



ROADMAP

Towards a New Generation of Smart and Sustainable Industrial Parks

THE ROAD TO 2030



MEXICAN ASSOCIATION OF INDUSTRIAL PARKS

CREDITS

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2019, AMPIP

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First Edition (Non-commercial use)

Mexico City, April 2020

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Foreword from the President of the Board of Directors

(2018-2019)



“With the vision to improve industrial real estate developments to a whole new level using smart technologies, protecting the environment and promoting social responsibility, the Mexican Association of Private Industrial Parks (AMPIP) presents the **Roadmap: Towards a New Generation of Smart and Sustainable Industrial Parks.**

More than a diagnostic document, the Roadmap is a tool that will guide AMPIP's steps to the year 2030. It includes a review of key trends and standards worldwide that are revolutionizing the way we operate a successful business, a thorough examination of the industrial real estate sector in Mexico, and a proposal of clear steps to achieve a long-term goal.

Developers in Mexico must go beyond just buying and selling industrial real estate and start evolving along with Industry 4.0. Today, we talk about robotics, internet of things, artificial intelligence and the cloud, but sooner than expected we will also hear about smart industrial parks. Technology is meant to encourage the efficient use of resources like energy and water and also help us find new ways to minimize waste. In addition, we want to contribute to society by improving the quality of life of those who work within and around industrial parks, while contributing to the competitiveness of our customers (tenants).

This unique effort has been possible thanks a dynamic, multidisciplinary, committed and knowledgeable working group of collaboration between the private sector, academia, civil society, and the public sector across.

I want to thank all the participants across the different stages of this project. This will undoubtedly be the beginning of a new era to strengthen the capacities of industrial parks in Mexico, for the benefit of our families, communities and businesses.

TOGETHER WE ARE STRONGER”
Héctor Ibarzábal



Foreword from AMPIP Executive Director

“The “Roadmap: Towards a New generation of Smart and Sustainable Industrial Parks” is a collaborative tool that helps us formulate a long-term strategy to point out which direction we want to go and what we want to accomplish as an umbrella organization for the sector we represent, in this case, the industrial real estate.

A first challenge of this project was to create a Confidence Group, that is, a selection of experts representing and analyzing the sector. This group defined the scope of the main areas of study related to the development and operation of an industrial park such as construction, finance, marketing, security, international standards, human resources, logistics, investment, trade, and technology, just to mention a few.

Acting like a “home” to several industries, industrial parks see their performance, development and surroundings deeply intertwined with multiple global and local phenomena. Thus, a second major challenge was to identify social, economic, environmental, technological, political and business trends, affecting cities, businesses, entrepreneurs, workers, consumers, and ultimately industrial parks. In the process of identifying major trends, several questions began to shape this Roadmap:

- » **Does e-commerce only modify the way we consume, or does it also drive the transformation of industrial buildings?**
- » **As industrial developers, will we continue to build as we have done it the past 15 years or will we have to adapt to new market demands?**
- » **How can we help to prevent climate change?**
- » **Will people's expectations from the place where they work change?**

Considering the vertiginous changes in the world and with the intention of generating a practical work tool, AMPIP also thinks of this Roadmap as a way to incorporate new technological paradigms such as Industry 4.0 and put in practice the United Nations Sustainable Development Goals, particularly Goal 9 "Industry, Innovation and Infrastructure". We intend to generate a systemic vision, one which industrial real estate entrepreneurs can pursue by conviction while contributing to national and international initiatives, without losing sight of profitability. Above all, the Roadmap is about achieving goals jointly and towards the same end as an industrial real estate sector.

We are living in a historical moment, which forces us to identify a new role for industrial parks in the social, economic and environmental spheres, in order to lay down the foundations for the future. Henceforth, this AMPIP Roadmap

defines the four pillars from which actions and work programs will be derived for the coming decade. The four pillars include: the creation of a Mexican chamber of industrial parks, a comprehensive information center on parks, the definition of criteria and establishment of smart industrial parks, and the manifestation of sustainability in industrial parks in every way: economic, environmental and social.

I want to thank all the businessmen and business women that participated in the Confidence Group, as well as the leaders of institutions such as ProMexico, the Ministry of Economy, UNAM, Universidad Anáhuac, CONACYT, American Chamber Bajío, GIZ of Germany, WRI, AMRFES, WFZO, IMEI, UNIDO, ANTP, CANACINTRA, CAPIM, INDEX, FEMIA, INA, among others. Your contributions, opinions, ideas, time, and commitment made this Roadmap possible, which will undoubtedly set the tone for AMPIP to fulfill its mission of contributing to competitiveness and thus move towards a new generation of smart and sustainable industrial parks in Mexico."

Claudia Ileana Avila Connelly



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DEVELOPMENT AND WELL-BEING

Development and well-being are the two pillars that support 21st century societies. Development is the continuous process of expanding human capacities to freely choose and carry out activities; while well-being is a state free of physical and mental pain. As it is simultaneously an end and a means, development for well-being and well-being for development, one without the other can hardly sustain a prosperous society for all. Combined, they give meaning to life in a society: development allows “to do”, while well-being allows “to be”.

Industrial parks (IPs) are an ideal and constantly evolving means for development and well-being. Since their origin in Manchester during the Second Industrial Revolution in the late 1800s, IPs became more than a real estate business. They became the physical space where industrialization materializes to create benefits, for instance, improving productivity, generating jobs, developing technology, and increasing income.

With the Third Industrial Revolution in the 1970s, IPs evolved to meet the space needs of new industries and began to mitigate the adverse effects of older ones like workforce exploitation and environmental pollution. As they multiplied and scaled-up, their macroeconomic impact in terms of local development, international trade, and foreign direct investment grew exponentially.

Nowadays, the world is experiencing a Fourth Industrial Revolution that is pushing industrial parks to think comprehensively about their impact on society, the economy, and the environment. With technological and organizational innovation, IPs are finding new ways to raise productivity, improve worker safety, and regenerate entire communities and ecosystems. In the context of rapid transformation, it is imperative to thoroughly analyze the national and international circumstances to enhance IPs' beneficial essence further.

With approximately 500 industrial parks, Mexico has a critical mass of industrial real estate actors enthusiastic about contributing to the country's development and well-being. A long-term strategy with a high degree of cooperation between decision-making actors is long overdue. Such an approach requires the participation of the quadruple helix:

- » **Industry** – IPs' developers, investors, users, and administrators
- » **Government** – Municipal, state and federal authorities
- » **Academia** – Universities and research centers
- » **Civil society** – Non-governmental organizations and communities

IPS ARE MORE THAN A
REAL ESTATE BUSINESS;
THEY HAVE A KEY ROLE IN
**NATIONAL
DEVELOPMENT
AND WELL-BEING**



With this in mind, the AMPIP, a crucial actor of representation and promotion, assembled experts and decision-makers to define the industry's direction for the next decade in this Roadmap.

A Roadmap is a collaborative strategic-planning tool based on the Cambridge Roadmapping Methodology (Phaal, 2019). Its purpose is to:

1. Analyze the present situation of an organization or industry.
2. Identify both the local and global economic, political, social, technological, environmental, and business trends affecting it.
3. Build a strategy based on milestones and projects with specific time, actions and resources.

For dynamic and relevant industries like the industrial real estate, a Roadmap can answer questions such as:

WHERE DOES IT STAND NOW? **WHY** SHOULD IT ACT DIFFERENTLY? **WHAT** CAN IT DO? **WHERE** IS IT GOING? **HOW** IS IT GOING TO GET THERE?

In the process of answering these questions the industry can evolve into a new generation, while harnessing benefits such as:

- » **Anticipating threats and taking advantage of opportunities identified in the context.**
- » **Promoting strengths and counteracting weaknesses.**
- » **Generating dialogue and consensus among decision-makers to formalize a strategic and integral vision of the sector.**
- » **Integrating efforts to structure long-term projects aligned to the vision.**
- » **Encouraging cooperation synergies between industry, academia, government, and society.**
- » **Increasing the industry's responsiveness to deliver innovative solutions to rapid changes.**

Methodologically, a Roadmap requires the integration of a Confidence Group (CG) composed of at least 30 high-level actors, decision-makers, and representatives of the industry's quadruple helix. In this case, AMPIP brought together a group of experts in industrial parks committed to the development and well-being of Mexico. The complete list of participants for the Roadmap is in Appendix 1.

Once created the Confidence Group ProMexico's Business Intelligence Unit provided methodological assistance to conduct five workshops. Each one had specific objectives: perform the SWOT analysis (strengths, opportunities, weaknesses and threats), identify trends, define the milestones, and the last two to structure and consolidate projects. Throughout the process of writing this document, the CG provided valuable insights by participating in online surveys, interviews, working tables, and reviewing draft chapters.

This Roadmap is divided into two parts and five chapters to answer the posed questions:

Part One is an analysis of the industrial real estate industry. Chapter One runs a diagnostic of the national and international IPs ecosystem. Chapter Two consists of a SWOT analysis. Chapter Three has a review of the economic, political, social, technological, environmental, and business trends that affect the industry.

Part Two is the overall strategy that the industry will implement in the coming years. Chapter Four defines guidelines to frame and articulate the strategy. Chapter Five describes four milestones or critical moments in the future history of IPs in Mexico, integrated by projects with specific objectives, scope, activities, deliverables, and time. It is important to note that any Roadmap is a comprehensive and dynamic planning system that must adapt to changes in the environment during its implementation.



PART ONE:

INDUSTRY ANALYSIS





SITUATIONAL DIAGNOSTIC

Where do IPs stand now?

CHAPTER I

1. INDUSTRIAL PARKS:

THE WORLD'S INDUSTRIALIZATION ENGINE

1.1. The origin of a new model of development

Amid the First Industrial Revolution, the city of Manchester in the United Kingdom stood out as the world capital of industrialization, mainly thanks to the textile industry for its advanced steam-driven machines to produce fabrics, that were exported around the world. Its importance was such that the city was world-renowned as "Cottonopolis". For most of the 19th-century textile factories and its suppliers occupied every available space in the city center where they found favorable conditions to operate. However, at the beginning of the Second Industrial Revolution, the demand for space for expansion proliferated as new machinery powered by electricity and internal combustion enabled mass production. Besides, the city was finishing the construction of a waterway for cargo that would connect Cottonopolis directly to the sea and, therefore, to the major international trade routes.

After purchasing 500 hectares six kilometers southwest of the city center and next to the waterway a group of entrepreneurs founded in June 1886 the world's first industrial park: Trafford Park Estates Ltd. At first, it seemed risky, but conditions were favorable for the new business: a sustained demand for industrial spaces and limited supply with adequate infrastructure. The pioneering group of developers subdivided the property into lots and then introduced roads, electricity, sewerage,

and an administration. The land sold quickly, and the first textile factories began to appear, as did others from metalworking, processed food, oil, and automotive industries (Herron, 2015). In a few years, the new real estate business model had become a complete success.

By 1911 Ford opened its first car plant outside the United States in Trafford Park because it could get every component of the manufacturing process locally. In its heyday in the 1930s and 40s, the industrial park built the UK's largest private railway system and freight terminal. Even during World War II, it became the main production center for the war effort, employing its all-time high record of 75,000 people (St Antony's Centre, 2012). However, from the 1960s on the UK entered a period of deindustrialization that turned the park into a debacle.

In a public-private effort to revive the site and its surroundings the Trafford Park Development Corporation was established in 1987. The partnership demolished abandoned factories to replace them with offices and industrial warehouses. Equipped with telecommunications infrastructure, the new buildings in the industrial park became attractive to companies of the Third Industrial Revolution. These were the first to use computing and robotics to digitize and automate production. Since then, recovery has been steady to the point that the world's first industrial park is now the largest in Europe, with more than 1,400 companies and 35,000 workers

(Trafford Park, 2012). In recent years, Trafford Park went another renovation to accommodate companies from the Fourth Industrial Revolution, with a 10-kilometer fiber optics circuit that provides super high-speed broadband services.

Trafford Park's history illustrates the close relationship between industrial parks and industrial revolutions. While both share Manchester as birthplace, **IPs owe their existence to changes in the production paradigm experienced by companies since the Second Industrial Revolution. Ever since, IPs have been critical for the process of industrialization of any nations.** The first manufacturing companies consolidated the demand for large spaces to install the latest advances in machinery, with adequate infrastructure and services to operate and transport goods.

The leap to the Third Industrial Revolution involved drastic changes in productivity. New companies and industries were born thanks to digitization, while the oldest ones disappeared or moved to countries where manufacturing was cost-efficient. Thus, IPs were forced to respond and adapt to the digital era.

The ongoing Fourth Industrial Revolution, also known as Industry 4.0 (i4.0), brings with it a new set of challenges for industrial parks. Technological developments such as the Internet of Things (IoT), artificial intelligence (AI), virtual reality (VR), 3D printing and big data are enabling innovative ways to produce goods and services for the latest generation of smart businesses (Schwab, 2018). **By paying attention to businesses' changing production and transportation needs and adapting infrastructure and services to them, IPs have become the place where the industrial revolutions materialize.**



1.2. The beneficial essence of industrial parks

The United Nations Industrial Development Organization (UNIDO) define industrial parks as: “A land surface developed and subdivided into lots according to a comprehensive plan with areas for roads, transport and facilities for common use, with or without factory constructions; for industrial use” (UNIDO, 1997).

IPs are internationally recognized as a critical driver of economic development in cities, regions, and entire countries.



Their presence has well-studied benefits such as:

- » Accelerate industrialization
 - » Generate numerous employment sources
 - » Increase per capita income
- » Attract Foreign Direct Investment (FDI) and domestic private investment
 - » Boost small and medium-sized enterprises
 - » Improve productivity and competitiveness
 - » Stimulate exports
 - » Encourage skills and technology transfers
 - » Organize urban development

(ONUDI, 2018)

Industrial real estate is capital intensive with a long-term period of return on investment; nevertheless, **IPs are a profitable business and an effective way to meet the needs of increasingly complex manufacturing and logistics companies.** UNIDO's definition reflects a hierarchy of the basic needs met by IPs:

- a. Offer land with sufficient space for a production plant with access to main trade routes.
- b. Provide essential infrastructure like roads, sewerage, electrical and telecommunications networks, and waste management.
- c. Build office buildings and warehouses fully equipped to house companies.
- d. Complement with services such as green areas, sports spaces, dining rooms, nurseries, first aid unit, business and training centers, commercial areas, fire stations, and security booths.

Logically, the provision of this infrastructure and services implies the existence of an administration responsible for maintenance and surveillance. For these reasons, **IPs are quintessential for the installation and operation of companies while providing certainty for long-term investment.**

INDUSTRIAL PARKS ARE
EXCELLENT **FACILITATORS**
FOR BUSINESSES TO SETTLE
AND OPERATE IN A SHORT
PERIOD OF TIME.
AT THE SAME TIME THEY
PROVIDE CERTAINTY TO LONG
TERM INVESTMENT, THUS
**STIMULATING
ECONOMIC GROWTH**

In financial terms, developers, tenants, and the government benefit from significant savings thanks to industrial parks. By developing vast plots of land and providing infrastructure and services for several tenants, IPs generate scale economies that significantly reduce costs for the initial investment and management fees. Furthermore, private IPs represent a strategic ally for the government as they can save public investment in infrastructure and maintenance while being a reliable tax revenue source.

Besides, **IPs promote agglomeration economies: the closeness between companies in the same industry or complementary industries allows greater access to labor supply, more specialized suppliers, and technology transfers.** These benefits translate into lower production costs and increased competitiveness for companies



(Zhang, 2015). This can explain why Ford settled in Trafford Park. The carmaker did not need to import any components because it could easily find within the industrial park good-enough suppliers for its production chain.

IPs also foster interaction between local and foreign companies by incentivizing the integration of global production chains, the acquisition of new skills, implementation of international best practices in social and environmental matters, as well as the transfer of innovative technologies (UNIDO, 2012). It is increasingly common to find within industrial parks around the world the coexistence of manufacturing and Research & Development facilities, putting some of them at the cutting-edge of technological innovation and disruption.

ULTIMATELY, EVERY
INTERACTION BETWEEN
COMPANIES AT AN IP ADDS
TO THE ECONOMIC GROWTH
OF THE CITY, REGION, AND
COUNTRY, THIS IS WHY
THEY ARE CONSIDERED A
**STRATEGIC ALLY FOR
GOVERNMENTS**

1.3. More than one type of industrial park

UNIDO's last census identified more than 20,000 IPs around the globe. Although the first one dated from the late 19th century, it isn't until the Third Industrial Revolution in the 1970s and 1980s that IPs proliferated (UNIDO, 2012). The first wave of industrial parks was dominated by the public sector, who carried out the developments and operated them with government subsidies to attract investment and reactivate the economy. The second wave, during the 1990s, was characterized by increased private investments to meet the digital needs of user companies with more flexible facilities and specialized services. Since the beginning of the 21st century, UNIDO

A **NEW GENERATION** of industrial parks is encouraging private and public sectors to collaborate closely than ever before. Furthermore, it is placing **TECHNOLOGY** and **SUSTAINABILITY** at the center of infrastructure and services while seeking to balance social **WELFARE, ENVIRONMENTAL QUALITY,** and **ECONOMIC GROWTH.**

gave greater importance to sustainability in industrial parks. The organization aims to proactively minimize setbacks in economic growth, responsibly manage natural resources, and advocate for social welfare. Thus, new models of IPs are emerging, like the **Agro-Industrial Parks**, which attempt to create agricultural value chains to kickstart development in rural areas without destabilizing ecosystems (UNIDO, 2018). Another model considering sustainability as the centerpiece is the **Eco-Industrial Park**. It focuses on applying technology and engaging with public institutions, academic entities, and non-governmental associations to reduce pollutant emissions, boost clean energy, and improve working conditions without compromising growth (World Bank, 2018). The latest industrial revolution is contributing to the development of parks with this scope while allowing them to offer high value-added services.

Likewise, a **new type of "smart" industrial park** is under development. It uses advanced Industry 4.0 technologies to measure, control, manage, and communicate information to offer increasingly personalized services to tenants. Smart IPs have a widespread application of IoT thanks to sophisticated networks of sensors capable of generating immediate responses to infrastructure malfunctions in lighting, drainage, or roads, for example.

The modern archetype of both a smart and sustainable park, is the Suzhou Industrial Park (SIP) operated jointly by China and Singapore. Just 20 minutes by train from Shanghai in a terrain of 288 km², the SIP works as a smart city. It integrates six ambitious infrastructure projects: a science and innovation park, a central business district, an ecology hub, a free trade zone for manufacturing, an area for high-tech companies, and an ecotourism resort. The SIP has become

the most competitive industrial park in all of China and one of the most attractive to FDI in the world (SIP Administrative Committee, 2010). International competition between industrial parks is intensifying, especially when it comes to attracting high-tech and high-value-added companies that generate additional benefits for society, the economy, and the environment.

It is essential to mention that IPs compete on two levels. Before the creation of a park, developers compete against each other in the local arena for the acquisition of land in strategic locations near main trade routes, pools of labor, markets, and also for financial resources and fiscal stimulus. Once the location is defined and the park created, it competes against others in the international arena to attract companies and keep its facilities occupied. IPs like the SIP demonstrate that it is no longer enough to aspire to attract a large number of businesses.

**The new generation
of IPs should be
capable of attracting
and retaining
high-tech and
high value-added
companies while
accelerating the
creation of new
companies locally.**



2. MEXICO'S

INDUSTRIAL PARK ECOSYSTEM

2.1. Definition and origin

The Mexican norm “*NMX-R-046-SCFI-2015-Parques-Industriales-Especificaciones*” defines IPs as: “the geographically delimited and specially designed area for the settlement of the industrial plant under suitable location conditions —close to major trade routes, logistics systems, housing areas, educational institutions, suppliers, customers, among others—, with infrastructure, equipment and basic services; and a permanent administration that allows continuous operation”.

IPs in Mexico date back to the late 1960s. To benefit from a temporary import program, known as the Manufacturing, Maquiladora and Export Services Promotion Program (IMMEX in Spanish), U.S. companies began settling in the Northern states. Linked from the beginning to FDI and international trade, the first industrial park in Mexico was born in 1968 called Antonio J. Bermúdez in Ciudad Juárez, Chihuahua.

2.2. Business model

Industrial parks in Mexico have undergone transformations similar to the historical evolution of IPs around the globe. At first, IPs sold subdivided lots of land within a delimited area to exporting-manufacturing companies so they could build facilities. However, with the rise of globalization and fierce international competition, most transnational companies began to lean towards renting industrial buildings and distribution centers already

built. This way, companies managed to avoid expensive fixed investment and transferred the risk of the real estate assets to the developer of the park (Avila Connelly, Industrial Parks and Export Manufacturing for The Competitiveness of Mexico, 2018). Thus, IPs developers began to introduce new infrastructure and related services.

Today, **IPs in Mexico still offer land, but mostly buildings for lease, both in inventory and built-to-suit.** At the same time, some provide a “shelter” scheme, in which the tenant company outsources management, human resources, and even sometimes the manufacturing and logistics processes. Due to the complexity of developing and operating an industrial park, only a few real estate groups, investment funds, real estate investment trust (FIBRAS in Spanish), and government trusts participate in the industrial real estate industry.

Commonly, companies interested in Mexico’s industrial parks are export-oriented operating under a just-in-time or just-in-sequence production scheme. Likewise, there are large distribution centers of retail companies and warehouses of logistics operators. Regardless of the type of company, they choose those IPs that effectively meet their needs with high value-added services and provide clear competitive advantages in:

- » **Infrastructure and its maintenance**
- » **Strategic location**
- » **Connectivity and accessibility**
- » **Security and surveillance**
- » **Availability of talent and social well-being procurement**
- » **Reliable suppliers**
- » **Ease of paperwork for permits**
- » **Lower costs**

The advantages offered by industrial parks in each of these aspects allows FDI to enter the country more easily and quickly, and once installed, provide certainty for the continuity of operations (Avila Connelly, Forbes, 2017). The advantages offered by IPs in Mexico exacerbate once combined with the country's own strengths, such as the demographic bond, macroeconomic stability, and trade openness thanks to its network of treaties with 50 countries.

2.3. Regulatory framework

Industrial parks in Mexico are regulated and overseen by numerous public and private entities. For urbanization and construction, particularly in the fulfillment of land permits, IPs are subject to state and municipal laws. For environmental protection, the regulatory bodies are the Ministry of Environment and Natural Resources (SEMARNAT in Spanish) and the Federal Office for Environmental Protection (PROFEPa). For electricity, the Federal Electricity Commission (CFE). For water and drainage systems, the National Water Commission (CONAGUA), and the municipal water commissions. For roads and communications infrastructure, the Ministry of Communications and Transport (SCT). For waste management, state laws. For safety, Civil Protection, and the Firefighters department. Finally, for labor rights, the Ministry of Labor and

Social Security (STPS), and the Ministry of Public Health (SSP).

Interestingly, industrial parks in Mexico have taken the initiative to standardize and assess their performance to comply with all to date regulations. In the 1990s, IPs developers defined a set of criteria to specify the key features of an industrial park. This effort led to the publication of the first voluntary legal standard in 1999.

