success, the rate is regressive). Total sales of the Kaohsiung Software Park approached \$15 billion in 2015, and 100 percent of the land (but not all the office space) in the Taichung Software Park has been rented out.

The science parks in Hsinchu, Taichung and Tainan now enjoy a higher profile than the EPZs, but they benefited from Taiwan Province of China's experience with the EPZ: especially the statute for establishing and administering the science parks, of the one-stop shop provision of services and the factory land are all copied from the export-processing zones. In 2010, the Nanzi Export Processing Zone II (NEPZ II) was created.

Source: Crook 2017.

(FDI) and establishing linkages with domestic producers, which made it possible for zone enterprises to establish linkages with domestic producers.

Characteristics and developmental needs addressed

While industrial parks and zones can be used for different objectives, they share the following common characteristics:

- Geographically delimited area, usually physically secured (fenced in), where several firms are established, such as manufacturers, traders and other service providers.
- Single management/administration.
- Various benefits provided to enterprises located within the area or zone.
- An operating infrastructure and supporting business services to client companies.
- Separate customs area (duty-free benefits) and streamlined procedures.
- Ensuring industrial safety and security in the area. Parks and SEZs as policy instrument address following developmental needs:
- To serve as a policy vehicle for effecting gradual reforms, using a pilot programme to implement such reforms on a zone by zone basis.

- To attract new business and foreign investors by providing an integrated infrastructure and business services.
- To foster ISID through promoting uptake of clean technologies and practices for addressing climate change and environmental issues.
- To concentrate dedicated infrastructure, business facilities and services in a well-defined and secured area.
- To provide transportation access, especially with more than one transport modes, highways, railroads, airports, ports.
- To boost exports, create jobs and alleviate unemployment.
- To foster social, environmental and economic performance and set examples for the rest of economy and contributing to realize the SDGs.

Why do investors, both domestic and foreign, choose to start activities in a specific park or zone?

The considered literature points out the following reasons:

- Country political and macroeconomic stability, costs of doing business, labour skills, proximity to target markets and infrastructure as well as stage of manufacturing development.
- Obtaining cost advantages on the most important productive factors: labour cost; labour relations; reliability and cost of infrastructure, particularly electricity, that largely impact overall costs, especially for heavy industry; simplified import and export procedures; and finally, the costs and problems caused by corruption.
- Overall business regulatory environment, both in terms of laws and regulations protecting investment and business and actual enforcement of such rules.
- More secure and comfortable location.
- Proximity to target markets, through sound transport infrastructure: roads, ports, airports and inland waterways.

Less advanced and transition economies can attract investors also based on different factors. Some of such appealing factors are:

- Sufficient political and macroeconomic stability, as well as a solid level of protection of business and investments.
- Consolidated historical tradition to supply industrial or agricultural products to markets of neighbouring countries, as in the former Soviet republics close to the Russian Federation.
- Traditional business and manufacturing culture of the local communities, for example growing certain agricultural crops, cattle husbandry, textile or carpets weaving, as well as products manufactured in the old industrial conglomerates.
- The availability of natural beauty, like lakes, rivers, mountains or archaeological sites.
- The concentration in one or more universities or research centres of potential to produce innovations capable of becoming productive technologies.
- A widespread tradition of craft or family business.

Such different factors could become the pillars for economic development of many countries, provided, however, that the strategy for positioning and establishing new SEZs—or re-orienting and revamping the existing ones—is not based on theoretical names and definitions, but on the SEZ features requested by potential investors.

Over the last decade, interest in EPZs has grown again in many developing countries. There are now over 4,000 EPZs, which is over 3,000 more than 20 years ago.²¹ More than 25 percent of world trade is carried out at free zones.²² The highest levels of EPZ-based exports tend to be by developing countries, including China, Egypt, Indonesia and the Philippines, although EPZs in New Zealand, Ireland and the United States of America are also among the largest by export quantity.²³

What do changes in international trade rules mean for EPZs?

New international trade rules mean that some of the traditional incentives for EPZs, such as tax breaks for exports, are no longer in line with the WTO rules. In

this context, EPZs and SEZs, need to innovate and use new approaches and tools to differentiate locations in terms of their attractiveness for investment.

EPZs face a challenge as traditional tax incentives for attracting companies into zones become incompatible with international trade law and as exemptions for developing countries expire. No World Trade Organization (WTO) rules deal with EPZs, but some aspects of these zones, especially the relief they offer from various internal and border taxes, may infringe on WTO rules, including the conditions attached to the authorization to operate in a EPZ, and thereby qualify for tax relief and other financial benefits. By restricting tax exemptions to exports, such fiscal incentives can be regarded as a form of subsidy on exports and thus a ‘distortion’ to international trade. Yet this approach has been central to the current competitiveness strategy of EPZs.

EPZs will need to provide benefits for corporations operating within their boundaries that take a form other than prohibited subsidies. The prohibited subsidies include:

- Requirements to use domestic over imported goods.
- Requirements to export a certain amount of production.
- Limitations on sales and exports into the national customs territory (including the payment of certain taxes on those sales).

For trade in goods, the General Agreement on Tariffs and Trade (GATT) and related agreements, especially the Agreement on Subsidies and Countervailing Measures (ASCM) and the Agreement on Trade-Related Investment Measures (TRIMs), apply to tax and non-tax measures. Such measures are prohibited if they are contingent on export performance or local content, and they are considered “actionable” if they are “specific” and have “adverse effects” on the interests of another WTO member. Prohibited and actionable subsidies may be challenged, either through the WTO dispute-settlement mechanism or through the imposition of countervailing duties.

The concepts of “subsidy” (Article 1 of the ASCM), “specificity” (Article 2) and “prohibited subsidies” (Article 3) are key. Article 1 (“Definition of a Subsidy”) holds that a subsidy is deemed to exist when there is a “financial contribution by a government or any public body within the territory of a Member” and “a benefit is thereby conferred.” Such financial contributions include direct transfers of funds, whether actual (grants, loans and equity infusion) or potential (loan guarantees). They also include forgone tax revenues (tax incentives) and the provision of goods and services other than general infrastructure or goods obtained through purchases. And they include cases in which a government makes payments via a funding mechanism or entrusts or directs a private body (such as an EPZ managing company) to carry out one or more of the functions specified above.

The ASCM provides that the exemption from or remission of import tariffs or indirect taxes on an exported product, typically a main feature of EPZs, does not constitute a subsidy. More specifically, tariff exemptions (as well as drawbacks and other similar schemes) for imported raw materials and intermediate inputs used in the production of goods for export are exempted from the ASCM definition of a subsidy. The same applies to exemptions from or remissions of internal indirect taxes (especially value-added taxes) on “inputs that are consumed in the production of the exported product” under certain conditions, including the requirement that these exemptions or remissions of indirect taxes not be “in excess of those levied in respect of the production and distribution of like products when sold for domestic consumption.” In contrast, any relief from direct taxes on exports constitutes an export subsidy, and is therefore prohibited.

The ASCM divides subsidies into those prohibited and those permissible. Subsidies that are “contingent, in law or in fact, whether solely or as one of several other conditions, upon export performance” or on the “use of domestic over imported goods” are prohibited by Article 3 on the grounds that they are presumed to distort trade. Tax relief would probably be considered a prohibited subsidy if, for example, the firms based in zones or parks

had to export a minimum percentage of the goods they produce, or if the tax relief were contingent on a quota of goods produced in the EPZs that could be sold in the domestic market. Tax relief would also be considered a prohibited subsidy if it required firms in zones to use a certain percentage of local rather than imported inputs. Pursuant to Article 3 paragraph 1(a) of the ASCM, governments are prohibited from providing direct fiscal subsidies contingent upon export performance (as are sometimes offered to firms operating within an EPZ).

Adjustment in the WTO's ASCM seeks to phase out the use of certain fiscal subsidies for EPZs. The geographical extent of application of this principle is changing to affect more developing countries. Pursuant to Article 27 paragraph (2)a, certain developing countries are not subject to the prohibition, if they are "Annex VII" countries—either least developed countries designated as such by the United Nations which are Members of the WTO, or part of a group of developing countries whose GNP per capita has not reached \$1,000 a year. In 2007, a WTO deadline of December 31, 2015 was set for ending the practice of granting exemptions to developing countries that did not meet either of the two conditions set out in Annex VII.

For countries no longer able to offer subsidies to corporations operating within EPZs, their EPZs will need to provide benefits for corporations operating within their boundaries that take a form other than direct subsidies.

Free zones

The concept of custom-free zones was used in ancient China, then Carthage, the third largest city of the Roman Empire.²⁴ Free trade zones are also considered a modern adaptation of the age-old concept of free ports dating back from 166 BCE, when Roman authorities made the island of Delos a free port, exempting traders from the usual taxes to stimulate local commerce.

Early types of free trade zones appeared among various European colonial outposts, such as Macau (founded in 1557), Hong Kong (1842), and more than 80 treaty ports were established throughout China from the mid-1800s onward. Free ports were also established

along international trade routes, as in Gibraltar (1704), Singapore (1819) and Hong Kong (1848).²⁵ By around 1900, free ports were pushed to the margin, and around 1900, the world had only about 11 free ports.

Free zones re-emerged in the 1940s. In 1948, the United States of America made Puerto Rico a free trade zone for US companies engaged not just in trade, but also in production. Free zones in the Republic of Korea and similar zones in Japan and other industrialized countries were explicitly intended to promote FDI, trade and manufacturing competitiveness.²⁶ Shannon Free Zone in Ireland inspired China and many other developing countries (boxes 2.4–2.6). The main rationale for the Shannon Free Zone, was to establish a "growth pole" in the economically distressed southern part of the country. Similarly, revitalization of economically distressed urban and rural areas was also the motivation behind the many zone programmes in the United Kingdom, France and the United States of America. Today there are thousands of free zones worldwide. Many Shannon-inspired free zones in China have contributed to its impressive economic growth over the past quarter century.

The growth of free zones has also led to the creation of organisations that seek to network free zone agencies and their stakeholders, for sharing best practices and networking relevant suppliers. The World Export Processing Zones Association (WEPZA) is an association of practitioners, government officials, consultants and academics engaged in evaluating, developing, promoting and improving SEZ globally. The World Free Zones Organization (WFZO), a non-profit entity committed to supporting the management and continuous development of free zones, offers a range of support service, including training and development programmes as well as research and analysis on free zones. The World Free & Special Economic Zones Federation (FEMOZA), a non-governmental, non-profit organization, provides aid forums and workshops to emerging transition economies on setting up free zones, as a tool for economic and industrial development.²⁷

The growth of such networks enables sharing of best practices and experiences contributing to

Box 2.4

Shannon Free Zone

Established by the Irish Government in 1959, Shannon Development is Ireland's dedicated regional development company. For several decades, the company has worked to develop and strengthen the industry sector in the Shannon region through promoting the Shannon Industrial Free Zone as a location for international investment. Established in 1959, it inspired many other zones across the world, most notably in China. The Shannon Free Zone incentives were tax breaks, exemptions on value-added tax on imported goods used for the production of goods for exports and corporate taxes cuts. Grants were also offered to companies for research and development.

The zones tested new policies and new ways of doing business in a small fenced territorial area, before rolling them out nationwide. This inspired many developing countries, including China, to use the zone concept for economic development in the 1970s and in the 1980s.

Today, incentives offered to companies do not differ from the ones in the rest of Irish economy. The custom control points were removed, most businesses are in services and most exports are to the EU, which is duty-free anyway. Ireland joined the EU in 1973 and the free zone regime is not in line with the EU state aid rules, which do not allow exemptions to regulations to specific territories, so benefits of a free trade zone were no longer relevant. Shannon Commercial Properties now has a well-designed program to attract inward investment based on creating a business ecosystem with incubation services and delivering state-of-the-art advanced technology manufacturing engineering and warehouse facilities for high-tech cluster development in the aviation, aerospace and autonomous vehicles sectors.

Source: Kennard and Provost 2016.

Box 2.5

Free zones in the European Union

In the European Union, 'Free zones' are enclosed areas within the customs territory of the Union—such as the Freeport of Verdon in France and Bremerhaven in Germany—where non-Union goods can be introduced free of import duty, other charges (taxes) and commercial policy measures. Such goods may be released for free trade circulation (subject to payment of import duty and other charges), or be placed under another special procedure (such as inward processing, temporary admission or end-use procedures—under the conditions laid down for these procedures) or re-exported. In addition, there may be special relief available in free zones from other taxes, excises or local duties. The free zones are mainly a service

for traders to facilitate trading procedures by allowing fewer customs formalities.

While there has been a proliferation of free zones and activities focused on exporting that give tax holidays to investors, the current EU thinking is that this represents an incentive that is not available to all companies and is therefore discriminatory and not desirable for a level playing field. Outside the EU, however the growth of special economic zones continues. The choice for investors in those locations is whether to take advantage of tax relaxation for the period of its availability, and then to align with the normal tax rates of the country where they are located.

Source: European Commission n.d., 2017.

formulating zone strategies in line with international trade and investment trends and changes in the global regulatory environment.

Why parks and zones can fail to meet desirable objectives

Parks and zones have been fairly successful in China, the Republic of Korea, Malaysia, Indonesia and Sri Lanka and previously in the advanced economies such

as United Kingdom, United States of America, Japan, Germany, Denmark, Sweden, Taiwan Province of China and Ireland. But in many other countries parks and zones did not produce desirable results. There are several reasons why some parks fail to produce desirable results.²⁸

- Poor site location away from business and urban centres (growth pole politics), poor maintenance, services, promotion and crowded facilities.

Box 2.6

Jebel Ali Free Zone, Dubai

In the past 30 years Jebel Ali Free Zone (Jafza) in Dubai has grown from 19 companies in 1985 to more than 500 in 1995 and over 7,000 today, which includes more than 100 Global Fortune 500 enterprises. The zone boasted an annual growth rate of 7 percent in the five years to 2016, with 126 companies expanding in 2016 alone. Several new guidelines for investing companies were introduced in 2016, such as allowing companies to redomicile in the zone and operate there without having to establish a subsidiary. A business centre was established in August 2016, exclusively to support SMEs. It boasts more than 1000 workstations in fully furnished offices, which share secretarial and office services and state-of-the-art meeting room facilities. Infrastructure developments abound, and a six-lane, two-way bridge is under construction to connect the north and south areas and ease traffic congestion on Dubai's Logistics Corridor. Plans are in place to build a multistore warehouse space to meet increased demand for Jebel Ali's facilities and for staff accommodation facilities, including more than 3500 rooms.

The success of this free zone can be attributed to seven factors:

- Location: Advantage of favourable locations: serving several emerging markets throughout the Middle East, Africa and Asia.
- Integrated infrastructure development: The zone created a solid multimodal, transport and logistics

platform. The port, the zone and a new airport, link sea, land and air for the first time in the Middle East.

- Integrated development: The port, the zone and a new airport, joined forces to form multimodal logistics platforms linking sea, land and air for the first time in the Middle East.
- Product offering: Evolve over time, to include land, housing, pre-built and customized warehouses, offices, business centres, showrooms, hotels and a convention centre.
- Investment promotion and aftercare: A key strategy of Jafza is to understand what investors need and to develop a package of services tailored to the needs. Investing companies are provided with an investor guide and a multiservice professional from the investor services team helping with all aspects of setting up in the zone.
- Legal and institutional framework: Oriented to the private sector with government regulatory oversight, and includes a delegated authority for licensing, registration and permits issuance, a one-stop shop service, e-services, simple application procedures and onsite customs.
- Quality of life: Dubai offers social and recreation activities, education, healthcare, shopping, multicultural society, a low crime rate and international sporting events.

Source: Jebel Ali Free Zone n.d., Mullan 2016.

- More costs (in incentives and subsidies) than benefits.
- Poor industrial safety and security conditions.
- High negative environmental spillovers.
- Lax environmental and labour standards.
- Weak regulatory authority and funding for the zone and weak intragovernmental collaboration.
- Poor labour policies and practices.
- Poor zone design, high maintenance and promotion costs, and inadequate administration of overdesigned facilities.
- Problems of extra-territoriality and trade triangulation when the country enters regional trade agreements, creating a country within a country, with two legal frameworks.
- Poor policy coordination between multilevel governments.
- Economic development strategies not consistent with a country's revealed comparative advantages.
- Lack of strategic planning with clear objectives and targets for future industrial park development taking advantage of a park's unique features and comparative advantages and in line with industrial and economic development strategies.
- Not enough firms attracted from industries to realize economies of scale, intra-industry knowledge spillovers, and forward and backward linkages or to leverage other agglomeration effects.

Chapter 3

A new generation of parks and zones

The need for more technologically advanced industrialization in developed regions led to the creation of science, research and technology-oriented industrial parks and innovation areas. Managed by professionals able to promote the culture of innovation and stimulate and oversee the flow of knowledge and technology among universities, R&D institutions, companies and markets, these parks facilitate the creation and growth of innovation-based companies through incubation and provision of other high value-added services along with high quality space and facilities.²⁹

The most successful science and research parks are hosted by universities with large, world-class fundamental academic research departments, such as Cambridge, Oxford and Stanford.

Technology parks foster technologically advanced industries through the support of high-level services such as marketing, networking with local R&D institutions and advisory services on finance and venture capital.

Other terms and expressions are also used such as science city/town, cyber park, hi tech (industrial) park, innovation centre, R&D park, university research park,

science and technology park, technology incubator and technopole.³⁰ Notwithstanding the different labels, they share many common objectives, elements and methods. They all have a close working association with one or more large and significant research centres, often but not always public sector owned, and unlike industrial parks—which often focus on manufacturing and administration, businesses and organizations—these parks typically focus on innovation, technological development and commercialization of new knowledge (box 3.1).