In its fifth iteration in 2015, the norm NMX-R-046-SCFI-2015 set specific standards for IPs in the provision of infrastructure concerning environmental protection, worker safety, administration, and buildings. There is also a compliance certification granted by accredited verification units according to the "Federal Law of Metrology and Normalization". Also, AMPIP promotes best practices in the design, construction, and operation of IPs based on international certifications and standards developed by AMPIP itself.

Examples of standards by topic include:

1. **Infrastructure:** Mexican Norm “*NMX-R-046-SCFI-2015-Parques-Industriales-Especificaciones*” and Building Class A

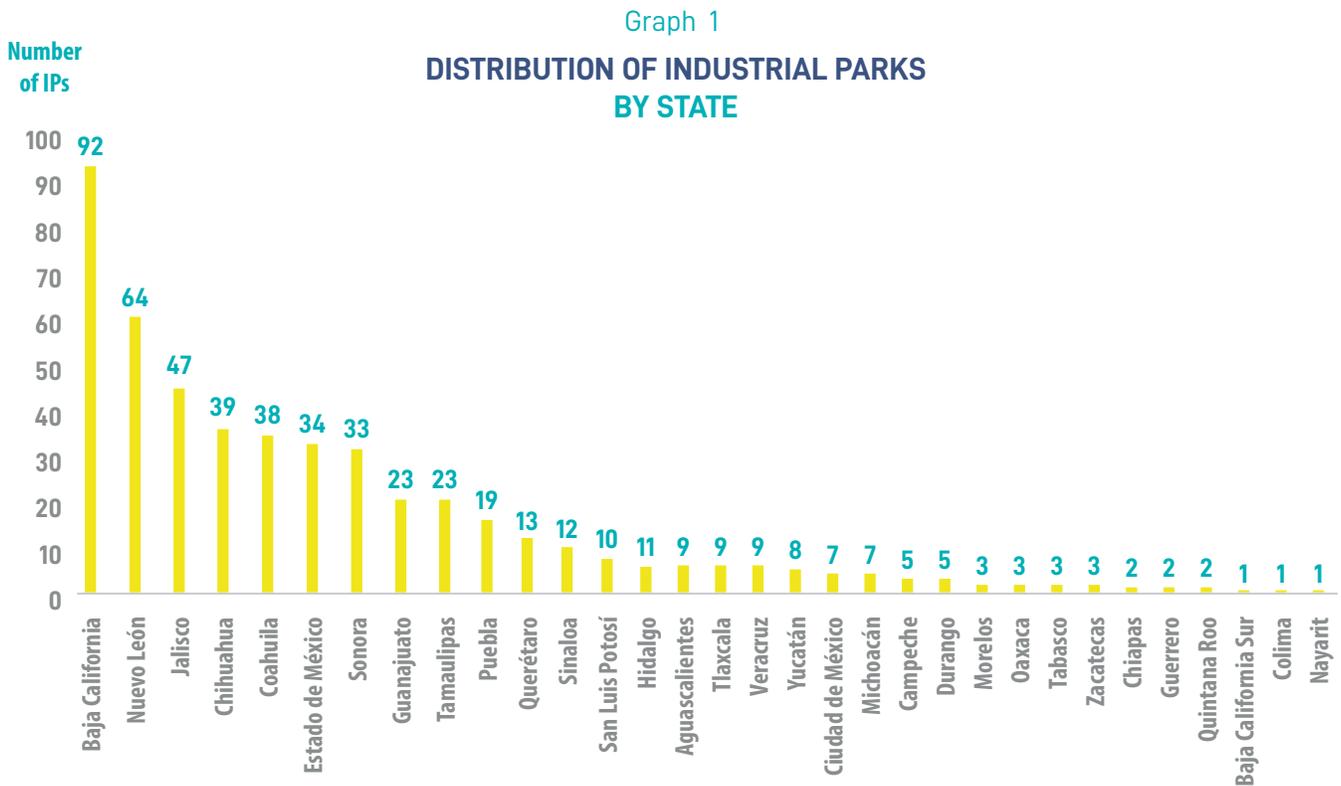
2. **Sustainability:** Leadership in Energy and Environmental Design (LEED), PROFEPA Environmental Quality, AMPIP Green Industrial Park, and Mexican Laws in Energy Efficiency

3. **Security:** Authorized Economic Operator (OEA in Spanish) and AMPIP Safe Industrial Park

4. **Technology:** Building Management System and Smart Industrial Parks

2.4. State and industry distribution

According to AMPIP estimates, Mexico has approximately 500 industrial parks, including the 254 under its representation. In 2018, AMPIP members had over 38 million m² of buildings in operation, with a 90% average national occupancy. **Even though all of the 32 states have at least one industrial park, 54% locate at the US-Mexico border states of Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, and Tamaulipas.** This fact stresses the preference of export-oriented companies to be close to the United States and Canada.



Source: National Census of Industrial Parks. AMPIP, 2016.



Regarding occupation, in the last quarter of 2018, AMPIP members reported a gross absorption, that is the amount of space rented or sold in a year, of 983,813 m², with an inventory of 74,853,335 m² and a vacancy of 4,189,791 m² (AMPIP, 2018). In terms of growth prospects, the industry shows a favorable outlook for the development of new IPs since they have roughly 106 million m² of available land for construction and 1,493,190 m² currently under construction. The industry projects an investment of approximately 4.6 billion between 2019 and 2021 for new developments. While Mexico City accounts for 16% of the inventory and 17% of the m² under construction nationwide, Monterrey has the highest gross absorption (24%) and availability (21%). Thus, both cities represent the main hubs of industrial infrastructure development in the country.

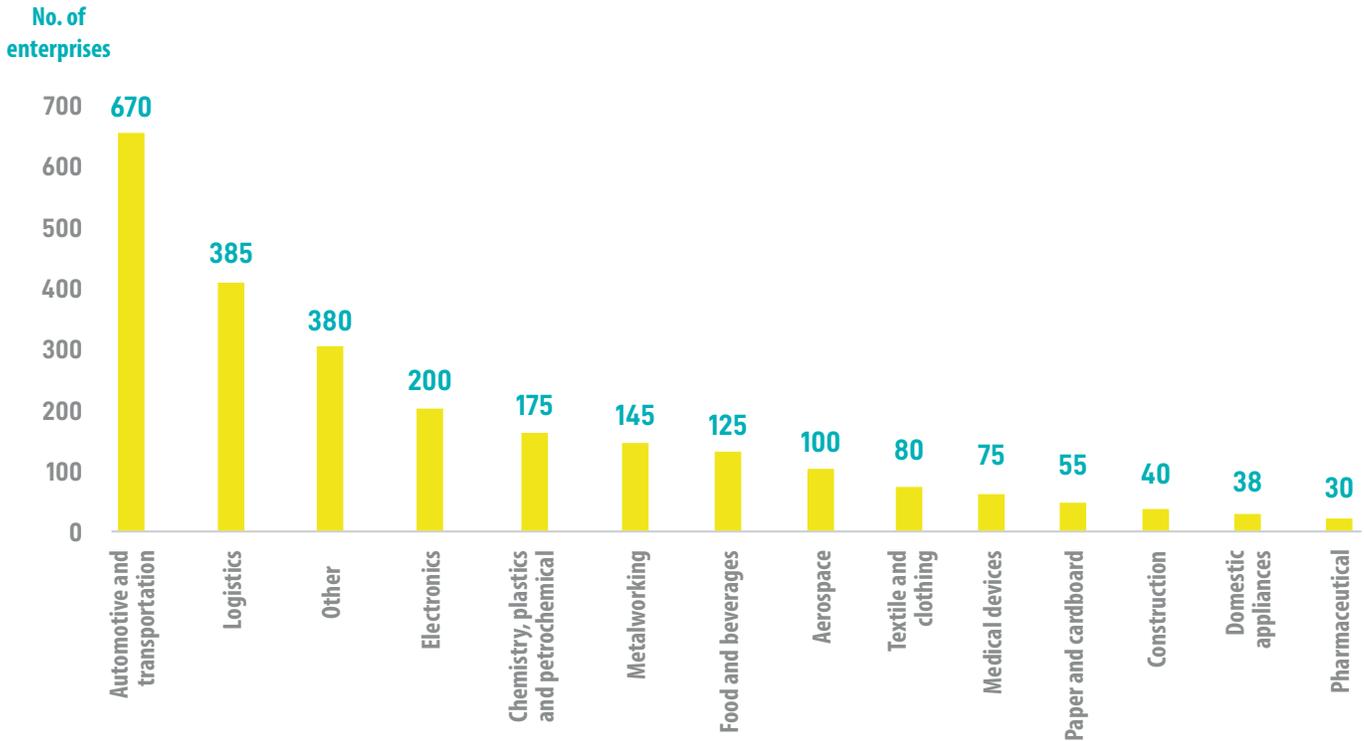
AMPIP members host over 2,500 companies from several countries and industries. Just under a third are Mexican companies, while 37% are from the United States, and the remaining 32% from other countries such as Japan, Germany, South Korea, Canada, and France. A significant number of businesses in IPs belong to the automotive and transportation industry, with a quarter of companies in it. Nevertheless, IPs host a wide variety of industries, as shown in the graph below.



THE INDUSTRY
SHOWS A FAVORABLE
OUTLOOK FOR THE
**DEVELOPMENT
OF NEW IPs**

Graph 2

DISTRIBUTION OF COMPANIES IN INDUSTRIAL PARKS BY INDUSTRY IN MEXICO



Source: National Census of Industrial Parks. AMPIP, 2016.

It is a fact that IPs around the globe have a **RECOGNIZED BENEFICIAL ESSENCE** that is closely related to production changes fostered by the Industrial Revolutions. Since the mid-20th century, Mexico developed a **ROBUST INDUSTRIAL REAL ESTATE ECOSYSTEM** thanks to dynamic and competitive actors at the regional and industry level, a young but solid regulatory foundation, and a representative body that directs its growth.



SWOT ANALYSIS

Why should IPs act more?

CHAPTER II

Chapter One explored superficially some internal strengths and weaknesses, as well as external opportunities and threats faced by industrial parks in Mexico. Identifying and recognizing each of these is key to understanding: **Why is it essential that IPs act differently? The answer, to boost the industry's strengths, seize current and future opportunities, counter existing weaknesses, and minimize the effects of recognized threats.** Reflecting on these issues will allow Mexico to take firm steps towards a new generation of IPs.

The Roadmap methodology allows exploring each element in greater depth by consulting the quadruple helix made up of business, government, academia, and civil society actors relevant to IPs. This chapter departs from the previous diagnostic, but above all, from the experiences and knowledge of the Confidence Group to define the most pressing

strengths, opportunities, weaknesses, and threats for IPs in the country. The SWOT analysis, together with the trend analysis of the next chapter, allows structuring the guidelines, milestones, and projects that will shape the overall strategy for the industry.

The following matrix summarizes the main ideas identified by the CG during the workshops. It presents them in order of priority for most participants. Each and every strength, opportunity, weakness, and threat are relevant to the quadruple helix of industrial parks in Mexico. The prioritization is based on identifying those issues whose attention is urgent. The graphs show the results of an online survey to the CG members. Each participant rated from 0 to 10, with 10 being a high priority, 5 medium priority and a 1 low priority. The following sections deepen each of these aspects with nuances and considerations supported by empirical sources, but mainly by the CG itself.

Matrix 1

- 1.1. Competitive, differentiated and value-added infrastructure
- 1.2. Entrepreneurs able to take risks and long-term projects
- 1.3. Presence of a support and representation organization (AMPIP)
- 1.4. Standardized business model
- 1.5. Investment and talent magnets

- 2.1. Strategic location and a robust logistics industry
- 2.2. A strong network of treaties and free trade agreements
- 2.3. Favorable geopolitical environment
- 2.4. High value-added services with i4.0
- 2.5. Nearshoring
- 2.6. New financial instruments
- 2.7. Functional regionalization in Mexico
- 2.8. Dual learning models

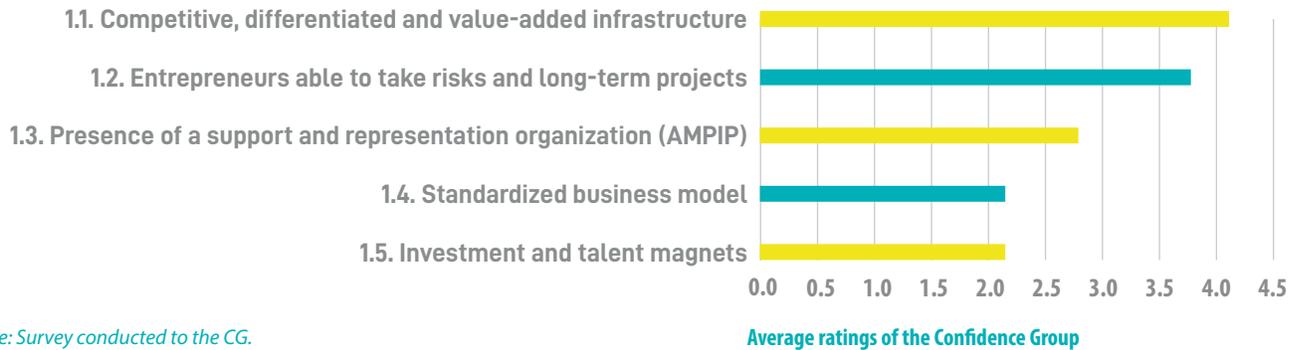


STRENGTHS



Graph 3

INDUSTRIAL PARKS' STRENGTHS PRIORITIZED BY THE CONFIDENCE GROUP



Source: Survey conducted to the CG.

1.1. Competitive, differentiated and value-added infrastructure

Industrial parks provide the necessary space to host manufacturing enterprises, which contribute to 16% of GDP and 97% of the country's exports (INEGI, 2018). **Mexico's IPs infrastructure stands out for three reasons: strategic location, quality facilities, and efficient management. The three of them make IPs a place of stability and certainty for investments.**

In terms of location, most IPs in Mexico offer a highly competitive logistics position for companies, as site selection generally responds to a comprehensive urban planning logic. IPs optimize cargo capacity and interconnectivity by staying close to roads, airports, railways, seaports, and border crossings. Additionally, IPs take into account the availability and proximity to skilled labor, urban centers, and transportation systems.

In terms of facilities, IPs tend to develop world-class infrastructure and industrial buildings. In Mexico, they provide amenities to tenant companies such as entertainment areas,

commercial spaces, and business centers, as well as added-value services like 24/7 surveillance, custom-made spaces, and talent recruitment at competitive prices. Low vacancy levels are evidence of how convenient IPs are for manufacturing and logistics businesses. In 2017, the average national vacancy rate was only 5.4%, and the national average monthly rent per m² was USD 4.42, nearly two dollars cheaper than in the U.S. and Canada for the same infrastructure and services quality (JLL Mexico, 2018).

In terms of management, tenants pay fees according to the m² that each one occupies and delegate to the park's administration the responsibility for infrastructure maintenance and expansion. Hence, every industrial park has an administration that continuously invests in facilities, protects assets from damage or theft, and ensures worker safety.

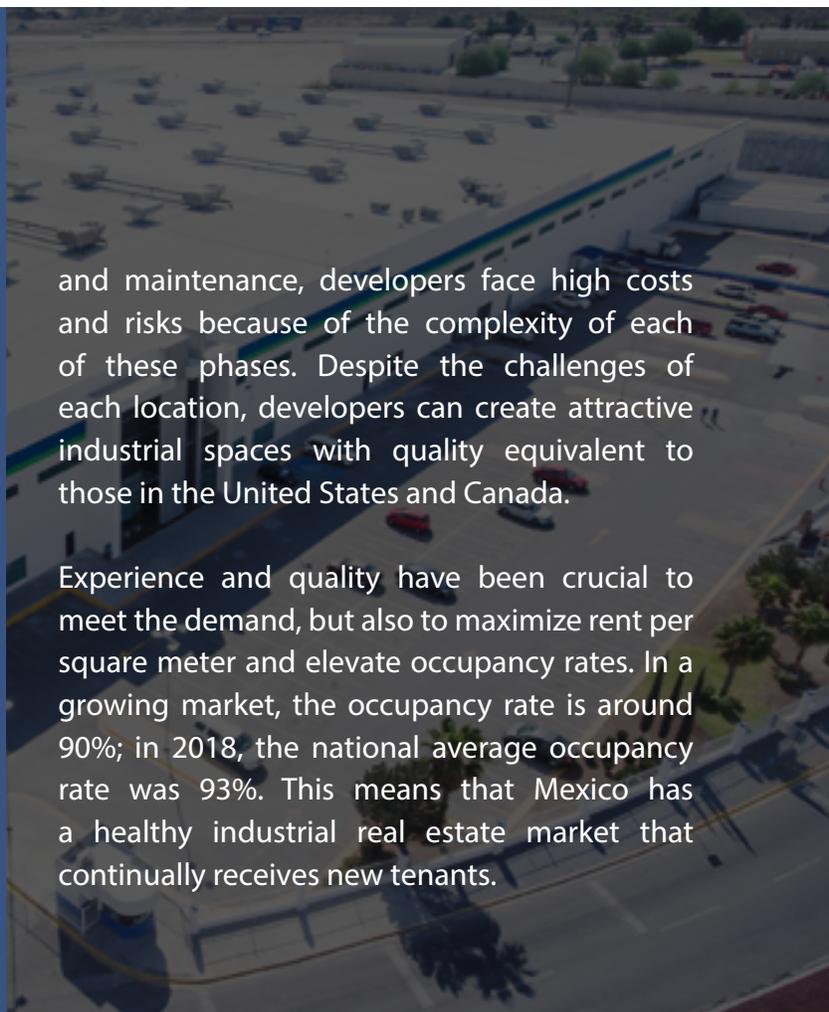
1.2. Entrepreneurs able to take risks and long-term projects

Since originating in the 1960s, industrial park developers in Mexico have been exceptional entrepreneurs, capable of taking investment risks in real estate projects despite the uncertainties of the market. They faced a steep learning curve to acquire the experience for developing successful long-term projects.

Industrial real estate development in Mexico has over half a century of capacity-building experience. From getting the land and preparing public services, through construction and urbanization of the site, to the management, promotion,

and maintenance, developers face high costs and risks because of the complexity of each of these phases. Despite the challenges of each location, developers can create attractive industrial spaces with quality equivalent to those in the United States and Canada.

Experience and quality have been crucial to meet the demand, but also to maximize rent per square meter and elevate occupancy rates. In a growing market, the occupancy rate is around 90%; in 2018, the national average occupancy rate was 93%. This means that Mexico has a healthy industrial real estate market that continually receives new tenants.



To further increase occupancy, industrial parks can also provide “shelter” services either by third companies or themselves. These services imply the outsourcing of various needs and processes of the tenant, from permits, human resources, and accounting to procurement, logistics, and maintenance. While few IPs have them, they facilitate the setting-up of new production plants, mainly from companies that are unaware of the local business environment hence, making IPs more attractive to FDI.

1.3. Presence of a support and representation organization (AMPIP)

AMPIP was created in 1996 to represent industrial real estate developers in Mexico before the government, potential users, and citizens. In 1999, it was the leading advocate for a norm to standardize IPs’ infrastructure and services quality, as well as to encourage compliance with all regulations.

SINCE ITS BEGINNING, AMPIP HAS ACTIVELY JOINED EFFORTS WITH AUTHORITIES TO ATTRACT FOREIGN DIRECT INVESTMENT, BY PROMOTING IPS AS PART OF THE COUNTRY’S COMPETITIVENESS. LIKEWISE, AMPIP HAS BEEN A CATALYST FOR CREATING NEW IPS ACROSS MEXICO. LIKEWISE, AMPIP HAS BEEN A CATALYST FOR CREATING NEW IPS ACROSS MEXICO.



In 2018, AMPIP effectively represented more than 250 IPs located in 25 states from 60 different corporate companies. These include investment funds and real estate investment trust, as well as state-owned industrial facilities.

1.4. Standardized business model

With the intensification of globalization in the 1990s and the corresponding increase in competition, IPs in Mexico began to seek various strategies to remain attractive and retain customers. Driven primarily by AMPIP, developers have concentrated their efforts on the following models:

» **Mexican Norm “NMX-R-046-SCFI-2015-Parques - Industriales - Especificaciones”.**

This standard is voluntary, and it helps IPs to verify compliance with regulations and permits concerning the land, water and energy services, urbanization, and amenities.

» **LEED Buildings.** The Leadership in Energy and Environmental Design is a certification created by the U.S. Green Building Council (USGBC). Complying with its standards provides benefits to the property like spaces that improve worker health and productivity, greenhouse gas emissions reduction, lower operating and maintenance costs, reduced waste generation, increased asset value, and energy savings.

» **Authorized Economic Operator Program (AEO) for industrial parks.** Implemented by the World Customs Organization (WCO), the program involves more than 57 countries. Its focus is on the implementation of safety standards in every link within the global supply chain to minimize risks from terrorism, illegal migration, and drug trafficking. Inspired on AEO, AMPIP designed a local program known as “Safe Industrial Park” as the first step to develop a safety and security culture among IPs.

» **Environmental protection programs.** IPs in Mexico often participate in programs aiming to reduce ecological damage by improving water, energy, and waste management systems like “Environmental Quality Certification” by PROFEPA, “Green Industrial Park” by AMPIP, and “Sustainable Industrial Areas” by GIZ German Cooperation Agency in partnership with the Mexican government.

1.5. Investment and talent magnets

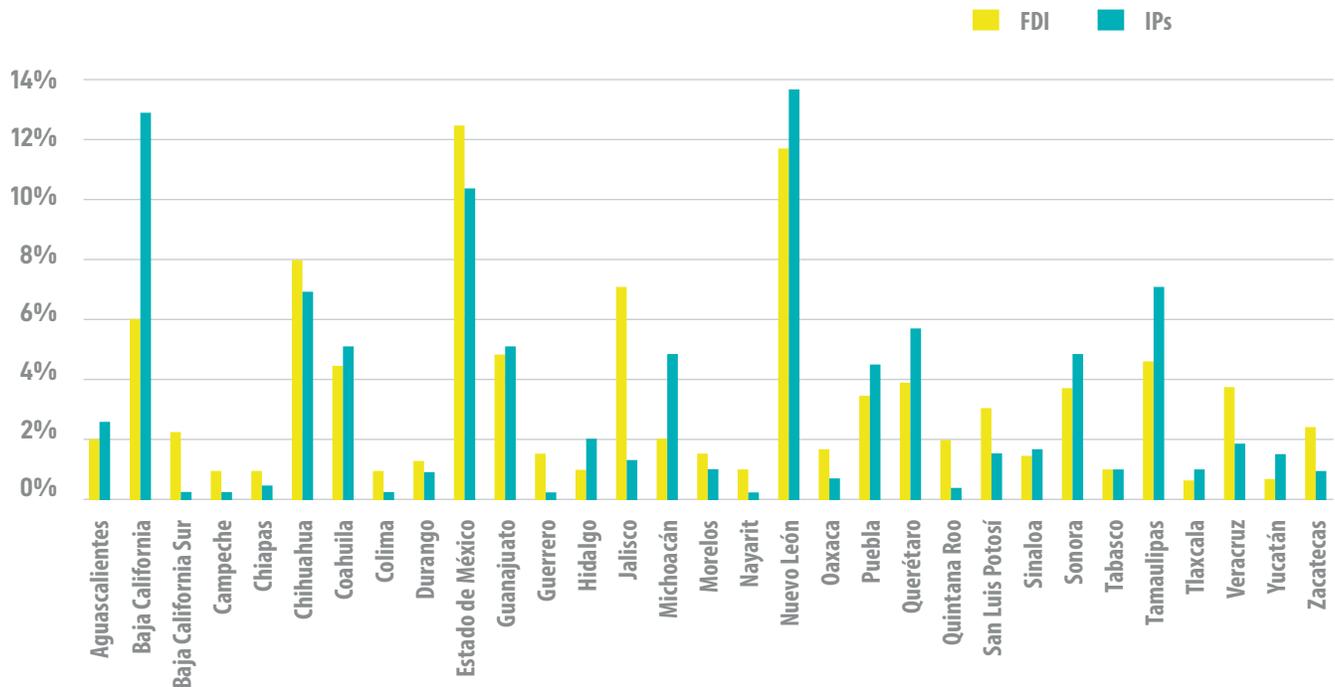
Industrial parks are necessary to attract FDI from the manufacturing and logistics industries. Since 2010, both industries account on average for 53.4% of the FDI that Mexico receives each year (AMPIP, 2019).

INDEED, FDI IS ATTRACTED TO PLACES WITH COMPETITIVE, DIFFERENTIATED AND VALUE-ADDED INFRASTRUCTURE, THE PRESENCE OF A SUPPORT AND REPRESENTATION ORGANIZATION AND STANDARDIZED BUSINESS MODEL, WHERE ENTREPRENEURS ARE ABLE TO TAKE RISKS AND LONG-TERM PROJECTS. INDUSTRIAL PARKS REPRESENT SUCH KIND OF PLACE.

Data suggests an intimate relationship between FDI flows and the presence of IPs in each state: the higher the national share of IPs, the more FDI flows received. This relationship is notable when looking at Nuevo León, Guanajuato, Coahuila, Baja California, and the State of Mexico. In 2018, these states concentrated 47% of the IPs in Mexico and attracted half of the manufacturing FDI; around USD 16.3 billion. The graph below compares each state’s share of national FDI against its share of IPs.

Graph 4

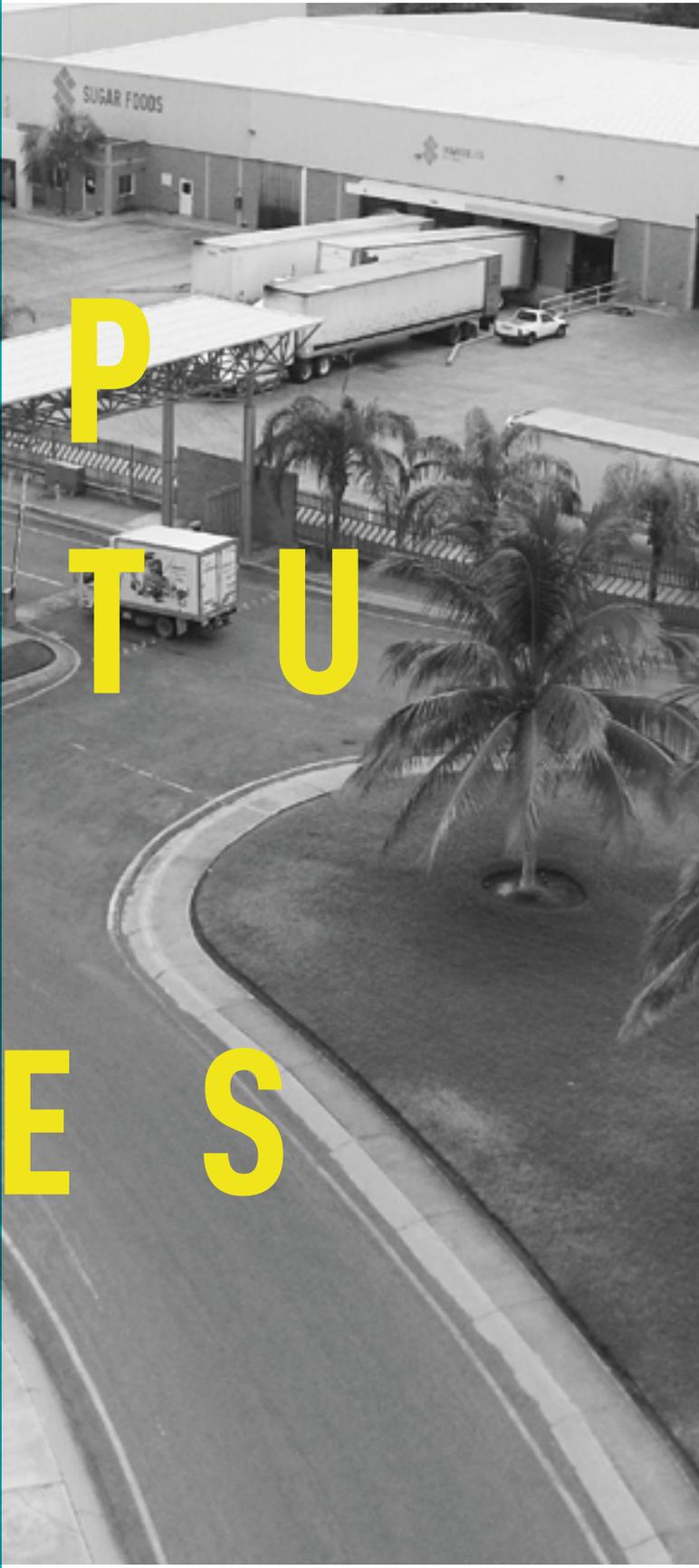
INDUSTRIAL PARKS VS. FOREIGN DIRECT INVESTMENT BY STATE*



Source: Own elaboration with data from INEGI and the National Census of Industrial Parks 2016.

*Mexico City has been excluded because it is an outlier in attracting FDI from industries different to manufacturing and logistics.

Furthermore, IPs encourage employment generation along with their tenants. **IN 2018, AMPIP MEMBERS EMPLOYED ALMOST THREE MILLION PEOPLE.** With most global companies offering training courses and scholarships to improve workforce skills, IPs also create quality jobs in managerial and operational levels.

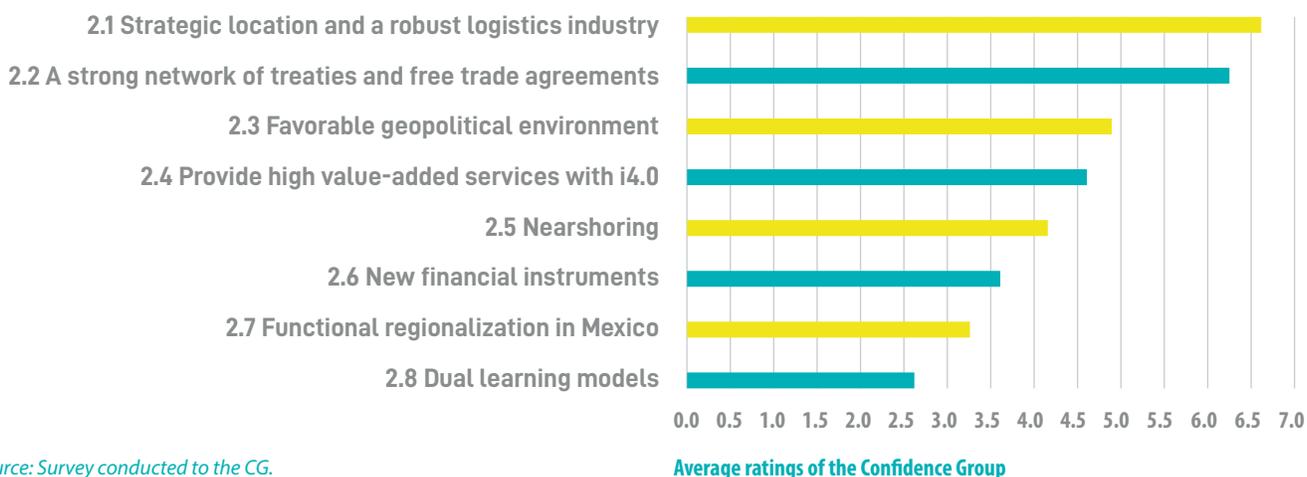


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2

Graph 5

PRIORITIZING OPPORTUNITIES FOR INDUSTRIAL PARKS ACCORDING TO THE CONFIDENCE GROUP



2.1. Strategic location and a robust logistics industry

Global Value Chains (GVCs) make effective interconnections between suppliers and customers located in different countries. Thus, location and logistics play a decisive role in the assembly and distribution of finished products. Mexico has a particularly privileged position for connectivity to GVCs and the world’s major markets. It is located in North America, shares geographical and cultural proximity to Central and South America, and has access to maritime trade routes in the Pacific and Atlantic Oceans.

Mexico has also a growing logistics industry and infrastructure, that favor IPs integration to GVC and is particularly adapted for international trade. In 2018, the national logistics infrastructure network included: 76 airports (64 were international), 117 seaports evenly distributed between the two coasts, 378 thousand km of

roads, 27 thousand km of railways, 63 border crossings, and 49 customs (ProMexico, 2018). **IPs are a vital part of the network, as they act as a facilitator of logistics operations that forge strategic alliances to enhance the country’s export capacity.**

2.2. A strong network of treaties and free trade agreement

Mexico benefits from deep economic integration with international markets thanks to its network of 13 free trade agreements, signed with 50 countries, and 32 investment protection agreements. Hence, Mexico is one of the most open nations to trade and investment. The network acts as a gateway for millions of goods and services to reach markets that represent 60% of the world’s GDP and more than one billion customers, mainly in America, Europe, and Asia (ProMexico, 2018).

Even though in 2018 Mexico ranked 12th as the world's largest exporter, with a value of USD 410 billion (World Economic Forum, 2019), exports can grow even more. Companies in IPs from industries like energy, aerospace, medical devices, electronics, and processed foods could actively seek to exploit the network of treaties and free trade agreements. **IPs could also explore the possibility of exporting the Mexican industrial parks business model.** IPs and tenants need to engage in promoting and understanding the business opportunities within the network, especially after the dissolution of the Mexican trade and investment promotion agency "ProMexico" in 2019.

2.3. Favorable geopolitical environment

Protectionism in developed economies is on the rise, Brexit and the renegotiation of the North American Free Trade Agreement (NAFTA) are just some examples. Therefore, major global trade blocs are now under reconfiguration. Such a scenario is creating more interest in traditional and non-traditional partner countries of Mexico to negotiate new deals. For instance, the Comprehensive and Progressive Agreement for the Trans-Pacific Partnership (CPTPP), creates new export and investment opportunities to and from Australia, New Zealand, Singapore, Brunei, Vietnam, and Malaysia. It will also strengthen cooperation relations with strategic partners for Mexico, such as Japan, Canada, Chile, and Peru, in critical industries like agriculture and automotive (Martínez Montero, 2018).

IN THIS CONTEXT,
**IPS CAN BECOME
INVESTMENT
FACILITATORS OF
COMPANIES FROM
THESE COUNTRIES**
AND THUS DIVERSIFY
THE ORIGIN OF
TENANTS AND THE
FINAL DESTINATION OF
EXPORTS.

Moreover, if the U.S.-China trade war continues, as well as the structural transformation of China to a service-driven economy, Mexico could prove to be a top winner in attracting manufacturing companies. Tariffs imposed by President Donald Trump on Chinese imports are beginning to divert the supply chain of American and Chinese companies. Businesses that traditionally exported from China are moving to Mexico or start thinking at the possibility, and thus still be able to sell to the U.S. market (Townsend & Martin, 2019). As Mexican exports to the U.S. continue to grow and displace the Chinese in the textiles, paper, agriculture, and metalworking industries, IPs could design strategies to attract displaced companies.

2.4. Provide high value-added services with i4.0

In the Fourth Industrial Revolution, technologies that facilitate the generation, collection, and processing of information, for example big data, constitute the basis of a new productive paradigm. Likewise, the digitization and automation of processes enabled by the IoT, collaborative robots, VR, AR, 3D printing, among other technologies, are optimizing the different phases of the production chain, both inside and outside the factories.

Companies and industries implementing these increasingly affordable technologies will significantly reduce costs and increase productivity. **Joining this trend is of paramount interest to IPs in Mexico to remain competitive.** Some IPs focus on attracting FDI with highly technological processes into the automotive, aerospace, and electronics industries. However, the new generation of IPs has to focus on creating an ecosystem that includes technologically sophisticated infrastructure and services.

2.5. Nearshoring

Some multinational manufacturing companies are starting to relocate outsourced operations closer to headquarters. By doing this, businesses seek to reduce transportation costs and times, integrate knowledge and technology, ensure inventory turn-out, and improve product quality. Nearshoring or “near-production” requires that the factory is four hours or less by flight from the parent company. It has become an increasingly attractive option for global companies to be close to consumer markets. Therefore, 51% of multinationals are nearshoring, and this percentage is expected to increase in the future (Miebach Consulting, 2017).

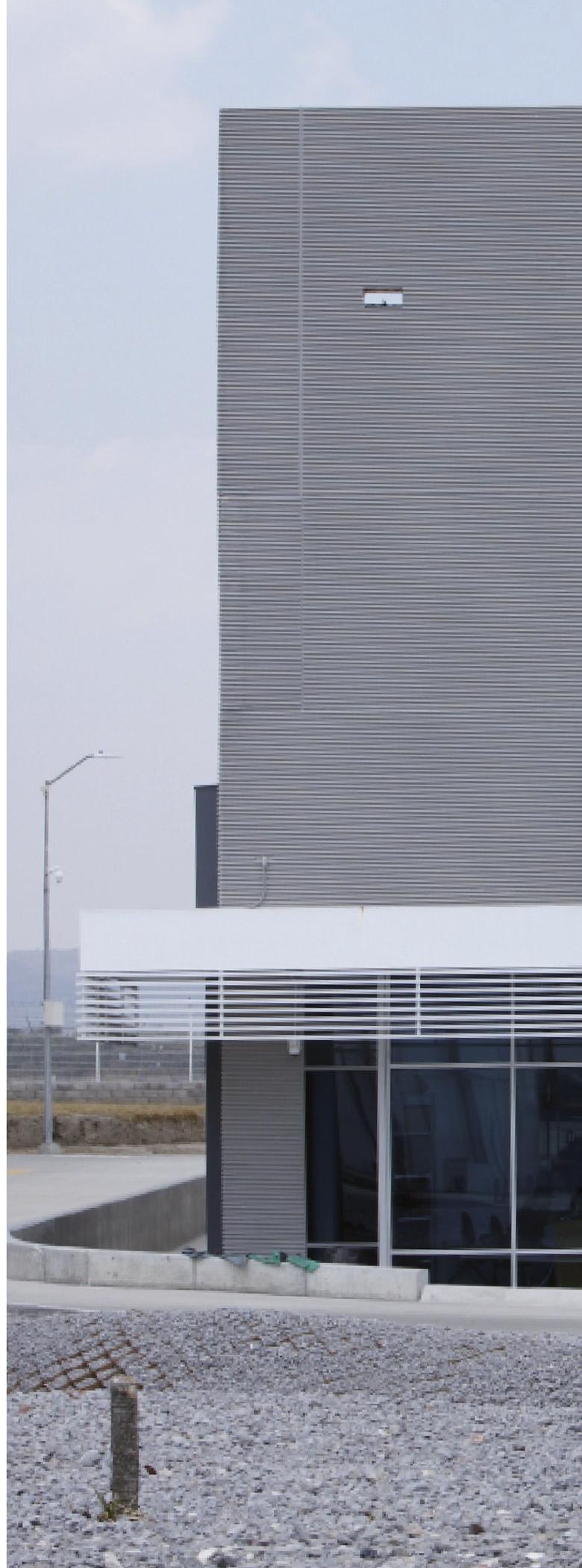
Mexico has been an attractive nearshoring destination for North American companies thanks to its logistics infrastructure, trade network, macroeconomic stability, low costs for skilled labor and transportation, young population, same time zone, comparable business culture to western countries, competitive local supply, and strategic location. In the past decade, Mexico consolidated a dynamic manufacturing industry in the automotive and aerospace industries. IPs played a key role and will continue to do so by providing industrial spaces for logistics and manufacturing companies.

AS GVCS TEND TO NEARSHORE, IPS IN MEXICO HAVE THE CHANCE TO SCALE UP PROMOTION STRATEGIES TO ATTRACT THE MOST SOPHISTICATED MANUFACTURING LINKS, AS WELL AS THOSE RELATED TO RESEARCH AND DEVELOPMENT.

2.6. New financial instruments

The real estate and capital markets in Mexico are mature enough to produce new players and financial instruments. Several industrial real estate developers are listed on the Mexican Stock Exchange (BMV in Spanish) as public companies or as FIBRAs. Some developers have access to capital through stock instruments such as Development Capital Certificates (CKD in Spanish) or Trust Certificates of Investment Projects (CERPI in Spanish). The latter makes use of retirement funds managed in Mexico by the Retirement Fund Administrators (AFORES in Spanish). In fact, the government of President López Obrador wants to reform the AFORES Act to allow the investment of retirement savings on privately offered securities for real estate and infrastructure, including industrial. Another funding tool more often used is crowdfunding. Through a digital platform, virtually anyone with some capital can invest in real estate.

INNOVATIVE FINANCIAL
INSTRUMENTS WILL
CONTINUE TO GIVE A
**STRONG IMPETUS TO
THE CONSTRUCTION
AND EXPANSION**
OF INDUSTRIAL PARKS
IN THE COUNTRY.





2.7. Functional regionalization in Mexico

Functional regionalization intends to define development policies in terms of the economic, social, political, and environmental particularities of a specific region to boost economic specialization. Public institutions like INEGI, several public research centers, and the Agricultural, Territorial and Urban Development Ministry (SEDATU in Spanish) have identified severe asymmetries between the regions of Mexico in terms of economic development and social welfare. In response, they have contributed to the design of public policies based on functional regionalization to balance development across the territory.

The government of Andrés Manuel López Obrador proposes regionalization projects such as the Tehuantepec Isthmus Corridor and the Mayan Train in the south of the country, or the Northern Border Free Zone. These projects aim to attract investment, generate jobs, and thus reduce poverty rates in historically impoverished regions. Such projects will attract Mexican and foreign companies with tax breaks like a 20% Income Tax, instead of 35%, and Value Added Tax (VAT) of 8%, instead of 16%. It could also include gasoline subsidies and local taxes or import tariffs exceptions.

Public projects like these represent a unique opportunity to foster cooperation between the government and industrial real estate developers. Together, private and public sectors can guarantee financial and technical soundness, as well as taking into account social, economic, and environmental considerations.

However, for such collaboration, the government must provide certainty for future investments and recognize IPs as a critical element for the nation's development and well-being.

2.8. Dual learning models

As demand for specialized human capital continues to grow, the Mexican Model of Dual Learning (MMFD in Spanish) of the Ministry of Public Education (SEP in Spanish) offers some help. It is a tool designed to meet companies' needs and expectations regarding the availability of technoscientific skills in a given location. The MMFD adapts the German model to Mexican reality. As a public-private initiative, it involves the National College of Technical Professional Education (CONALEP in Spanish), the Employers Confederation of Mexico (COPARMEX in Spanish), and the Mexico-German Chamber of Trade and Industry (CAMEXA in Spanish). The MMFD promotes working in a company while studying in a university for one or two years with a scholarship. Since 2015, the model has been regulated by law, and in 2016 it had 1,384 apprentices in 11 states related to the automotive, electronics, ICT, and processed foods industries (SEP, 2018).

The model has shown a good response from foreign companies and exhibits the potential for escalation. The Secretary-General of the Swiss Conference of Cantonal Directors of Education visited Mexico in 2016 and noted that Swiss companies generate 60,000 jobs in Mexico, but they require a more specialized workforce to create more employment. Henceforth, both countries are working on a new dual-learning model. In the words of the Secretary-General: "The scheme ensures that apprentices are productive and efficient much faster. Companies may argue that it is an expensive program because they must invest time, money, and staff to train students. Yet, experience has shown that cost-benefit is positive, as apprentices become very productive employees after concluding studies."

Indeed, the MMFD represents opportunities for industrial parks. Dual learning models can become an additional factor for companies choosing a specific site. They could act similar to having universities and research centers nearby to guarantee a pool of skilled labor to nearby businesses. Thus, IPs could promote a dual learning model along with local institutes, as a value-added service to tenants to address issues like staff turnover or mismatch between education and the labor market. Also, real estate developers could boost dual learning programs tailored to their specific needs.

DUAL LEARNING MODELS CAN BECOME AN ADDITIONAL FACTOR FOR COMPANIES

CHOOSING A SPECIFIC SITE. THEY COULD ACT SIMILAR TO HAVING UNIVERSITIES AND RESEARCH CENTERS NEARBY TO GUARANTEE A POOL OF SKILLED LABOR TO NEARBY BUSINESSES.



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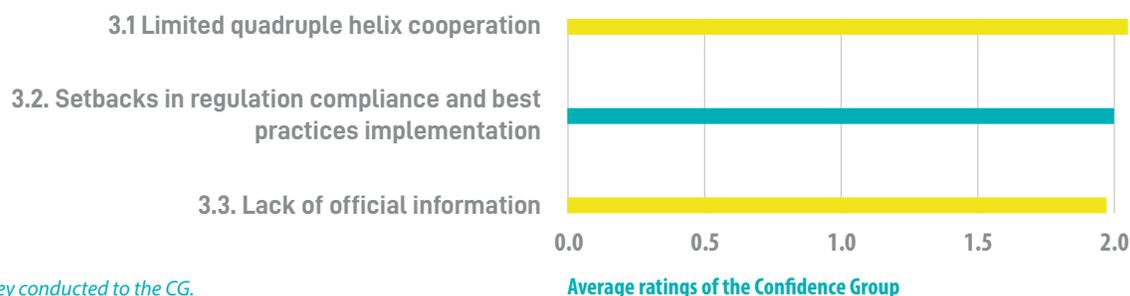
N E S

S E S

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Graph 6

PRIORITIZING WEAKNESSES FOR INDUSTRIAL PARKS ACCORDING TO THE CONFIDENCE GROUP



Source: Survey conducted to the CG.

3.1. Limited quadruple helix cooperation

While there is cohesion among industrial real estate developers, there is little dialogue with universities, international organizations, civil society, or even the government; whether due to lack of resources, time, interest or absence of the right spaces. **Cooperation between helixes is paramount to driving the development of any industry.**

For example, collaborating with educational institutions and research centers makes it possible to create programs, diplomas, and trainings suited to the needs of IPs and the tenants. Collaboration with international organizations makes it easier to stay up to date with the best and most advanced international practices on security, administration, or sustainability issues.