Some technology parks mature into conventional industrial parks and can be dominated by a few big technology-based manufacturing organizations that inhibit the formation and growth of new small firms. Alternatively, they can be taken over by non-technical firms, turning the technology park into a conventional office centre that rents to new technology firms. Examples of both cases are:

- Imperial Park, Newport, in the United Kingdom was taken over by Hitachi to manufacture microchips.
- Newcastle Technopole in the United Kingdom has become a conventional city centre office block,

Box 3.1

Jinqiao Economic and Technological Development Zone

The Jinqiao Economic and Technological Development Zone, an integral part of the Shanghai Hi-Tech Development Zone, is a key contributor to Shanghai's development as an innovation hub with global influence. It hosts such industries as auto and auto parts, electronics and information technology, home appliances, food processing and biopharmaceuticals. Those industries have been upgrading technologies: new energy vehicles (new energy cells and self-driving); intelligent manufacturing (industrial internet, robotics and 3D printing); mobile video and audio (mobile internet and VR/AR); and emerging financial services (FinTech) and block chains. In 2017, the subzone's industrial output was 234.2 billion RMB, its revenue was 720 billion RMB and its taxes were 52.4 billion RMB.

Jinqiao aims to achieve strategic transformation of its industries in line with global industrial development trends, through the synergy between free trade zone advantages and proprietary innovation policies. Based on "Made in China 2025," a plan to transform China into a leading manufacturing power, Jinqiao's goals are to become the core location for integrated development of advanced manufacturing and producer services, a cluster of innovation and business start-ups, and a leader of coordinated development of industries and urban functions with a better environment for businesses and for living. Its achievements include investment facilitation, trade facilitation, financial reform, on-going and ex-post regulation, human resource support and industrial support.

Source: UNIDO 2018.

with a few remaining software companies among the many estate agents, financial and insurance offices occupying most of the space.

Most of the successful technology parks mature into commercial organizations due to a lack of financial resources from public sector. And some industrial parks strive to create new profiles and to attract high-tech investors, paying more attention to R&D and tightening links with universities and research centres.

Science and technology parks

The world's first renowned science and technology park was established in the 1950s in the community known today as Silicon Valley. In 1951, Stanford University, under Dean Frederick Terman developed and leased university land for start-ups, with the aim to attract and foster high-technology companies that later became the Stanford Research Park and the core of the industrial agglomeration that later came to be known as Silicon Valley. Following the lead of companies along Boston's Route 128, the area evolved from one of the poorest regions in the United States of America to a global centre of innovation, technology, finance, education and research. In 1959, Research Triangle Park was established in North Carolina to foster economic growth in a depressed region.³¹

The idea spread beyond the United States of America to become the reference for science-based industrial development. The Japanese developed science cities in the 1970s, the successful case being Tsukuba Science City, located about 50 kilometres northeast of Tokyo, and segmented into the Research and Education District and the Suburban District, which together attract more than 300 public and private institutes, universities and firms, and about 20,200 researchers, with around 220,000 residents, including foreign researchers and their families.

The first science and technology parks were created in Europe in 1972 with Sophia Antipolis in France and the science parks at Cambridge University in England. Similar projects started to flourish in Louvain, Belgium, and Grenoble, France, followed by Heidelberg in Germany, favouring the transfer

of knowledge from nearby universities to the private sector, as well as the creation of new high-tech firms. Projects in Italy (Bari), Spain (Malaga), France (Montpellier) followed Sophia Antipolis' examples, and similar projects following Grenoble's and Louvain's models were set up around universities elsewhere, like Lund (Sweden) and Rennes and Nancy (France).³² This trend not only favoured technology transfer from the public research community to the private sector, but also enhanced a culture of entrepreneurship in academia. These initiatives were developed in a framework of science-push model of innovation.

Science and technology parks often need champions who help to move the project forward and attract additional interest. The founder of Sophia Antipolis Science Park in France, Senator Pierre Laffitte, was an important figure in the science world, and he attracted higher education institutes as well as major international companies. Science and technology parks also need an open-minded and flexible education environment that encourages cooperation between higher education researchers and companies.

But there can be obstacles to interactions among the public sector, industry and research. First, the financial risks for the private sector are great so the support of the public sector in R&D infrastructure investment is needed. Second, there are differences in culture and interest between researchers and businessmen, with the former focused on publications and the latter on money. In France and in Europe more generally, researchers gain prestige from publications. In the United States of America, researchers produce publications and then explore how to make money, with the support of businessmen, or they become businessmen, supported by their university. This led to the first business incubators on university campuses in the 1950s.

Another risk is making poor choices, from the location to the type of tenants. If the companies and laboratories do not complement each other, reciprocal opportunities will not arise, often because of a bad strategy and weak park management.

Research parks

Research parks share features with science and technology parks, but they usually do not engage in production. They are generally established in conjunction with research centre activities of large enterprises for developing new models and prototypes. This approach is much diffused in Japan to enhance technology development in large companies.

Technology parks

Techno-parks allow companies, research laboratories and educational institutions to develop synergies on projects and to take leading positions in their field. The technology park can host technology, productivity and information centres, offering services to enterprises that are often too costly and complex when provided in an open market.

Higher education institutions stimulate innovation and entrepreneurship. Business schools offer master's degrees integrated with business incubators and provide services to companies within the park. Collaborative programmes support industry needs, providing tailor-made research and diplomas. The private sector can sponsor students and research teams, offer internships, integrate doctoral students and post-docs and foster academic spin-off within the comprehensive innovation ecosystem building (box 3.2 and figure 3.1). These parks are thus useful to establish value-added links between academic research and industry.

Business incubators, or business innovation centres are key parts of a science and technology park. By supporting entrepreneurial innovation, they ensure that the work produced in laboratories by doctoral students and others has spin-off applications in innovative companies. In Europe, a network of 165 business and innovation centres assesses projects and advises entrepreneurs how to set up their own companies.

So developing gateways and osmosis between the users of industrial parks—the tenants and the sponsors—encourages innovative projects. Parks create a sense of belonging to a common dynamic of technological development, so branding is also key. Technology parks can thus be considered as innovation factories (boxes 3.3 and 3.4).

Sophia Antipolis, France

Sophia Antipolis—a 'city of science and wisdom'—was founded by Senator Pierre Lafitte in southeast France in 1969. Based on a strong concept of cross-fertilization of ideas between researchers, professors and companies, the idea was to attract R&D investment to a place, renowned for its quality of life and environment but without any technological and industrial background, where innovators and researchers could succeed and innovation could flourish. It has proven to be a catalyst for development in the region and now operates as a global hub through its companies and R&D institutions. Today the park is home to 2,230 companies that employ 36,300 people, alongside 4,500 researchers and

Box 3.2

Shannon Development and the National Technology Park Limerick, Ireland

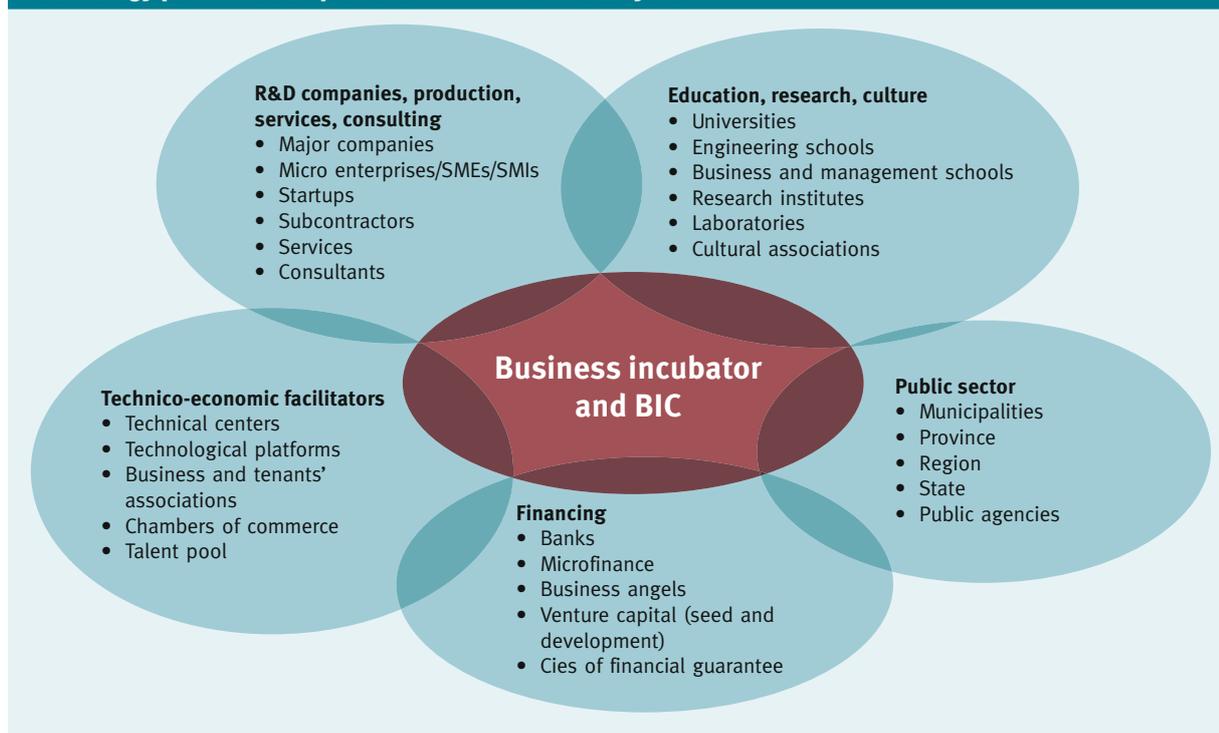
Established in 1984 as Ireland's first science and technology park, the National Technology Park Limerick (NTP) is managed through a wholly owned subsidiary of Shannon Development. It has become home to a growing and influential nucleus of high technology and knowledge-based companies.

With more than 80 organizations employing 5,000 skilled workers, the park stretches over a 650-acre riverside site and has a balanced mix of multinational subsidiaries, Irish technology companies, R&D entities and support services.

One of the park's key strengths is the University of Limerick, located at the heart of the park and the proximity of research institutions. The park takes advantage of the university technology resources for the needs of enterprise and economic development. The potential for collaboration and synergy is a key attraction for businesses setting up in the NTP. There are plans to develop an Enterprise and Incubation Centre giving SMEs access to hot-lines and shared office space and meeting facilities.

Source: Shannon Commercial Properties n.d.

Figure 3.1

Technology park: the comprehensive innovation ecosystem

Box 3.3

Suzhou Industrial Park for high-tech innovation and entrepreneurship

China's Suzhou Industry Park comprises the Suzhou New and High-Technology Service Centre, Suzhou International Business Incubator and China Suzhou Pioneering Park for Overseas Chinese Scholars. The first incubator was set up in 1994, and the China Suzhou Pioneering Park for Overseas Chinese Scholars was created in 1998.

The park has expanded rapidly, greatly contributing to the city of Suzhou's urban, social and economic development. Its gross domestic product (GDP) surged from 1.1 billion yuan (\$170 million) in 1994 to 190 billion yuan (\$28 billion) in 2013. Industrial output has grown dramatically since the early 2000s, and the share of high-tech output in industrial output is well over half. There were 700,000 employees in SIP by 2014. Invested foreign capital went from \$100 million in 1994 to \$20 billion in 2013. The park is home to majority of Suzhou's expatriates and the base for Fortune 500 giants such as Motorola, Samsung and UPS. Of 25,000 companies, 91 were in the Fortune 500.

In September 2015, the State Council of the People's Republic of China approved the SIP's proposal to become

the first experimental zone for economic liberalization and innovation. It is shifting focus from being an investment park for foreign and domestic manufacturing to becoming an industrial park for high-tech innovation and entrepreneurship, with a services sector focused on research and development, financial technology and shared services.

The park aims to create an innovation-based ecosystem in four ways:

- Attracting and retaining international talent, with incubators like the National University of Singapore's Block71 Suzhou.
- Establishing a global network of research institutes and associates through its Dushu Lake Higher Education Town.
- Transforming the financial services sector and putting in place an intellectual property regime.
- Building product chains around three new strategic clusters of nano-technology, biotechnology and cloud computing.

Source: Channel News Asia 2017; The Straits Times 2014.

Box 3.4

Technology Park Ljubljana

From its origins as a tenant at an electronics institute, Slovenia's Technology Park Ljubljana has grown into an internationally recognized business support organization and the largest innovation ecosystem for commercialization of knowledge and technology in Southeast Europe. The Park was designed from the beginning to promote collaboration between regional and national centres of learning and research. The park planners located the technology park on the same site as the Ljubljana Polytechnic and the Faculty of Natural Sciences of the University of Ljubljana, as well as close to the National Institute of Biology and the University's Faculty of Biotechnology.

The park offers its tenants business review initiatives, assistance in preparing business plans, business and technology advice, and mentoring. By linking public

bodies, research institutes, universities and firms, it facilitates the flow of new knowledge. And the management board searches for business and strategic alliances to help tenants access national and international markets.

Today, the park provides business infrastructure for start-ups and entrepreneurs during the pre-incubation and incubation stages, guiding companies through the various stages of their development. Park management nurtures innovation through collaboration with the university's research laboratories and the research institute. Support to start-ups is so important that the park helps villages around Ljubljana install incubator services. Each village has its own business zone for attracting companies.

Source: Memedovic 2014; <http://www.tp-lj.si/en>; accessed 12 August 2018.

5,500 students. The park is spread across 2,400 hectares with two-thirds of the surface being green spaces. Two-fifths of employees are in the information and communications technology (ICT) sector.³³ Services to enterprises and individuals include a fibre optic network, a post office, recruitment agencies, bank branches, schools, cultural and leisure amenities, airport shuttle links and professional waste collection and processing.

The park is policy driven, with R&D institutions helping to attract global companies early in its development. The design and quality of the physical and social infrastructure have ensured that the original structures are still standing. There has been strong public support and investment from state and local authorities. The park is linked to a range of education, research and innovation institutions, including higher education and business incubators. Academics are encouraged to become entrepreneurs while remaining research scientists and engineers. Park management is the responsibility of a single authority that responds to the needs of the tenants. The park also has high-quality environmental management.

Innovation areas

The main idea behind innovation areas is that science, technology and engineering (as well as design, arts,

culture and media) can be driving forces for urban regeneration and redevelopment.³⁴ They become laboratories for smart living, to test new solution and experiment with new technologies that can be applied to society and the distinct living environment, either in mega cities or less urban, even rural regions.

They tend to have a global outlook and kinship with international entrepreneurship and innovation values. They create new products, technologies and market solutions through the convergence of disparate sectors and specializations, such as for instance information technology, bioscience, energy or education. This shared understanding facilitates collaboration and consensus on the concepts and instruments of innovation and entrepreneurship. In these innovative geographic areas, communities, or workspaces, leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators and accelerators, fostering collaboration, open-system innovation and high-tech development.

Innovation areas can become innovation hubs enabling face-to-face interactions and knowledge transfers between researchers, business, industry, investors, government and representatives of academia and civil society, allowing decision-makers to meet with all stakeholders and discuss business solutions. In this way, they facilitate industrial diversification by

giving people with different background the opportunity to work together and commercialize ideas, creating demand for other professional and commercial services and jobs. Hubs empower entrepreneurs and have unique potential to address challenges of social inequality and environmental degradation and to spur ISID. They can reduce carbon emissions by promoting sustainable projects and the uptake of climate technologies, and they can create new jobs and educational opportunities for disadvantaged populations in urban areas. Innovation areas usually create a virtuous cycle of growth, in combination with urban development.

Berlin Adlershof

Berlin Adlershof Science City is a successful innovation district, showcasing the elements of integrated long-term planning. It has combined a more “traditional” industrial park with elements of a technopark, and gradually evolved into a science city. Now Germany’s largest science and technology park, it has risen to the top of both science parks and innovation areas in Europe. In 2016, it was home to 1,041 companies and scientific institutions, 16,778 workers and 6,700 students at the Humboldt University campus, which connects practical applications of its research to the industries there.

At the Berlin Adlershof Science City, the WISTA management company manages state of the art technology centres, and runs an acquisition and business development team as well as a centralized public relations and marketing department. All companies, science institutes, technology and business networks contribute to the management of business development activities and marketing campaign under one flagship logo. Collective efforts contribute to a strong high-tech trademark, leveraging marketing power for high-tech SMEs and science institutes.

The Adlershof success criteria have been modified for the conversion of Tegel Airport into a 21st century Science and Technology Park. The Berlin local government and WISTA Management, encouraged by the continuing growth and productivity of Adlershof,

decided to plan, build and run a new science and technology park on the site.

Tegel focuses on urban technologies, combining energy, mobility, water, recycling, and the cross-cutting topics and ICT under one interdisciplinary umbrella, creating solutions for the city of tomorrow. All fields of urban technologies are represented by large international corporations in Berlin: Bombardier, Siemens, Otis, ALBA, BMW, DB, Daimler, Vattenfall and Schneider Electric, to name a few, with many close to Tegel.

In sum, Adlershof and Tegel demonstrate the importance of creating an innovative ecosystem that provides space, technological resources and expertise for creativity, along with advisory services to commercialize creative ideas into business realities.

Whatever an innovation area’s size, the ingredients of successful development are regional strengths and potentials, political stability and long-term support, integrated economic development plans, synchronized research and higher education strategies, and a responsible and motivated development and management entity.

Eco-industrial parks

The concentration of many industrial facilities in an industrial park or zone can cause significant environmental damage and increase health, environmental and safety risks if pollution discharges are not strictly controlled.

Most high-income countries have strict environmental rules and regulations for their industrial parks and zones and have invested in related soft and hard infrastructure. In many low- and middle-income countries sustainable business practices and their negative spillovers to the society were ignored or overlooked by governments, parks’ authorities and the tenants operating in them. In these countries, industrial parks have little to no waste treatment and disposal infrastructure, and no pollution control mechanisms, to control release of main contaminants (such as electronic waste, land toxic substances like lead, lindane, mercury and others) into surrounding air, soil, water and food, harming the environment and health of

people. South Asia, Southeast Asia and Africa all have large-scale groundwater contamination by untreated effluent, causing serious health problems for several millions of people. However, new initiatives in Africa are addressing these issues (box 3.5).

With global climate change and rising environmental degradation, inequalities and marginalization of some population groups, countries are building a new generation of inclusive and sustainable industrial parks and zones. Investment in social and environmental management can generate significant returns, much of which benefit poor people, whose livelihoods often depend on the quality and availability of natural resources and access to knowledge and skills to cope with the risks and impacts of social exclusion and environmental and climate change challenges.

Eco-industrial parks are an emerging contributor to economically sound and environmentally and

socially sustainable industrial development. They are also known as eco-industrial districts, green zones, environment compliance zones and low-carbon zones. They can evolve into smart parks, zones and cities helping countries leverage new climate and other frontier technologies for realizing the SDGs.

The idea of the eco-industrial park was first described at the United Nations Conference on Environment and Development in Rio de Janeiro 1992, and has been well known since 1993 in the United States of America.³⁵ Industrial ecology is a principle for the new economy and eco-industrial parks are one of the tools to implement the concept of industrial ecology through inter-company collaboration.

Owners and operators explicitly seek enhanced economic, social and environmental performance by striving to meet national and internationally accepted standards on water, waste and environmental management; labour; and industrial safety and security. Last but not least, a special attention is also given to a new role of eco-industrial parks to realize ‘brain gain’ by attracting qualified skills back to countries of origin.

The concept of eco-industrial parks was realized in Northern Europe—in Kalundborg in Denmark (box 3.6) and Kymi and Harjavalta in Finland—in the 1960s and in China and the Republic of Korea in the 2000s (box 3.7).³⁶ It is based on biomimicry. In nature, one organism uses waste or by-products created by other organisms. But in human society, almost every product is ultimately wasted. Each stage of a product’s life cycle creates waste, during extraction, manufacturing, consumption and eventually disposal. Eco-industrial parks try to address this by organizing industrial production and consumption in a symbiotic way, by mimicking how production and consumption are organized in natural ecosystems. The approach builds on the wider field of industrial ecology and industrial symbiosis.

These eco-industrial parks locate different production processes in the same place and apply a whole-system design approach to connecting resource and energy flows. The process and product are redesigned,

Box 3.5

The Hawassa Industrial Park in Ethiopia

Inaugurated in June 2017, the Hawassa Industrial Park is located 275 kilometres from Addis Ababa near one of Ethiopia’s top holiday destinations, Lake Hawassa. The 300 hectare eco-park, centred on textile and garment products, is fully integrated with the newly built Hawassa University. As an eco-park, it is to be powered mostly by renewable energy, and it is aimed to conserve energy and water through natural lightning, natural ventilation, low consumption bulbs, recycling rain water and using solar powered LED street lights—making it Ethiopia’s first major eco-friendly development. This was the result of collaboration between PVH, the world’s second largest apparel company, and the Ethiopian government in pioneering a fully vertically integrated and socially and environmentally responsible supply chain in the textile industry. It features state-of-the-art, environmentally friendly technology; government commitment to enforce laws on worker rights and industrial safety, and international quality and production standards. It also supports Ethiopia’s unutilized market access preferences to the US and EU markets through the EU’s Everything But Arms regime and the recently extended US African Growth and Opportunity Act.

Source: SkyscraperCity 2015; Mihretu and Llobet 2017.

Box 3.6

Kalundborg, Denmark

Kalundborg in Denmark, though not originally designed as such, is an example of an eco-park whereby firms located inside the park and in the surrounding municipality developed economic and strategic relationships of mutual benefit.

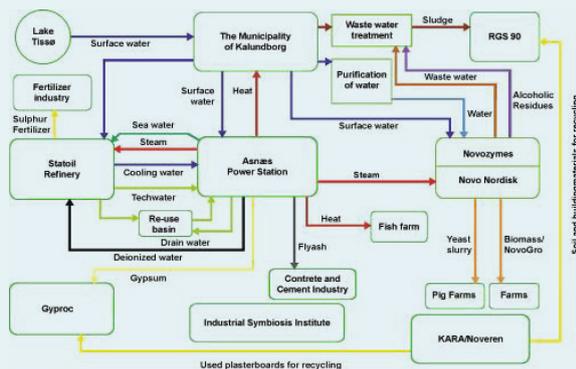
The park's eco credentials developed incrementally as tenant companies took advantage of industrial symbiosis with tenant firms operating in energy, waste management, pharmaceuticals and manufacturing. In the 1960s, plans for a refinery had to be put on hold due to a lack of water. The problem was solved when the local power station and industries collaborated to develop a new water supply. Over the next 35 years, industry gradually expanded and new synergies and collaborative projects were developed. Excess heat generated by the park's power plant warms homes and an adjacent pharmaceutical company uses the steam. Sharing resources means that thermal pollution from the power plant is cut significantly. Kalundborg is often cited as an example of win-win sustainability based on a willingness to cut costs and protect the environment. Both the firms and the local community benefit from environmental and economic returns. Companies saved \$3.5 million a year, 23 gigalitres of seawater, three gigalitres of surface water and 40,000 gigajoules of heat.

The Symbiosis Center Denmark, founded in 2015 in Kalundborg, provides a variety of services such as an

industrial symbiosis database to assist in matching firms. It also organizes knowledge sharing and provides advice to companies seeking to cut costs through symbiosis approaches.

The Kalundborg model has developed over several decades. Its success can be attributed to large firms operating in the same locality, to incentives for cutting pollution and using resources effectively and to an active management board that encouraged collaboration among firms.

Zero waste for the Industrial Symbiosis Park in Kalundborg, Denmark



Source: Caroli, Cavallo and Valentino 2015; Memedovic 2012.

so that disused products at the end of their useful life can be disassembled into fully recyclable or up-cyclable industrial feedstock, or organic feedstock. Recycling alone is not enough if it leads solely to materials finding another use in less valuable and less complex products, before ultimately ending as waste in landfills. Up-cycling is about maintaining biological and industrial nutrients cycling through the biological and industrial processes so that they can be converted into higher quality or equal quality products at the end of a product's useful life.³⁷ Replicating this model of eco-industrial parks has proved difficult, leading to criticism of the concept. But given the potential benefits, the concept cannot be dismissed (box 3.8).

Eco-industrial parks can generate economic, environmental and social returns:³⁸

- Economic returns: Savings come from cutting the costs of raw material and energy use, waste management and transportation. New value can be created through responsible branding for a responsible market.
- Environmental returns: Replacing raw materials with locally available waste streams saves planetary material resources and reduces the waste and emissions generated by industries collaborating in the cluster. The use of renewable energy contributes to addressing climate change.
- Social returns: The relocalization of production and consumption, and the business opportunities created by interconnecting different industries generate local job opportunities and diversify and strengthen local economies. Increased

Box 3.7

China's approach to eco-industrial park development

Chinese eco-industrial parks emerged in the early 2000s and have since embraced the principles of the circular economy and industrial symbiosis, taking advantage of the scale of existing zones. The Chinese approach has three main aspects. First, a government has made environmental management a principle for the design of zones from the outset, to minimize waste from industrial processes. Second, the government endorsed the use of the ISO 14001 certification standard as an element of the EIP programme. Third, the application of ISO 14001 certification in zones guarantees to firms and supply chain partners that a management system standard is in place for activities of the zone management.

Established in 1984, Tianjin Economic Development Area (TEDA) in northeast China was among the first national economic and technological development zones in China and is now one of the largest zones in the country. It started eco-industrial development in 2000 and is now a fully operational eco-industrial park covering 34,000 hectares and hosting 10,000 companies and 485,000 employees. Its success is attributed to strong

leadership, international support and well-developed industrial symbiosis.

Unlike other EIP projects in China, TEDA received technical support from international experts during its early stage, covering infrastructure sharing, integrated water, solid waste, land and information management. As a result, 42 byproduct exchanges among 248 participating companies were valued at \$3.36 million in 2012. TEDA increased industrial synergy through a dedicated facilitation programme. Special TEDA funds support industrial symbiosis related R&D activities so that more byproduct exchanges could be identified among different tenant companies. TEDA has consistently worked towards improving its environment management through implementing ISO14001, GRI reporting, Eco Logo on industrial solid waste management, energy and carbon emission audits—and through fostering better water management by implementing International Water Stewardship Standards.

Sources: UNCTAD 2015; UNIDO 2016; Erkman 2016.

Box 3.8

Examples of the role of environmental management services**Value Park, Germany**

Founded in 1998 in the German state of Saxony Anhalt, the privately owned Value Park has a large anchor firm (the biggest plastics supplier in eastern Germany). More than a dozen subsidiary firms have symbiotic relationships as suppliers to the anchor firm and consumers of its products. The anchor firm plays an executive role in running the park and in selecting firms to locate there, if aligned with the park's aims. The firms in the park benefit from savings generated by sharing resources and green infrastructure, including waste, sewage and water treatment, warehouses and a logistics centre, a power plant and recycling. They can take advantage of advisory, environmental and management services and marketing activities provided by the anchor firm. The park also contains a research institute that promotes knowledge sharing among tenant firms as well as training for firm employees. A key factor explaining the success of the park is a cluster of firms in the same industry, allowing them to reduce costs by sharing infrastructure and exchanging mutually beneficial knowledge and technology.

Crewe Business Park, UK

Crewe Business Park is a cluster of firms working in the technology, communication, software and service industries in northwest England. It is considered one of the first ecologically based developments of its kind and is one of only two business parks in the UK to receive the Millennium Marquee Award for Environmental Excellence. When two local councils established it in 1986, the planners consulted environmental protection bodies on legal aspects of environmental protection. The park is designed to have a minimal impact on local nature, and its buildings fit around natural features. Rather than offering the ecological infrastructure commonly found in eco-industrial parks, such as waste treatment facilities, Crewe's approach to sustainability is based on conservation. The park offers tenants 125-year leases and provides a range of facilities and services from offices, research, environmental management and development activities to assistance with administrative issues, applications for funding and business plan development.

Source: Caroli, Cavallo and Valentino 2015.

participation and cooperation along the product life-cycle strengthen community.

Eco-industrial parks can be greenfield and retrofitted, and can be initiated top-down or bottom-up, or in partnerships, as follows:

- Top-down refers to planning eco-industrial parks from scratch by a government or public authority; some eco-industrial parks in China are top-down (see box 3.7).
- Bottom-up refers to industrial parks that have independently transformed themselves into eco-industrial parks such as Kalundborg in Denmark.
- Existing industrial parks retrofitted by government intervention or through public–private partnerships are the most common.

Existing or new industrial parks could start with obtaining ISO 14001 certification (an international environmental management standard), or another form of environmental management system.³⁹ This can become a reference for the region and be promoted to attract new investors wishing to be associated with an eco-industrial park project, respecting minimum environmental and social requirements (see also box 3.7 on China’s approach).

The GIZ, UNIDO and the World Bank Group worked together to formulate a set of parameters that can be applied to different geographical locations to increase the credibility and sustainable development of eco-industrial parks.⁴⁰

The framework describes management, environmental, social and economic performance requirements for eco-industrial parks:

- Park management performance covers park management services, systematic monitoring, planning and zoning.
- Environmental performance covers environmental management and monitoring; energy management; water management; waste and material recycling and up-cycling; and natural environment and climate resilience (see box 3.8).
- Social performance includes social management and monitoring, social infrastructure, and community outreach and dialogue processes.

- Economic performance deals with employment generation, local business and SME promotion and economic value creation.

The prerequisites are setting initial targets, and where possible, eco-industrial parks must strive to exceed those targets.

Compliance with national and local regulations is an absolute requirement for all industrial parks, regardless of their geographic location and characteristics. This requires complying with international and national regulations on employment, discharge limits, national air emission limits, waste disposal techniques, waste transportation, hazardous waste handling and noise limits during operations.

Smart parks and cities

The transformation triggered by Industry 4.0 technologies will change the footprints on industrial parks, zones and cities. Smart parks that use the new ideas, concepts and technologies of Industry 4.0 for effective use of resources and for pursuing low carbon and inclusive development pathways, will be a key driver for achieving the SDGs. Smart production schemes, enabled by a network of sensors, will help companies optimize their production processes and use material resources and energy effectively. And cyber-infrastructure can be developed for better design and operation of eco-industrial parks and cities (box 3.9).

By applying Industry 4.0 concepts, comprehensive systems can be based on well-structured information. Electronic devices sense plant operating data, such as temperature, pressure, flow rate and pollutant emission. The data are then stored in the corresponding knowledge base with contextual information tagged. The data can then be converted into other useful forms, such as surrogate models, which could be further used for system modelling and optimization.⁴¹ Planning industrial parks using Industry 4.0 methods—like modelling, simulation and creating a virtual industrial park—requires handling massive and heterogeneous data sets in the real time, which could be a useful testing ground for Industry 4.0 applications in the rest of the country.

Box 3.9

Smart city in Songdo International Business District

The Songdo International Business District is a smart city development project in Republic of Korea integrating real estate, utilities, transportation, education, health and government. It is strategically located at the Northeast Asian trading hub in the Incheon Free Economic Zone. Owned and driven by the private sector, it is a joint venture between the City of Incheon, Gale International, POSCO and Morgan Stanley Real Estate.

The design of Songdo smart city implies environmental and sustainability strategies to minimize its ecological impact on new urbanism, smart growth, transit oriented development and green growth. The measures include:

- Korean and LEED certification for major buildings.
- Citywide pneumatic waste disposal.
- Reduced energy consumption by applying low U value windows, LED lights, water-cooled air conditioning system, as well as solar panels.

- Extensive social and recreational spaces, including bike and walking paths, as well as broad green spaces.
- A central park that uses indigenous plants.
- Charging stations for electric vehicles throughout the city.

The city expects to attract banks, multinational and domestic corporations; to host four universities; and to respond to overcrowding and expensive conditions in Seoul by providing a comfortable place and incentives for its residents and businesses. Incentives for expats to attract FDIs include e-government services, international schools, universities and hospitals (70 percent foreign schools), various tax incentives for tech companies and income tax exemption for non-Koreans.

Source: New Cities 2014.

Consider the Jurong Island Eco-Industrial Park, which has modelled its tenants' material flows.⁴² The park harnesses Industry 4.0 technologies, such as semantic representation of data, cyber-physical systems, virtual reality, high performance computing, algorithms, data analytics and modelling to enable intelligent design, operation and management. Some material flows can be improved using Industry 4.0 technologies—say, by switching to alternative materials that have either less consumption or better properties in the production process. Industry 4.0 technologies help better inform stakeholders so that they can make proper decisions on how to reach strategic targets in the optimal way while minimizing environmental impact (box 3.10).

Clusters and industrial parks and zones⁴³

Clusters are groups of interlinked companies, suppliers and associated institutions, providing a related group of products and services in a specific geographic region. They are based on proximity, creating new value and favourable business environments. They include companies from different industries

interacting with each other in the production of goods and services and cooperating with government agencies, universities and other institutions at the national and regional levels.

Clusters have many advantages. First, companies can operate with higher efficiency, drawing on more specialized assets and suppliers with shorter reaction times than when working alone. Clusters collaborate with research institutes, technology labs, productivity centres, venture capitalists and other providers of business development services. Second, companies and research institutions can build connections to learn and innovate, as tacit information and knowledge are developed and exchanged locally. Third, business formation tends to be higher, since start-ups are more reliant on external suppliers and partners. Clusters can be a lever to acquire new competencies and access international markets through participation in global value chains, contributing to local technological learning and innovation. Clusters are thus very important for fostering innovation in the era of new industrial revolution driven by Industry 4.0 and convergence of technologies.

Clusters generally do not require institutional underpinning for their active collaboration but

Box 3.10

Malaysia's digital free trade zone

In March 2017 Malaysia inaugurated a Digital Free Trade Zone (DFTZ). The two major stakeholders are the Malaysian Government through the Malaysian Digital Economy Corporation and the Alibaba Group, in a public–private partnership (PPP) within an SEZ. The objective is to provide physical and virtual space for small and medium enterprises to grow in the internet and e-commerce cross-border activities. The zone's main objective is to enable Malaysian SMEs to go global. It guides them through setting up an e-commerce presence, finding online trade opportunities on business-to-customer (B2C) and business-to-business (B2B) e-marketplaces, engaging trade custom agents and logistic partners and performing digitized export, import and transshipment.

The zone offers the first Electronic World Trade Platform (eWTP) outside of China. It offers not only a regional logistics hub, but a one-stop international B2B trading services platform, cloud computing and big data storage, e-payment and inclusive financial services, and digital talent training under the Alibaba Business School.

The zone is set to have an e-fulfilment hub, satellite service hub and e-service platform. The e-fulfilment hub

helps SMEs and businesses export their goods easily, with the provision of logistics, cloud computing, mobile payment and talent training services. The satellite service hub connects SMEs and businesses with leading players who offer financing, last-mile fulfilment, insurance and other services important in cross-border trade. The e-service platform manages cargo clearance, which has been reduced from six hours to three hours, and other processes needed for cross-border trade.

The first e-fulfilment hub, operated by a private partner, is the KLIA Aeropolis. The first satellite service hub, the Kuala Lumpur Internet City (KLIC), is in Kuala Lumpur and operated by a private partner. The e-service platform is developed and managed by the government of Malaysia. Malaysia DFTZ serves as a best practice example of import–export process improvement in which a logistic hub facility enables fast storage, warehousing operations and customs clearance—cargo clearance time has been reduced from six hours to three.

Source: Malaysia Digital Free Trade Zone n.d.

purposive collaboration facilitated by institutions for collaboration can enable them to better exploit the complementary skills and capabilities of local suppliers and service providers while knowledge flows between companies and research institutes and universities can be improved.

Clusters develop over time and mainly without purposive public or collective actions. Some clusters develop from networks of SMEs; others are linked to a keystone company or university. Most clusters develop from specific aspects of the location, specific business environment conditions, related clusters and the long-term impact of specific entrepreneurial decisions.