A restricted or non-existent dialogue with the surrounding community can generate antagonism to IPs. Particularly, unintended problems like transit, waste disposal, deforestation, and water scarcity mobilize the

population against a specific development. Finally, the lack of collaboration with the government, in its different levels, limits the scope of public policies and IPs to support industrial growth, and consequently, national development and well-being.

3.2. Setbacks in regulation compliance and best practices implementation

Quality among industrial parks in Mexico varies considerably because the Mexican Norm for IPs is not mandatory by law and there is no authority to enforce its compliance. Therefore, a gap exists between those IPs with world-class infrastructure and services and those that do not meet standard parameters and their respective regulations. Strictly speaking, those developments that do not comply with the standard should not be called IPs, despite being within the technical definition. This situation adds complexity to the generation of official statistics.

Part of the problem with compliance is related to a lack of commitment from developers to insist on quality. The reality is that world-class IPs in Mexico are the exception, not the rule.

Even those who satisfactorily comply with the **STANDARD** and follow regulations often remain reluctant to upgrade quality beyond the minimum requirements. This would mean investing in **CERTIFICATIONS, TECHNOLOGY, AND TRAINING.**

The following are examples of IPs' weaknesses related to quality:

- » **Strategic planning:** On the one hand, there is no single way to document the processes for creating a new industrial real estate development. Each developer has a methodology to keep records on how it buys the land, obtain permits, urbanize, construct the buildings, and operate the industrial park. Some don't keep records at all. As a result, when inspectors come, or the administration tries to apply for any certification, the necessary evidence is not available or up to date. On the other hand, the Mexican Industrial Parks Standard only sets the minimum requirements for any industrial park. It does not define any specific plan or process to create and operate one. Hence, the learning curve for new projects is long and costly. Often developers and authorities do not know the whole process and its requirements, leaving space for corruption.
- » **Infrastructure:** Some IPs have higher costs than anticipated for not knowing the procedures and regulations regarding energy, water, waste management, urbanization, and labor, to mention a few. For example, there have been cases where developers purchased land and installed ducts and wiring, but the area had restrictions on water and energy consumption. This is undoubtedly linked to a lack of strategic planning. Before acquiring the land, developers must make feasibility studies by asking the authority about resource availability and supply conditions. Otherwise, they may have additional costs to re-adapt infrastructure. The same is true for urbanization with signs, roads, and lighting, for instance, since all infrastructure is subject to mandatory standards and local regulations. All of these aspects are generally considered within the feasibility and impact studies.

» **Environmental and social responsibility:**

While an industrial park administration is not responsible for tenants' practices, a handful of IPs urge them to implement actions beneficial for the environment and the community, both inside and outside the premises. Others, more proactive, carry out mandatory measures such as recycling programs, using renewable energies, or installing common spaces for the well-being of workers.

» **Safety:** IPs often lack a "prevention culture" for not having a comprehensive strategy that includes safety protocols and training, contingency plans, and risk assessment. Another problem is the lack of a definition of internal procedures and records on property vulnerabilities. Some common issues are, for example, damaged perimeter fences, faulty closed circuits of video surveillance, few access controls, no cybersecurity protocols, and outdated protocols and equipment in case of an accident or natural disaster. Not having any safety-related certification increases the chances of having any of the above-mentioned issues.

» **Implementation of new technologies:**

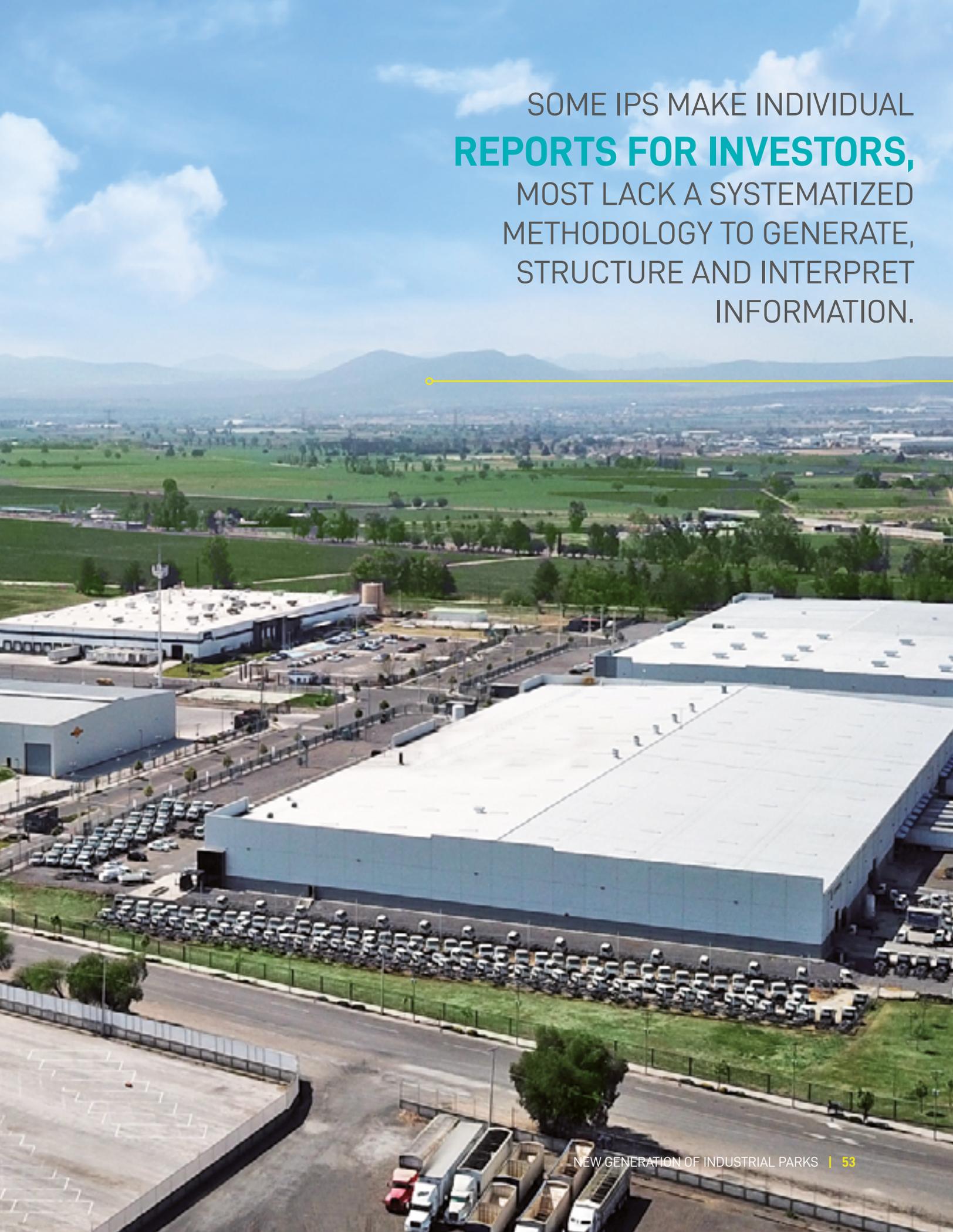
Nowadays digitization and automation are revolutionizing the way goods and services are produced. Thus, virtually every industry is investing in technology to improve. For example, in terms of security, IPs could use "the cloud" to store sensitive information instead of paper. Also, they could install camera systems with facial recognition software to monitor vehicles and personnel in real-time. However, few IPs have the resources and interest to identify potential technological improvements and carry out the corresponding implementation and operation.

3.3. Lack of official information

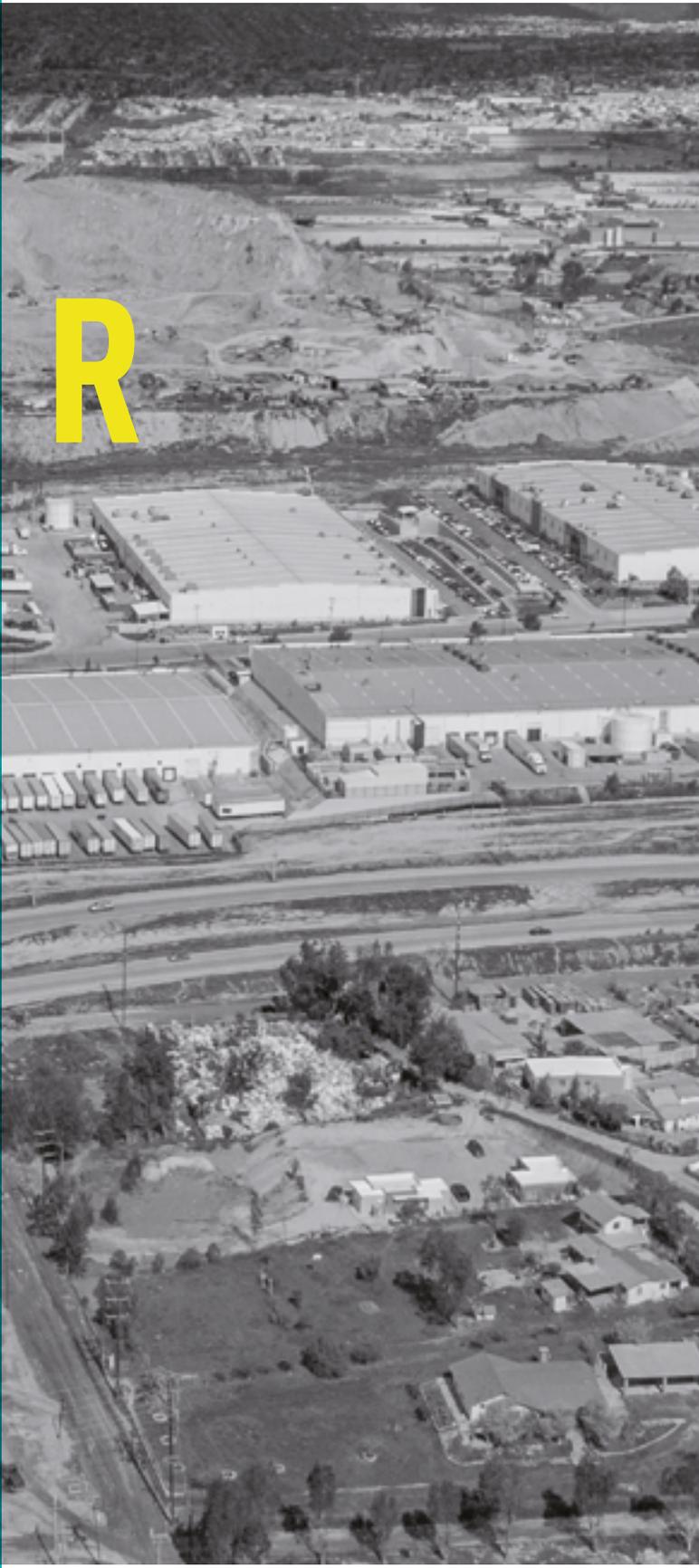
The Fourth Industrial Revolution allows companies and entire industries to generate and analyze immense amounts of information. Thanks to big data, it is easier to identify opportunity areas, make continuous improvements, and thus attain higher returns. However, **for IPs, the possibility of using data for business intelligence is limited. One reason is that there are no official statistics on IPs in Mexico. Another one is that there are few affordable tools available on the market that allow gathering and processing information in a standardized manner.** Such technologies would help developers be aware of market trends and thereby adjust their business strategies. At the same time, more information means better ways to justify collective actions to the government and the different stakeholders for the benefit of the real estate industry.

While **some IPs make individual reports for investors, most lack a systematized methodology to generate, structure and interpret information.** IPs daily produce lots of data about management and administrative activities, market behavior, employment, investment, inventory, marketing, tenants, and compliance with regulations. Despite the census efforts and indicators monitored by AMPIP, business intelligence units are much needed in each industrial park in the country to exploit all the information IPs produce.





SOME IPS MAKE INDIVIDUAL
REPORTS FOR INVESTORS,
MOST LACK A SYSTEMATIZED
METHODOLOGY TO GENERATE,
STRUCTURE AND INTERPRET
INFORMATION.



THREATS

4

Graph 7

PRIORITIZING THREATS TO INDUSTRIAL PARKS ACCORDING TO THE CONFIDENCE GROUP



Source: Survey conducted to the CG.

4.1. Uncertainty and volatility in the national and international contexts

Recientes acontecimientos en la arena nacional Recent events in the national and international arena have potential impacts on the supply and demand of the industrial real estate market in Mexico. The rise of protectionism in some of the most developed and globalized economies is creating a trade war dynamic. Countries now tend to favor domestic production, renegotiate or withdraw from trade agreements, implement regressive tax reforms, impose import tariffs, or ban individual foreign companies. While these measures end up primarily affecting consumers in those countries, for Mexico, they could indicate lower investment flows and exports. **In a world where protectionism makes it more difficult and expensive for companies to invest in and export from Mexico, the demand for industrial spaces could be severely affected.**

Furthermore, U.S. tariffs on steel and aluminum can affect the supply of IPs in Mexico, as they increase the price of the two most important raw materials for construction. In June 2018, after the U.S and then Mexico applied tariffs, construction materials cost increased on average 11.2%, the highest jump in the last decade (Centre for

Economic Studies of the Construction Sector, 2018). The most affected materials were steel bars with an increase of 31%, steel wire (28%), and mesh wire (22%). In particular, steel is a strategic material because it accounts on average for 18% of the materials used on a construction site. For IPs, this percentage is undoubtedly higher, considering that the structures and foundation of industrial buildings are made of steel. It is important to mention that about 46% of the steel used annually in Mexico comes from abroad, making its price is susceptible to the volatility of international context.

The rise of right-wing liberal governments in Brazil, Poland, India, Turkey, Thailand, and even the U.S. and the United Kingdom is intensifying the competition for attracting FDI. These governments advocate for deregulation measures, tax breaks, and reductions on the minimum wage, thus lowering the overall production costs. As a result, IPs in Mexico are going to face more intense international competition in order to bring investors and tenant companies.

On the other hand, at the national level, with the election of a left-wing government in 2018, Mexico begins to experience drastic changes with potential effects on the development and operation of IPs. President Andrés Manuel López Obrador is implementing radical austerity measures to combat corruption. He is downsizing the federal administration both in expenses and personnel. Some of the affected institutions are important for the creation and operation of IPs like the Ministry of Economy (SE in Spanish) and the Ministry of Communications and Transportation (SCT in Spanish). Moreover, the President has eliminated others, like the National Institute for Entrepreneurs, ProMexico, and the Tourism Promotion Council. Likewise, he has resorted to public polls to cancel large investment projects.

ALL OF THESE
CHANGES **GENERATE**
UNCERTAINTY TO
INVESTMENT
AND CREATE ADDITIONAL
COSTS FOR IPS AND THE
TENANT COMPANIES TO THE
EXTENT THAT CONTRACTS,
MEETINGS, AND SERVICES
ARE DELAYED OR CANCELED.



4.2. Impunity for corruption and organized crime

An essential component for economic activity is institutions that ensure the protection of private property and encourage competition. Without this, companies lack the confidence to plan for future growth (Acemoglu & Robinson, 2012). In Mexico, corruption and organized crime have consistently undermined businesses' confidence, including that of real estate developers. As long as institutions fail to punish both kinds of evil, Mexico won't be able to generate economic development, social well-being, and environmental sustainability at its full capacity.

Corruption increases IPs' operating costs and creates unfair competition. The lack of clearly defined procedures for obtaining several permits required by regulation obscures transparency for how state and municipal governments decide to grant them. Often, who pays more, gets the license first. Another situation where corruption is noticeable is related to conflict of interest. There have been cases in which authorities offer their privately-owned lands to investors interested in establishing a new plant, rather than suggesting an industrial park.

The Inter-American Development Bank estimates that economic losses related to organized crime represent, on average, 3% of the GDP in Latin American countries. Exporting companies, the main clients of IPs, have experienced theft, extortion, and even kidnapping while transporting

goods to the borders or a seaport. As a result, companies contemplate additional costs to buying products and services to protect workers, merchandise, and assets. IPs are also not exempt from additional security costs to mitigate the risks of organized crime.

Many developers have been forced to spend far more on surveillance services than in sustainable infrastructure. Both corruption and organized crime eventually end up making Mexico more expensive and, therefore, a less attractive destination for FDI.

4.3. Limited public sector view on IPs

Despite the beneficial essence of industrial parks, authorities have not fully recognized them as part of the infrastructure that drives social, environmental, and economic development in Mexico. IPs are not part of the public policies that encourage and coordinate strategic infrastructure. Neither the National Infrastructure Program, nor local urban development plans, or the infrastructure projects for functional regionalization (Tehuantepec Isthmus Interocean Corridor, Tehuantepec Isthmus Free Trade Zone, Mayan Train or the Northern Border Free Trade Zone) formally take into consideration IPs. Hence, the possibility of exponentiating FDI, employment, exports, tax collection, innovation, and the overall development and growth of businesses and workers is lost. By not understanding and thus not considering IPs in public policies, the government continues to have a limited perspective on the business model of these real estate developments.

As a result, **PERMITS AND LICENSES** are embedded with corruption or red tape, infrastructure and public services are insufficient or rundown, and regulation is misguided or unenforced. These issues combined make it **TROUBLESOME TO CREATE AND OPERATE AN INDUSTRIAL PARK IN MEXICO.**

Many state governments have tried to develop IPs on their own to create employment. Mostly, they sell the land at symbolic prices to incentivize companies to build their facilities. In fact, the current administration wants to develop six IPs of 500 hectares each in the Isthmus of Tehuantepec.

However, the problem with the government's industrial real estate development model is not having one. Often, the lack of planning and resources make it impossible to urbanize the land and create a permanent administrative entity. Also, in government transitions, projects are forgotten and abandoned. In light of this situation, private industrial developers can be strategic government allies. They have both the resources and knowhow to create and maintain such infrastructure but require favorable conditions.

One condition could be a specialized one-stop-shop for real estate developers. This government office could significantly improve time for creating and operating an industrial park, therefore, accelerating the recovery time of investment. Currently, for one permit or license, the same authority but different person, asks for the same documents several times to move forward with the process. Also, during government transitions, paperwork gets lost or is in standby, further delaying projects and involving additional costs for developers. Difficulty in finishing these bureaucratic procedures can be the difference between attracting job and generating FDI or not.

A good and frequent example is the permit to obtain electricity services, which illustrates several issues:

1. For the service feasibility application process, there is redundancy in documents requested from the National Energy Control Centre (CENACE in Spanish) and the CFE. Also, CENACE does not always recognize prior agreements with CFE and often demands new requirements. Response times are long and can take more than a year, delaying the arrival of new companies to IPs.
2. The request to be connected to the electric transmission network, using the CENACE Interconnection and Connection Request System, is unnecessarily rigid. The bureaucratic procedure does not allow to add more than one authorized person to follow up on the paperwork except the legal representative of the industrial park. In reality, it is the appointed manager who is up to date with the process of creating and monitoring an industrial park, not the legal person.
3. Regulations consider a fee for energy reserves requests above 200 KVA. Today, this threshold is insufficient to meet the high energy needs of modern industries.
4. When the government is unable to invest in energy transmission infrastructure, the Energy Regulatory Commission (CRE in Spanish) mandates that the industrial park will spend instead. CRE then uses a presidential decree on "Contributions" to incorporate the new infrastructure into the public network. These cases represent an expensive investment not contemplated by the developer in the original project, which is also not reflected in its tax balance sheets.

IPs also face significant challenges with water services. Because the amount of water authorized for consumption in concessions to private individuals is only valid for two years, IPs are permanently struggling to renovate this permit. **Regardless of the public service, it is a fact that IPs must have them operational at all times to give certainty to potential tenants. Currently, bureaucratic procedures are expensive and time-consuming, a situation that slows down the arrival of new investments to Mexico.**



TRENDS ANALYSIS

What can IPs do?

CHAPTER III

Chapter Two revealed what industrial parks in Mexico are good at. They can adequately provide quality infrastructure and services, undertake risks and long-term projects, attract investment and talent, and standardize processes, to mention a few. But IPs also have some flaws, like limited collaboration with third parties, lack in regulation compliance, and a shortage of official information. The previous chapter showed that IPs are excited about attracting logistics companies, taking advantage of international treaties, nearshoring, and new financing instruments. Yet, they are concerned about volatility in the international context, corruption and organized crime, and a limited understanding of the industry benefits by authorities. The SWOT analysis justified and highlighted the need for the industry to evolve. The next thing to do is identify the means to boost strengths, seize opportunities, counter weaknesses, and minimize threats. An analysis of the latest trends allows reviewing what others are doing and its impacts.

A trend occurs when multiple actors show the same behavioral patterns over time until it is normalized or disappears. Trends can define entire epochs to the extent that they become the standard.

Trends can define entire epochs to the extent that they become the standard. A trend may affect the business model of a company by making it obsolete or by activating advantages to make it disruptive and differentiated from the competition. It depends on whether the trend is ignored or embraced.

Therefore, identifying and analyzing trends is a crucial step in defining implementation strategies, resources, and objectives.

The CG acknowledges each trend in this chapter. All have a national scope but are international in essence. They are grouped into six different types:



SOCIETY



ECONOMY



BUSINESS



ENVIRONMENT



TECHNOLOGY



POLICY

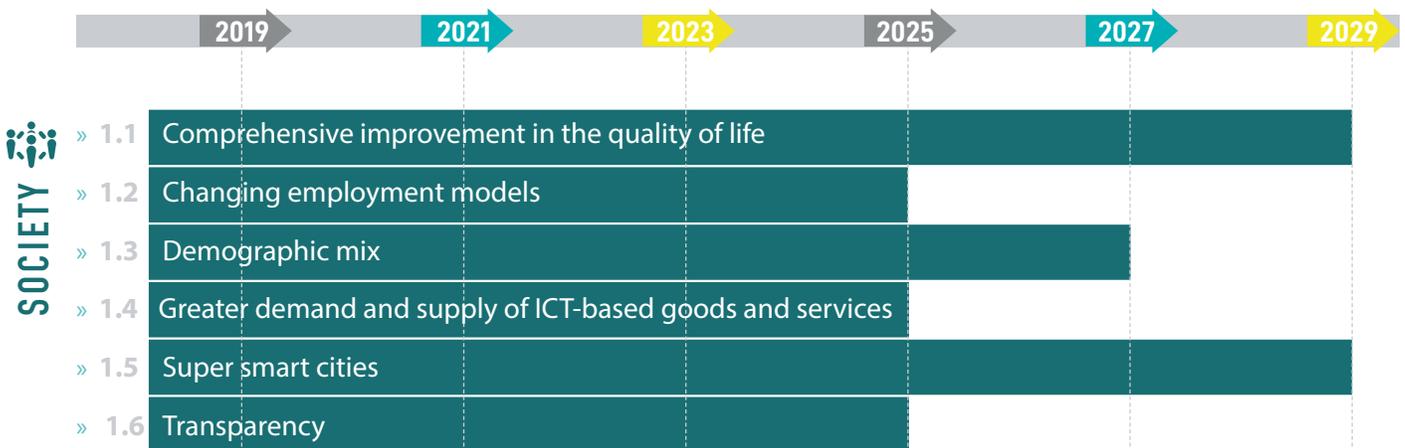
Trends are described and analyzed according to the effects on the industrial real estate industry, in some cases, for the construction industry. By grasping their implications, IPs can decide what to do as part of the industry's strategy.