Industrial parks, zones and innovation areas are potential drivers for cluster development. Successful examples include automotive and electronic clusters in South-East Asia.⁴⁴ If parks and zones are developed in association with cluster projects, they will often have more of a service-driven approach. Industrial parks will provide a variety of building accommodation to host SMEs and start-ups. A resource centre might host

the cluster's animation organization, and joint testing or development centres can facilitate exchanges between research organizations and SMEs. The notion of an industrial supply chain that facilitates the collocation of businesses on the same or on neighbouring sites can also play a part in developing cluster-based industrial parks. Cluster policies can also help increase the visibility of industrial parks and make them more attractive to inward investors since companies will know that they will have access to pools of qualified workers and to relevant support services.

The Aerospace Valley cluster, in Bordeaux and Toulouse, in France, has major development zones to accommodate the growth of this cluster, for example the Aero Constellation Campus, based around the airport of Toulouse Blagnac.

Similarly, parks and zones, providing high-quality and cluster-specific business environments, can market them to relevant companies, leading over time to the cluster being the attraction for new companies. It is crucial to align industrial park and cluster strategies

and policies and identify the needs of targeted strategic industries (firms and their clusters). In the conception phase, work needs to be done with cluster companies to identify their business environment needs. For instance, few self-sustaining clusters have emerged in the life sciences, despite the billions invested by the public sector. Industrial parks and cluster policies should also take into consideration local comparative advantages and linkages between higher education institutions and entrepreneurs to facilitate innovation by upgrading skills, improving access to finance, streamlining government rules and regulations and being open to foreign investment and competition.

Clusters can also lead to the development of new industrial parks (box 3.11). The agro-food clusters in Southwest France and in Tuscany have mixed agropole, science park and industrial zones projects: Agen Agropole and Pisa Research Park. Health and life science clusters also require dedicated industrial and business park sites, with a mix of office and production space. Examples can be found in the Medicon Valley cluster region in Denmark and in southern Sweden.

Smart regions

Regions, administratively defined within a country, may host various industrial parks, science and technology parks, eco-industrial parks, universities, research institutes, vocational training bodies, technology labs and various others intermediary organizations and institutions (figure 3.2). Networking among SMEs

and their clusters in and outside industrial parks and zones can result in systemic collaborations and interactive learning processes among businesses, local governments and academia. When underpinned by regionally embedded governance structures and supported by regulatory and institutional frameworks at the national level, this systemic collaboration can form a regional innovation system. Key to the success of regional innovation systems is a multilevel and embedded governance approach to facilitate interactive learning and innovation for the commercialization of new knowledge and to coordinate policies.

Success of these regions rests on building institutions, norms, standards and shared values to ensure coherence and nurture the culture of innovation, knowledge capture and entrepreneurship. The strategic framework of smart regions goes beyond the triple helix innovation model that includes perspectives of industry, academia and government; it is based on the quadruple and quintuple helix innovation models. The quadruple helix model adds another helix and perspective of civil society, while the quintuple helix model goes further by adding the helix and perspective of the natural environment.⁴⁵

Smart regions leverage new growth opportunities for innovation (including social innovations), digitalization, decarbonization, circular economy, human and social capital, and the natural environment (see smart region initiatives in the United States of America and the European Union such as Smart Helsinki).⁴⁶

Box 3.11

Zhangjiang Hi-Tech Park's cluster development strategy

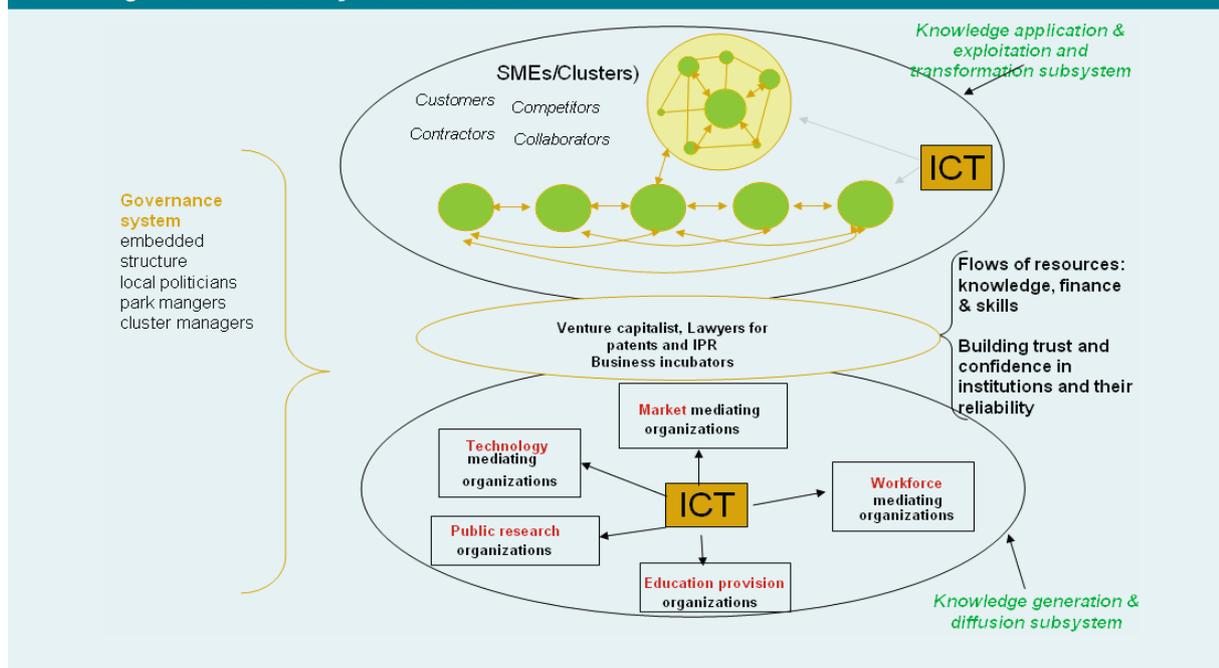
Zhangjiang Hi-tech Park in Pudong district in Shanghai, China, operated by Zhangjiang Hi-Tech Park Development Co., Ltd., specializes in research in life sciences, software, semiconductors and information technology. It hosts more than 100 research and development institutions and 3,600 companies and employs more than 100,000 workers.

The park benefited from municipal support, an industrial cluster development strategy and a strategy to uphold excellence in talent, production, corporate culture and service support. Zhangjiang's objectives are to stay

abreast of cutting-edge developments and promote transition from high-tech "park" to "science city."

Zhangjiang has gradually established innovative industrial clusters in high-tech industries such as integrated circuits, software industry, information and communications technology, biotech and pharmaceuticals, aviation and biomedicine. The medical industry cluster includes production of medicines, medical instruments and medical care. The E-industry cluster includes firms that design and manufacture integrated circuit chips and applications for mobile internet.

Figure 3.2

Smart region's innovation system structure

The coexistence of many clusters and industrial parks—with various knowledge bases, knowledge-creating and intermediary organizations, and representatives from regional governments and civil society—forms a complex organizational structure requiring a sophisticated governance structure to develop, plan and coordinate strategies for industrial parks and clusters with those of regional and national development (figure 3.3).

How to leverage parks and clusters to foster industrial diversification

Cluster literature implies specialization but this can be risky for economic development, when exposed to external sector-specific shocks. Many dynamic regions have a diverse portfolio of specializations (clusters), of unrelated and related varieties of industry. The unrelated variety generates a portfolio effect that helps to spread risk from external shocks, while the related variety is important for spillover effects and innovation-driven growth. The development of modern diversified economies is based on inter-related sectorial connections and knowledge spillovers of

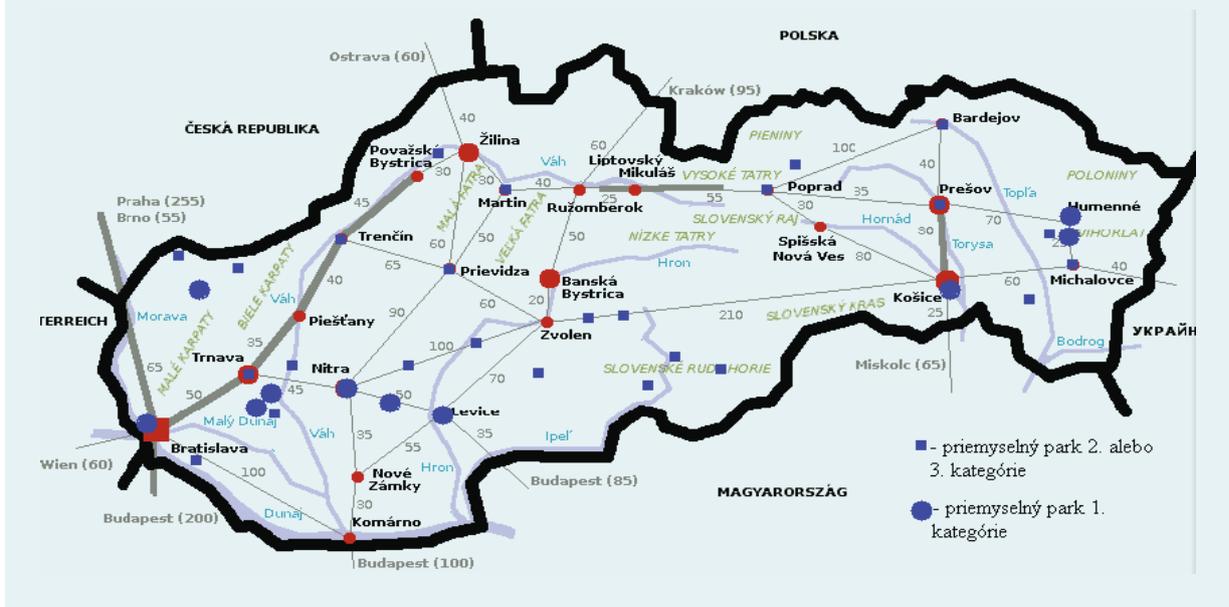
the 'related variety' of industries, where there is swift adaptation of innovation to nearby related industries and where 'absorptive capacity' of related sector management is high.⁴⁷

A multisector or mixed zone can house different types of industries and firms, allowing for the emergence of spontaneous specializations, based on the market opportunities deriving from the zone location and revealed comparative advantage potential. Existing strategies and incentive schemes could then be oriented or fine-tuned towards a more specialized zone with a related variety of industrial sectors and interrelated clusters that provide fertile ground for companies to grow and create new activities and thus to diversify. But this approach can be risky when there are external shocks. Unrelated variety enables hedging against the risk, so combining different sites can be an option.

Industrial parks and zones should be developed as an integral part of the national and regional innovation support system for SMEs and their clusters.

China shows that many parks have clusters of same or similar industries, resulting in high specialization and low diversification. The leading industry

Figure 3.3
Networks of industrial parks and clusters in Slovakia



in Zhangjiang Hi-Tech Park is biopharmaceuticals, which is also the leading sector in Suzhou Industrial Park (see box 3.11). The 22 parks in Shanghai's

Dazhangjiang district host similar industries, adversely affecting the creation of distinctive and complementary industrial agglomeration areas.

Chapter 4

Preparatory analysis and design for 21st century parks and zones

There is no single blueprint for a successful economic park and zone. But there are five principles and guidelines structured in six phases for successful design and implementation. First, parks and zones must be transparent to provide clarity to investors, to reduce unpredictability and risk and to instil confidence. Second, their design, development and implementation should engage all stakeholders and particularly local communities, small-scale producers, small-scale farmers and such disadvantaged groups as youth and women. Third, parks and zones should be carefully planned, designed and integrated into national and regional development strategies. Fourth, they should be based on robust legal and policy frameworks developed within the broader framework of the country's legal system. Fifth, they should contribute to growth that is socially, economically and environmentally sustainable.

To guide planning and implementing a park or zone, the framework here distinguishes six phases: preparatory analysis, diagnostics, policy design and planning, implementation and financing, operation and adaptation, promotion and marketing, and monitoring and evaluation (table 4.1).⁴⁸

Diagnostics: Do they fit with broader national and regional development strategies?

Factors to consider when planning parks and zones in all countries include macro-economic and political stability; the stage of economic development; level of industrialization; attitude towards the private sector; regulatory and economic environment for business; and the capacity to attract and protect investments and businesses, both national and foreign (checklist 4.1).

It is important at this stage to conduct thorough diagnosis, to determine how the zone fits in with broader national and regional development strategies and how the particulars of the national and local political, social and economic environment could influence

the choice of zone/park type, its location and the focus of its economic activity, as discussed in chapter 3.

While parks and zones offer advantages, their contribution to economic development will be conditioned by the overall socioeconomic conditions in the country: political and macroeconomic stability; liberal trade and investment regime; intellectual property rights regime; transparency of regulation; costs of doing business; and provision of business development services. Industrial parks and zones should be developed as an integral part of the national and regional innovation support system for SMEs and their clusters.

What are the goals of the zone and park?

Zone strategy should be of a long-term, based on vision engaging all stakeholders and part of the overall country industrialization and economic development strategy and plan. Even the most successful parks take several years to see results, and it takes time for profitable firms to emerge. The zone and park strategy should define objectives and set targets that are realistic and achievable based on maximally using existing resources and skills to attract investment and firms in specific sectors, according to the revealed comparative advantages of the country and location. At the same time, these strategies need an element of adaptability and flexibility, to respond to rapid technological change and to leverage opportunities from geographical and functional fragmentation of production value chains and their integration in real time.

Park and zone plans allow the stakeholders to better identify the type of investment that is needed (private, public, foreign, domestic or a mix), and the types of sectors and companies to attract. Planning requires assessing the availability of land and mapping out all legitimate land users with formal and informal rights, identification of utilities and investment needs and addressing environmental and social issues.

Table 4.1

Steps for establishing a park or zone

Diagnostics and demand analysis	<ul style="list-style-type: none"> • Identify and review national and regional strategies and programmes, stage of economic development, level of industrialization and macro-economic and political stability. • Selection of the type of desired zone (for example, EPZ, SEZ, IP or FTZ) or park and the economic and industrial activities they intend to attract. • Specify the goals and confirm that a park or zone are appropriate. • Identify relevant stakeholders. <ul style="list-style-type: none"> ◦ Owner: A public or private sector entity holding legal title to the land site. ◦ Developer: Owner or a separate entity under contract, physically develop site; finance, design and construct; marketing. ◦ Manager: Owner, or developer or third party under contract; day-to-day management of zone; lease/sublease lots or buildings; operate facilities and services. • Identify relevant institutions responsible for the parks' development.
Laws, regulations, policy, design and master planning	<ul style="list-style-type: none"> • Review existing legislation: Law or decree that establishes and defines the park regime. • Review regulatory functions: Plan/administrative regime; responsible state body and authority appointed; review and evaluation of the proposal by relevant state authority; executive decision on IP/IZ establishment. Coordination of government agency inputs; licensing/permissions; ensuring compliance; and monitoring performance. • Design the incentive system for zone firms. • Identify possible location and select site: economic, geographical, infrastructure and cost factors, also (but not purely) political considerations; involve urban planners, economists, and local engineers, geographers and geologists. • Tackle land use and land zoning issues. • Consider local environmental, economic and social aspects. • Conduct a feasibility study (consulting company through an open tender process or multilateral organizations). <ul style="list-style-type: none"> ◦ Assess the location; topography; access to labour and material resource and energy; availability and conditions of utility and transportation infrastructure. ◦ Assess demand: what industries and how many companies; demand for land, buildings, power, water and labour; greenfield or brownfield. • Master plan development and technical documentation: conceptual layout of land plots, roads, utility networks; common buildings; phasing milestones and costs; forecast demand; climate-resilient infrastructure; industrial safety; eco infrastructure if possible; detailed technical and visual model of the park. • Financial feasibility of the real estate.
Implementing and financing	<ul style="list-style-type: none"> • Construct the park. • Set up management: private sector; or public sector (separate from the regulator; manage on commercial basis). • Finance the park.
Operating and adapting	<ul style="list-style-type: none"> • Identify or set up responsible authority/public entity/PPP for development and management. • Provide business development services (government supported or PPP). • Set up a one-stop shop using modern electronic facilities for submitting all necessary applications and paperwork; company registration. • Services: issuing business licensing; leasing facilities; resident permits and visas; building permits, completion certification; driving licenses; telecommunications; company registration. • Extension services: training centres, laboratories.
Promoting and marketing	<ul style="list-style-type: none"> • Early promotion of park design and its services; anchor investor; working environmental systems (industrial symbiosis). • Investment promotion: marketing, branding, investor attraction, support and aftercare. • Zone regulator/ authority: marketing strategy and priorities • Zone operator communication strategy.
Monitoring and evaluating	<ul style="list-style-type: none"> • Monitor social, environmental and economic impact. • Adjust the development strategy based on performance.

Checklist 4.1

Evaluation of the political, macroeconomic and business environment

Political environment

- ✓ Is the country in a conflict or post-conflict area?
- ✓ Is the country affected by insecurity, social turbulence or widespread crime?
- ✓ Can investors consider the zone as guaranteeing the security necessary for conducting its business?

Intellectual property

- ✓ Are there any laws and regulations ruling upon IP rights?

Taxation

- ✓ What general tax regime is in force in the country?

Checklist 4.1 (continued)

Evaluation of the political, macroeconomic and business environment

- ✓ How many treaties have been stipulated by the country with other countries to avoid double taxation?

Currency exchange and repatriation of funds

- ✓ What is the import regime for capital and financial resources for investments?
- ✓ What is the export regime for financial resources?
- ✓ Can nationals (natural persons or companies) open or hold foreign currency accounts at local banks?
- ✓ Can nationals (natural persons or companies) open or hold accounts at foreign banks?
- ✓ Can foreign subjects (natural person or companies) open or hold foreign/local currency accounts at local banks?

Land ownership, FDI and dispute settlement

- ✓ What is the property right legal regime? Can an individual own land or buildings? Can foreign individuals own land or buildings?
- ✓ Are there laws forbidding the introduction of future provisions (laws, regulations or administrative provisions) that can worsen the treatment granted to foreign investor?
- ✓ Are the managing bodies of partnerships with a foreign investor required to be of the nationality of the Country or to have their residence in the country?
- ✓ How is the settlement of disputes regime? Is the recourse to international arbitration allowed?
- ✓ What is the level of privatization in the country and the competence of privatization authorities?