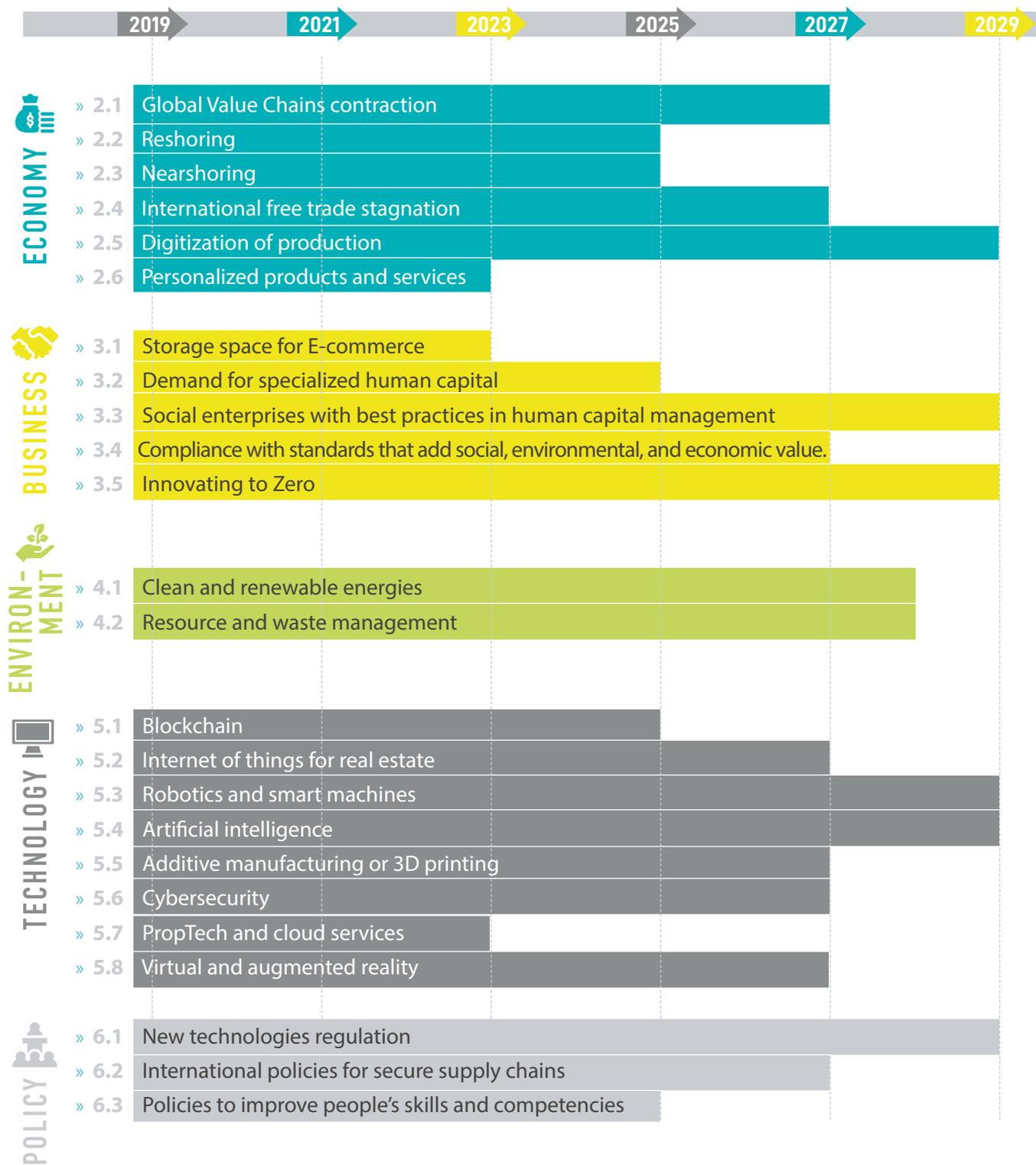
The following matrix lists every trend identified, analyzed, and agreed upon by the CG. The timeline provides an estimated period for every trend before it becomes a standard or irrelevant according to the CG. Likewise, the number before each trend indicates how relevant, on average, it is to the CG members.



Matrix 2
SOCIAL, ECONOMIC, BUSINESS, ENVIRONMENTAL, TECHNOLOGICAL, AND POLITICAL TRENDS THAT IMPACT INDUSTRIAL PARKS IN MEXICO

Estimated year for trend consolidation





1. SOCIETY

1.1. Comprehensive improvement in the quality of life

Workers' priorities are expanding beyond wages, into the quality of life. Physical safety and securing a patrimony are at the top the list of what people expect from a job, along with a life free of violence. Secondly, people want to spend time with family and friends. In third place, people care about total income and career opportunities. Other interests among workers are access to affordable prices for health and housing, education and training, environmental quality, and access to culture and recreational activities (Mercer, 2018). People in 2019 no longer worry only about the money.

When employers and governments do not review and seek to improve working conditions on a regular basis, workers feel worse-off resulting in low productivity, high employee turnover, and even strikes and demonstrations. For instance, the “yellow vests” protests in France began as a movement against the rise in fuel prices, but soon enough evolved to include demands for raising the minimum wage and pensions (Calm down, 2018). Likewise, in Mexico, workers of maquiladora companies at the border town of Matamoros went on a strike in early 2019 to demand the payment of bonuses, as well as wage increases (Forbes, 2019). The protests quickly grow in size and impact due to the presence of social media. Hence, workers, employers, and authorities must work together to implement mechanisms for continuous improvement in work-life balance.

1.2. Changing employment models

Internet massification, better information and communication technologies, and a higher interest in achieving work-life balance are transforming employment. **People can now work from anywhere at any time.** Thus, self-employment is rising, while hourly wage jobs are moving in the opposite direction. The sharing economy, with platforms such as Uber and Airbnb, intensifies employment transformation. It generates new ways of entrepreneurship and self-employment that affects the life-work balance, especially among younger people. By 2020, freelancers are expected to account for 50% of the global workforce (Kaufman, 2014). Therefore, companies need to adjust employment models to find new ways to attract and retain talent.

1.3. Demographic mix

As an economy develops, it tends to generate a “demographic time bomb”. High life expectancy, on the one hand, and low fertility rates on the other can become a dangerous mix for the economy. To sustain economic growth, the population needs to grow at a fertility rate of 2.2 kids annually (Kotecki, 2018). In countries like Japan, the United Kingdom, South Korea, and the United States, the rate is less than two children and continues to fall each year. Even some developing countries like Turkey, Brazil, China, Malaysia, and Mexico are following the same trend.

A demographic bomb explodes as the aging population puts pressure on public health and pension systems, while at the same time, the taxpaying workforce gets thinner. As a result,

labor becomes scarce and expensive, young people need more time and money to take care of their elders, and communities begin to depopulate, thus, the economy languishes. While allowing migration in can delay and even reverse this trend, countries are increasingly tightening controls to limit the flow of people across borders. Perhaps, Japan is the clearest example. The country has a negative fertility rate since 2008 and a marked economic stagnation since the beginning of the 21st century.

In this matter, **industrial parks can provide amenities like daycare for both kids and seniors to encourage employees to have children or feel at ease about their elders.** This way, IPs can become better at finding and retaining people to meet the labor demand of both tenant companies and the industrial park itself.

1.4. Greater demand and supply of ICT-based goods and services

The Fourth Industrial Revolution accelerates the incorporation of Information and Communication Technologies (ICTs) into virtually every aspect of people's lives and organizations' processes. Thanks to the internet, mobile electronic devices, and digital platforms, ordinary activities like reading, studying, working, trading, investing, having fun or relating to others are digitized, which means that they can be performed practically at any time and from anywhere. In addition to making such activities more accessible, more efficient, and even at a lower cost, ICTs also allow making better-informed decisions (Pilat, 2004). Thus, greater use of ICT in companies is related to improvements in competitiveness and productivity.

ICTs can offer several benefits for an organization. It can enhance communications internally and externally to identify and meet the needs of consumers, suppliers, investors, and any other actors relevant to the organization. Also, **ICTs allow real-time information tracking to generate reports and responses about performance, vulnerabilities, bottlenecks, and failures. Whether IPs keep investing in ICTs or not, it is a fact that digitally based solutions will continue to grow exponentially.**

1.5. Super smart cities

At the intersection of fast urbanization and a Fourth Industrial Revolution, the concept of smart cities emerged in the early 21st century. By investing in ICTs to upgrade urban infrastructure and services, city managers can make scientific decisions; in other words, operate as a responsive data-driven administration. This translates into a safer, healthier, and wealthier built environment for the inhabitants. Soon, smart cities will evolve to become super-smart cities. These are characterized by deep integration with ICTs to speed up procedures and permits, improve mobility with autonomous vehicles synchronized to the road network, and strengthen public safety through facial recognition on camcorders and drones (Deloitte China, 2017), for example.



SOME INDUSTRIAL PARKS ARE **PIONEERS ACTING AS LABORATORIES FOR TESTING TECHNOLOGIES FOR FUTURE SUPER-SMART CITIES**, THAT IMPROVE ENERGY, WATER, WASTE, AIR CONDITIONING, LOGISTICS, AND SECURITY SERVICES AND INFRASTRUCTURE (MAENOSONO, 2011). THUS, IPS WILL INCREASINGLY DEVELOP AS A VITAL PART OF AN INTELLIGENT NETWORK OF URBAN SERVICES AND INFRASTRUCTURE.

(Maenosono, 2011).

Thus, IPs will increasingly develop as a vital part of an intelligent network of urban services and infrastructure.

1.6. Transparency

Transparency involves institutional practices that encourage citizen participation, grant access to public information and make accountability mandatory for any organization, whether public or private. A business that endorses transparency tends to keep investors, authorities, workers, and customers alike well-informed and satisfied, thus generating trust in it.

INDUSTRIAL PARKS IN MEXICO
ARE BECOMING ADVOCATES OF:

- » **TRANSPARENCY**
- » **BUSINESS INTEGRITY**
- » **RIGHTS TO ACCESS
INFORMATION**
- » **ACCOUNTABILITY**
- » **LAW ENFORCEMENT**
- » **TRANSPARENT RESOURCE
MANAGEMENT**





In February 2019, AMPIP members signed the global initiative **“Alliance for Integrity”** to fight corruption and embrace transparency.



2. ECONOMY

2.1. Global Value Chains contraction

GVCs will continue to grow but at a slower pace. Digitization and automation of production based on IoT, advanced robotics, or AI could reverse the importance and length of GVCs (Schwab, 2018). As developed economies implement these technologies, they require less, yet more specialized staff.

Global companies will tend to automate and maintain in their home country more links of the production process, where they can source people with advanced technoscientific skills. Countries relying on the attraction of human-assembled manufacturing, like Mexico, could face lower FDI flows and therefore, lower demand for industrial spaces.

2.2. Reshoring

This practice involves companies, mainly from the U.S. and Europe, returning links from the production chain to their home country, especially from manufacturing. **Country risk, corruption, lack of protection of human and property rights, bureaucracy, insecurity, increase in labor costs, and inflation have traditionally been causes of reshoring.** However, since 2010, protectionism seeking “to return jobs”, once sent abroad by offshoring, is increasing the number of reshoring cases (Reshoring Initiative, 2018). As a consequence, FDI and jobs are lost in the host economy, while demand for industrial spaces drops. Although reshoring is not a

widespread trend among global companies (Banker, 2018), **IPs can discourage tenants' departure by maintaining value-added services and infrastructure.**

2.3. Nearshoring

Between offshoring and reshoring, there is a greater interest in regionalizing production by nearshoring operations. Under this arrangement, **global companies import nearly finished products and execute a final assembly within a factory in the country of origin.** Businesses have better control over production to ensure final delivery to the consumer in the shortest time (Sourcing Journal, 2019). For countries like Mexico, which are geographically and culturally close to major consumer markets and global business headquarters, nearshoring represents an opportunity (Forbes, 2014). **It is a trend that stimulates the demand for industrial spaces in Mexico, mainly to supply the North American market.** Nevertheless, it could also mean less FDI flows from further away countries.

2.4. International free trade stagnation

The geopolitical context is turning averse to international free trade. Protectionist practices like import quotas and tariffs, as well as tax benefits and subsidies to domestic industries, hamper fair competition. Furthermore, multilateral negotiations backed by the World Trade Organization (WTO) through the Doha round remain stagnant due to a lack of consensus. Likewise, the number of new or expanded regional trade agreements (RTAs) is reduced. In 2009, new RTAs reached an all-time high of 36 notifications to the WTO; by 2018, there were only four (WTO, 2019). Trade agreements are decisive for global economic growth because

they set the rules for controversies, eliminate non-tariff barriers, protect investors, and reduce tariffs between partner countries. Without them, global free trade remains paralyzed.

A weak WTO and fewer RTAs mean less FDI flows to produce and export from different countries and, therefore, restricting the demand for industrial spaces. Additionally, a tighter monetary policy with upward interest rates, as well as inflationary pressures and higher levels of debt, could start a global economic downturn in 2020 (Roubini & Rosa, 2018; NAIOP, 2018). Although a recession is normal and inevitable because of the nature of economic cycles, the current geopolitical context adds complexity to finding solutions at the international level to mitigate its effects. **The real estate industry is among the most affected during an economic crisis, so companies must take preventive measures such as reviewing the financial liquidity, contractual obligations, dependence on government purchases, foreign currency debt, or diversifying assets.**

2.5. Digitization of production

ICTs are transforming physical-economic activities into digital ones. In fact, the digital economy is expected to outperform the physical by 2050 (Arthur, 2011). The real estate industry is quickly adapting to the digital era. **Fundamental activities like funding a development, sell or rent properties, visiting a site, preventing fraud, or managing contracts can now be done efficiently with a computer program.** As more productive activities rely on ICTs, the digital transformation will continue to revolutionize the commercial, residential, and industrial real estate alike.

2.6. Personalized products and services

During the Second Industrial Revolution, mass production resulted in a standardization of goods and services in terms of quality, functionality, and appearance. By contrast, **the Fourth Industrial Revolution ICTs enable a much more personalized production of products and services based on people's tastes.** Consumers are increasingly aware, demanding, and flexible with the products' characteristics and costs while beginning to take an interest in the co-production (Adecco Group, 2017). For example, technologies like additive manufacturing or 3D printing allows people to have customized designs before production.

Both the supply and demand for customizable goods and services will continue to grow across industries. Hence, the global economy will gradually depend more on mass customization rather than mass production (Nagle, 2017). Although this trend entails significant challenges in terms of design, construction, and costs for the real estate industry, **IPs have been listening to the particular needs of customers by offering custom-built and equipped properties.**





3. BUSINESS

3.1. Storage space for E-commerce

E-commerce is ubiquitous, has a global scope, levels the field for competition, and is growing extremely fast. In the United States, the largest online market, e-commerce sales accounted for USD 453 billion in 2017 and are expected to exceed USD 525 billion by 2023 (Pfister, 2018). Cross-border e-commerce will expand from 15% in 2018 to 22% by 2020 as a share of total global online sales (Manners-Bell, 2018). In Mexico, banking operations related to e-commerce recorded USD 16.22 billion in 2018, 59% more than the previous year (Galeano, 2019). This trend is making manufacturers, distribution centers, and retailers modify supply chains to meet the expectations of online consumers. Hence, companies worry more about delivery times, managing possible returns, and, most of all, having enough storage spaces.

Increased online sales and a lower rent cost per square meter in a warehouse rather than in a retail store translates into more demand for space in industrial parks. As the demand for warehouses expands together with e-commerce, IPs will tend to specialize in services and infrastructure for the logistics needs of companies. For every USD 1 billion growth in e-commerce sales, an additional 115 thousand m² of storage space is necessary (Pfister, 2018). In terms of location, online companies need distribution and storage centers to be as close as possible to urban centers, preferably in the city. Likewise, online

businesses need reliable nearby express delivery companies for the “last mile” sometimes in less than 24 hours after the purchase.

For storage space features, companies expect buildings and warehouses that can accommodate automation and expansions. For example, floors have to be perfectly leveled, with the possibility of equipping it with sensors to allow robots to operate effectively. Furthermore, ceilings height has to be above 12 meters to accommodate larger pallet rack systems and handling equipment. Also, ceilings must be resistant to support larger air conditioning systems. The capacity of an industrial warehouse is no longer measured only in m² but also in available cubic space (m³) (Bisacchino, 2016). Thus, IPs need to profit on the cubic space demand by conceptualizing and building taller spaces for storage.

3.2. Demand for specialized human capital

Industry 4.0 is radically transforming the skills set needed by companies. So much so that around one out of every ten jobs in G20 countries is at risk of being entirely replaced by automation by 2025. In that same year, nearly 60% of workers will carry out tasks that did not exist in 2017 (Adecco Group, 2017). High-tech companies search for people with a mindset that is critical, agile, multicultural, communicative, interdisciplinary, and empathetic. Yet, skills like creativity, planning, innovation, resilience, problem-solving, analytical reasoning, and leadership will continue to be relevant in the near future. **Some examples of new job positions in real estate will be data detective, man-machine team training manager, augmented/virtual reality tours designer, well-being supervisor, and customer experience manager.**

3.3. Social enterprises with best practices in human capital management

More businesses want to become a “social enterprise” to attract and retain talented people. This status implies greater collaboration and integration between areas of the organization, as well as a genuine commitment and involvement to generate socio-environmental impact in the community around it. Besides, people no longer want to be treated as a “human resource”; instead, workers want to serve a purpose within an organization and attain work-life balance.

Approximately 65% of global companies’ CEOs consider “inclusive growth” as one of their top three concerns, even above “shareholder value” (Deloitte, 2018). When this is the case, organizations tend to have more initiatives like continuous training, generational adaptation programs, gender and diversity inclusion, volunteer programs, and donations to charities. Moreover, Fortune Global 500 companies alone spend about USD 20 billion a year on social programs and activities. They also incorporate performance indicators to measure the quality of the working environment and the organization’s impact on the community.

Industrial parks have the potential of being social enterprises with enormous impact if they involve tenant companies. On the one hand, IPs can provide plenty of amenities to improve workers’ experience inside the premises, for instance, green and recreational areas, nurseries, business centers, health and first aid centers, retail space, ATMs, bike lanes, or public transport. On the other hand, industrial park administrations can implement social initiatives that improve business competitiveness while transforming

the economic, social, and environmental conditions of the communities where they operates.

3.4. Compliance with standards that add social, environmental, and economic value

The Sustainable Development Goals (SDGs) developed by the United Nations (UN) define the path that the entire world must follow to ensure the continuity of our species. Several organizations have developed standards and certifications based on these objectives to measure and evaluate businesses' performance. Putting them in practice has become a capacity building catalyst and a remarkable reference for investors. Examples of international standards for the real estate industry include:

» **Environmental, Social and Governance (ESG) standard.** It evaluates a company's relationship with the environment and examines the relationship with employees, suppliers, customers, and the community where the business operates. Also, the standard observes the company's leadership, payments to executives, audits, internal controls, and shareholders' rights. Critical ESG indicators for investors include the impact of the company on climate change measured by carbon emissions, water management, and conservation efforts, anti-corruption policies, diversity on the board, respect for human rights, and support to the community.

» **WELL standard.** Awarded by the International WELL Building Institute (IWBI), this standard seeks to improve people's health in buildings and communities around the world. With the vision of creating inclusive, integrated,

flexible communities and organizations that promote the generation of high-level social commitments, the WELL standard evaluates ten parameters: air, water, food, lighting, people's physical condition, temperature, noise, materials, mental health, and community development.

» **B-Corp standard.** It evaluates how well-balanced companies are between profit generation and their impact on employees, customers, suppliers, communities, and the environment. This certification validates and awards companies that prioritize social impact while generating economic benefits. It has become a forerunner for a global movement of business leaders seeking a fair and prosperous society for all.

» **Leadership in Energy & Environmental Design (LEED) standard.** Backed by the U.S. Green Building Council, the standard aims to certify sustainable buildings that allow a global improvement in the environmental impact of the construction industry. It evaluates the sustainability of buildings based on energy efficiency, the use of alternative energies, indoor air quality, the practicality of free spaces, materials selection, low cost of maintenance, among others. It is currently the most widely used "green" construction certification in the world and is available for any construction project.

FINSA



FINSA

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AVAILABLE SPACE

3.5. Innovating to Zero

More businesses embrace the mega vision of achieving zero emissions, zero accidents, zero defects, zero safety violations. Even though innovating to zero is ambitious, **organizations with this vision are more likely to be disruptive, stimulate productivity, and develop new products and services** (BCG, 2017). Coupled with other international standards, innovating to zero not only ensures social and environmental benefits, it increases profit margins and reduces risk perception from the company too. As a result, companies with this vision become more attractive for investors.



4. ENVIRONMENT

4.1. Clean and renewable energies

Clean energy comes from electricity generation processes with zero or very low carbon emissions, such as nuclear, hydroelectric, or solar power plants. Renewable energies, in particular, are the cleanest because they depend on natural phenomena generated continuously or periodically from wind, sun radiation, ocean and river movement, or geothermal deposits.

Both governments and companies invest more in clean and renewable energies to reduce environmental impact. In 2017, half of the Fortune 500 companies had at least one goal established to reduce greenhouse gas emissions, increase energy efficiency, or take advantage of renewable energy (WWF, 2017). With such objectives, organizations actively fight global warming and climate change, while reducing costs and even by generating additional revenue streams. Many companies now choose to settle in energy-efficient properties powered by renewable energy sources. Thus, the real estate industry is having more demand for green buildings.

For industrial parks, a transition to clean energy is perhaps more straightforward than in other real estate segments. IPs tend to have vast tracts of land where to install renewable energy sources, especially photovoltaic solar cells, and wind turbines. They can even take advantage of roofs and parking lots for installation. The benefits for developers include raising assets value, savings in energy

consumption, achieving green certifications, meet corporate sustainability goals, attract global tenant companies, earn tax incentives, and generate additional revenue from selling energy surplus.

4.2. Resource and waste management

SDGs encourage best practices for sustainable resource management, as well as strategies to reduce waste. Sustainability requires that the process of extraction and transformation of a resource guarantees its renewal and permanence in the long run. Additionally, these processes should not compromise the environment, society, and the economy. As a practice, sustainable resource management has become relevant for manufacturing companies in industrial parks thanks to international programs like Industrial Area Competitiveness through Sustainability Program (PROCAIS in Spanish) and the Renewable Energy Cooperation Programme (RECP).

PROCAIS, developed by the German agency GIZ, focuses on planning, implementing, and documenting innovative measures to improve resource management, safety at work, and gender equality in IPs. Similarly, the RECP, developed by the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Program (UNEP), seeks to increase production efficiency and, at the same time, reduce risks for humans and the environment. For example, it promotes the rational use of energy in inputs and finished products transportation.