Investment regime

- ✓ Is foreign investment allowed in all sectors of economic activities?
- ✓ Is foreign investment to be authorized by government or administrative bodies?
- ✓ What is the competency of authorities to authorize foreign investments? Which sectors will eventually require specific authorizations?
- ✓ Can the foreign investor operate without going into partnerships with local investors and control 100 percent of the investment?
- ✓ Can the foreign investor own the majority of the investment?
- ✓ Can business be conducted by a foreign person directly, or it must be done through nationals or residents?

Bank and financial sector

- ✓ Can the banks grant credits and/or financing in the short, medium and long term or just according to one of these categories?
- ✓ Can regular banks have a direct shareholding in company capital?
- ✓ Are there one or more national development banks capable of acquiring a direct participation in joint-venture investments between local and foreign partners?
- ✓ Which international organizations can grant credits to a joint venture in the country?
- ✓ Are leasing companies in the country?
- ✓ Are insurance companies operating in the country?

Company registration

- ✓ In which legal forms can companies be set up? What are the procedures? Which are the competent authorities? Is there a one-stop shop centralizing the procedure?
- ✓ Can foreign companies establish branches or offices in the country? Which are the procedures? Which are the competent authorities?

Employment

- ✓ What is the recruiting procedure for local personnel?
- ✓ How is the remuneration of personnel defined, and how is it structured?
- ✓ Are dismissals at the employer's discretion?
- ✓ Is dismissal possible only for defined reasons?
- ✓ What is the average incidence of social charges on the gross yearly pay?
- ✓ What is the amount of the severance indemnity?
- ✓ What is the salary/remuneration? Repatriation regime for the foreign expatriate personnel?

Identify relevant stakeholders

The main stakeholders are the regulator, owner, developer and manager. The regulator sets the administrative regime, designates zone sites and licensing, coordinates public agency inputs, monitors performance and ensures compliance. The regulating entity should be separate from the operating entity so that they can impartially monitor compliance of the zone among all the stakeholders and avoid potential conflict of interests. The owner can be a public or private sector entity with a legal title to the zone land site. The developer is the owner or a separate entity under contract to physically develop, finance, design and construct the site, as well as market and prepare for the zone. The manager can be the owner, developer or a third party under contract, responsible for the day-to-day managing of zones, leasing/subleasing lots or buildings and operating facilities and services (checklist 4.2).

The government is more interested in the zone from an economic development perspective and views the zone as an integrated part of a national and regional economic development strategy. It establishes zones and provides buildings in advance of demand, attracting investors who can move in quickly. Operational maintenance is provided from the state budget (national or regional). But financing construction and maintenance of the zone or park can be a drain on budgetary resources. Over time, infrastructure may degrade, and unless the state budget allows, it cannot be maintained.

In some countries, a commercial approach is followed, where the private sector is encouraged to build and maintain the zone. The most notable trend over the previous 15 years was the growing number of privately owned, developed and operated zones worldwide.⁴⁹ Of the 2,301 zones in developing and transition countries, 62 percent were privately developed and operated, up from less than 25 percent in the 1980s. The downside is that the private sector is primarily interested in commercial opportunities and will not locate where there are no economic returns; it charges higher rents and maintenance costs. And it will react to market demand for the locations they

wish to develop and not on developmental objectives government wish to promote.

A public–private partnership (PPP) is a partial solution to some of the drawbacks in commercial or state-driven investment in parks and zones. The state is the provider of land, infrastructure and services. The private developer provides the other functions. The state can provide financial subsidies to developers. More important, many states have an investment promotion agency that can promote new parks in international markets. When a private sector partner is associated with a developer or manager of a zone, the infrastructure and management will be more attuned to investor needs.

Although many zones are now entirely private, most buildings, infrastructure and services are still publicly funded and controlled. Experts and international financial institutions increasingly suggest PPPs, but regulating such partnerships is lacking, incomplete or hard to enforce, because of the low capacity of public administration (checklist 4.3).

Identify relevant institutions responsible for parks

Special economic zone governance and management are crucial to ensure the success and effectiveness of a national SEZs system and to guarantee individual SEZ management. Two types of governing bodies can be identified (checklist 4.4):

- A national authority, commission or ministry competent for strategic planning, authorizing individual zone creation and general zone system supervision.
- An individual SEZ management body/board.

Most countries have a national authority for establishing and supervising zones. Such authorities can be ad hoc SEZ commissions (ministerial or interministerial), or departments within ministries, usually ministries of economy or industry. They often comprise ministers and other high-level officials as well as experts from involved state bodies. Since zones are important for promoting private sector development, it is advisable to coordinate with private business representatives from chambers of commerce or business associations or to involve them in their activities.

Checklist 4.2

Identifying and consulting the stakeholders

- ✓ Which are the political, administrative and/or other public bodies involved in the establishment or supervision of SEZs, both de jure, as explicitly identified by the law, or de facto, in the sense that they have been informally involved because of their position and importance in the country's political or administrative organization, regardless of the legal regulations prescriptions?
- ✓ Which are, de jure or de facto, the public interests borne by each of such public bodies and the role they are actually playing—or played so far—in SEZ establishment or supervision? And if, and to what extent, there might be an overlapping or a conflict of interest between the establishment and supervision function and the management of the zones?
- ✓ Have all public authorities and bodies identified as competent for realizing, managing or supervising SEZs been contacted and involved? Which was their attitude in respect to SEZs?
- ✓ Have Business Membership Organizations (BMOs), like Business Associations and Chamber of Commerce, been consulted and involved? What did they suggest for SEZs location, type, business sectors, funding and so on?
- ✓ Have banks and financial institutions been consulted and involved? Are they interested in the creation or development of SEZs? What did they suggest for SEZs location, type, business sectors, funding and so on?
- ✓ Have universities and research centres been contacted and involved? Are they interested in the creation or development of SEZs—especially technological—and what did they suggest for SEZs location, type, business sectors, funding and so on?
- ✓ Have CSOs and NGOs representing the grassroots local communities interests (environment, labour and so on) been consulted and involved? Which is their attitude in respect to SEZs? What did they suggest for SEZs location, type, business sectors, funding and so on?

Checklist 4.3

Governance of public–private partnerships

- ✓ Is there in the country a legal framework governing PPP, which could be applicable also to the creation/operation of SEZs?
- ✓ Has such PPP regulation ever been successfully applied so far? Which authorities or bodies were able to successfully apply such regulation?
- ✓ In case a PPP regulation would not have been applied—or successfully applied—so far, which were the reasons?
- ✓ Are there among the country's public authorities, agencies or bodies involved in SEZs creation, some structures competent and able to smoothly and effectively enforce the domestic PPP regulation?
- ✓ Is it presently feasible to have recourse to international institutions or specialized consulting firms, to support competent authorities in organizing PPP operations?
- ✓ If the country allows the creation of private SEZs, is there an independent regulatory authority competent to supervise them?
- ✓ Is it possible that international financial institutions and/or top skilled consultants will support competent public authorities in managing PPP operations?
- ✓ Do reliable domestic and/or foreign investors manifested their actual interest in co-financing and managing the SEZ?

The role of the national zone authority varies, but usually includes:

- Nationwide strategic planning.
- Authorizing the establishment of new individual SEZs or enlarging and restructuring existing zones.
- Ensuring proper zone management.
- Supervising the functioning of the national zone system and of individual zones, in accordance within an existing legal and regulatory framework.
- Approving investments in individual SEZs.
- Policy advocacy.

Laws, regulations, policy, design and planning*Law or decree that establishes and defines the park regime*

Many developing countries wishing to establish growth poles and corridors, especially those in Africa, launch

Checklist 4.4

Governance frameworks

- ✓ What is the mission and composition of the national SEZ authority? Are private subjects represented in such authority or involved in its activities?
- ✓ Is the SEZ national authority competent for adopting national SEZ strategic planning, authorizing the establishment of new zones, granting incentives, admitting investors in the SEZ, supervising the functioning of SEZs?
- ✓ What is the composition of SEZs management body? Are the following subject represented: national public authorities, local public authorities, Chambers of Commerce, business associations, housed firms, banks, universities and research centres?
- ✓ Are the mission and competencies of SEZs management bodies clearly defined? Do they include ensuring maintenance of infrastructure and utilities, services and appointing and supervising zone executives?
- ✓ Is there a supervisory body, distinct and independent from the managing body, in the sense that its members have no relations with the institutions and subjects represented in the managing body, or the latter is presently performing a dual function of SEZs management and supervision?
- ✓ Was it ascertained that all public authorities, agencies and bodies at the central and local levels and potentially affecting/impacting SEZ establishment and management have been involved in the SEZs planning or reviewing procedure?
- ✓ Have one or some of such bodies manifested or showed a negative position?
- ✓ Were the reasons of such position analysed and taken into consideration, or justifiably rejected?

the process of setting up special laws and regulations to facilitate park establishment and attract investment. Table 4.2 lists the topics that a comprehensive SEZ law should deal with. Regulations should be developed within the broader framework of the country's domestic legal system to hedge against the risk of enclaves, where investors operating within the growth poles are exempt from the host country's domestic laws, or the special parks laws undermine or contradict the domestic legal system. New laws or regulations should not contradict or replace national laws but should rather fill gaps in existing laws in line with best practices.

A highly controversial issue is the stabilization provision that freezes domestic laws at the time an investment contract is signed—often found in contracts between the state and investors, or occasionally in national investment laws.⁵⁰ The result is that investors are either exempt from applying new laws that the country may amend or adopt at some point in the future, or the company may have legal recourse to compensation, if such laws lead to a substantial increase in costs or decrease in profits. Governments should avoid the use of such provisions in growth poles altogether. If the government decides to include a limited fiscal stabilization provision in parks, zones or growth poles, it should not override or conflict with domestic law, but may form part of the fiscal bargain for the project.

The national regulatory framework for parks and zones must address issues of definitions; principles of establishment and institutional arrangements; structure, power, function and autonomy of the zones' authorities; legal attributes; sources of funds; tax status and contractual arrangements between government and developers; obligations of operators and enterprises; tenant selection criteria; incentives, privileges and benefits for developers and enterprises; ownership of land, if allowed; environmental protection principles and policies; and dispute resolution procedures. The legal framework should also allow for flexibility to be updated, modernized and reformed in line with new technological changes.

Legal and regulatory environment in the zone

It is crucial to analyse the legal and regulatory context and to identify gaps and bottlenecks as well as measures for improvement (checklist 4.5). The key legal areas that affect potential new investors and firms in the zones are:

- Investment, company and trade regime.
- Land and building regime.
- Private property protection and industrial and intellectual property rights (IPR) regime.
- Fiscal and trade incentives.

Table 4.2

Topics a comprehensive SEZ law should deal with

Specific zone law	
Provisions in SEZ law	Establishment
	Duration
	Type of activity/ies
	Type of zone/s
	Privileges
Management	Regulation
	Administrative board (management)
	Advisory board (supervision)
	One-stop shop/Single window
	Monitoring activity
Legal core areas	
Regime	Property protection
	Investment protection
	PPP
	Custom
	Tax
	Financial
	Land
	Labour
	Incentives
	Dispute resolution
Sustainability	Health
	Social
	Environment

- Currency exchange regime.
- Financial transaction regime (international transfer of capital).
- Employment and immigration issues.
- Environment protection.

- Banking and finance.
- Dispute resolution.

Designing the incentive system for zone firms

Aspects to be addressed include:

- Which are the incentives granted to firms established in an SEZ?
- Are such incentives considered useful by the firms present in or interested in joining the SEZ (checklist 4.6 and also later on business environment conditions and incentives in checklist 4.10)?

Parks and zones offer a range of incentives for firms, including financial support, reduced rents, facilities and extension services, and social and environmental services. Tax incentives are also common, but can create opportunistic behaviour from beneficiaries and objections from other stakeholders and are often ranked below high-quality infrastructure, efficient park administration and skilled labour on the list of priorities by potential investors.⁵¹ Tax exemptions are often limited to a defined territory and a specific time-frame, as part of economic catch-up programmes.

Tax exemptions can distort the market, but if the policy decision is to support new technologies and innovative industries with expected positive externalities, these incentives are justified. It is important that the legal and policy instruments developed for parks, zones and growth poles do not provide additional incentives beyond those already provided under the general tax laws, and that they ensure that any tax reforms in the future will apply to the parks and zones.⁵²

Checklist 4.5

Legal frameworks

- ✓ Does comprehensive law governing zones exist in a country?
- ✓ Is this law considered exhaustive and satisfactory by public and private stakeholders?
- ✓ Does the law governing zones provide regulation for all the matters listed in the above box?
- ✓ If different laws regulate some of the above matters, or other matters referring to zones or host firms, which of those laws and their enforcement is somehow affecting zone functioning?

Checklist 4.6

Incentive frameworks

- ✓ Are firms established in the SEZ entitled to corporate tax break, and what is its duration?
- ✓ Are personal income tax break granted to executives, managers or workers—or only to expatriates—and which is its duration?
- ✓ Is a VAT exemption granted for SEZ's exported products and imported raw material or semi-finished products?
- ✓ Are imported raw materials, semi-finished products, investment machinery and components and exported products exempted from custom levies?
- ✓ Are firms established in the SEZ entitled to freedom of currency exchange regime allowing the payment of salaries in hard currency, holding firms bank accounts in foreign currency and freely transferring profits and salaries abroad?
- ✓ And, if authorizations are required to obtain the above incentives, are they promptly issued?

Site selection

Site selection includes identification of possible location(s) for establishing parks and zones; required size of the site; access to transport infrastructure and required transportation (by air, rail, ground) and relative network for each; access to utilities (water, electricity gas, sewage system); soil types and topography/drainage; and cost estimate of using particular site.

Analysis of potential locations to host parks or zones includes factors of production, infrastructure, utilities, services and potential markets and their specific aspects, as shown in checklists 4.7 and 4.8.

Dealing with big issues

Effective zoning requires comprehensive analysis of the community's needs and desires, complemented by well-designed and strictly enforced zoning regulations. Countries should develop a corpus of laws and an effective administrative system, which should be open to adaptation and adjustments with the objective of creating the best conditions for inclusive and sustainable economic development.

A well designed land–property administration conceptualizes rights, restrictions and responsibilities related to land and property use. Property rights are normally connected with land ownership and tenure, whereas restrictions usually limit the use of land. Individual and state responsibilities relate more to social and ethical commitments or attitudes towards environmental sustainability and good management of natural resources. The common theoretical framework of land administration describes it as the

way of applying effective land tenure rules, including an extensive range of systems and processes for land administration, to make development sustainable and inclusive and to guarantee good governance and environmental protection.

Effective territorial management and planning at the national, regional or municipal level is instrumental for protecting and developing national and local communities according to their economic, cultural, social and health interests—and for ensuring impartiality, transparency and justice in managing and administering such interests. In developing countries and transitional economies, rural and urban local self-governance structures (municipalities) lack the capacity, skilled personnel and financial resources to adopt transparent and effective decisions on land management (zoning, subdivision, negotiation, taxation and effective control of land) and do not have adequate powers to advocate for their territorial interests.

One critical aspect is implementing procedures for the privatization of state and municipal land. Open auctions are required for transferring land into the ownership or use of private entities, but the auction process might not ensure the expected effectiveness and transparency. Special attention must be given to a bottom-up approach in which local authorities and citizens are involved in the development of their territory and the community.

The participation of all relevant stakeholders—including responsible ministries, agencies, specialized research facilities, citizens, investors and local municipalities—through the public hearings and

Checklist 4.7

Land, material resources, infrastructure, utilities, services**Availability of land**

- ✓ Who is the owner of the land where the SEZ should be located?
- ✓ Is there any subject legally entitled to the use of the land where the SEZ should be located?
- ✓ Is any subject or human community actually using the land where the SEZ should be located traditionally or for a long time?

Proximity to raw materials or basic products

- ✓ Is the planned or existing zone located or to be located close to raw materials or basic products sources?
- ✓ Can the connection of an existing zone to raw materials or basic products sources be improved, such as through infrastructure amelioration?
- ✓ Considering the location of an existing zone, its products and its target markets, is transport and delivery of such products to potential customers cost effective and are products competitive on such markets?
- ✓ And if they are not competitive enough, is it possible—and how—to improve the cost effectiveness of transport and delivery to customers?

Services and facilities provided to investors and one-stop-shop

- ✓ Are essential services available in the SEZ?
 - Maintenance and repair.
 - One-stop shop.
 - Information on laws and regulations in force.
 - Medical assistance.
 - Internet service.
- ✓ Are very important services available in the SEZ?
 - Zone internal transport.
 - Shipping and transport agents.
 - Training facilities.
 - Banks.
 - Insurance companies.
- ✓ Are important services available in the SEZ?
 - Search for business partners.
 - Search for personnel.
 - Legal assistance.
 - Accounting.
- ✓ Are useful services available in the SEZ?
 - Consulting services.
 - Marketing studies.
 - Residence and housing facilities for workers and executives.
 - Work and leisure facilities like conference and meeting rooms, cinemas and trade centres.

consultations is crucial for identifying the planning and zoning gaps in the early stage. While the industrial park is expected to serve the national development agenda, the interests of the current landowners cannot be overlooked. As with any infrastructure or urban development, the landowners should be adequately compensated and, as far as possible, assisted in re-establishing their livelihoods elsewhere. Bottom-up approaches for park planning can ensure acceptance of the park by a local landowners, and identify bottlenecks in land acquisition.

Planning and zoning solutions created in developed countries could inspire countries wishing to establish a stronger and deeper commitment of

municipal authorities, where the public is involved at all stages of development and can even monitor the appropriateness of the decision-making process after decisions are made (box 4.1).