Furthermore, the **RECP** considers three dimensions of sustainability, both individually and synergistically. First, higher economic

performance through better productive use of resources. Second, environmental protection by preserving resources and minimizing the industrial waste impact. Finally, social improvement by providing jobs and protecting the well-being of workers and communities.

5. TECHNOLOGY

5.1. Blockchain

This technology is becoming increasingly popular for digital transactions. It is practical, instantaneous, ubiquitous, and has exceptional security protocols; thus, it is expanding beyond cryptocurrencies where it began. Its expansion is happening so fast that by 2025, around 10% of the world's GDP will depend on this technology (WEF, 2015). Similar to a transaction log electronic book, blockchain enables micropayments and crowdfunding, protects identity and copyrights, can handle smart contracts, verify actions, safeguard voting systems, among many other applications.

For the real estate industry, three potential applications stand out:

- » **“Tokenization”** means using a cryptocurrency to divide assets value, wholly or partly, into tokens stored in the blockchain. These tokens can be bought and sold not only by large groups of investors but also by smaller ones to finance any project.
- » **“Smart contracts”** reduce the number of intermediaries in any given transaction, like brokers or lawyers. The seller includes all the property details while the buyer adds its information in an encrypted and secure smart contract. Computer protocols verify the transaction conditions, and it is not completed until both parts met all the predefined terms. Thus, transactions can be completed in a short time and with fewer chances of fraud.



» Adding “**property titles**” to the blockchain can save time and money when it comes to verifying the information. With the property titles online rather than on paper, it is possible to eliminate the need for title insurance and also update information about construction, damage, or upgrades related to the property much faster. Indeed, blockchain technology provides greater certainty to any transaction concerning a property.

5.2. Internet of things for real estate

IoT is transforming every facet of buildings, from design and construction to occupancy and management. The IoT ecosystem of solutions for the real estate and construction industry is rapidly growing (Levy, 2017). These are some of the latest applications:

» **Building Information Modelling (BIM)** is a process to generate an intelligent 3D model of a building’s structure and internal systems during design and construction. Any changes can be easily incorporated, and the software simultaneously reviews and updates all the other plans that may be affected. Once a building is in operation, the BIM uses smart sensors installed in the building to monitor and model patterns in, for example, energy and water consumption, changes in temperature or movement of people. Additionally, all of this information can be analyzed to refine future projects.

» The installation of **smart sensors in a building’s support system** can reduce its overall impact on the environment. These can control and distribute air, energy, and water rationally throughout the building. Smart eco-buildings turn off redundant support systems automatically when unoccupied, or close pipes

in case of leaks. They can also open and close blinds to maximize sunlight, for example.

» The use of **prefabricated building components** is faster and cheaper than traditional construction methods and contributes to reducing construction waste. However, using numerous prefabricated parts can be complex to coordinate. IoT is helping to address this problem with radio frequency identification sensors to track prefabricated components along the supply chain. These sensors mitigate delays while allowing a real-time representation of the building’s progress with several project performance indicators.

» **Construction equipment and machinery upgraded with sensors** for predictive maintenance can save time and prevent delays in construction projects. Through remote monitoring of fluctuations in indicators such as temperature or vibration, it is possible to detect abnormal patterns to issue maintenance alerts for workers before the equipment fails.

5.3. Robotics and smart machines

Scientific advances in mechatronics and robotics are rapidly moving into practice. **The real estate and construction industries begin to implement semi-autonomous machines in dangerous or highly repetitive tasks to improve quality, productivity, and efficiency.** For instance, robotic arms can pre-assemble concrete, brick, steel, and wood structures. Autonomous rovers equipped with various sensors can dodge obstacles, transport materials, navigate the construction site to monitor personnel safety and structural integrity.

Moreover, exoskeletons help to protect workers from injuries in physical activities and to increase the capacity and speed of the task. Drones are commonly seen in construction sites for progress inspections, study vast areas of land in a few minutes, and to ensure workers stay out of harm (Mills, 2019). Together, the new generation of robots and smart machines will significantly improve safety and productivity in the construction of industrial parks.

5.4. Artificial intelligence

AI-based algorithms developed by start-ups in real estate are just entering the market. There are three AI applications gaining popularity among developers:

- » **Project programming optimizers** can rely on big data to consider millions of alternatives for project delivery and continuously improve the overall planning process.
- » **Image recognition and classification software** from video footage collected on construction sites can identify and analyze behavior patterns to inform future training priorities.

- » **Enhanced analytical platforms** can collect and analyze sensors' data in a building, understand patterns, and implement real-time solutions, thereby reducing costs, prioritizing preventive maintenance, and avoiding unplanned downtime. (White, Fuchs, Parsons, & Joao, 2018)

AI can make industrial buildings smart; in other words, capable of self-management and pro-actively assist tenants. Pioneers in this technology will set the direction of the industry and exponentially reap the short- and long-term benefits.

5.5. Additive manufacturing or 3D printing

More and more real estate developers are using 3D printing to deliver high-quality products with precast components. Some noticeable advantages for the industry include:

- » **Significant time reduction** between placing an order for prefabricated materials or parts and its processing.
- » 3D printing grants **flexibility in prototyping** while monitoring in real-time the manufacturing process for a more customizable product.
- » It represents a sustainable construction method because it **optimizes the use of raw materials** than standard component manufacturing techniques. Hence, it significantly reduces waste.
- » It **allows leaving empty spaces inside structural components** to place wiring, piping, and other support services (Haag, 2018).

In spite of manufacturing challenges in terms of affordability and accuracy, real estate developers are already experimenting and innovating with 3D printing.

5.6. Cybersecurity

As companies digitize, security concerns arise regarding sensitive and critical information for the business. All digital technology is vulnerable to cyber-attacks. For example, attackers can exploit IoT vulnerabilities to take control of a building, uncrewed vehicles, or even sensitive information to ask for a ransom, sell, or destroy it. The more users and devices are connected to a network, the more digital security protocols have to be robust concerning identity management, data breach, and information protection. Therefore, more real estate companies tend to implement cybersecurity strategies to identify which ICTs systems are at risk.

5.7. PropTech and cloud services

The real estate industry is frequently using cloud-based solutions for project development, financing, rental, property management, or remote control and access to data. A new sector known as property technology or PropTech is creating these platforms based on cloud technology to increase transparency, information protection, real-time tracking of databases, workflows, sites, geolocation of personnel and assets, and transaction status. Since people can access information wherever and whenever, PropTech platforms are significantly improving communication within companies and also with customers and suppliers.

There are few PropTech start-ups developers around the globe, but they are proliferating. District Technologies offers a smart construction application that allows developers to create unique building experiences for end-users. Datscha has a platform that identifies and locates suitable land for construction in seconds.



Additionally, it runs property analysis and site evaluations. Dalux digitizes the construction process from design to facility management. Finally, Proda has an AI-powered software for real estate data standardization in Excel.

5.8. Virtual and augmented reality

AR and VR are a fast-growing industry with the ability to stimulate growth in others. It is expected to become a USD 30 billion industry by 2020 (Liu, 2017). **In the real estate and construction industries, the number of companies that are offering AR or VR services is on the rise. Both technologies are changing the way people visit and interact with properties.** They facilitate the promotion of buildings still under construction with 360-degree videos or virtual “tours” on the devices of customers or sales agents anywhere in the world, without limiting purchase or rental decisions to physical visits.





Bearing 1

41

Stator 3

39

Stator 4

42

Stator 6

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Stator

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Stator

9



6. POLICY

6.1. New technologies regulation

The Fourth Industrial Revolution is transforming the economy, society, and environment like never before. As a result, governments and international organizations began to generate rules to frame its boundaries and guarantee benefits for all. The OECD has done efforts to harmonize regulations across countries on global industries like e-commerce to protect users and their information without creating barriers to productivity and trade flows.

For emerging industries, some countries are creating sandbox regulatory frameworks, which are flexible enough to adapt over time and enable tech development. For instance, financial technologies or FinTech have regulatory sandboxes in a handful of countries such as the United Kingdom, Singapore, and Mexico. Real estate and construction businesses should advocate for similar legal frameworks for PropTech to enhance everyone's growth.

6.2. International policies for secure supply chains

Since the terrorist attacks in 2001, the world has seen an intensification of security controls in the flow of people and goods. Governments and international agencies have since promoted safety tangible and intangible supply chains to prevent smuggling, terrorism, money laundering, and, more recently, hacking. Several public programs seek greater standardization on how customs

authorities review procedures and certify compliant companies. The main objective is to shield the entire chain of global enterprises.

Some examples of such programs are “Customs-Trade Partnership Against Terrorism” (C-TPAT), “Partnership In Prosperity” (PIP), and “Authorized Economic Operator” (AEO). This last program, developed by the World Customs Organization (WCO), encourages companies in global supply chains to implement meticulous security protocols to minimize risks. Since tenants tend to request such certifications and some governments award with unique benefits for meeting the requirements, both tenant companies and industrial parks are contributing to more secure supply chains.

6.3. Policies to improve people’s skills and competencies

Technology has a positive effect on prosperity, as long as countries implement appropriate policies to develop highly skilled labor (Goran, 2015). Also, because talent is increasingly important to attract FDI (OECD, 2002), **governments must continuously work on education and labor policies so that new generations have the skills needed by the Fourth Industrial Revolution.** With this in mind, the World Labor Organization (WLO) established the World Commission on the Future of Labor in 2017. The Commission brings together the quadruple helix to analyze the relationship between society-work-technology. Its purpose is to design strategies to face the challenge of job creation without neglecting social welfare. Likewise, the Commission will prepare school and training plans, so people acquire the skills and knowledge necessary.

Programs like the dual training model have become more present around the globe. For companies, it represents savings related to the costs of hiring and training employees. Also, it develops the specific skills that the organization needs. For apprentices, a dual training model means job opportunities at the host company, develop skills and competences, and economic support while studying. For the government and society, it contributes to reducing youth unemployment and crime. While Mexico has joined this trend with the Mexican Dual Training Model, these types of initiatives need more impulse from the quadruple helix to succeed.





advance
REAL ESTATE

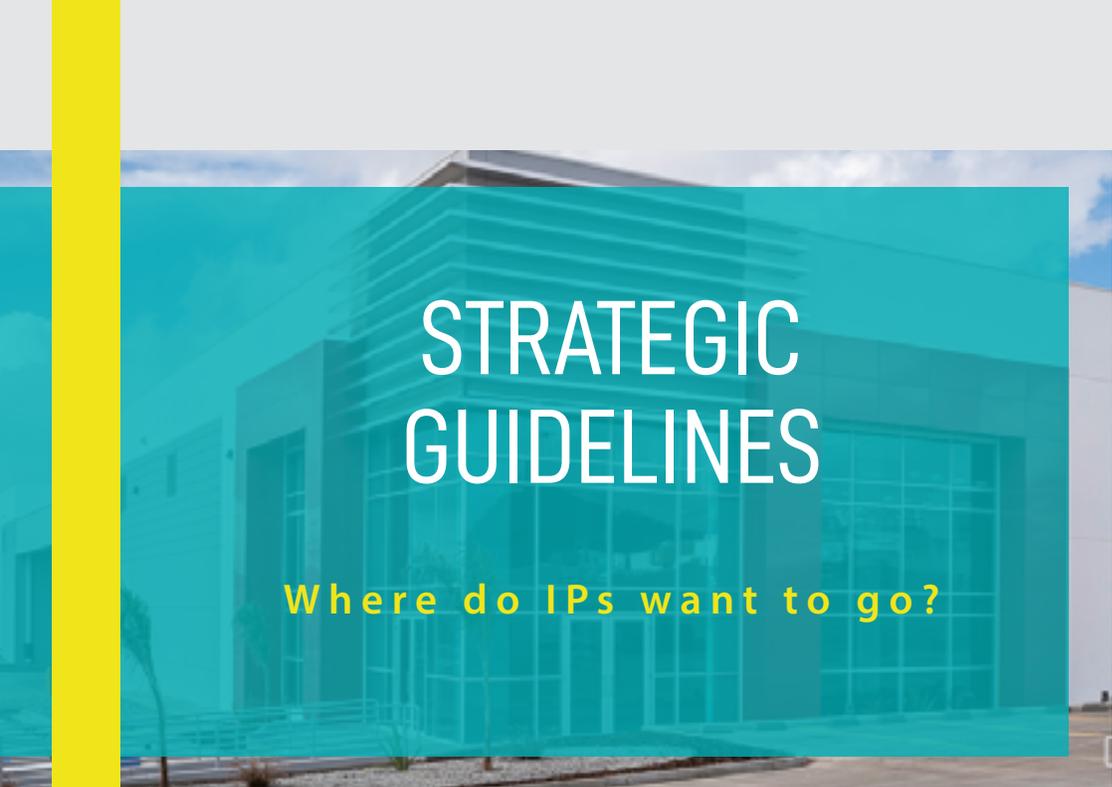




PART TWO:

INDUSTRY
STRATEGY





STRATEGIC GUIDELINES

Where do IPs want to go?

The variety of topics presented in the SWOT and trend analysis puts into perspective the vast possibilities and the high potential of the evolution of the industrial real estate industry in Mexico. But first, it is necessary to define the destination; in other words, what IPs want to become in the coming years.

The CG prioritized each strength, weakness, opportunity, threat, and trend throughout the workshops, individual interviews and an online survey. The strategic guidelines are based on all of these elements. Their purpose is to establish what IPs are looking for and also contribute to articulate Roadmap's strategy. The guidelines consist of a Massive Transformative Purpose (MTP), five general approaches, and a series of international standards to take into consideration.

The strategic guidelines are postulates that reflect the aspirations of the industry. They align, motivate, and compromise individual and collective efforts towards a shared long-term vision. Accurately, the MTP is represented by an aspirational motto, which provides a unified purpose of a shared future. The five general approaches frame the efforts towards the MPT. Finally, the standards work as metrics in different fields to measure progress and assess project performance.

CHAPTER IV

1. IPS MASSIVE

TRANSFORMATIVE PURPOSE

The concept of MTP is the one single element shared by the 100 fastest growing organizations in the world (Ismail, 2014). A MTP tends to be bold, broad, and aspirational. It intends to cause transformation in the community, industry, and the planet. Besides, an MTP provides meaning behind the work done while inspiring and uniting efforts.

IPs are more than a real estate business that provides space for manufacturing and logistics companies to occupy. They constitute a strategic industry capable of enhancing development and well-being for the country, comprehensively by balancing benefits for the society, economy, and environment. IPs can generate development, they provide competitive infrastructure and value-added services, attract domestic and international companies, create employment, drive urban growth, respect the natural ecosystem around, and engage with neighboring communities. IPs can generate well-being by providing infrastructure and services that can increase people's safety and health, aid tenant companies become more productive in the context of i4.0 by improving working conditions, wages and skills, well-planned urbanization, sustainable management of resources, and help local communities feel supported rather than threatened.

As of 2019, only a couple of industrial parks generate development and well-being in those terms. Throughout the elaboration of this

Roadmap, there was no doubt that many want to participate. Additionally, IPs now have the know-how and the means to produce high-quality infrastructure and services capable of creating social, environmental, and economic value. Therefore, with commitment and passion, **the MTP of industrial parks in Mexico is to make possible the evolution towards a more sustainable and smarter industrial infrastructure.** This way IPs can, ultimately, contribute to the development and well-being of Mexico. To achieve the MTP, IPs defined five approaches to consider.

2. APPROACHES

The approaches that will frame the MTP of IPs in Mexico are:

-  1. Information management
-  2. Standardization
-  3. Institutional linkages
-  4. Sustainability
-  5. Digital transformation

Complementary to each other, they provide scope to each milestone and strategic project.

2.1. Information management

It refers to **holistically improve the systems related to the generation, collection, processing, representation, and dissemination of information IPs**. The lack of official and accurate data on things such as the number of IPs in the country, internal management, job creation, investment attraction, inventory, tenants, compliance with regulations, among others, is a critical weakness for the industry.

Even with AMPIP's efforts, the information collected is insufficient to detail the industry's performance, impact, and evolution. A constant flow of information could significantly benefit IPs to anticipate problems, encourage continuous

improvement, make assertive decisions, and facilitate cooperation. New technology trends operate based on massive amounts of data; without proper information management mechanisms it will be difficult for them to boost the sector.

2.2. Standardization

On the one hand, IPs have important strengths concerning their competitive, differentiated, and value-added infrastructure as well as a standardized business model. On the other hand, they also face a significant weakness. There is a broad gap in compliance with regulations and implementation of best practices between IPs in aspects like strategic planning, infrastructure, security services, environmental protection, social responsibility, and application of new technologies. An approach to standardization intends to close the gap in every aspect. Standardization involves regularly **sharing best practices, motivating actors to certify to the highest national and international standards, communicating the benefits of complying, and raising competitiveness throughout the country**.

2.3. Institutional linkages

As detailed in the SWOT analysis, the lack of institutional linkages between IPs and actors from the government, academia, and civil society is an industry weakness. Likewise, uncertainty and volatility caused by drastic changes in the national and international context is a

continuous threat. However, both can be appeased with effective communication and cooperation mechanisms. **By fostering greater collaboration between actors in and out of the industry in the planning and operation processes, IPs could boost FDI attraction, employment generation, exports, sustainable use of resources, and innovation.**

2.4. Sustainability

More and more industrial park developers in Mexico want to have initiatives that benefit the society, economy, and environment equally, in line with the SDGs. A sustainability approach aims at **minimizing waste, lowering CO2 emissions, using water and energy responsibly, and improving people's lives in and out of the industrial park, for instance.**

2.5. Digital transformation

The Fourth Industrial Revolution is rapidly transforming society, economy, business, policy, technology, and the environment. Implementing new technologies like IoT, VR/AR, AI, cybersecurity, PropTech, 3D printing, and smart machinery, equipment and vehicles to upgrade infrastructure and services represents a significant comparative advantage in today's market and multiple future opportunities. Fortunately, the industrial real estate industry has the strength of taking risks and long-term projects, something necessary to adopt new technologies. A digital transformation approach is likely to make water and energy use more efficient, strengthen risk prevention systems, improve safety, and reduce costs.



3. STANDARDS

A standard works as a benchmark for measuring and evaluating each strategic milestone —key and specific moments in the development of the industry as a whole— and related projects —the series of actions necessary to complete a particular milestone. At the same time, standards allow identifying deviations from the MTP, as long as they frame institutional capacities and responses. At the operational level, standards also help industrial park managers to plan and operate based on international best practices.

Currently, the performance indicators from the “International Framework of Eco-Industrial Parks”, jointly developed by UNIDO, World Bank and GIZ, are the most advanced series of standards entirely based on IPs’ best practices around the world. Similar to the MTP, the Eco-Industrial Parks framework strives to support the creation of “industrial developments that guarantee sustainability through the integration of aspects of social, economic and environmental quality into location, planning, management and operation” (World Bank, 2017).

Therefore, the Roadmap builds on this effort, adjusting it to the reality of IPs in Mexico. The framework classifies standards into four categories: social, economic, environmental, and administration. The following sections expand on the standards available for each type, the issues covered, and some examples.

3.1. Social

The Eco-Industrial Parks framework defines 15 standards covering three social issues: social management systems, social infrastructure, and engagement with the local community. Two examples of standards are: “The park administration provides accessible communication platforms or other means to maintain a regular dialogue with the community and relevant civil society organizations, such as newsletters, regular press releases, information display panels, and cultural and sports events.” and, “At least 75% of companies in the industrial park with more than 250 employees have a system of prevention and response to harassment.”

3.2. Economic

There are nine standards covering three major economic issues: job creation, local businesses and small and medium-sized enterprises promotion, and economic value creation. An example is: “At least 60% of plant workers in the industrial park are employed through direct jobs with permanent contracts, i.e., not for fees or subcontracted by third parties.”

3.3. Environmental

The Eco-Industrial Parks framework defines 19 standards covering five environmental issues related to management and monitoring, energy, water, waste and materials use, and global warming and the natural ecosystem. Two examples of environmental standards are: “There are programs and supporting documents to improve the energy efficiency of tenant companies, especially for the 50% of higher energy consumption” and “The industrial park administration has a plan to assess the environmental impacts of the operation of companies and aims to limit their impact on the local ecosystem.”

3.4. Administration

It defines five standards covering three issues concerning the administration: risk monitoring and management, planning and zoning, and park management. An example is

“AT LEAST 75% OF
RESIDENT COMPANIES
INDICATE **SATISFACTION**
WITH THE PARK'S
PROVISION OF SERVICES
AND COMMON
INFRASTRUCTURE.”



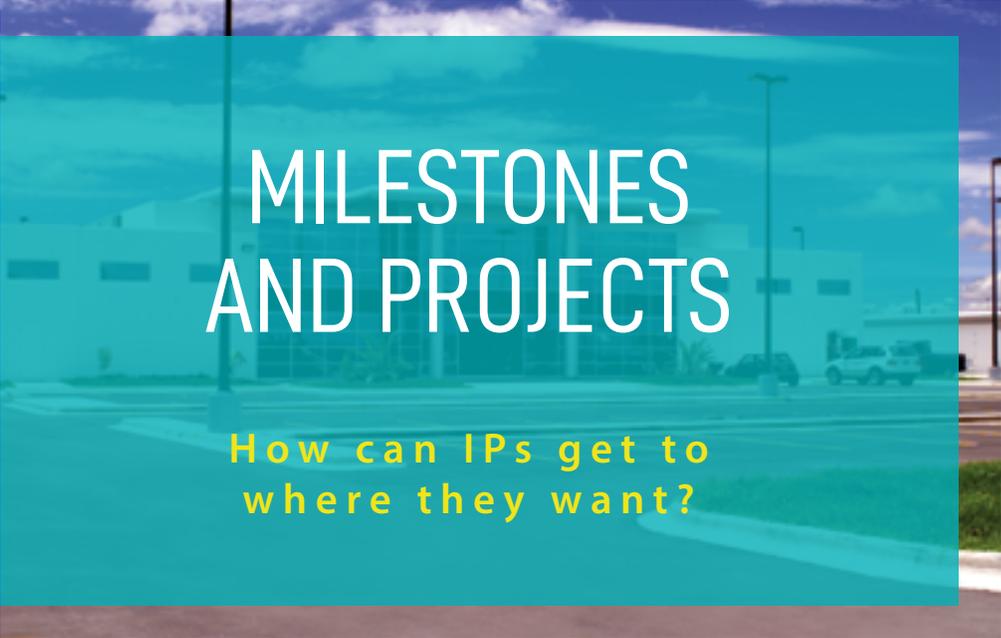
Graph 8

INTERACTION BETWEEN STRATEGIC GUIDELINES, STANDARDS AND THE MTP



**MASSIVE TRANSFORMATIVE PURPOSE
TO MAKE POSSIBLE THE EVOLUTION TOWARDS A
MORE SUSTAINABLE AND
SMARTER INDUSTRIAL INFRAESTRUCTURE**





MILESTONES AND PROJECTS

How can IPs get to
where they want?

A strategy is a route for making decisions. Daily, organizations make decisions that include capital investments, operational priorities, promotion, recruitment, sales, among others, but it is only with a strategy that it is possible to ensure decisions are focused and prevent the organization from moving in conflicting directions. This chapter presents the strategy that will allow the industrial parks industry in Mexico to achieve the MTP while improving information management, promoting standardization, promoting institutional linkage, advancing digital transformation, and driving sustainability. The strategy consists of two elements: milestones and projects, based on the different findings of the SWOT, trend analysis, and strategic guidelines.

A milestone is a specific point in time that marks a significant event within the lifecycle of a strategy. Milestones are completed after fulfilling their associated projects. Once completed, it is an opportunity to review future projects, assess progress internally and externally, verify resources and budget, and promote the results achieved so far. The following graph presents the milestones defined by the GC in chronological order of estimated compliance.

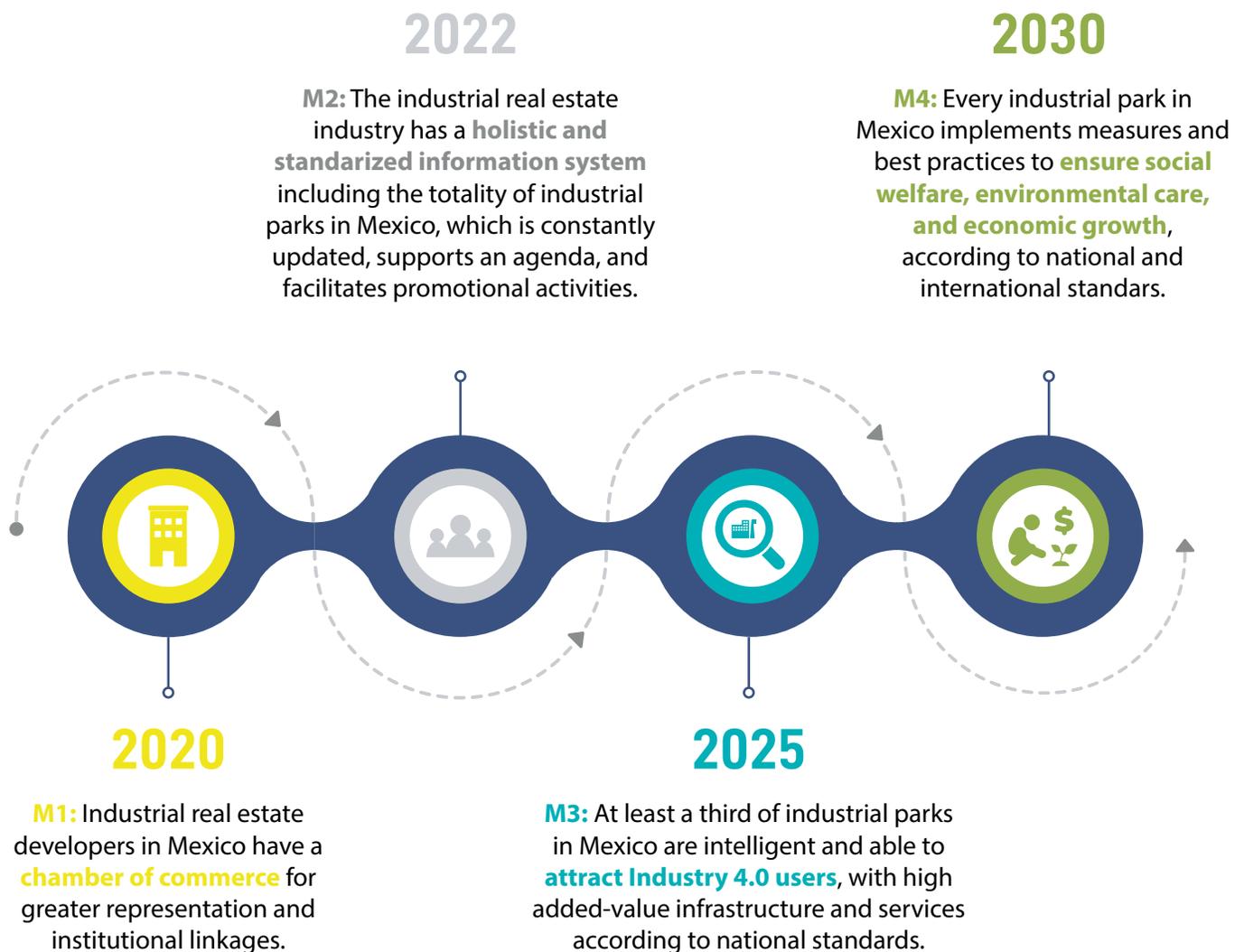
CHAPTER V

The CG jointly defined four milestones and ten projects for this Roadmap strategy through their participation in workshops, online surveys, interviews, and review of progress.

The following sections describe the milestones for the associated projects, each with a defined objective, scope, activities, deliverables, and estimated time for execution.

Graph 9

INDUSTRIAL PARKS STRATEGIC MILESTONES



It is important to note that although the projects belong to different milestones, they are interrelated and dependent on one another. The following chart lists the projects by milestone.

Graph 10

INDUSTRIAL PARKS PROJECTS BY MILESTONE

Project 1.1:
Formal constitution of a chamber of commerce for the industrial real estate.

Project 1.2:
Collaboration and institutional linkages agenda between industrial parks and the government, academia, and civil society.

Project 2.1:
Creation of a coordinating body for the management of information from the industry.

Project 2.2:
Creation of a comprehensive system for information management.

Project 2.3:
General strategy for promoting IPs.

Project 3.1:
Definition of a "smart industrial park" standard in Mexico.

Project 3.2:
Creation of a committee attentive to the present and future technological needs of IPs in Mexico.

Project 4.1:
Definition of a "sustainable industrial park" standard in the Mexican Norm of IPs.

Project 4.2:
Common purpose fund for the implementation of sustainable practices specified in the Mexican Norm.

Project 4.3:
A general program for attracting and training talent for IPs and its tenants.



BY 2020, INDUSTRIAL REAL ESTATE
DEVELOPERS IN MEXICO HAVE A
CHAMBER OF COMMERCE
FOR GREATER REPRESENTATION AND
INSTITUTIONAL LINKAGE.

MILESTONE ONE

In spite of having an effective representation and promotion entity, AMPIP, IPs in Mexico still face significant challenges in terms of insufficient official information, limited linkages with government, academia and civil society, gaps in regulations compliance, impunity for corruption and organized crime, as well as uncertainty and volatility in the national and international context. Evolving from an association to a chamber of commerce will equip AMPIP with institutionalized action mechanisms to address the issues mentioned above and create a more favorable environment for the industry, society, economy, and the environment.

According to the “Mexican Law of Chambers and Confederations”, these are autonomous institutions of public interest with legal personality and own assets made up of traders and industrialists for no profit, and non-religious or partisan activities. A chamber of commerce’s primary purpose is to develop, promote, and defend nationally and internationally the businesses of its industry. Additionally, it has to collaborate with the government to achieve socio-economic growth, as well as to generate and distribute wealth. By law, a Chamber maintains a close relationship with the public sector as it is also a point of reference in all matters related to the activities it represents.

Among the core objectives of a chamber of commerce for the industrial real estate industry in Mexico are: to be a reference for the government, increase the number of organizations represented, encourage compliance with standards and certifications, promote best practices, and influence the development and implementation of public policies relevant to IPs.

1.1 PROJECT: Formal constitution of a chamber of commerce for the industrial real estate

Objective

Formally create the Chamber that will represent, promote, and defend the interests of industrial infrastructure developers in Mexico.

Scope

Define the structure, resources, and final powers of the Chamber, so it is fully operational. Among its objectives will be increment in the number of organizations represented, develop more significant institutional linkages with actors of the quadruple helix, improve the quality standards throughout the industry, generate and gather strategic information, contribute to the attraction of FDI, and support job creation in IPs.

Activities

1. Define project managers and available resources.
2. Plan the critical route of actions necessary to formally constitute and operate the Chamber, indicating dates and responsible actors.
3. Specify the statutes, object, attributions, legal form, financing scheme, budget, management team, and administrative areas.
4. Execute the critical route, which includes submitting the formal application to the Ministry of the Economy up until the official presentation event of the Chamber with authorities.
5. Design the corporate image and adapt the website as well as social media.
6. Ensure an orderly and complete transition of AMPIP structure, documents, image, and personnel once constituted.

Deliverables

- » A corporate charter approved by the Ministry of Economy as a chamber of commerce.
- » Organization statutes detailing objectives, structure, and planned operations.
- » A corporate governance with members appointed to the general assembly and board of directors, and an administrative structure.
- » A corporate image, website, and social media identity.
- » An official presentation event with the presence of the quadruple helix.

Timespan

To begin in 2019, with an estimated time of execution of eight to ten months.

1.2 PROJECT:

Collaboration and institutional linkage agenda between industrial parks and the government, academia, and civil society

Objective

To have an agenda that sets IPs interests in terms of cooperation with actors of the quadruple helix.

Scope

The agenda will establish and prioritize issues of interest to industrial infrastructure developers who require close linkages with relevant actors from the quadruple helix. It will lay the foundations for regular cooperation efforts with different government levels to build trust and facilitate the development and operation of IPs. The agenda will promote national and international events involving actors from the industry to attract FDI and generate business intelligence.

Activities

1. Assign project managers and available resources.
2. Determine the mechanisms and rules to 1) set and remove items from the agenda, 2) time for review and execute each issue, and 3) establish a committee responsible for the agenda.
3. Define the agenda issues to be addressed, taking into account the latest national and international developments with an impact on IPs and detailing for each one its importance for the industry and the expected results.
4. Generate a directory of the key players by issue, with information about their relevance for IPs and contact details.
5. Design a series of tactics by issue to engage collaboratively with key actors.
6. Implement the first cooperation agenda of the industrial real estate industry in Mexico.

Deliverables

- » A committee that is responsible for defining and monitoring the agenda.
- » A document with the operational rules of the agenda and the committee.
- » A directory of contacts by topic with information about their importance to IPs.
- » An agenda that highlights and details the main interests of the sector in terms of collaborative projects with the government, academia, and civil society, including the tactics for carrying out cooperation.

Timespan

To start in 2019, with an estimated time of execution of four to five months.

BY 2022, THE INDUSTRIAL REAL ESTATE
INDUSTRY HAS A **HOLISTIC AND
STANDARDIZED INFORMATION SYSTEM**
INCLUDING THE TOTALITY OF INDUSTRIAL PARKS
IN MEXICO, WHICH IS **CONSTANTLY UPDATED,**
SUPPORTS AN AGENDA, AND FACILITATES
PROMOTIONAL ACTIVITIES.

MILESTONE TWO

The generation, collection, and processing of information is a crucial activity to drive growth in any organization and industry. The use of information as a business intelligence tool is still limited in IPs. New mechanisms and instruments are required to obtain standardized data on different topics such as internal management, administration, risk monitoring, compliance standards, services description, energy and water consumption, waste and hazardous materials management, social management systems, job creation, and economic value creation.

With the support of information and communication technologies, it will be possible to ensure real-time monitoring of performance, vulnerabilities, bottlenecks, and failures in every industrial park in the country. An industry information system would support intelligence-based activities to identify new business opportunities, support the institutional linkages agenda, and generate strong arguments to attract tenants.

2.1 PROJECT:

Creation of a coordinating body for the management of information from the industry

Objective	<p>Have an independent coordinating body that generates, manages, and processes relevant information about IPs in Mexico.</p>
Scope	<p>The responsible team will be self-sufficient in terms of resources to operate but integrated into the chamber of commerce created in project 1.1. As part of the Chamber, the team may collect information about the represented businesses, but must also collect information from those who are not yet members. Among its responsibilities will be to structure and manage databases, establish and define variables to track, classify data, and design key performance indicators. The team will also generate a catalog of the actual and potential uses of the information, define official sources and communication channels, establish alliances for the exchange of information, and safeguard the integrity and privacy of the data.</p>
Activities	<ol style="list-style-type: none">1. Set project manager and available resources.2. Identify, from a review of all existing information to date, the key variables that allow detailed monitoring of the development and operation of IPs. Justify the importance and outline the limitations of each variable.3. Generate databases with structured, broken down, and validated information of each of the IPs in the country according to the pre-defined key variables. Data classification shall be according to the types of standards: social, economic, environmental, and administrative. Managers will keep a record of the data sources and year.4. Define the responsible body in terms of its structure, attributions, and resources for its operation.5. Design mechanisms to ensure economic self-reliance, so that funding is not dependent on the chamber of commerce, information is neutral, and business intelligence products are profitable. Some of the mechanisms to consider should include obtaining resources from national and international organizations and the generation of intelligence products for sale.
Deliverables	<ul style="list-style-type: none">» A detailed report of the critical variables to be tracked.» An executive report with the preliminary structure of the databases with identified sources and periods of time.» The operational statutes and procedures of the coordinating body with a description of the definitive mechanisms for economic self-reliance.
Timespan	<p>To begin in 2020, with an estimated time of execution of five to six months.</p>



2.2 PROJECT: Creation of a comprehensive system for information management

Objective

Provide industrial parks in Mexico a service of value-added business intelligence indicators for better decision-making.

Scope

The service will be based on the collection, processing, and display of relevant data on IPs at the strategic, tactical, and operational levels. It shall be operated by the coordinating body of project 2.1. The system will have economic self-reliance thanks to the sale of tailored business intelligence products through a membership. The system will be able to link to other existing data platforms from INEGI and CONACYT and also to others under development such as DataMexico. Quantitative and qualitative data collected by the system will report on business opportunities and provide visibility to the infrastructure and services of industrial parks established in Mexico. It will also provide information on industry benchmarks, news, and new legislation on a regular basis.

Activities

1. Define project managers, participating agencies, and initial resources.
2. Consolidate database structure with the key variables identified by the coordinating body incorporating definitions, operating rules, statistical criteria for analysis, regional and industry benefits, data protection protocols, requirements to be part of the system registry among other aspects related to the integrity of the information. Diseñar una metodología para la obtención de la información de forma estructurada y estandarizada, definiendo aspectos como fuentes oficiales, unidad de análisis y universo, herramientas a utilizar tanto para la recolección como para la gestión y análisis, y la periodicidad con la que se recabará.
3. Design a methodology for obtaining information in a structured and standardized manner. Define official sources, the data unit of analysis and the total population, tools for collection, management and analysis, and the period in which data will be gathered. Socializar la metodología con los actores del sector quienes proporcionarán información, al igual que el funcionamiento y los beneficios del contribuir al sistema.
4. Define intelligence products such as market and impact studies or infographics and fact sheets on IPs capabilities and needs, as well as a marketing strategy. Elaborar los primeros productos de inteligencia.
5. Socialize the methodology with industry stakeholders who will be providing the information, as well as the functioning and benefits of contributing to the system.
6. Gather information and build the platforms that will host IPs information systems.
7. Elaborate the first intelligence products.
8. Share the main findings and benefits of the comprehensive information system with the quadruple helix actors.

Deliverables

- » A methodology for the collection, management, and analysis of information
- » A list of entities to forge alliances with for exchanging information
- » One or more databases with structured and verified information on IPs
- » A catalogue of business intelligence products, as well as a marketing strategy
- » A digital platform (app, website, or both) that concentrates essential information about IPs in Mexico
- » A launch event to publicize the system to the quadruple helix and the general public

Timespan

To start in 2020, with an estimated time of execution of 10 to 12 months.



2.3 PROJECT: General strategy for promoting IPs

Objective

Have an action plan articulated with tools to promote industrial parks and attract national and international tenants.

Scope

The marketing strategy will promote industrial parks fairly and transparently by showcasing the infrastructure and services available by region and industry. It will aim to be complementary to the efforts of other national actors with plans to attract investments, avoiding any conflicts of interest. The overall strategy for promotion will identify events and business fairs abroad and coordinate efforts to attend, representing IPs from a specific region or tenants' industry. The body created in project 2.1 will be in charge of it, creating promotional arguments based on the intelligence generated by the information system from project 2.2. The marketing strategy will also establish guidelines to coordinate institutional communication campaigns of the Chamber and individual IPs.

Activities

1. Define a body responsible for the promotion and available resources.
2. Identify the target population for IPs by strategic sectors and regions. Define communication tools to reach each target such as social media, advertisements, and attendance at business fairs.
3. Generate guidelines to focus communication efforts through the approval of terms, definitions, data, public statements, and arguments among the actors responsible for IPs promotion.
4. Specify the necessary actions to reach the target population, defining implementation and review periods, as well as the terms for partnerships with other actors that also carry out promotional activities for attracting investments, in coordination with the agenda of project 1.3.
5. Socialize the strategy among industry members to receive feedback and make adjustments.
6. Execute the overall IPs' marketing strategy.

Deliverables

- » An operational structure responsible for coordinating IPs promotion activities by region and sector.
- » A marketing manual with concepts, data, arguments, business opportunities, and communication tools to strategically develop and align IPs' promotion activities.
- » An industry promotion action plan that is periodically reviewed and takes advantage of business opportunities both inside and outside the country.

Timespan

To start in 2020, with an estimated time of execution of six to eight months.



**BY 2025, AT LEAST A THIRD OF INDUSTRIAL PARKS
IN MEXICO ARE INTELLIGENT AND ABLE
TO ATTRACT INDUSTRY 4.0 USERS,
WITH HIGH-VALUE INFRASTRUCTURE AND
SERVICES ACCORDING TO NATIONAL STANDARDS.**

MILESTONE THREE

The Fourth Industrial Revolution is a rapidly progressing phenomenon, bringing substantial benefits in terms of productivity and competitiveness to those capable of effectively incorporating new technologies. This represents an opportunity for IPs to join current trends and promote reductions in pollutant emissions, recycling, clean energy, security, and data to make decisions in real-time. Smart parks provide higher value-added services for the benefit of not only the tenants and the park administration but also the society, economy, and the environment around it.

There are few IPs in Mexico with sufficient resources and knowledge to implement technological solutions to everyday problems. Most face significant weaknesses in strategic planning, security, infrastructure, environment, and social responsibility. Yet, new technologies are becoming more accessible in terms of costs and operation by the day. Thus, the projects of this milestone will seek to identify the technological tools relevant to IPs in Mexico.

3.1 PROJECT: Definition of a smart industrial park standard in Mexico

Objective	<p>Generate a reference manual that guides the adoption of new technologies with a series of parameters of what it means to be a smart industrial park.</p>
Scope	<p>Based on the identified problems in the supply of infrastructure and services faced by IPs and their respective technical solutions, this project will develop a classification of the degree of technological adoption. The classification will serve to define the minimum criteria necessary to be considered as a “smart” industrial park in Mexico and will be compared to smart IPs definitions around the world. The standard’s criteria will be specified for industrial real estate businesses, defined by the comprehensive information system, tactically and operationally narrowed for implementation, and structured in a progressive way to achieve different levels of “intelligence”. The standard will also take into account the rapid evolution of technology and enable the segmentation of technological needs by industry type. It should allow for better measurement, visualization, and management of internal processes, as well as the generation of key performance indicators for more effective decision-making for park managers and tenants. Concerning the areas of implementation, the standard will include technologies for energy, water, waste, telecommunications, mobility, and safety. It will also seek the approval and feedback of concepts and definitions with the information system.</p>
Activities	<ol style="list-style-type: none">1. Set the responsible workgroup and resources for the project.2. Generate a report with a theoretical framework, objectives, and methodology to classify the degree of technological adoption in IPs. The report should conclude with the criteria that will constitute the standard of a “smart” industrial park in Mexico. To this end, there will be support and feedback from the information management system from project 2.2.3. Based on the standard criteria, elaborate a manual or guide with a series of recommendations to achieve different “smart” degrees.4. Distribute the manual within industry members and technology experts to receive feedback and make adjustments.5. Seek regular review and updating of both the standard and the recommendations manual.
Deliverables	<ul style="list-style-type: none">» A report that details the degree of technological adoption by IPs in Mexico, which identifies technology issues and the corresponding solutions, contrasts with international practices and provides criteria for defining a smart industrial park standard.» A manual with recommendations so that IPs can achieve different “smart” degrees.» A series of mechanisms for sharing, reviewing, updating, and monitoring the standard and the manual.
Timespan	<p>To begin in 2021, with an estimated time of execution of seven to eight months. However, the definition of the standard should be simultaneous to the creation of the information system indicators.</p>



3.2 PROJECT:

Creation of a committee attentive to the present and future technological needs of IPs in Mexico

Objective

Have an expert group responsible for providing technology solutions to IPs from identifying specific problems and needs.

Scope

The committee will be integrated by a group of technology experts from the industry, academia, and IP users. It will monitor the progress in compliance with the standard defined in project 3.1, organize events and workshops with experts and suppliers of technology goods and services, forge partnerships with national and international institutions (e.g. IJALTI, Siemens, Urban Land Institute, or the National Association of Industrial and Office Parks), develop diagnostics to identify innovation opportunities and implementation strategies; review the latest technological trends, and assist IPs throughout implementation. The committee will also seek resources for its operation through sponsorships, multilateral agencies, and partnerships with financial institutions, among others.

Activities

1. Define a responsible team and initial resources for the project.
2. Generate a census of technological implementation at the tactical and operational levels, taking into account the information system of project 2.2, as well as IPs' tenants. Based on the census, the committee will prioritize the most common issues among IPs that can be solved with technological solutions available in the market.
3. At the request of individuals or groups of IPs and with their support, whether from the same region, developer, or tenant industry, the committee will run diagnostics to detect opportunities for technology improvements and oversee implementation. Some of the issues addressed should include monitoring and reporting of natural and energy resources consumption, cybersecurity and personnel security, telecommunications infrastructure, and process automation.
4. Once technological needs are identified, the committee will seek specific tools and potential suppliers. It will organize workshops and business meetings for implementation, considering the agenda project from 1.3.
5. Generate regular reports on the latest technological trends relevant to IPs and on the progress in compliance with the smart industrial park standard to support marketing efforts from project 2.3.

Deliverables

- » A responsible team for identifying the technological needs of IPs, capable of providing solutions and monitoring progress.
- » A first census-diagnosis on individual and group IPs' issues (by region and sector) that can be addressed with technology.
- » An updated report on the latest technology trends implemented around the world by IPs
- » A first forum, workshop, or business meeting between IPs and technology experts and providers.
- » A first annual report on the industry's digital transformation progress based on previous deliverables.

Timespan

To begin in 2021, with an estimated time of execution to establish the committee from one to two months and to generate reports between five to six months.



**BY 2030, EVERY INDUSTRIAL PARK IN MEXICO
IMPLEMENTS MEASURES AND BEST PRACTICES
TO ENSURE SOCIAL WELFARE, ENVIRONMENTAL
CARE, AND ECONOMIC GROWTH, ACCORDING TO
NATIONAL AND INTERNATIONAL STANDARDS.**

MILESTONE FOUR

Sustainability in social, environmental, and economic terms is undoubtedly the central paradigm that guides organizations' actions today. Whether to increase the use of clean and renewable energy, ensure sustainable resources and waste management, improve work conditions, or strengthen the relationship with the community, IPs in Mexico more frequently implement programs and measures for these purposes. Hence, this milestone's projects are aimed at advancing sustainability measures so that it becomes fundamental for IPs infrastructure and services across the country.