Environmental, economic and social aspects

Many industrial parks are growing and operating unsustainably. They are often run down spaces, marked by social and environmental problems caused by poor planning and management. These issues have a negative effect on people in industrial parks and in the outside community and on the environment. Sustainable parks and zones address these challenges,

Checklist 4.8

Defining the number, types and location of zones, and potential markets

- ✓ Have the natural and human resources of the different country's key geographic areas been identified and localized?
- ✓ Have products markets for each tentative zone been carefully studied?
- ✓ Have the necessary infrastructures inside and outside the zone been duly identified?
- ✓ Have the necessary utilities inside the zone been duly identified to be made available to host firms in the needed quantity and ensuring the continuity of supply?
- ✓ Have the services needed by the tenant firms been duly focused for provision in the zone?
- ✓ Are the executives' selection criteria predefined, specific and transparent, and such to provide an effective guidance to the zone management bodies in the appointment procedure?
- ✓ Have the funding needs for zone establishment been duly analysed and methods carefully evaluated to find a viable solution?

Potential markets for zone products and services

- ✓ Is the planned multisectoral SEZ strategically located in respect to a large city or very populated areas?
- ✓ If an existing multisectoral SEZ is not strategically located in respect to a large city or very populated areas, are there measures to support tenant firms to enter new markets or increase existing ones?
- ✓ Is the planned specialized/sectoral SEZ strategically located in respect to the traditional or potential market for the targeted products?
- ✓ Could demand for a product or set of products from a given industry be considered as an opportunity to establish a thematic, specialized SEZ? Could it be interesting and feasible to re-orient the marketing of products of an existing SEZ to new potential markets?
- ✓ Has balancing the role of public authorities and private business been dealt with, and have solutions been agreed on?

Box 4.1

Land use planning and zoning in France

Strategic planning and zoning in France are governed by a combination of national and local regulations. The national regulations are contained in the French planning code, which guides regional and local planning and outlines procedures for obtaining building permits. Local regulations are prescribed mainly by municipalities and are contained in local development plans.

The state is responsible for decision-making and enforcing rules, and local authorities (communes) are responsible for implementation. In practice, planning control is either in the hands of the local town hall or dealt with by the Departmental Equipment Directorate under the control of the prefects, who are representatives of the French state at each administrative division.

Development and designated use of individual parcels of land are the responsibility of the local planning authorities, and therefore heads of municipalities are in charge of issuing planning permissions. Moreover, planning permission is required prior to constructing new buildings or refurbishing existing ones (including expanding space, changing use and other works in historical buildings). Other statutory permits are determined individually, including various environmental licences and permits.

The government strongly encourages PPPs through a new law introduced in 2008. There are some successful cases, like the development of activity zones or zone of economic activities.

Generally, zones are regulated by the specific legal regime of the development permit or joint development zone or mixed development zone, allowing authorities (whether state or, often, territorial public bodies) to plan and implement the development of an area, as well as to change and extend the category of land to facilitate and encourage growth of the zones.

However, the implementation of the zone, or the partial change of land category inside the zone or its future extension, must comply with the rules of the national planning code and the local development plans. This process, called concerted or coordinated development, also implies earlier public consultations and allows the public (inhabitants, associations) to react as early as during the preliminary studies, in a process of specific upstream consultation.

Zones are classified into a dozen categories, including artisanal zones, commercial areas and areas of commercial activity, industrial zones, also known as zones of industrial activity, logistics areas (storage and distribution

Box 4.1 (continued)

Land use planning and zoning in France

of products), areas of service activities, mixed zones (industrial activities, logistics companies, technological activities, trade and so on), port and airport areas, areas of technological activity, specialized areas and technopoles (science parks) where companies, research centres and universities are concentrated.

These areas are defined, planned and managed by the respective territorial authority and normally located close to major urban centres. Such zones in total cover around 500,000 hectares throughout France. The key factor in their success is increasing the attractiveness of their territory for external economic actors.

Source: DLA PIPER Real World n.d.

so public policy should aim to give such sites a sustainable future by providing planners with the tools to develop eco-friendly industrial parks.

Environmental and social impact assessments (ESIAs) and management plans should thus be part of the design phase. Most developing countries now have laws on ESIA. Multilateral and regional development banks also have appropriate safeguard systems that would apply in case they are involved and can strengthen compliance with required standards. To be effective, the ESIA process should lead to the development of an environmental and social management plan, and a third party should independently verify the assessments and plans.

Environmental aspects

Industrial activities in parks and zones could damage natural environments. During the planning phase of industrial parks and zones, the environmental impact assessment (EIA) could predict and assess environmental impact.⁵³ Environmental effects must also be measured against the economic and social benefits (checklist 4.9).

Environmental impact assessments are a legislative tool to reduce man-made impacts on the environment. They are a process and procedures of collecting information on the potential environmental impact of a park project conducted by the developer or other party, and including all concerned stakeholders, that should inform the decision-maker on whether the development of a park should go ahead.⁵⁴ Environmental impact procedures are comprehensive planning and inclusive decision-making tools.

Various methods and techniques to calculate, model and predict environmental impact are available. For example, geographical information systems (GISs) combined with matrix methods, are graphic mediators of spatial knowledge. Further, GISs allow for spatial and temporal analyses of an assumed environmental impact. The benefit expected from applying GISs in environmental impact assessment is objectively and accurately analysing a planned industrial park.

Based on data collected with a GIS, among others, the following steps can be considered for further planning parks.

- Identify factors in environmental degradation, including climate, geology, hydrology data and some degradation factors in the region such as its location, different types of pollutants, land use and ecological conditions.
- Collect and create baseline data sets. “Baseline” information is essential in any EIA, so collect as much data of the proposed development site as possible.
- Analyse data.
- Evaluate data with quantitative method by using the matrix.

As some parks expand over time, applying continuous environmental impact assessments can help the park sustain its environmental performance. Combining EIA and performance indicators will further the park’s environmental sustainability, even if the initial objective was not specifically set on environment.

Many companies approach ecological sustainability incrementally—for example, by first meeting

Checklist 4.9

Environmental aspects

- ✓ What is the proportion of tenant companies with more than 250 employees that have an environmental management system in place in line with internationally certified standards?
- ✓ What is the proportion of park- and company-level energy consumption for which metering and monitoring systems are in place?
- ✓ Is total renewable energy use in the zone equal to or greater than the annual national average energy mix?
- ✓ Does the zone management set and work towards ambitious (beyond industry norms) maximum carbon intensity targets (max. kgCO₂e/kWh). Have short-, medium- and long-term targets been set?
- ✓ Does the zone management set and work towards energy intensity targets per production unit (kWh/\$ turnover)? Have the short-, medium- and long-term targets been set?
- ✓ Does total water demand from companies in the zone have significant negative impact on local water sources or local communities?
- ✓ What proportion of industrial wastewater generated by the SEZ and tenant companies is treated to appropriate environmental standards?
- ✓ What proportion of total industrial wastewater from companies in the zone is reused responsibly within or outside the zone?
- ✓ What proportion of solid waste generated by companies do other companies, neighbouring communities or municipalities reuse?
- ✓ What proportion of companies in the zone appropriately handle, store, transport and dispose of toxic and hazardous materials?
- ✓ What proportion of wastes generated by companies in the zone goes to landfill?
- ✓ What is the minimum proportion of open space in the park used for native flora and fauna?
- ✓ What proportion of companies in the zone has pollution prevention and reduction strategies to reduce the intensity and mass flow of their release beyond national regulation?
- ✓ What proportion of the largest polluters in industrial park has a risk management framework in place that:
 - a. Identifies the aspects that have an impact on the environment, and
 - b. Assigns a level of significance to each environmental aspect?

government regulations and then looking for efficiency gains and ultimately addressing consumer concerns. Such incremental approach allows for organizational learning, yet it is not in line with sustainability objectives.

To preserve natural resources and reduce the environmental impact, management should adopt a sustainable environmental approach by following environmental management and performance standards.⁵⁵ Two important standards are the ISO 14001 certification, the international standard on environmental management, and the Eco-Management and Audit Scheme registration on the environmental performance of enterprises. Parks and zones should control and optimize energy consumption and use renewable energy. They should encourage the construction of eco-designed buildings and prepare and implement a waste management plan, reducing the quantity at source, optimizing waste collection and sorting, and recovering and recycling of

materials. Sustainable management of water and biodiversity and other risks and pollution are also important.

For some parks and zones, environmental sustainability and eco-innovations are part of the innovation process from day one, not subsequent add-ons. Eco-innovation is any form of innovation aiming at significant and demonstrable progress towards sustainable development, by reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy.

A common approach to eco-efficiency in traditional parks with traditional manufacturing areas is using resource-efficient and cleaner production (RECP), a process of continuously improving the efficient use of natural resources and the application of preventive environmental strategies to processes, products and services to increase their efficiency and reduce their risks to humans and the environment.

Economic aspects

From a business perspective, the concept of sustainability has two meanings. First, a sustainable firm employs business strategies to sustain its long-term existence, for instance, by generating acceptable returns on investment. Second, the sustaining company contributes to the community and wider society by reinvesting in the community's natural, human and institutional capital, and responding to the global challenges of resource efficiency and climate change.⁵⁶

The functioning of a park or zone can have both positive and negative economic spillovers on neighbouring areas and communities. Firms can recruit from the workforce close to the zone, and buy and sell goods and services from and to enterprises or individuals in neighbouring areas or regions, thus creating positive effects on local economic development.

An advantage for zone tenants is the zone's favourable business environment and availability of services to help companies and researchers develop together and compete (checklist 4.10). In an innovation ecosystem, parks, zones and clusters help innovation and technological development. They facilitate scientific and international collaboration in global value chains and production networks and allow firms and regions to compete on a global scale, thus creating forward linkages with the global economy.

Potential risks are a concentration of economic support and isolation of parks from the wider economic and social environment. Planners should seek to prevent parks and zones from crowding out other recipients of economic aid and preserve economic diversity by avoiding sectoral or technological elitism. Harmonizing tax incentives inside the park or zone with the national tax system will help prevent socio-economic imbalances by integrating the park within the economy and society.

Social aspects

Corporate social responsibility refers to the broader responsibility of every organization, not just private enterprises, to consider the impact on society and the environment of its decisions and activities, particularly

in the following areas: organizational governance, human rights, labour practices, the environment, fair operating practices, consumer issues and community involvement and development (checklist 4.11).

Parks and zones have great potential to create economic and social linkages that benefit the surrounding community, such as through local employment and skill development, and by linking local businesses (as suppliers) with park residents. Social considerations should ensure that zones avoid turning into sweatshops that bypass international labour standards and even national regulations for workers' well-being. Effective monitoring on a park and company level must always keep minimum social requirements in mind. Going beyond minimum social requirements could help market the park or zone to attract high-skilled workers and gain a competitive advantage.

Social requirements can be met through various means:

- Set up and regularly update management and monitoring systems at the park and company level to address relevant social aspects.
- Use industrial safety systems to protect workers, assets and the environment, particularly in hazardous process industries, like oil and gas and nuclear plants, and chemical industry—using available international industry safety conventions, standards, norms and best practices for management systems and benchmarking tools.
- Set up a security control mechanism, since natural hazards, political instability (sabotage), cybercrime and other developments can cause massive damage to industry, society and the environment.
- Set up an occupational and health and safety management system.
- Establish grievance management systems, which encompass monitoring and reporting of any internal grievances (over workplace issues) or community grievances (stemming from the ongoing operations of the park (pollution, leaked chemicals). The mechanisms should be designed with the community and should be understandable, accessible, transparent and culturally appropriate. The park

Checklist 4.10

Business environment conditions and incentives

Services provided

- ✓ What are the incentives perceived by the firms as the most effective to support business?
- ✓ What is the firm's opinion on the infrastructure and utilities provided in the SEZ?
- ✓ What is the firm's opinion on zone management and maintenance?
- ✓ What services provided by the zone are mostly appreciated by the firms?
- ✓ What are the improvements to the zone's structure and functioning sought by the firms?

Property

- ✓ If local regulations allow both buying and leasing land, what would the firms be inclined to do—regarding planned SEZs—or what did they choose to do—regarding existing SEZs?
- ✓ Do firms intend to build and own—or they built and own—their buildings and premises in the SEZ, or they prefer—to lease or rent them?
- ✓ Is the level of import duties and procedures for importing machinery and equipment considered as an impediment or a very relevant burden by the firms? Is the country's government adopting measures to face the problem?
- ✓ Can firms easily find assistance and financial support by country's banks for buying machinery and equipment? And, if not, is the government adopting measures to face the problem, eventually with the support of International Financial Institutions?

Import-export regime of raw materials, components and semi-finished products

- ✓ Are import/export duties eventually levied on raw materials, component and semi-finished products hampering or affecting the housed firms product competitiveness?
- ✓ Will the planned SEZ host—or is the existing SEZ hosting—a customs office, assisting the housed firms in import/export procedures, working eventually within the SEZ's one-stop-shop?
- ✓ Can firms easily find assistance and funding by country's banks for import/export of raw materials, components and semi-finished products? And, if not, is the government adopting measures to face the problem, eventually with the support of International Financial Institutions?
- ✓ Is a marketing support service foreseen within the planned SEZ—or is it active in an existing zone—able to orient and assist housed firms, and particularly SMEs, for the identification of the most suitable raw materials, components or semi-finished products to be purchased?

Checklist 4.11

Social aspects

- ✓ Have communities living in the surroundings of the SEZ been affected by the establishment of the SEZ and/or by the operations of the tenant firms.
- ✓ What is the proportion of total workers employed in the park who live within daily commuting distance?
- ✓ What is the proportion of tenant companies that have documented programmes and supporting facilities in place for training and human resource development of their workforce?
- ✓ What proportion of total company workers in a zone are employed through direct employment (not employed on fee for output basis or not supplied through labour supply company) and permanent contracts?
- ✓ What is the proportion of tenant companies that use local suppliers or service providers for at least 80 percent of their total procurement value?
- ✓ What is the proportion of total procurement value of park management supplied by local companies or service providers?

authorities can be responsible for setting up and managing the grievance mechanism, and charge a fee to tenants for operating and maintaining it.

- Set up an independent ombudsperson to deal with disputes arising between the investor, the state or responsible agency, and other stakeholders. This

can help avoid more formal dispute settlement processes. If formal disputes arise, they would best be settled in domestic courts, rather than through international arbitration. Domestic processes can ensure a deeper understanding of national law and cultural contexts.⁵⁷

- Maximize employee growth potential and community satisfaction through local employment targets, providing employee skill development opportunities, and longer-term employment security through providing long-term or permanent contracts where appropriate; creating good working and labour conditions; and offering equal employment and capacity building opportunities for disadvantage groups (such as women and youth).
- Provide social infrastructure for workers and local community, such as local shops, restaurants, canteens, recreation areas, medical facilities and banking facilities, in parks or nearby.
- Facilitate dialogue with stakeholders and the local community to strengthen trust and relations between industries and local communities.

Labour rights

Many SEZs aim to attract foreign investment and adopt liberal and concessional treatment for admitting, recruiting and treating foreign personnel—facilitating the working visas, including the possibility of being paid in hard currency and to hold hard currency accounts in local banks, as well as transferring salaries abroad

without restriction. In practice, however, permits and authorizations can often be delayed (checklist 4.12).

Labour inside zones is usually subject to the same treatment as in the rest of the country. Only the hiring of expatriates is facilitated for recruitment and provision of work visas. But the treatment of workers varies from country to country, and many developing and transition countries tend to apply very low standards. Indeed, working conditions in many countries are strongly affected by the races to the bottom to attract foreign investment.

Even so, all zones, regardless of their type or nature, end up generating “islands” or “microcosms” that could drive positive change. Working conditions are more visible, since industrial activities are concentrated and more easily subject to scrutiny by authorities, if they are able and willing to protect worker rights. Sound working standards inside the zones could be more easily enforced through different types of measures, like information dissemination, proactive management and the competition and mutual control among tenant firms. This means that many zones in many countries could be progressively driven to apply higher standards of working conditions.

Checklist 4.12

Labour rights

Labour treatment and human rights compliance

- ✓ Are worker salaries and working conditions applied in the SEZ in line with country's labour law?
- ✓ Is country labour law ensuring to worker a just and favourable remuneration ensuring for himself and his family an existence worthy of human dignity (Art 23, (3) Universal Declaration of Human Rights)?
- ✓ If country's labour law guarantees a HR compatible treatment, is it fairly and effectively enforced by countries competent authorities?

Expatriate labour regime

- ✓ Is it easy for foreigners to obtain visas and working permits in the SEZ's country? How long does it take?
- ✓ Can foreigners be paid in hard currency and can they hold hard currency accounts in local banks?
- ✓ Are foreigners free to negotiate all their working conditions? And if the above operations need authorizations, are they promptly issued?
- ✓ Are foreigners entitled to transfer their salaries abroad without restrictions?
- ✓ Is it easy for foreigners to obtain visas and working permits in the SEZ's country? How long does it take?
- ✓ Can foreigners be paid in hard currency and can they hold hard currency accounts in local banks?
- ✓ And if the above operations need authorizations, are they promptly issued?

Chapter 5

Formulating and implementing a master plan

A master plan is typically geared to a large, multiyear, bigger budget project with two or more potential construction phases. Many comprehensive master plans start with a feasibility study to understand the site's geographic, environmental and historic context. Most parks have a master plan that is continually updated.

Assessing feasibility

The preparation of business feasibility studies includes commercial (including demand analysis), financial and environmental feasibility, and the development of a business plan based on the outcome of those studies. A feasibility study assumes the collection of current and historical data about the property and its surroundings, followed by analysis of the data to determine what types of developments are feasible and what the future requirements will be for the entire approval process. It includes findings, analysis and conclusions from visioning and scoping exercises for a given industrial site area. It indicates whether the chosen site is suitable for the intended function, considering the financial, social and environmental aspects of each proposal. Any background reports deemed necessary (hydrology, environment, cultural heritage, transport, land zoning and so on) should also be commissioned at this stage to inform the master planning process.⁵⁸

The business feasibility study supports the decision-making process based on a cost-benefit analysis of the actual business or project viability. It is an analytical tool that includes recommendations and limitations, which assist the decision-makers when determining whether the business concept is viable.⁵⁹

A feasibility study should provide all data necessary for an investment decision (figure 5.1). The commercial, technical, financial, economic and environmental prerequisites for an investment project should thus be defined and critically examined based on alternative solutions already reviewed in a prefeasibility study. The result of these efforts is then a project

whose background conditions and aims have been clearly defined for its central objective, marketing strategy, the desired market shares, the corresponding production capacities, the location, existing raw material resource and technology needs, appropriate technology and mechanical equipment and, if required, an environmental impact assessment. The financial part of the study should cover the scope of the investment, including the net working capital, the production and marketing costs, the sales revenues and the return on capital invested.