4.1 PROJECT: Definition of a sustainable industrial park standard in the Mexican Norm of IPs

Objective

Update the Mexican Norm NMX-R-046-SCFI-2015 to include sustainability concepts and regulate its mandatory application by IPs developers, administrators, and tenants.

Scope

Based on the Roadmap, the information system, and in collaboration with developers, administrators, and users of IPs, this project will develop an intelligence report on the degree of implementation of sustainable practices by IPs. Using the report and the Eco-Industrial Parks social, economic, environmental, and administration standards, the project will define the criteria necessary to be considered as a “sustainable industrial park” in Mexico. These will be incorporated into the Norm and a guidebook to conduct the actions of IPs developers, administrators, and tenants.

Activities

1. Define a responsible team and available resources.
2. Outline the criteria, special requirements, and sustainable practices to categorize and classify IPs in Mexico and then draft the standard for the Norm. To this end, there will be support and feedback from the information system from project 2.2.
3. Generate a regulatory model for the standard to ensure that all IPs in Mexico implement sustainable best practices.
4. Circulate the standard and its regulation through workshops with the quadruple helix for discussion and modification.
5. Incorporate the sustainability standard and its regulation to the Mexican Norm NMX-R-046-SCFI-2015.
6. Track its incorporation and implementation in IPs activities.

Deliverables

- » The Mexican Norm NMX-R-046-SCFI-2015 has detailed criteria specifying the conditions to be considered a “sustainable industrial park” in Mexico.
- » A regulatory framework that directs developers, administrators, and tenants’ actions in terms of social, economic, and environmental sustainability.

Timespan

To start in 2019, with an estimated time of execution of seven to eight months.

4.2 PROJECT: Common purpose fund for the implementation and adoption of sustainable practices specified in the Mexican Norm

Objective

Have a pool of economic resources for industrial parks to fund improvements in infrastructure and services with a sustainable approach.

Scope

The fund will grant economic and technical resources to make improvements on IPs infrastructure and services with a social, economic, and environmental impact that transcends the facilities. The scope of the improvements will be specified in the regulation defined in project 4.1. The fund will also serve as a tool to counteract unforeseen impacts from the planning, construction, and operation of the industrial park. It will contribute to assessing environmental, economic, and social impacts as well those at the local, regional, and national levels. It will encourage the use of clean energy and new technology adoption to make resource management more efficient.

Activities

1. Create a responsible body to operate the fund, defining which are the administrative, assignment, and evaluation arms.
2. Define the types of resources to be granted and their source.
3. Integrate the rules to operate the fund by setting the number of resources and their characteristics, defining who can have access to them and how, and specifying the transparency and monitoring mechanisms.
4. Formalize any partnerships with local and federal governments, as well as with other national and international agencies, to strengthen the scope of the fund resources, coordinating with projects 1.3 and 2.3.
5. Carry out the first allocation of the fund's resources.

Deliverables

- » A range of resources available to IPs to improve infrastructure and services with a sustainable approach.
- » A series of guidelines and rules to operate the fund.
- » A team responsible for the management, allocation, and evaluation of the fund's resources.
- » A set of inter-agency partnerships that support the resources managed by the fund.

Timespan

To start in 2022, with an estimated execution time of eight to nine months.

4.3 PROJECT: A general program for attracting and training talent for IPs and its tenants

Objective

To ensure a supply of specialized and quality talent that meets the labor needs of IPs and their different user industries.

Scope

The overall talent program will have two main axes of action. One axis will design strategies to attract and retain people with specialized skills and knowledge. The other shall create the mechanisms for the people to acquire them. Both attracted and trained talent will meet the needs of IPs and tenants thanks to programs that foster national and international links with academia and industry. The program will identify IPs talent needs by region and sector, creating regional and sectoral committees. At the same time, the committees will review where investments flow and which companies are interested in the program.

Activities

1. Define a team responsible for designing and operating the two axes of the program, attraction and training, as well as the necessary resources.
2. Create regional and sectoral committees by defining responsibilities, such as monitoring labor trends and IPs talent needs, forming alliances with universities, research centers and recruitment agencies, and identifying public programs to join.
3. The attraction axis will be based on institutional linkages with specialized human resources agencies. The responsible team will ensure close communication with industrial park users and operators to identify where talent is needed, generate cooperation agreements, and develop a labor pool.
4. The training axis will be based on institutional linkages with academic institutions so that students can join IPs as volunteers, social service, dual training schemes, or research stays. The responsible team will develop rules for safety and behavior issues within the facilities, define the selection processes (minimum requirements, interview, letters of recommendation and motives), monitor tutor-apprentice relationships, and specify possible stimuli (food, lodging or transport), and recognition schemes (diplomas and certificates).

Deliverables

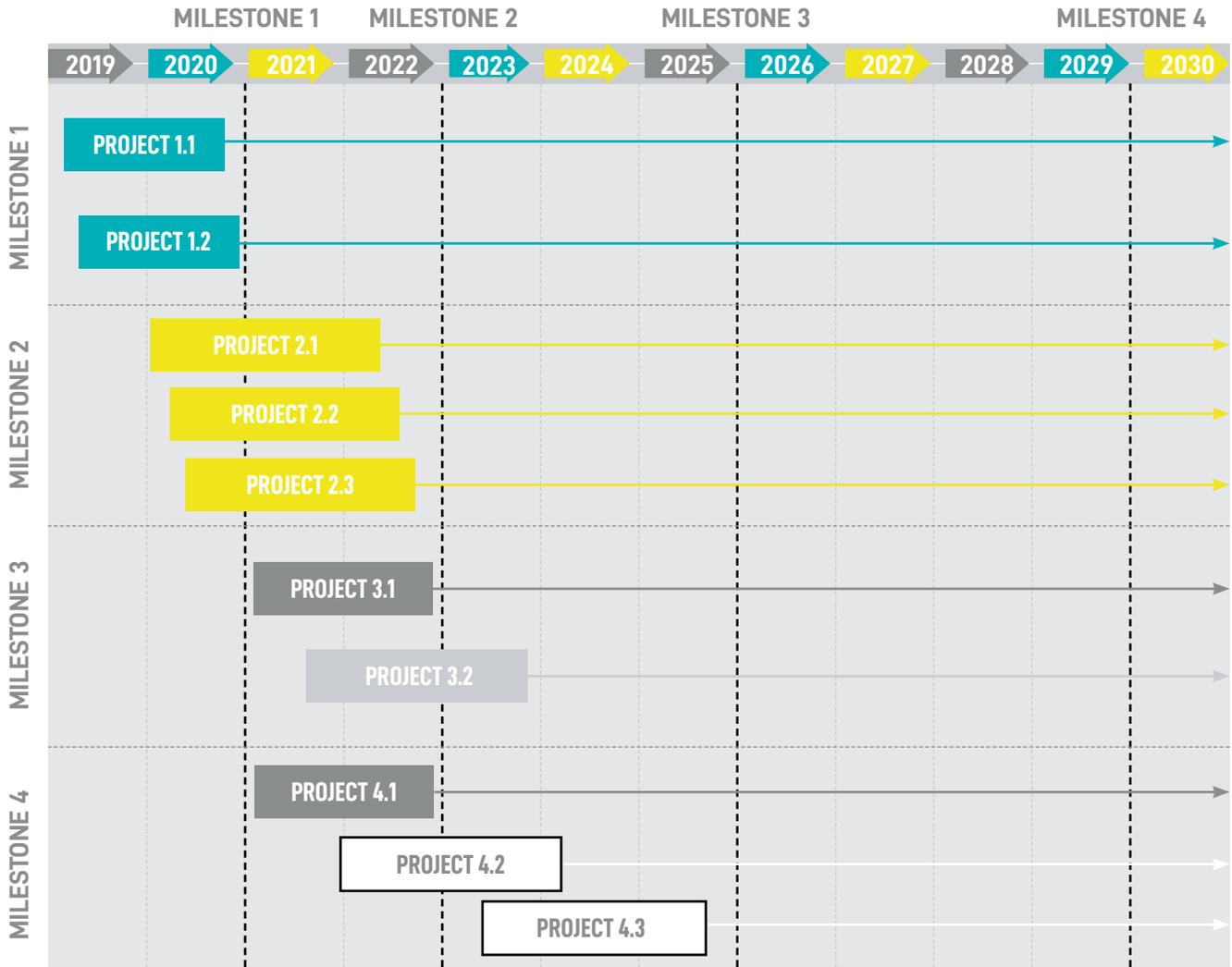
- » A program in charge of attracting and training highly specialized and certified talent.
- » A series of regional and sectoral human resources committees to support the program.
- » A pool of labor, tentatively in the form of a database, with vacancies for both IPs administration and tenants.

Timespan

To start in 2023, with an estimated time of execution of 11 to 12 months.

Graph 11

PROJECT TIMELINE AND ITS MAIN APPROACHES



APPROACHES



INDUSTRIAL PARKS

IPs are, by definition, a means to generate development and well-being. They have proven this throughout a parallel evolution, even symbiotic, with industrial revolutions by being the space where industrialization materializes. From improving productivity and generating jobs, to mitigating labor exploitation and pollution, to kickstarting regional and industry development, boosting international trade and attracting foreign direct investment, the benefits of IPs are rather undeniable.

Generally locked to a city but open to a globalized world, industrial parks impact the local environment more than ever before and, at the same time are affected by the global environment. Aware of this position, the AMPIP, with the support of ProMéxico, developed this Road Map to provide the industrial real estate in Mexico five specific tools to navigate both environments.

1. A **situational diagnostic** showing that industrial parks are in a robust ecosystem thanks to dynamic and competitive actors at the regional and industry level, a young but firm regulatory basis, and a representative body to guide them. Yet, it also showed that Mexican IPs face intense international competition.

2. **The SWOT analysis** demonstrates that IPs must start acting now because there are:

- » Opportunities to take advantage of, such as the country's strategic location and trade agreements network.
- » Strengths to boost like competitive infrastructure and services and a supporting representation association.
- » Weaknesses to counter like a limited institutional linkage and gap in compliance with regulations.
- » Threats to minimize such as uncertainty, impunity, and corruption.

3. **The trend analysis** identified that IPs can:

- » Socially, improve the quality of life of workers and people around the development.
- » Economically, anticipate the contraction of value chains by automation.
- » Business-wise, benefit from the expansion of e-commerce.
- » Environmentally, increase the use of clean energies and enhance resource management.
- » Technologically, implement blockchain and IoT to create smart buildings and parks.
- » Politically, prepare for greater regulation on new technologies and security issues.

4. The strategic guidelines specify the destination that industrial parks want to reach, which include: a massive transformation purpose which is to make possible the evolution towards a sustainable and smart industrial infrastructure; five approaches to frame the actions of the sector:

- » Information management
- » Standardization
- » Institutional linkage
- » Sustainability
- » Digital transformation

And a number of international social, economic, environmental and administrative standards to measure and assess the efforts.

5. The last tool, and more important tool, are the **four milestones with ten strategic projects** that trace the exact route to reach the proposed destination. The four milestones will:

- » Create a chamber of commerce in 2020.
- » Enable a comprehensive information management system in 2022.
- » Make at least a third of IPs smart by 2025 .
- » Get them all to implement sustainability practices by 2030.

Finally, the effectiveness of these tools to have IPs contribute to Mexico's development and well-being while remaining a highly profitable business is critically dependent on greater institutional linkage and cooperation between the quadruple helix and their ability to balance the social, economic and environmental benefits. Only then Mexico will move...

...TOWARDS A NEW GENERATION OF SMART AND SUSTAINABLE INDUSTRIAL PARKS.

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APPENDIX

1. Confidence Group Members

Industrial Real Estate Developers:

- » Advance Real Estate
- » American Industries
- » Artha Capital
- » Cactus Valley Industrial Parks
- » FIBRA Macquarie
- » FINSA
- » GP Desarrollos
- » Grupo Marabis
- » IAMSA Development Group
- » Parque Industrial Calafia
- » Parques Industriales Amistad
- » VESTA

Academia:

- » Center for Regional and Sustainable Urban Development Studies (CEDRUS)
- » National Autonomous University of Mexico (UNAM), Economics Faculty
- » DAQUA-IDEA Anahuac University
- » UNAM, Engineering Institute

Civil society and international organizations:

- » Asociación Mexicana de Recintos Fiscalizados Estratégicos (AMRFES)
- » Asociación Mexicana del Edificio Inteligente y Sustentable (IMEI)
- » World Free Zones Organization (World FZO)
- » United States – Mexico Chamber of Trade – Guanajuato Chapter
- » CIEN Consultores
- » GIZ
- » Mercer
- » World Resources Instituto (WRI) Mexico

Government:

- » Fideicomiso de Parques Industriales del Estado de México (FIDEPAR)
- » Ministry of Economy
- » ProMéxico

Industry:

- » ABB México
- » América Móvil Hitss
- » Mexican Association of Industrial Parks (AMPIP)
- » National Association of Private Transportation (ANTP)
- » National Chamber of the Transformation Industry (CANACINTRA)
- » Mexico's Industry Supply Chain (CAPIM)
- » The Mexican Chamber of Electronics, Telecommunications and Information Technologies (CANIETI)
- » CBRE Mexico
- » Colliers International
- » National Council of the Export Maquiladora and Manufacturing Industry (Index)
- » Mexican Federation of the Aerospace Industry (FEMIA)
- » Hermosillo y Asociados
- » Honeywell México
- » National Auto Parts Industry (INA)
- » JLL Mexico
- » Kansas City Southern de México (KCSM)
- » Siemens
- » Ware Malcomb

2. Standards for industrial parks

Below, the relevant standards for industrial parks in Mexico according to the “International Framework of Eco-Industrial Parks” (World Bank, 2017). Each one is classified by topic and subtopic and has a description of the parameters and evidence required for compliance.

2.1. Park Management

TOPIC	SUB- TOPIC	STANDARD: DESCRIPTION & EVIDENCE
<i>Monitoring and risk management</i>	Monitoring performance and risks	<p>Park management entity maintains an EIP framework monitoring system in place, tracking:</p> <ul style="list-style-type: none"> » Progress on environmental, social and economic performance at the park level. » Critical risk factors and related responses, at least for: <ul style="list-style-type: none"> - Risk points where the accidental release of poisonous solid, liquid and gaseous effluents, including during transportation and disposal when fire hazards are possible; and - Applicable natural disaster risks (for example, earthquakes)
		<p>Where required, Park management has a plan in place to react to possible negative impacts due to climate change risks (heat waves and droughts, storms and floodwater events). All adaption needs for infrastructure and services are identified and in place for the industrial estate to protect against climate change risks and potential damages.</p>
	Information on applicable regulations and standards	<p>Park management entity has a functioning system in place to comply with local/national regulations and international standards applicable to the industrial park. Park management informs compliance by resident firms including compliance information that firms share with the park management entity.</p>
<i>Planning and zoning</i>	Master plan	<p>A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed and is reviewed periodically (and updated if required), including the following core elements:</p> <ul style="list-style-type: none"> » Site selection study based on various risk analyses; essential and efficient infrastructure, utilities, and transportation network; environmental and social issues; internal park land zoning; buffer zone around the park; procedure to safely locate high risk industries; and cluster synergistic industries. » Integration into Master Plan of relevant requirements specified in this EIP framework that have spatial implications.
<i>Park management services</i>	Park management entity property and common infrastructure	<p>75% of resident firms indicate satisfaction with regard to the provision of services and common infrastructure by the park management’s entity.</p>

2.2. Environment

TOPIC	SUB-TOPIC	STANDARD: DESCRIPTION & EVIDENCE
Management and monitoring	Environmental/ Energy Management Systems (EMS and EnMS, respectively)	Park management entity operates at least one environmental/energy management system in line with internationally certified standards, monitoring park performance and supporting resident firms in the maintenance of their own firm-level management systems. The park has an appropriate, functioning EMS and EnEMS systems (for example, ISO 14001 Environmental Management Standard and ISO 50001 Energy Management Standard) in place to set and achieve targets, and covering key issues (for example, energy waste and material use; water; point-source emissions; and the natural environment).
		At least 40% Proportion of resident firms, with more than 250 employees, which have an environmental/energy management system in place that is in line with internationally certified standards.
Energy	Energy consumption	90% of combined park facilities and firm-level energy consumption, for which metering, and monitoring systems are in place.
	Energy efficiency	Supporting programs and documents are in place to improve the energy efficiency of resident firms, especially for the top 50 percent of major energy-consuming businesses in the park.
		Park management entity sets and works toward ambitious maximum energy intensity targets per production unit (kWh/\$ turnover) for the park and its residents. Targets should be established for the short, medium, and long term.
	Exchange of waste heat energy	An industrial heat recovery strategy is in place to investigate opportunities for heat and energy recovery for the major energy-consuming firms in the park. (Typically, these are firms that individually consume at least 10-20 percent of total firm level energy consumption).
	Renewable and clean energy	Total renewable energy use in the industrial park is equal to or greater than the annual national average energy mix.
Park management entity sets and works toward ambitious (beyond industry norms) maximum carbon intensity targets (maximum kilograms of carbon dioxide equivalent (kg CO ₂ e) / kilowatt hour (kWh) for the park and its residents. Targets should be established for the short, medium, and long term.		

<i>TOPIC</i>	<i>SUB- TOPIC</i>	<i>STANDARD: DESCRIPTION & EVIDENCE</i>
<i>Water</i>	Water efficiency, reuse and recycling	Park management entity has demonstrable plans and (preferably) prior documented evidence to increase water reuse in the short and medium term. This would be achieved by either reuse of industrial effluents, or by rainwater/storm water collection.
		At least 50% of total industrial wastewater from firms in the park are reused responsibly within or outside the industrial park.
	Water consumption	100% of water demand from firms in industrial park which do not have significant negative impacts on local water sources or local communities.
	Water treatment	95% of industrial wastewater generated by industrial park and resident firms is treated to appropriate environmental standards.
<i>Waste and material use</i>	Waste/ by-products re-use and recycling	20% of solid waste generated by firms is reused by other firms, neighboring communities, or municipalities.
	Dangerous and toxic materials	100% of firms in park appropriately handle, store, transport and dispose of toxic and hazardous materials.
	Waste disposal	Maximum 50% of wastes generated by firms in the industrial park go to landfills.
<i>Climate change and the natural environment</i>	Air, GHG emissions and pollution prevention	A mechanism is in place to avoid, minimize, and/or mitigate significant point- source pollution and GHG emissions. This should cover CO ₂ , methane (CH ₄), nitrous oxide (N ₂ O), Chlorofluorocarbons (CFCs), and hydrofluorocarbons (HFCs), sulfur oxides (Sox), nitrogen dioxide (NO _x), as well as chemicals and pesticides use and management.
		50% of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release beyond national regulations.
	Environmental assessment and ecosystem services	The park management entity has a plan in place to assess operational environmental impacts and aims to limit the impact on prioritized local ecosystem services.
	Flora and fauna	Minimum 5% of open space in the park used for native flora and fauna.

2.3. Social

TOPIC	SUB-TOPIC	STANDARD: DESCRIPTION & EVIDENCE
<i>Social management</i>	Management team	Functioning system(s) are in place for ensuring social infrastructure provisioning, operations and performance, as well as collecting, monitoring, and managing key social information and impacts relevant to the industrial park. Dedicated personnel exist (as part of the park management entity) to plan and manage social quality standards.
	OH&S management system	75% of all firms in the industrial park with more than 250 employees have a well-functioning OH&S management system in place (based on ISO 18001 standard), keep records about rates of injury, occupational diseases, absenteeism, as well as total numbers of work-related fatalities.
	Grievance management	A grievance mechanism should be in place and accessible to receive and address grievances from within the industrial park, as well as outside the park from external stakeholders. Examples include help desks, complaint boxes, and hotlines (phone booths) located inside and outside of the industrial park.
		75% of all firms in the industrial park with more than 250 employees have a code of conduct system in place to deal with grievances.
		100% of grievances received by the park management entity are addressed within 90 days.
	60% Percentage of grievances received by the park management entity were brought to conclusion.	
Harassment response	75% Percentage of all firms in the industrial park with more than 250 employees that have a harassment prevention and response system in place.	

<i>Social infrastructure</i>	Primary social infrastructure	Provision of fundamental social infrastructure in the industrial park or its proximity also facilitate and encourage women's employment, for example, lavatories and public toilets (for men and women), drinking water fountains, provision of cafeterias within reach of the employees, recreational areas, and childcare programs. This infrastructure needs to be fully operational to encourage women's employment.
		80% of the surveyed employees' reporting satisfaction with social infrastructure.
	Industrial park security	The industrial park has security systems and services that are fully operational and fit-for-purpose operation. Examples include, among others: appropriate lighting systems in and around the park, closed circuit television (CCTV) systems, a centralized security office, and night transportation provisioning.
		100% of reported security and safety issues are adequately addressed within 30 days.
	Capacity building	75% of all firms in the industrial park with more than 250 employees have a program for skills/ vocational training and development.
		At least 20% of female workforce benefit from available supporting infrastructure/programs for skills development.
<i>Local community outreach</i>	Community dialogue	Provision of established accessible communication platforms or other means to maintain regular dialogue with the community and relevant civil society organizations. Examples include news bulletins, regular media releases, and information display boards. Over 80 percent of the surveyed community members are satisfied with the community dialogue.
	Community outreach	The park management entity and resident firms engage in community outreach activities and maintain documentation. These activities could include: an annual day with celebrations inside the park; clean-up drives or public service activities that are organized in the community areas by the park management; infrastructure for community areas (for instance, drinking water supply, sanitation).

2.4. Economic

TOPIC	SUB-TOPIC	STANDARD: DESCRIPTION & EVIDENCE
<i>Employment generation</i>	Type of employment	Park management entity has plans to generate specific numbers and types of jobs (including diversity and inclusiveness) in line with government targets.
		25% of total firm workers in industrial park employed through direct employment (that is, not employed on a fee-for-output basis or provided through a labor supply firm) and permanent contracts.
	Local employment generation	60% of total workers employed in industrial park who live within daily commuting distance.
<i>Local business and SME promotion</i>	SME development	Park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents.
	Local value added	25% of resident firms using local suppliers or service providers for at least 80 percent of their total procurement value.
		90% of total procurement value of park management entity supplied by local firms or service providers.
<i>Economic value creation</i>	Market demand for IP services and infrastructure	A market demand and feasibility study, supported by a business plan, for specific “green” and “smart” infrastructure and service offerings has been undertaken to justify planning and implementation in the industrial park.
	IP meets economic interests of the government	Tracked by the park management entity, the industrial park fulfils relevant government targets, including domestic, foreign direct investment, and tax revenues.
	Investment-ready park for firms	The ratio of rented or used space by resident firms compared to the total amount of available space earmarked for resident firms within IPs. Average percent occupancy rate over 5 years [50%].

3. Workshops photo album





ROADMAP

**Towards a New Generation
of Smart and Sustainable
Industrial Parks**

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