Developing a master plan

As a dynamic long-term planning document, providing a conceptual layout to guide future growth and development, the master plan makes the connection between buildings, social settings and surrounding environment. It includes analysis, recommendations and proposals for a site's population, economy, housing, transportation, community facilities and land use. It is based on public inputs, surveys, planning initiatives, existing development, physical characteristics and social and economic conditions.

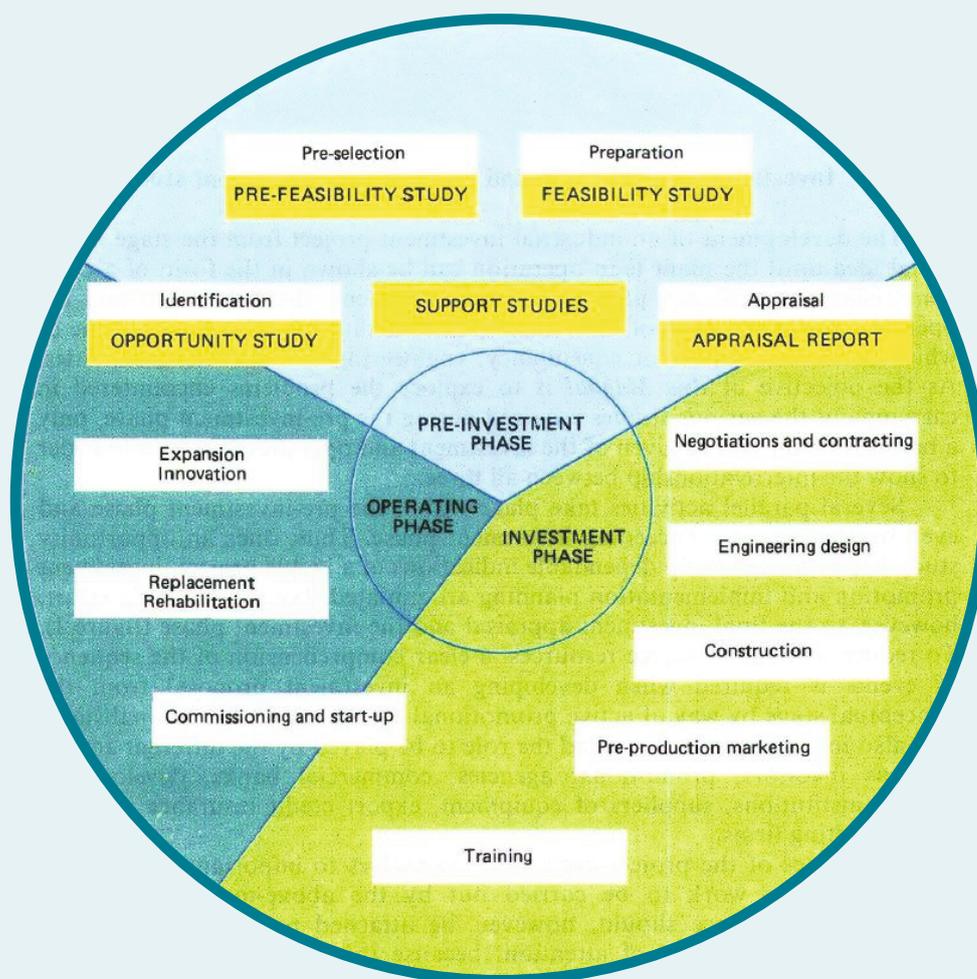
Detailed master plans guide infrastructure and its management over time. The creation of buffer zones around the industrial park is also necessary. Their size should be commensurate with the type and risk profile of the industrial park, and once confirmed an ongoing and concerted effort is required to maintain the buffer zones. Industrial zones have sometimes attracted illegal settlers near parks and zones, which may in turn cause logistical problems in accessing the industrial zone, and adversely affect emergency preparedness and response measures.

Master plans should be promoted using modern advocacy material and tools to let potential investors know what the future might look like for the particular site.

The feasibility study outline for the park establishment can be outlined as follows:

Figure 5.1

Pre-investment, investment and operating phases of the project cycle



Source: UNIDO.

Feasibility study elements

General background information on the project:

- Global, regional and national, supranational context.
- Project history.
- Objectives of the project.
- Methodology for implementation.
- Preparatory studies and related research.
- Stakeholder analysis.

Local economy assessment:

- Regional context.
- Brief history, demographics, geography and climate.

- Overall macroeconomic overview.
- Nature magnitude.
- Infrastructure.
- Local skills and availability of the workforce.

Demand analysis and development strategy:

- Market orientation at local, national and regional level.
- Projection of production volumes by product and by site, unit prices, sales, objectives and so on.
- Consumer analysis and distribution channels.
- Competition analysis.
- Development of the park strategy.

- Development of the marketing policy.
- Marketing costs and revenues.
- All other critical factors that can affect market potential.

Location analysis and selection:

- Existing land uses.
- Existing zoning and related subdivision requirements.
- Existing industrial activity.
- Assessment of the environmental and social impact.
- Socioeconomic policies.
- Access to transportation and utilities.
- Final choice of location.

Site selection and its features:

- Size of site required.
- Required transportation (air, rail and ground) and relative network for each.
- Access to potable water and domestic sewer.
- Access to utilities such as electric and gas.
- Soil types and topography/drainage.
- Cost estimates.
- Site selection.

Raw materials and supplies:

- Classification of raw materials and supplies.
- Requirement specification and certification of materials.
- Availability of supply.
- Procurement policy and programme.
- Costs of raw materials and supplies.

Engineering and technology:

- Programme and production capacity.
- Choice of technology.
- Acquisition and transfer of technology.
- Detailed plan of installations and basic engineering.
- Choice of machinery and equipment.
- Civil engineering works.
- Maintenance and replacement.
- Estimates of general investment costs.

Economic and financial analysis:

- Site development costs.
- Construction costs.
- Amortized/annual costs.
- Project management and maintenance costs.

- Payback scenarios—long-term lease, purchase, rent or lease.
- Detailed site-specific construction costs (difficult terrain or soil).

Organization and overhead:

- Organization and management of facilities.
- Organization's conception.
- Overhead.

Visuals and initial design for Master Plan (optional):

- Developing a general layout with consideration to adjacent property, zoning and terrain.
- Developing road layouts for access and future flexibility during actual development.
- Laying out lots with appropriate access and future flexibility.

Implementing and financing

Actual construction of the park is usually responsibility of the industrial park developer, which may contract civil engineering and construction company for the construction of an industrial park. The public sector is generally the main source of financing during the early zone or park development stage. Initial strategic public investment and support can serve as a catalyst to future self-sustaining private sector development. If the public authorities do not fund the park directly, they can provide other incentives, such as cheap land. Other sources of finance can be private developers who have experience managing real estate or properties, as well as large companies with a network of subcontractors. Banks can also invest in parks based on anticipated added value on the price of the land and real estate, and profitability from rentals. Several international institutions are also giving subsidies or loans to develop parks, such as the World Bank and the Asian Development Bank. Establishing or strengthening contacts between the zone management body and the financial structures is thus of utmost importance for supporting the establishment of national and foreign investors in the zone.

Operating and adapting

Identifying management responsibilities

The success of a park or zone depends on efficient and responsive management, charged with the following responsibilities:

- Establish and maintain zone infrastructure (buildings, facilities and utilities).
- Choose services to be provided to firms. The range of services may vary depending on the type of industries the park is hosting. Ensuring access to vital services that support innovation and learning of firms is a critical part of establishing a nurturing environment to foster vibrant industrial development in the park and zone.
- Admit firms to the zone. According to the zone laws, a clear procedure must be adopted for admitting firms to the SEZ, when such power is not attributed to or shared with the national authority.
- Select, appoint and supervise zone executives, to whom the management body shall also delegate some functions. A clear and transparent allocation of powers and competencies from the management body to zone executives is essential to guarantee the functioning of the zone. This is connected to the composition of the management body, and to the executives' recruitment procedure, prescribed by laws and regulations, or directly decided by the management body.
- Monitor and enforce obligations to secure compliance with the augmented environmental and social requirements.
- Play a key role in investment promotion and investor aftercare.

Setting up the management body

In many countries, the management bodies are *de jure* or *de facto* performing a dual and conflicting function of management and supervision. This creates a conflict of interests, seriously jeopardizing executive independence and often the capacity to perform the functions in a sound business-minded manner.

The composition of the management body is important to guarantee its capacity to ensure a smooth, business-minded and flexible zone governance and an effective and fair supervision of executives (checklists 5.1 and 5.2). In most countries, representatives of ministries and/or other national and local public authorities are members of the management body by law. This ensures that the public interest is duly represented, as zones are important tools for the implementation of national economic and industrial development strategies. The challenge is to ensure a balanced membership between public authorities and representatives from the private sector. There is no standard formula for ensuring an effective balance of the different components. However, in countries where the state still has a major role in managing and controlling the economy, as in many former socialist countries, zone management bodies are composed predominantly of public authority officials, who mostly lack the approach and the culture of private business managers. This can make the zone management cumbersome and bureaucratic.

Best practices suggest that a sound management body should include all relevant national and local stakeholders such as:

- Public authorities, both national and local.
- Representatives of civil society.
- Private business representatives, such as business associations and chambers of commerce, especially at the local level.
- Tenant firm representatives.
- Banks and financial institutions (in large and important zones).
- Universities and research institutions (especially for technology parks).

An effective zone management body should also provide networking and interaction platforms for all stakeholders.

Setting up a one-stop-shop system

The wide range of public interests involved in the creation and functioning of zones requires the involvement of several ministries and public agencies, including

Checklist 5.1

Management body structure

- ✓ Is the number and the skill of staff sufficient and adequate for meeting the needs of zone management and operation?
- ✓ Are staff functions and competencies attributed through comprehensive and transparent job descriptions?

Checklist 5.2

Vision, mission and organization of the governing/management body

- ✓ What is the composition of SEZ management body? Are the following subject represented: national public authorities, local public authorities, Chambers of Commerce, business associations, housed firms, banks, universities and research centres?
- ✓ Are the mission and competencies of SEZs governing/management bodies clearly defined? Do they include at least: ensuring maintenance repair of zone's infrastructure and utilities, deciding about the services to be activated and how, the appointing and supervising the zone's executives?
- ✓ Is there a supervisory body, distinct and independent from the managing body, in the sense that its members have no relation whatsoever with the institutions and subjects represented in the managing body, or the latter is presently performing a dual function of SEZs management and supervision?

Executive recruitment procedure

- ✓ Has a specific and structured procedure been adopted for selecting and appointing SEZ executives?
- ✓ Are the executives' selection criteria predefined, specific and transparent and such to provide an effective guidance to the SEZ's management body in the appointment procedure?

labour, tax and customs authorities, and environmental protection, roads, ports and airport agencies. The critical issue is: are there meetings and contact opportunities, structured or informal, between the zone's executives and the public authorities involved—de jure or de facto?

Although such bodies could be represented in the zone management body, the daily relations and working with such different public authorities often prove to be arduous for zones executives and for the investors. A one-stop shop (OSS) inside the zone could be important for sound development. It not only saves time and money, but provides more transparent access to procedural requirements. Following the initial phase of zone operation, OSS performance should be monitored.

The appropriateness of the OSS system should be based on an assessment of the needs of the companies and the regulations in the country. If regulations are complex, the OSS should offer specific services that meet these needs to fit the country context and offer country-relevant services. A note of warning: avoid the "one-more-stop-shop" syndrome, whereby the OSS creates an additional layer of bureaucracy. Whenever

possible, the OSS services should be electronic, not paper-based.

In many countries, OSS services reduce the number of administrative procedures and speed them up. An OSS is in practice a single office hosting the representatives of a local administration involved in business operations. The firms can turn to such an office to request and obtain all the certificates, authorizations and permits necessary for the different business operations, like incorporating a company, paying taxes and custom duties, issuing building licenses and certificates for importing and exporting. But it should be ascertained that the OSS is fully operational and is in a position to facilitate administrative procedures. It is often necessary to drive the different public administrations to cooperate and progressively concentrate their functions to OSS, making it the only counterpart for firms.

Identifying the supervisory body

Most legal entities, both public and private, are governed by two bodies, the board of directors, as the management body, and the board of auditors, as the supervisory body (checklist 5.3). The allocation of

Checklist 5.3

Supervisory body

- ✓ Does the SEZ have a supervisory body?
- ✓ Is the supervisory body distinct and independent in respect to the management body?
- ✓ Is the supervisory body appointed by subjects and entities different and independent from the ones responsible for appointing the management body?
- ✓ Is the supervisory body entrusted with the surveillance of the overall zone management?
- ✓ Has a specific and structured procedure been adopted for selecting and appointing SEZs executives?
- ✓ Are the executives' selection criteria predefined, specific and transparent and such to provide an effective guidance to the SEZs management bodies in the appointment procedure?
- ✓ Are there meeting and contact opportunities, structured or informal, between SEZs executives and the public authorities involved—de jure or de facto—in zones activities?
- ✓ Are there enough SEZ staff and are their skills sufficient to manage and operate the zone?
- ✓ Are individual staff functions and competencies attributed through comprehensive and transparent job descriptions?

powers between the two is clearly defined and consolidated in the international practice of company and collective bodies' law. The supervisory body is responsible for verifying the accounting documents, the respect of the laws in force and consequently the behaviour of managers and executives.

The two bodies thus have clearly distinct functions, though this might not be the case in many countries, especially when zones are public entities. In such countries, zones often have only a management body, performing, de jure or de facto, the dual function of management and supervision.

It is important that the supervisory body is clearly distinct and independent from management. It is entrusted with the surveillance of the overall zone management, and it is appointed by subjects and entities different and independent from the ones responsible for appointing the management body.

Defining the types of services and facilities to be provided

As addressed in previous chapters, zones and parks are more than simple physical infrastructure. They are policy tools to foster regional development, investment, competitiveness and partnerships. Sector-specific zones are more common since they can create critical mass of extension services and realize economies of scale.

While the relative importance of services depends on type of industry, an industrial park must offer all of them of consistent quality and at a reasonable price (see box 5.1 on best practices in zone services). Firms require electricity, telephone, internet, water, sewage treatment, transportation and residence. They also require extension services such as technology centres, training centres, testing laboratories and so on. A service-driven approach means that industrial parks will provide a variety of building accommodations to host SMEs and start-up companies. Joint industrial testing or development platforms might also be created to facilitate collaboration between research organizations and SMEs.

The types of facilities, services and amenities that a zone provides depend on the industries and sectors it is targeting and the obstacles the zone intends to overcome. Science and technology parks aim at technologically advanced industries and emphasize high-level support services, such as marketing, technical consultancy through networking with local R&D institutions, advisory services on finance and venture capital and joint venture partners as well as incubation services for start-up companies.⁶⁰ Along similar lines, zones are a useful tool for countries working to establish export-oriented manufacturing sectors, while lacking the technical or administrative capacity to develop a countrywide system to allow exporters duty-free access to imported equipment and materials

Box 5.1

Best practices in zone services

The following recommendations reflect best practices in zone services:

- Provide long-term leases of land for zone to attract investors.
- Conduct feasibility studies to identify the services and facilities that the zone would need to offer as incentives to attract tenants.
- Charge a reasonable price for utilities to keep investors jointly responsible for zone functioning. If utilities are provided free of charge—or at very low cost—firms have a tendency not to complain about poor maintenance or slow repairs, which could affect the zone's quality, effectiveness and appeal.
- Undertake promotion and outreach activities for the zone.
- Require that firms applying to be in a zone to submit a business plan explaining their motivation.
- Tailor incentives offered to companies to locate in a zone according to the desired industrial sectors in cooperation with government authorities. Certain types of incentives appeal to different companies. Exemptions from customs are attractive for manufacturers but not so relevant for firms in research and development.
- Encourage active members of the zones to mentor entrepreneurs, start-ups and graduates.
- Instil a culture of high regulatory performance and promote strong compliance across tenants. This should include compliance with regulations on intellectual property, trade and fiscal measures, health and safety, and corruption, among others. From an environment sustainability perspective, zone tenants should comply with national regulations on air emission limits, regulations on energy and resource efficiency, protection of natural environments and biodiversity, and water extraction and watershed management.
- Engage with all relevant stakeholders, including periodic stakeholder consultations (with local citizens, government officials, workers and company representatives).
- Promote, support and facilitate collaboration and knowledge sharing between tenants, as well as opportunities for company level resource efficiency and sharing of wider benefits.
- Attract new companies to the zone and provide fit-for-purpose training services to companies where appropriate.
- Regularly monitor the tenants using well communicated and clear enforcement with proper conditions and reasonable penalties. The requirements should be manageable and not impose a heavy burden to residents.
- Ensure appropriate spatial planning and zoning in the park to maximize synergies across sectors, and raise awareness of firms on how to create synergies across their operations.
- Demand a thorough, independent risk analysis for the industries in the park and identify options to deal with them—especially working with new substances, adopting new technology or innovative methods, or having a complicated organizational set-up.
- Comply with international standards and certification. Park authorities should consider the following non-exhaustive list of standards:
 - Quality Management System Standard.
 - ISO 14001 Certification: International Standard on Environmental Management.
 - ISO 18001 Occupational Health & Safety Management System Standard.
 - ISO 50001 Energy Management System Standard.
 - EMAS registration (Eco-Management and Audit Scheme): environmental performance of enterprises.
 - ISO 26000 Social Responsibility.

as well as to address the issue of formulating quality policy and establishing a quality infrastructure system to ensure the quality, safety and environmental performances of goods, services and industrial processes.

Having service providers inside the SEZ has two advantages. First is proximity: firms do not need to travel far to obtain them. Second is quality and—potentially—cost effectiveness. Service providers are, or can be, admitted in the SEZ upon selection by the

management body (or by the national SEZ authority), which would also be responsible for supervising them. This is relevant for SMEs that are often unable to identify the service providers most fit their needs.

Promotion and marketing

To attract foreign investors requires promoting and marketing zones at national and international events. Zone management is typically responsible for

marketing a zone in coordination with other relevant stakeholders, such as the regulatory body and investment promotion agencies. A zone's advisory board can regularly assess the positioning of the zone and adapt accordingly to the changing economic conditions.

Also important is to share experiences and best practices and to explore opportunities through facilitating cross-border networks, especially those that promote exchange among industrial park managers, organise common events or develop a common service for tenants.

Faced with competition, industrial parks must differentiate themselves, by promoting specific assets of their location, an image and a brand that can be quickly and easily recognized, to generate pride in being a tenant of the park and a feeling of being part of a community. They must highlight innovation, and technological learning and development, and respect for environmental and social standards. The promotion of infrastructure and services provided must anticipate company expectations. The master plan and business plan should be promoted in the markets the park wishes to serve, using a brochure or a website to let people know what the future might look like for the location. The park must assess the needs of tenants and benchmark these against other regions and countries.

The functions of investment promotion agencies include:

- Image building:
 - Advertise in general financial media.
 - Participate in investment exhibitions.
 - Advertise in industry- or sector-specific media.
 - Conduct general investment missions from source country to host country or from host country to source country.
 - Conduct general information seminars on investment opportunities.
- Investment generation:
 - Engage in direct mail or telemarketing campaigns.
 - Conduct industry- or sector-specific investment missions from source country to host country or vice versa.

- Conduct industry- or sector-specific information seminars.
- Engage in firm-specific research followed by sales presentations.
- Investor services:
 - Provide investment counselling services.
 - Expedite the processing of applications and permits.
 - Provide post investment services.
- Policy advocacy:
 - Participate in policy task forces.
 - Develop lobbying activities.
 - Draft laws or policy recommendations.
 - Report investors' perceptions.⁶¹

Monitoring and evaluation

Monitoring and evaluation can be the most challenging phase for parks authorities. It is important to allocate sufficient financial and human resources for this phase, and one possibility is charging investors for these services. Zone authorities should also have the capacity to monitor and evaluate the project effectively. Setting out clear reporting requirements and performance indicators can ensure that zone authorities can regularly track whether the investor is fulfilling its social, economic and environmental objectives.

Zones should demonstrate compliance with local and national regulations and targets for waste transport, discharge and disposal; air, water and noise emission limits; handling and disposal of hazardous wastes; and employment, investment and other social and economic objectives (checklist 5.4).

A sound monitoring and evaluation system can keep tabs on the performance of tenants, and the zone management authority should go beyond national standards and regulations where they fall short of international expectations.

Monitoring tools and approaches to be used are:

- Ecological footprint analysis.
- Risk assessments, including climate risk assessments and industrial safety.
- Water footprint analysis.
- Strategic environmental assessment.

Checklist 5.4

Evaluating spillovers**Spillover**

- ✓ Has employment among the population living in the areas neighbouring the SEZ increased as a result of business activities conducted by the firms in the SEZ?
- ✓ Have goods or service providers and the other firms established in the area neighbouring the SEZ registered an increase in business, due to transactions with firms in the SEZ?
- ✓ Can a specialization in manufacturing products belonging to the same value chain (clustering effect) be observed, referring to the firms established in the areas neighbouring the SEZ?

Environmental and human rights compliance

- ✓ Can labour standards applied by tenant firms in the SEZ be transferred and enforced in the communities neighbouring the SEZ or even at the country level?
- ✓ Can environmental standards applied by tenant firms in the SEZ be transferred to firms established in the areas neighbouring the SEZ?
- ✓ Do the firms housed in the SEZ promote and fund projects to the benefit of the communities leaving the areas neighbouring the SEZ?

- Social impact assessment.
- Life cycle assessment.
- Material flow accounting.
- Market segmentation analysis.

International certification and rating systems

International certification, which helps to assess the environmental impact of buildings and construction projects, may be another factor to attract FDI. The following non-exclusive list of schemes and systems could be used to establish those schemes at the park level:

- Indian Green Building Council—Green Rating, Green Townships and Green landscape.
- CK Rating (China Knowledge).
- Eco-industrial toolbox (GIZ).
- Chinese EIP standard.
- Devens EcoStar criteria.
- Infrastructure DGNB rating system for industrial districts.
- CII-Sohraji Godrej Green Business Centre.
- Koenig's criteria for Thai eco-industrial parks (proposed).

At the industry and project level, companies may choose to apply for international certificates that help in designing more sustainable projects and buildings by providing frameworks with specific criteria for assessing a building's environmental impact, such as:⁶²

- German Sustainable Building Council.

- Leadership in Energy and Environmental Design Rating System, USA.

Key performance indicators

Key performance indicators (KPIs) are important for industrial parks to monitor their progress towards realizing economic, social and environmental sustainability. A comprehensive list of indicators must be developed during the planning stages, including outlining key aspects and how they can be measured.

While some aspects can be easily measured in numbers, environmental and social elements may be harder to assess numerically. Even so, some targets and monitoring how to achieve them might well be developed by park authorities, governments and businesses. Most important, KPIs should always be used in combination with the vision for the park, as well as the roadmap on how to achieve it. Eventually, they serve as an objective source of information and can outline areas where the park needs improvement.

For environmental aspects, industrial parks need to focus on the following issues to become sustainable:⁶³

- Resource use and consumption—energy, water and material efficiency, water collection and treatment, green architecture; and life cycle assessments.
- Waste management and exchange—recycling, industrial clustering, establishment of Industrial

- symbiosis networks between companies and within the complex, hazardous waste handling.
- Land use—land use efficiency and earthworks management.
 - Environmental risks assessment of the location—geographical and topographical features, natural event to minimize the costs from a stress scenario (meteorological, geological or hydrological disasters).
 - Control of emissions to air, water, land and the surrounding environment:
 - Air emissions include greenhouse gases, acid rain, eutrophication and smog precursors, dust and particles, ozone-depleting substances, volatile organic compounds, metal emissions.
 - Emissions to water include nutrients and organic pollutants and metals.
 - Emissions to land include pesticides and fertilizers, metals, acids and organic pollutants, waste (landfill, incinerated and recycled) and radioactive waste.
 - Noise emissions include outdoor equipment, tracks and compressors that might distract local inhabitants and animals.
 - Environmental management systems (ISO 140001 or EMAS certification systems) at the park and company level; monitoring of park performance, analysis and prevention of environmental expenses.
 - Integration into natural ecosystems—ensuring biological diversity, designing energy-efficient sites and buildings, preserving natural drainage systems and natural areas and choosing the right location and mix of companies and services.
 - Climate change mitigation and adaptation—promoting low-carbon production and climate-resilient planning.
- Share of firms with pollution prevention and greenhouse gas emission reduction strategies that are beyond national regulations [50 percent].
 - Share of renewable energy use in industrial park relative to national average.
 - Energy efficiency targets set for parks by park management.
 - Carbon dioxide emissions targets (short, medium, long term) established in-line with sectorial benchmarks and national norms.
 - Annual solid waste generated by the park [annual 5 percent decrease].
 - Share of solid waste that is treated and reused in the park/zone or by local community [20 percent].
 - Maximum share of waste generated by enterprises that goes to landfills [less than 30 percent]
 - Share of waste water treatment in the park [100 percent] and share of industrial waste water reused inside and outside the park [50 percent].
 - Share of firms in park that appropriately handle, store, transport and dispose of toxic and hazardous materials [100 percent].
 - Share of green space such as native flora and fauna in the park and recreational spaces [at least 5 percent].
 - Environmental risk and prevention management system in place [at least in 50 percent of tenants].

Key performance indicators—social:

- Share of individuals satisfied with the quality of health services (including work safety) offered in the park [80 percent of surveyed].
 - Share of individuals satisfied with the availability of good, affordable housing.
 - Share of local population in the park/zone workforce [60 percent of employees].
 - Share of individuals who earn above national minimum wage [100 percent].
 - Share of youth in the park workforce [20 percent].
 - Share of women in the workforce (in combination with park and national average) [no less than 20 percent].
 - Share of firms with more than 250 employees with operational industrial safety and security systems,
- Examples of key performance indicators for the new generation of parks and zones⁶⁴**
- Key performance indicators—environment:
- Share of firms with more than 250 employees with environmental and management system in place and in-line with international standards [45 percent].

including occupational health and safety management systems [75 percent].

- Share of firms with well-functioning grievance systems [75 percent].
- Share of firms with well-functioning harassment prevention and response systems [75 percent].
- Share of firms with more than 250 employees with skill-upgrading programmes, including tailor-made programmes for female workers [75 percent].
- Satisfaction with community dialogue and outreach activities [80 percent of surveyed].
- Average response time to different emergencies [not more than 15 minutes—fires, ambulance, crime].⁶⁵

Key performance indicators—economic:

- Share of workers in the park employed through direct employment (not employed on a fee-for-

output basis or provided through a labour supply firm) and permanent contracts [25 percent].

- Share of resident firms using local suppliers or service providers for at least 80 percent of their total procurement value [25 percent].
- Share of total procurement value of park management entity supplied by local firms or service providers [90 percent].
- Ratio of space rented or used by resident firms to the total amount of available space earmarked for resident firms within park/zone [50 percent] and average occupancy rate over 5 years [50 percent].

General recommendations

A list of issues to be addressed alongside some suggested measures is given in table 5.1.

Table 5.1

General recommendations

Issue	Suggested measures
Decentralization of political and administrative decision-making	<ul style="list-style-type: none"> • Investigate whether and to what extent a decentralization process has begun. • Raise national authorities' awareness about the need of local authorities' involvement in zone creation and operation. • Understand real interest and political willingness of local authorities to be involved in the process.
Strategy and planning	<ul style="list-style-type: none"> • Conduct a careful analysis of the economic and social environment, to identify the best models and localizations to anchor each zone to local community traditional activities, capabilities and potential. • Orient or re-orient each objective, infrastructure and service to meet the needs of targeted sectors and activities. • Explore the opportunity to create or re-orient SEZs to house firms in neglected but promising sectors such as agriculture and tourism. • Identify the stakeholders to be involved, including local authorities. • Support national and local authorities in the drafting of new SEZ planning strategies consistent with the principles and guidelines provided in the present report.
Coordination among governmental bodies at the central and local levels	<ul style="list-style-type: none"> • Organize study tours and technical seminars to expose decision-makers at the national and regional levels to different models of zone planning, financing, management and promotion. • Organize workshops to share best practice and lessons learned from foreign zone models.
Consultation mechanisms with the private sector	<ul style="list-style-type: none"> • Identify relevant national and local stakeholders. • Identify existing organizations representing private sector constituencies within the country. • Assess national and local public authorities' willingness to involve private stakeholders in zone establishment or operation. • Support public authorities in the definition of the most suitable tools for private stakeholder involvement. • Support competent authorities in the definition of legal/regulatory SEZ framework and in its implementation phase strongly promoting private sector role.
Modern financing schemes for zone development	<ul style="list-style-type: none"> • Arrange a training programme on the financial analysis of investment, infrastructure and public-private partnership projects.

Table 5.1 (continued)

General recommendations

Issue	Suggested measures
SEZs development potential	<ul style="list-style-type: none"> Analyse the opportunity to create specialized subzones and eventually different sectors (textile, mechanics) to increase the effectiveness of the zone in relation to higher value-added sectors/ specializations. Tailor sectors to subzone needs and potential. Consider the opportunity to create a subzone or incubator devoted to SME and start up creation or development. Carefully assess local community manpower to identify training needs.
Business environment for industrial zone development	<ul style="list-style-type: none"> Support reform process by decision-makers, legislators, administrators and implementers. Promote legal framework upgrade and compliance with international standards and best practices. Strengthen institution competencies to manage complex business transactions related to SEZ development and especially regarding PPP transactions.
Participation of private stakeholders	<ul style="list-style-type: none"> Identify relevant national and local stakeholders. Identify existing organizations representing private sector constituencies within the country. Assess policy/legal framework governing participation of private sector in zone establishment and operation. Assess national and local public authority willingness to involve private stakeholder in zone establishment and operation. Support public authorities in defining of the most suitable tools for private stakeholder involvement.
National infrastructure and access to international transport corridors	<ul style="list-style-type: none"> Analyse the state of the art of the development of the international corridors, the political and financial participation of each target country and the actions within regional international cooperation institutions. Monitor the overall national infrastructure improvement strategies and planning to make them consistent with zone strategies.
Capacity to generate innovative technologies	<ul style="list-style-type: none"> Survey top universities and research centres to identify the most promising fields of research and specialization potentially generating innovative products and technologies. Promote networking of universities and research centres with analogous institutions in advanced countries. Investigate the opportunity and the feasibility to support the establishment of an anchor leading high tech firm in SEZ as locomotive for attracting other technological investors. Support cooperation between SEZ administration and academia in order to make research a pillar of zone development.
Large number of unskilled or poorly skilled manpower	<ul style="list-style-type: none"> Conduct a need assessment of universities and vocational schools to ascertain the type of training and technical assistance needed for aligning the skill standards to required levels. Assess the opportunity to launch a scholarship and/or training on the job programmes in foreign countries to support capacity building of managers and/or top technicians. Support customized capacity building programmes to improve managerial skills of individual public and private zone managers.
Awareness about the role of SMEs	<ul style="list-style-type: none"> Assess local communities' manufacturing, business and service providing traditional activities, to ascertain the potential for SEZs to support SMEs development in the different areas. Build awareness of the benefits of supporting SME activities for boosting economic development and employment.
Limited financial and banking system	<ul style="list-style-type: none"> Substantially improve capacity of financial and banking institutions to effectively support enterprises. Rely on best models used in other countries to provide financial facilities addressing enterprise needs. Strongly increase cooperation with DFI and bilateral donors for facilitating enterprise access to financial facilities.

Source: USAID, World Bank, OECD, UNIDO.

Notes

1. UNIDO has provided direct assistance for the establishment of industrial parks in many developing countries and has produced guidelines for the establishment of industrial estates in 1978 and guidelines and specifications for the construction of small-scale industry estates in 1988 (UNIDO 1997, 1978).
2. UNIDO 1997. See also Meng (2003).
3. Samson et al. 2001.
4. Kepl 2002.
5. Perroux 1950, 1955.
6. See Meng (2003).
7. Perroux 1950, 1955.
8. This SEZ definition coincides with one suggested by FIAS: “modern special economic zones, a generic term that encompasses the recent variants of the traditional commercial zones. The principles incorporated in the basic concept of a special economic zone include: 1—Geographically delimited area, usually physically secured (fenced-in) 2—Single management/administration 3—Eligibility for benefits based upon physical location within the zone 4—Separate customs area (duty-free benefits) and streamlined procedures.” Akinci and Crittle 2008. See also Farole and Akinci (2011) on terminology.
9. ILO 2007.
10. In 2015, there were roughly 4,500 Special Economic Zones (SEZs) in 140 countries employing around 66 million people in the world (The Economist 2015).
11. ADB 2015.
12. Warr and Menon 2015, p. 5
13. Ibid.
14. Ibid; Belarus report.
15. AfDB 2015.
16. See also Meng (2005).
17. Baissac 2011.
18. Brautigam and Tang 2011a.
19. Brautigam and Tang 2011b.
20. Brautigam and Tang 2011a.
21. UNCTAD 2015.
22. ILO 2003, 2007; EU Commission 2007
23. UNCTAD 2015.
24. World Bank 1992.
25. Amado 1989.
26. Akinci and Crittle 2008.
27. UNCTAD 2015.
28. Akinci and Crittle 2008.
29. IASP 2002.
30. <http://www.unesco.org/new/en/natural-sciences/science-technology/university-industry-partnerships/science-and-technology-park-governance/concept-and-definition/>.
31. Phillimore and Joseph 2003.
32. Coulon 2003.
33. <http://www.investincotedazur.com/en/sophia-antipolis/>.
34. Hall 2001.
35. Lowe 1995.
36. UNIDO 2008.
37. Ayres 1992.
38. UNIDO, World Bank and GIZ 2017.
39. Lowe 2001.
40. UNIDO, World Bank and GIZ 2017.
41. Li Zhou et al. 2017.
42. Industry 4.0 in EIP.
43. Based on Ketels and Memedovic 2008.
44. ASEAN Secretariat and UNCTAD 2017.
45. Carayannis, Barth and Campbell 2012.
46. <http://helsinki.fi>.
47. Based on Cooke and Memedovic 2006.
48. According to OECD recommendations, policy-makers should focus on six critical elements; type of zone to be developed, policy framework, incentive framework, regulatory framework, institutional framework and physical development/management. See OECD (2009). <https://www.oecd.org/mena/competitiveness/44866585.pdf>.
49. UNCTAD 2015.
50. IMF et al. 2015.

51. Steenbergen and Javorcik 2017.
52. IMF et al. 2015.
53. Ghasemian et al. 2011.
54. Kominkova 2008.
55. UNIDO, World Bank and GIZ 2017.
56. Dunphy, Griffiths and Benn 2007.
57. Picard, Coulibaly and Smaller 2017.
58. Blackmore 1990.
59. Drucker 1985; Hoagland and Williamson 2000; Thompson 2003c; Thompson 2003a http://bestentrepreneur.murdoch.edu.au/Business_Feasibility_Study_Outline.pdf.
60. UNIDO 2002.
61. Wells and Wint 2000.
62. <http://www.mdpi.com/2071-1050/9/7/1226/pdf>.
63. For example, the city of Dubai has a KPI framework for measuring their progress towards being a smart city. <https://www.dubaiplan2021.ae/dubai-plan-2021/> [Accessed February 2, 2018].
64. UNIDO, World Bank and GIZ 2017; UNEP 2001; Thieriot and Sawyer 2015.
65. <https://www.emsworld.com/article/10324786/ems-response-time-standards>.

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